NEXTera ENERGY POINT BEACH

July 29, 2010

NRC 2010-0079
10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Point Beach Nuclear Plant, Units 1 and 2
Dockets 50-266 and 50-301
Renewed License Nos. DPR-24 and DPR-27

License Amendment Request 241
Alternative Source Term
Response to Request for Additional Information

References:
(1) FPL Energy Point Beach, LLC letter to NRC, dated December 8, 2008, Submittal of License Amendment Request 241, Alternative Source Term (ML083450683)
(2) NRC electronic mail to NextEra Energy Point Beach, LLC, dated May 13, 2010, DRAFT Request for Additional Information from Mechanical and Civil Branch on AST (ML101340533)
(3) NextEra Energy Point Beach, LLC letter to NRC dated November 20, 2009, Transmittal of Information to Support License Amendment Request 241, PBNP VNPAB and CREFS Seismic Evaluation (ML093310308 and ML093310309)

NextEra Energy Point Beach, LLC (NextEra) submitted License Amendment Request (LAR) 241 (Reference 1) to the NRC pursuant to 10 CFR 50.90. The license amendment would revise the current licensing basis to implement the alternative source term (AST) through reanalysis of the radiological consequences of the Point Beach Nuclear Plant (PBNP) Final Safety Analysis Report (FSAR) Chapter 14 accidents.

The NRC staff determined that additional information was required (Reference 2) to enable the staff's review of the amendment request. Enclosure 1 provides the NextEra response to this request for additional information. Enclosure 2 provides Revision 1 of S&A Report No. 09Q0839-R-001, PBNP VNPAB and CREFS Seismic Verification, dated July 15, 2010, which supersedes Revision 0 of this report transmitted in Reference (3).

This letter contains no new regulatory commitments and no revisions to existing regulatory commitments.

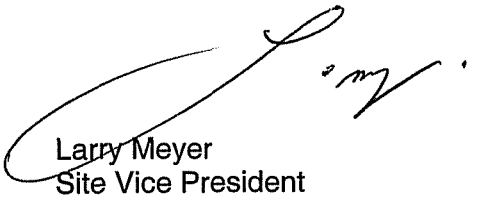
The information contained in this letter does not alter the no significant hazards consideration contained in Reference (1) and continues to satisfy the criteria of 10 CFR 51.22 for categorical exclusion from the requirements of an environmental assessment.

In accordance with 10 CFR 50.91, a copy of this letter is being provided to the designated Wisconsin Official.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on July 29, 2010.

Very truly yours,

NextEra Energy Point Beach, LLC



Larry Meyer
Site Vice President

Enclosures

cc: Administrator, Region III, USNRC
Project Manager, Point Beach Nuclear Plant, USNRC
Resident Inspector, Point Beach Nuclear Plant, USNRC
PSCW

ENCLOSURE 1

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

LICENSE AMENDMENT REQUEST 241
ALTERNATIVE SOURCE TERM
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

The NRC staff determined that additional information is required (Reference 1) to enable the Staff's review of License Amendment Request (LAR) 241, Alternative Source Term (AST) (Reference 2). The following information is provided by NextEra Energy Point Beach, LLC (NextEra) in response to the NRC staff's request.

EMCB HVAC RAI 1

Reference 2 (pages 3, 8 and 131) states that:

> *"[T]he HVAC ductwork and plena for most of the CREFS are covered with a lightweight insulating material that obstructs viewing of some of the duct supports and duct stiffeners... the recirculation duct for the CREFS is un-insulated which allowed the Seismic Review Team (SRT) to examine the construction, stiffener spacing, hanger spacing and type, and material condition of the ductwork. This examination of the recirculation duct indicated the same type and quality of construction as that found for the VNPAB system; therefore the SRT considered it reasonable to adjudge that the number and location of CREFS stiffeners and duct supports within the insulated CREFS systems conform to the SMACNA code (Reference 4) and PBNP Ventilation System Design Specification (Reference 3) requirements and that the duct construction is adequate. The dead load, seismic and pressure stresses in the CREFS ducts, duct stiffeners, and duct supports were evaluated based on this approach."*

Reference 2 makes a similar assumptions (on page 15 and in SEWS page 122) for judging acceptable the structural integrity of inaccessible ducts and duct supports located "in locked radiation areas or visually blocked by overhead items and construction scaffolds." Also, on page 141 because duct support anchorage is blocked by fireproofing, the assumption of welding is made for anchorage and the support has been called acceptable. The welding though is of unknown size and quality.

Please consider that:

a) *The SRT has reported in the Screening and Evaluation Worksheets (SEWS) and Section 9.0, Outliers (OLs) of Reference 2, that the accessible ductwork, which they were able to examine, requires additional supports, duct stiffeners and repairs for existing supports and anchorage in order that the AST credited HVAC SSCs will be able to maintain their structural integrity and perform their intended function during and after a seismic event.*

b) *The SRT found and recorded (see table in page 7 of Ref 2) that the gage of some of the examined installed ductwork does not appear to be in conformance with the PBNP Ventilation System Design Specification 6118-M-41. Some of the as-installed tested ductwork profile (4/5 tested) was found to be of lesser thickness than the 6118-M-41 specified duct gage.*

c) *Experience has shown that inadequate welding (such as field welding without design documentation for size and control) can cause brittle type failure of duct supports. Without inspection of non-designed welds, how can assurance be provided that poor quality or inadequate welding does not exist in these inaccessible areas?*

Based on the above, the assumption made in Reference 2, that, by comparison to the accessible and examined ductwork, the inaccessible ducts, duct stiffeners, and duct supports are structurally adequate to withstand an earthquake and perform their intended function during and after a seismic event is not regarded as a sound engineering judgment. Provide a technical justification for the structural adequacy of the AST credited SSCs that were not examined during the walkdowns of Reference 2.

NextEra Response

a) Control Room Emergency Filtration System (CREFS) Area:

The CREFS mechanical equipment room has an uninsulated 46" x 12" duct run and an uninsulated 50" x 40" duct run which have passed all dead load (DL), seismic and pressure integrity calculation checks (DL for angle, rods and anchors; vertical capacity for anchors and rods; stiffener pressure check and DL and seismic check for allowable duct spans).

The encased (insulated) ducts (five runs) consist of four duct runs of 46" x 12" and one duct run of 40" x 40". In all cases the encased ducts pass all calculation checks, except for the stiffener pressure check, which could not be performed because all of the stiffeners could not be counted due to the encasing insulation cover. However, evidence of stiffeners was found in all runs based on the "bulging" of the insulation where stiffeners were expected.

The number of hangers could be counted so all ducts including the encased ducts passed all other aforementioned calculation checks with the exception of the encased 46" x 12" (#43) duct, which is a cantilever and will be modified to correct the condition.

As such, the only feature that is unverified is the stiffener pressure check for the encased runs, since all of the stiffeners could not be seen. Since the uninsulated 50" x 40" duct and 46" x 12" ducts in the same room easily have enough stiffeners (calculations show a Factor of Safety (FS) greater than 2 for pressure allowable stress). The assumption that the encased ducts have adequate numbers of stiffeners (being of identical or similar size, located in the same room, of the same manufacturer, and presumably installed by the same craft) is seen as reasonable. There are no other unverified design features. In addition, the proposed Technical Specification (TS) 3.7.9, Control Room Emergency Filtration System (CREFS) Surveillance Requirement (SR) 3.7.9.6, "Perform required CRE [Control Room Envelope] unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program," includes provisions for measurement of the CRE pressure relative to all external areas adjacent to the CRE boundary during the TS emergency mode of operation. The frequency is 18 months. This surveillance requirement ensures that the CREFS ductwork is adequate for pressure.

b) Duct Thickness

The thickness measurement was performed at random locations in the primary auxiliary building (PAB) area and in the CREFS mechanical equipment room simply to establish duct thicknesses, since they could not be physically measured. In four out of the six cases measured, the gage met or exceeded the Point Beach Nuclear Plant (PBNP) ventilation specification requirement of two gages stronger (heavier) than the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) requirement (three in the PAB and one in CREFS Room area). In the other two instances, the measurement was lighter than required by the PBNP specification but was still stronger than SMACNA requirement. Given this data, the analyses were conducted conservatively by calculating weight assuming the duct was two gages heavier than SMACNA requires, and calculating engineering strength properties (area, section modulus and moments of inertia) using duct thicknesses equal to minimum SMACNA requirements.

In addition, the calculation of the weight density was also performed conservatively. It is based on the weight of duct per unit length assuming the duct thickness as two gages thicker than required by SMACNA, the weight of stiffeners and the weight of the joints. This calculation was performed for three duct sizes: 46" x 26", 104" x 26" and 30" x 12". The calculated additional weight of the stiffeners and joints over the duct weight itself averages 42%. The final calculation used 50%, a factor of 1.5, to allow for other incidentals (e.g., insulation) and unknowns.

c) Weld Inspections

The only welds not visible were for the support of the duct leading to the exhaust stack. A knee-braced strut hanger is attached to a steel column, but the column is encased in what appears to be gypsum board. As a knee-braced strut mounted to a steel column the dead load is the most significant load it experiences, so it was not unreasonable to assume it would be adequate for the additional stresses due to a seismic event.

Subsequent to the walkdown NextEra removed the fire proofing in order to collect data on the subject welds. Calculations were performed that confirmed that the welds are adequate.

EMCB HVAC RAI 2

a) *Please verify that the SRT, prior to their walkdowns, for all duct sizes involved in this project, prepared duct span table(s) that were used for screening during their walkdowns.*

b) *Provide a summary table which shows the allowable horizontal and vertical spans (and or horizontal to vertical span relationships) along with allowable cantilevered duct lengths for all circular and rectangular duct sizes involved in this project and confirm that these data were calculated using the guidance and criteria provided by Reference 4.*

c) *Provide assurance that duct spans nonconforming to these allowable values were further evaluated and found acceptable by analysis or by modification using guidance and criteria contained in Reference 4.*

NextEra Response

a) A duct span table (Attachment 1) was generated prior to the initial walkdown to assist in the initial screening. During the walkdown, it was determined that it was relatively straightforward to collect data such as duct spans for all accessible ducts, so the table was not used for a detailed evaluation.

b) Attachment 2 tables provide the calculation results for each duct section evaluated for dead load/seismic using the criteria of the Electric Power Research Institute (EPRI) Seismic Evaluation Guidelines for HVAC Duct and Damper Systems (Reference 5). The calculations are based on the existing horizontal and vertical spans of the ducts as well as the applicable spectral accelerations. The allowable span for each duct is included in the tables. Reference (5) provides an equation for determining the allowable vertical span for a duct that has a three or more span configuration. Since some ducts had different span configurations, equations were developed for ducts with less than three spans using the methodology of Appendix C of Reference (5). Similarly, equations were developed for cantilevered duct sections.

c) For duct spans that did not meet the criteria as specified in Reference (5), further evaluations were performed. Duct spans found not to be acceptable (see Enclosure 2) will be modified.

EMCB HVAC RAI 3

Reference 2, Section 6.1.2, states that "The last hangers on cantilevered or terminated ducts in the PAB were examined and found to be positively secured to the end hanger." Provide a justification for omitting this observation in the CREFS ductwork walkdown.

NextEra Response

The cited observation was not omitted for the CREFS ductwork. Section 6.1.7 of Enclosure 2 discusses the cantilevered duct observed on the CREFS ductwork. This cantilevered duct was evaluated and will be modified to add a lateral support.

EMCB HVAC RAI 4

Reference 2, Section 6.1.2, also states that "VNPAB ductwork is often not positively secured to the horizontal angle cross-member of the trapeze hangers." And that "The SRT judged that this is unimportant since most hangers consist of trapeze supports that "capture" the ductwork between the vertical support rods thereby ensuring that the ducts cannot fall off the hanger during a seismic event."

*a) The above states that **most** hangers consist of trapeze supports, etc. Are there any ducts that are not tied down securely on supports of the non-trapeze or non-boxed type supports where the non-secured ducts could possibly displace and hit adjacent SSCs, slide and/or fall off during a seismic event and how have these issues been resolved?*

b) For ducts on trapeze supports and/or on supports that provide a mechanism to capture the duct from falling off but not stop it from possibly displace due to a seismic event, has the SRT considered seismic interactions with adjacent SSCs and how has this issue been resolved?

NextEra Response

a) The Seismic Review Team observed one non-trapeze support that was not tied down. This support/duct was classified as an outlier (Enclosure 2, Section 9, Outlier No. 8) and will be repaired by adding fasteners.

b) A calculation to conservatively determine the lateral displacement of selected long ducts was performed. The results of the calculation show that a lateral displacement of 0.4" was calculated at mid-span for a long 59 foot duct run. This mid-span displacement is small and does not result in seismic interactions with adjacent structures, systems and components (SSCs) for any of the ductwork systems observed.

EMCB HVAC RAI 5

Reference 2, Section 5.0 (page 8) states that "Specification 6118-M-41 gages will conservatively be used for the dead load and seismic evaluations." The staff notes that four (4) out of the six (6) listed ducts in the table of Section 5.0 are shown to have heavier actual gages than the 6118-M-41 specified gage. Therefore, by using Specification 6118-M-41 gages for these ducts, it produces non-conservative lower deadweight and seismic loads. Provide a technical resolution for this issue.

NextEra Response

As discussed in Section 5 of Enclosure 2, the assessment of the ducts was performed by using the SMACNA gage to compute the duct capacity (structural section properties, area, section modulus and moments of inertia) and the PBNP ventilation specification gage (2 gages heavier than SMACNA) to determine the dead loads and seismic loads. In addition, the calculation of the weight density is also conservatively performed. It is based on the weight of duct per unit length setting the duct thickness as two gages thicker than SMACNA required, the weight of stiffeners and the weight of the joints. This calculation is based on three duct sizes: 46" x 26," 104" x 26," and 30" x 12". The calculated additional weight of the stiffeners and joints over the duct weight itself averages 42%. The final calculation uses 50%, a factor of 1.5, to allow for other incidentals (e.g., insulation) and any unknowns.

EMCB HVAC RAI 6

Reference 2, in table of Section 5.0, contains the width and the diameter of the rectangular and circular ducts that were tested for thickness using ultrasonic testing. Majority (4 out of 5) of the duct profiles tested produced an actual lighter gage than the PBNP Ventilation System Design Specification 6118-M-41.

a) Please update the table to show both dimensions for the field tested rectangular ducts.

b) Provide a table which shows all the duct sizes, material and type involved in the AST credited HVAC.

c) Please provide a sound justification for the duct sizes that were not field tested for thickness.

NextEra Response

a) Reference (1), Section 5 has been updated to show both dimensions for the field tested rectangular ducts and is provided in Attachment 3. A typographical error in the CREFS duct size has also been corrected.

b) Attachment 4 shows the duct sizes for all ducts in the program. All ducts are made of galvanized carbon steel and consist primarily of rectangular type ducts with a small number of circular ducts.

c) A sample of six locations were selected for "skin" thickness testing that reasonably represent the duct profile breadth observed at PBNP, ranging from the smallest (10" x 8") to the largest (104" x 26") chosen sections. Four out of the six locations tested produced thicknesses that meet the PBNP ventilation specification. The other two tested locations fell below the specification, but were still heavier than the SMACNA requirement. Since the section (strength) properties are based SMACNA requirements and the weight (dead load) is based on the specification, this issue is conservatively resolved. See the NextEra response to EMCB HVAC RAI 1b) for the discussion of conservatisms.

EMCB HVAC RAI 7

Reference 2, Section 6.1.1, "Duct Stresses", states that "The allowable bending stress is 8 ksi for carbon steel." It is noted, that while this is true (per Reference 4) for carbon steel, galvanized sheet and stainless steel rectangular ducts, it is not the case for circular ducts. Please verify that all duct stresses, either by calculation or by sound engineering judgment, after including required modifications, meet the Reference 4 allowable values.

NextEra Response

There are a very small number of non-rectangular duct sections in the scope of the project. Three non-rectangular duct sections are in high radiation areas and are judged to be acceptable using engineering judgment by the Seismic Review Team (SRT). The basis for this judgment is summarized below. Two circular ducts in the high radiation areas are 8" in diameter and one duct is 10" in diameter. They are uninsulated. The transverse joints appear to be beaded crimp joints, which SMACNA requires be secured with no less than 3 rivets/screws. The ducts are small and lightweight; therefore, by judgment, they will not fail their hanger supports.

The SRT judgment is based on the following considerations. To the extent they were observed, the ducts were single strap supported and anchored to concrete by single expansion anchors (reasonably assumed), which is a very ductile overall configuration. The hanger spacing was not observed; however, SMACNA, Fourth Edition (1969), requires a 10 foot maximum spacing. It is pointed out that Figure 6 of Enclosure 2 shows total horizontal lengths of 15 feet and 10 feet (based on scaling) for the 10" diameter and 8" diameter ducts, respectively. SMACNA-1969 does not require greater than 26 gage for this duct size. Round ducts of this size require no reinforcement for low pressure (2" w.g.) design per SMACNA-1969. Sizing the duct to 24 gage to meet the specification requirement, the minimum thickness required is 0.0239". This means the 10" diameter duct probably weighs about 3 lbs per foot, so the dead load on an anchor is slightly less than 30 lbs using the 10 foot hanger spacing. Actually, the 10 foot tributary span weight assumption is conservative, since the longest horizontal span is approximately 15 feet (based on Figure 6) and at least 2 hangers are needed to support any horizontal span. A system like this will swing much like a pendulum in a seismic event inducing little seismic stress

in the duct. The metal strap is not considered to experience fatigue in such a low cycle event. In addition, this overall system is a return air system such that even if it opened at a seam it would still be able to perform its design function of returning (drawing) air.

PBNP is located in a low seismicity region of the country. Therefore, these lightweight circular ducts are judged to be capable of surviving and functioning through the postulated safe shutdown earthquake (SSE) event.

With regard to the overall acceptability of the duct sections, calculations were performed that determined the interactions for the various evaluations required per Reference (5). When interactions exceeded 1.0, more refined calculations were performed. If the interactions still exceeded 1.0, a modification was proposed (for example, the addition of a support) and a new interaction ratio is calculated.

EMCB HVAC RAI 8

Reference 2 indicates that for duct support evaluations were performed in accordance with the criteria of the AISC Manual of Steel Construction, 9th Edition.

a) Please state the design basis AISC steel construction manual edition for original construction.

b) Please provide reference to the specific controlled documentation that supports the AISC steel construction manual reconciliation from your original construction design basis AISC manual to the 9th Edition.

NextEra Response

a) The American Institute of Steel Constuction (AISC) code in affect at the time of design for PBNP was AISC Manual of Steel Constuction, 6th Edition, 1967.

b) No specific controlled documentation exists at PBNP that supports the code reconciliation to the AISC 9th Edition. The following portions of the duct evaluations were completed in accordance with the AISC 9th Edition:

1. Single angle member evaluation: The 9th Edition of AISC presents a detailed methodology for evaluation/design of single angle members including using a 25% factor on determining bending stresses in the angle members in order to account for use of geometric axis, as well as reduced allowable stresses dependent on the angle leg width and thickness. The 6th Edition does not contain this methodology. Calculations generated in accordance with the 6th Edition would not have considered the 25% increase in stresses, when using geometric axis or a reduction in allowable stresses.

2. Density of steel: Unchanged from 6th Edition.

3. The capacity of the threaded rods in tension: The 9th Edition specifies 0.33 times Fu (0.33*58*ksi=19.14 ksi) while the 6th Edition states 0.4 times Fy (0.4*36*ksi=14.4 ksi). The 6th Edition allowable stress is less than the 9th Edition. The resulting allowable tension on the rod using 6th Edition criteria is 1,590 lbs. Since the majority of rods were attached to shell anchors and the shell anchor allowable (1,095 lbs.) is less than either the 6th or 9th Edition rod allowable, the shell anchor allowable controlled and was used to evaluate the rod supports. For the cases where the rods were not supported by shell anchors, the rod stresses were low and not the controlling component.

4. Section properties for the angles used are the same (note that 9th edition shows section properties to thousandths while the 6th Edition's precision is to the hundredths).

5. Compressive strength and bending allowable stress. Differences between the codes are insignificant.

Therefore, the use of the AISC 9th Edition is acceptable.

EMCB HVAC RAI 9

Are there any walls, floors or ceilings other than reinforced concrete that were used to provide ductwork support and how has their seismic integrity been evaluated?

NextEra Response

The SRT did not observe any walls, floors or ceilings constructed from materials other than reinforced concrete.

EMCB HVAC RAI 10

Please verify that in cases where beam clamps are used, clamping frictional forces have not been credited to resist deadweight or seismic (horizontal or vertical) loads.

NextEra Response

The use of beam clamps to support components is allowed by the Reference 5, EPRI HVAC Seismic Guidelines, and the Generic Implementation Procedure (GIP), as long as the clamps are not oriented in such a way that gravity loads are resisted only by the frictional forces developed by the clamps. Beam clamps oriented this way might loosen and slip off in an earthquake and possibly cause a collapse of the system. The beam clamp seen by the SRT (only one instance was observed) was orientated such that it resisted gravity loads without considering frictional forces.

EMCB HVAC RAI 11

None of the SEWS shows duct sizes. Please provide the duct sizes (including thicknesses or gages) for submitted SEWS.

NextEra Response

Attachment 4 provides the duct sizes for all ducts.

EMCB HVAC RAI 12

The SEWS show only galvanized sheet metal for duct material. Please confirm that all AST credited HVAC ductwork utilizes galvanized sheet metal for duct material.

NextEra Response

Per the PBNP ventilation specification, all ductwork is specified to be constructed using galvanized sheet metal. The SRT review confirmed this.

EMCB HVAC RAI 13

The staff notes, that the NRC approved GIP is GIP-2. Reference 2, Section 11.8, makes reference to GIP-2. The SRT utilized GIP-3A to evaluated Control Room HVAC control panel C-67, fans W-1 3 B1 & B2 (Control Room Recirculation Fans), W-14 A & B (F-16 Control Room Charcoal Filter Fans), W21 A & B (PAB Exhaust Fans) and W30 A & B (F-23/F-29 PAB Exhaust Fans). Please verify that GIP-3A has been incorporated in the stations' licensing basis FSAR. If this is not the case, the staff requests that the SEWS be revised to show compliance with GIP-2.

NextEra Response

The Seismic Evaluation Work Sheets (SEWS) for fans and control panels were inadvertently printed with the GIP Revision 3A SEWS forms. They are revised to use GIP Revision 2 (Corrected 2/14/92) forms (see Enclosure 2).

EMCB HVAC RAI 14

The SRT's walkdown included the charcoal filter banks located in the same rooms with fans W30A and W30B. The SRT comments shown in the SEWS are as stated below:

> *"In the same room (about 20 ft away) there are charcoal filter banks in the rooms with a footprint of 107" x 180". The visible 107" side has 10 - ½/" concrete expansion anchors with two anchors having nuts that are raised. The 180" side cannot be fully viewed as it is adjacent to a wall but at least 10 anchors were counted, some of which again were missing nuts or for which the nuts were raised. The two other sides are inaccessible. The filter banks are about 10' high and are adjudged to have a natural frequency in excess of about 20 Hz. Since they cannot uplift the anchors only need to resist base shear and there are sufficient visible anchors to accomplish this so they are declared seismically adequate. They pose no interaction potential risk to the fans."*

The SRT comments describe degraded conditions which need to be repaired. There are missing anchor nuts and raised anchor nuts on the sides that were accessible for walkdowns, while two sides on each unit were inaccessible. The provided justification for acceptance lacks rigor. No basis is provided for the judgment that they have a natural frequency in excess of 20 HZ. The SRT did not provide a technical justification which either involved actual dimensions and weights or estimated ones nor a calculation or technical discussion to justify that the lifting force at the bolt pattern, which can be developed due to the CG coupled overturning moment, is overcome by the unit's deadweight or anchorage resistance.

Please provide assurance that these SRT commented non-conformances will be corrected for these important to safety components prior to the proposed AST implementation and provide an acceptable justification for the seismic adequacy of these units.

NextEra Response

Using the peak of the floor response spectrum, it can be shown that the filter bank overturning does not overcome the restoring moment so the bolts experience no tension. Using a conservative density of 35 lbs per cubic feet, the shear force for the anchors (20 minimum per walkdown notes) is about 1.4K lbs. The anchors are 1/2" diameter concrete expansion anchors, which have a capacity in excess of 2.2K lbs in 3 ksi concrete based on the GIP (see Attachment 6 for the simple rigid body mechanics calculation).

The few missing nuts are not consequential, since they would only be important if the bolts experience tension forces which they do not experience when the most conservative assumptions are made. In addition, the filter bank is not safety-related, cannot seismic interact with (i.e., fall on) the fans in the room given its location, or impede the flow of air by collapsing or sliding in any manner. Note also that the VNPAB filters are not credited in the AST radiological analyses.

EMCB HVAC RAI 15

Resolutions for the floor response spectrum outliers where demand exceeds capacity for fans W13B1, W13B2, W14A and W14B have not been provided. Provide resolution for these outliers and reference of controlled documentation containing information needed to implement resolution.

NextEra Response

Each of the SEWS for fans W-13B1, W-13B2, W-14A and W-14B identified issues for each of these four outliers. The seismic demand exceeded the capacity in the low frequency range of the spectral curves, anchorage corrosion was observed (W-13B1 & W-13B2), and the fans are mounted on vibration isolators. The modification of these fans involves the installation of 3-way restraints that will render the vibration isolators ineffective. This work will be performed under Engineering Change (EC) 11690, Alternative Source Term Implementation and CREFS Upgrades to Support AST License Amendment Request, which is currently scheduled to be installed by the end of 2010, prior to implementation of the Alternative Source Term license amendment. The identified corrosion will be cleaned and the load path and anchorage will be re-inspected to confirm their effectiveness and repaired, as required, to ensure that seismic capacity exceeds seismic demand.

EMCB HVAC RAI 16

The SRT observed corroded anchorage of fans W13B1 and W13B2. Shown in the SEWS, the SRT's resolution for these outliers was to replace the corroded anchorage. Please include these outliers in the list of OLs of Section 9.0 and provide reference of controlled documentation which provides information needed to implement these repairs.

NextEra Response

Section 9.0, Outliers, of Enclosure 2 has been revised to include the three caveats for fans W-13B1 and W-13B2 and is included as Attachment 7. Repairs for the fan outliers will be completed under EC 11690, Alternative Source Term Implementation and CREFS Upgrades to Support AST License Amendment Request, and are currently scheduled to be installed by the end of 2010.

EMCB HVAC RAI 17

a) *Provide a list of all required HNAC modifications identified in Reference 2. The list of outliers (OLs) and recommended resolutions in Section 9.0 Reference 2 does not contain all SRT identified OLs.*

b) *Please provide reference of controlled documentation containing information needed to implement resolution of the identified outliers and documentation which tracks the schedule of repairs and assures that all HVAC required modification will be completed prior to implementing the proposed AST. Also provide resolution where resolution has not been provided.*

NextEra Response

a) All equipment and duct outliers are now identified in the summary table in Section 7.0 of Enclosure 2. The table (Attachment 7) has been revised to include the three attributes for each of the four fan outliers

b) The upgrade of the supports for fans W-13B1, W-13B2, W-14A and W-14B is being tracked under EC 11690, Alternative Source Term Implementation and CREFS Upgrades to Support AST License Amendment Request, and are scheduled to be installed by the end of 2010. Other seismic upgrades to the VNPAB and CREFS ventilation systems are being tracked under Engineering Change 14606, Modify PAB Exhaust and CREFS HVAC As Required for Seismic Qualification. The implementation of the Alternative Source Term (AST) license amendment following approval by the NRC staff is controlled under Engineering Change EC 11690, Part H, "Physical, procedural, and licensing basis changes to be implemented once the NRC SE is received for LAR 241." The engineering change package for EC 11690, Part H, includes the development of a transition plan, which will establish and control the required seismic upgrades and other plant modifications to ensure they are completed prior to implementation of LAR 241. In addition, a PBNP High Impact Team (HIT) has been chartered to develop the transition plan and coordinate its implementation to ensure prerequisite modifications are completed prior to LAR 241 implementation.

The following documents are provided as Attachments to Enclosure 1:

Attachment Number	Document
1	Allowable Span Tables
2	Dead Load/Seismic Evaluations
3	Ductwork Ultrasonic Thickness Measurement Results
4	Duct Summary Tables
5	PBNP Ventilation Material Specification
6	Charcoal Filter Bank Calculation
7	Seismic Evaluation Outliers

References

(1) NRC electronic mail to NextEra Energy Point Beach, LLC, dated May 13, 2010, DRAFT Request for Additional Information from Mechanical and Civil Branch on AST (ML101340533)

(2) FPL Energy Point Beach, LLC letter to NRC, dated December 8, 2008, License Amendment Request 241, Alternative Source Term (ML083450683)

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(4) NextEra Energy Point Beach, LLC letter to NRC dated April 20, 2010, Supplement to License Amendment Request 241, Alternative Source Term, Proposed Technical Specifications for Control Room Emergency Filtration System (CREFS) (ML101100605)

(5) NextEra Energy Point Beach, LLC letter to NRC dated January 14, 2010, Transmittal of Information to Support License Amendment Request 241, Alternative Source Term, Seismic Evaluation Guidelines for HVAC Duct and Damper Systems (ML100190066),

ENCLOSURE 1
ATTACHMENT 1

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

LICENSE AMENDMENT REQUEST 241
EXTENDED POWER UPRATE
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

ALLOWABLE SPAN TABLES

4 pages follow

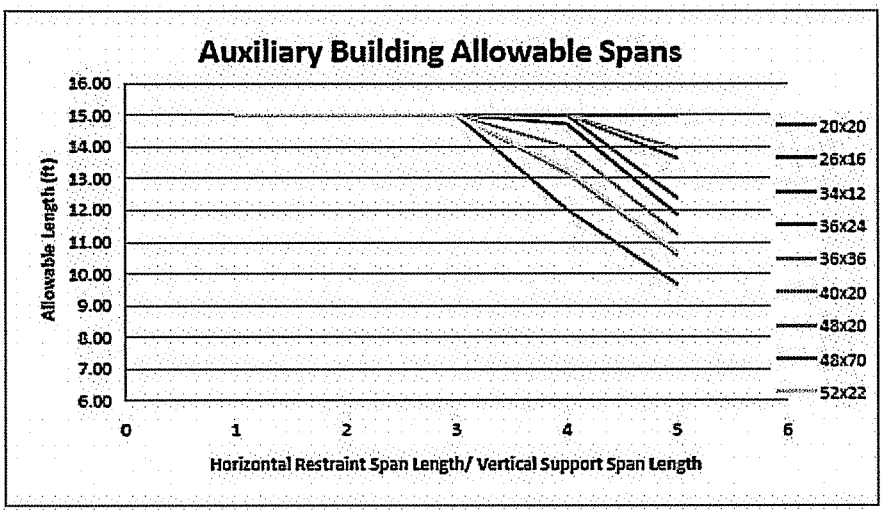
Attachment 1 – Allowable span table
Auxiliary Building

ρ =	0.3625	lb/in3	Duct wall material density
Fb SSE=	13600	psi	Allowable material stress (=1.7 * Fb)
Sa=	0.974	g's	Horizontal peak spectral acceleration (@26 feet)
Sv=	0.1267	g's	Vertical peak spectral acceleration
R=	5		Ratio (Horizontal restraint span length/Vertical support span length)

H (in)	W (in)	K1	L (ft)
20	20	2.8011	13.64
26	16	3.5309	11.86
34	12	4.8526	9.66
36	24	2.2640	12.39
36	36	1.4888	13.94
40	20	2.7432	11.25
48	20	2.7341	10.59
48	70	0.7593	15.00
52	22	2.4640	10.69

R	20x20	26x16	34x12	36x24	36x36	40x20	48x20	48x70	52x22
1	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
2	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
3	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
4	15.00	14.72	12.04	15.00	15.00	13.99	13.18	15.00	13.30
5	13.64	11.86	9.66	12.39	13.94	11.25	10.59	15.00	10.69

Attachment 1 – Allowable span table
Auxiliary Building

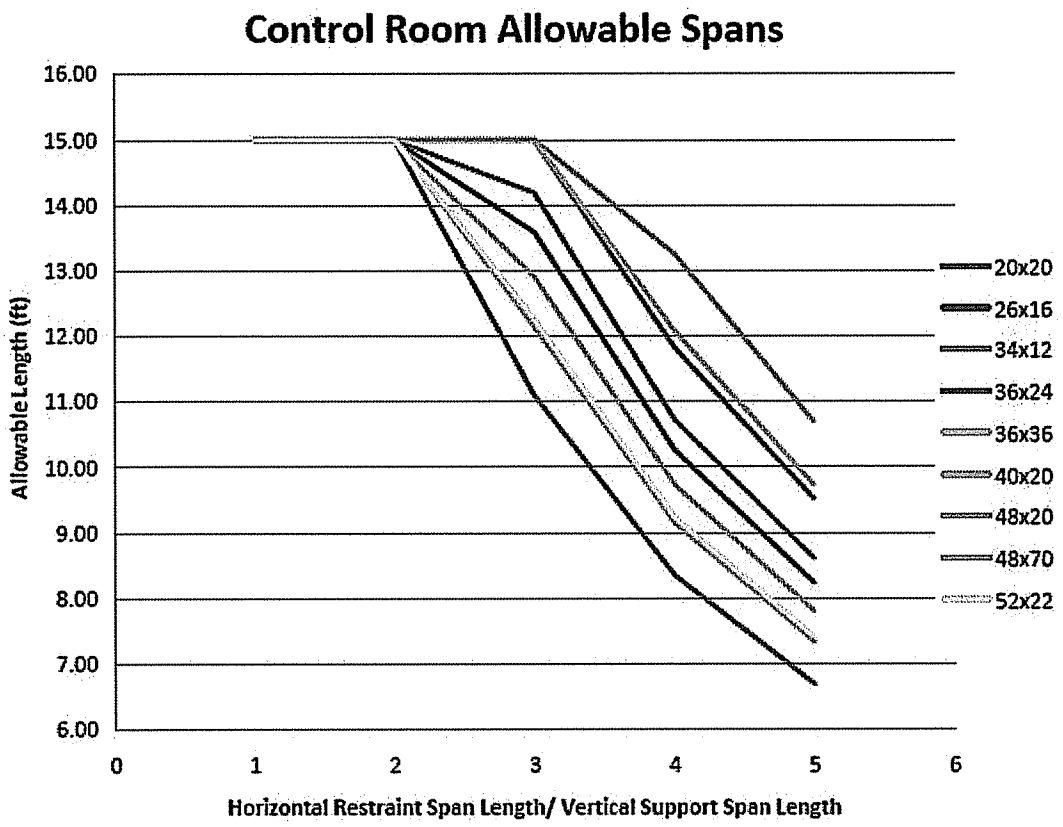


Attachment 1 – Allowable span table
Control Building

ρ =	0.3625	lb/in3	Duct wall material density
Fb SSE=	13600	psi	Allowable material stress (=1.7 * Fb)
Sa=	2.045	g's	Horizontal peak spectral acceleration (@74 feet)
Sv=	0.1267	g's	Vertical peak spectral acceleration
R=	2		Ratio (Horizontal restraint span length/Vertical support span length)

H (in)	W (in)	K1	L (ft)
20	20	1.0145	15.00
26	16	1.2413	15.00
34	12	1.6716	15.00
36	24	0.7996	15.00
36	36	0.5392	15.00
40	20	0.9565	15.00
48	20	0.9473	15.00
48	70	0.2840	15.00
52	22	0.8543	15.00

R	20x20	26x16	34x12	36x24	36x36	40x20	48x20	48x70	52x22
1	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
2	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
3	15.00	13.58	11.09	14.19	15.00	12.90	12.15	15.00	12.27
4	11.83	10.26	8.35	10.72	12.09	9.73	9.15	13.25	9.24
5	9.51	8.23	6.69	8.61	9.72	7.81	7.34	10.69	7.41


Control Room Allowable Spans
16.00
15.00
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
Allowable Length (ft)
0
1
2
3
4
5
6
Horizontal Restraint Span Length/ Vertical Support Span Length
20x20
26x16
34x12
36x24
36x36
40x20
48x20
48x70
52x22

ENCLOSURE 1
ATTACHMENT 2

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

LICENSE AMENDMENT REQUEST 241
EXTENDED POWER UPRATE
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

DEAD LOAD/SEISMIC EVALUATIONS

6 pages follow

DUCT DEAD LOAD & SEISMIC EVALUATION SHEET

VNPAB - PRIMARY AUXILIARY BUILDING

ρ =	0.426	lb/in3	Duct wall material density (=1.5 * 0.284)
Fb SSE=	8000	psi	Allowable material stress (= Fb)
Sa=	0.8294	g's	Horizontal peak spectral acceleration (@26 feet) for 7 % damping
Sv=	0.1104	g's	Vertical peak spectral acceleration

Increase factor determined to account for miscellaneous components
Reference 3
Per PB Seismic Design Criteria Guidelines, DG-C03 Revision 0
Per PB Seismic Design Criteria Guidelines, DG-C03 Revision 0

Data							Dead Load and Seismic Stress Check			
No.	Width (in)	Height (in)	L Span (ft)	N Hangers	Average Tributary Span Per Vertical Support (ft)	Support Configuration	K1 (1)	All. Span (ft) (2)	Dead Load/Seismic Interaction Ratios	
1	104	26	59	11	4.92	≥ 3 Spans	2.4245	5.75	0.85	
2	48	26	59	11	4.92	≥ 3 Spans	5.2711	5.17	0.95	
3	56	26	46	10	4.18	≥ 3 Spans	3.7976	5.79	0.72	
4	76	20	46	10	4.18	≥ 3 Spans	2.8219	6.21	0.67	
5	10	6	13	1	6.50	1-2 Spans	1.2723	15.00	0.43	
8	40	20	56	11	4.67	≥ 3 Spans	6.3882	5.22	0.89	
10	10	6	12	2	4.00	≥ 3 Spans	2.2829	15.00	0.27	
11A	36	20	21	3	5.25	≥ 3 Spans	0.8899	14.47	0.36	
13B	34	16	11.67	1	5.83	1-2 Spans	0.3492	15.00	0.39	
14	34	14	26.25	1	13.13	1-2 Spans	0.3725	15.00	0.88	
14	14	34	26.25	1	13.13	1-2 Spans	0.6089	15.00	0.88	
15	30	12	65	8	7.22	≥ 3 Spans	4.9840	7.06	1.02	(3)
16	40	20	26	4	5.20	≥ 3 Spans	1.2004	12.04	0.43	
17	24	8	9.667	2	4.00	Cantilever	0.7601	9.26	0.43	
18	16	18	57	7	7.13	≥ 3 Spans	7.6401	6.34	1.12	(3)
19	24	12	40.5	4	8.10	≥ 3 Spans	2.0747	11.82	0.69	
22	18	12	19	2	6.33	≥ 3 Spans	1.1236	15.00	0.42	
23	18	8	19	2	6.33	≥ 3 Spans	1.2473	15.00	0.42	

Data							Dead Load and Seismic Stress Check		
No.	Width (in)	Height (in)	L Span (ft)	N Hangers	Average Tributary Span Per Vertical Support (ft)	Support Configuration	K1 (1)	All. Span (ft) (2)	Dead Load/Seismic Interaction Ratios
24	12	6	19	2	6.33	≥ 3 Spans	1.9309	15.00	0.42
26	26	16	22.33	3	5.58	≥ 3 Spans	1.2440	14.13	0.40
27	16	30	34	3	8.50	≥ 3 Spans	1.9503	10.78	0.79
28	20	16	35	4	7.00	≥ 3 Spans	2.4328	10.91	0.64
29	30	12	22	3	5.50	≥ 3 Spans	1.1426	14.74	0.37
34	70	48	20	3	5.00	Cantilever	0.4336	6.39	0.78
35	66	40	23.5	3	5.88	Cantilever	0.4671	6.49	0.91
36	24	12	12	2	4.00	≥ 3 Spans	0.8731	15.00	0.27
37	24	12	12	0	12.00	Cantilever	0.2749	14.52	0.83
38	24	12	12	2	4.00	≥ 3 Spans	0.8731	15.00	0.27
39	24	12	12	3	3.00	≥ 3 Spans	1.3988	14.39	0.21

(1) Derived constant K1 in accordance to EPRI Report, "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems", Appendix C (page C-2)

(2) Allowable span calculated in accordance to EPRI Report, "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems", Appendix C (page C-1)

(3) Detailed evaluation results in an interaction ratio less than 1.0

DUCT DEAD LOAD & SEISMIC EVALUATION SHEET

VNPAB - PIPEWAY # 1

ρ =	0.426	lb/in3	Duct wall material density (=1.5 * 0.284)	Increase factor determined to account for miscellaneous components
Fb SSE=	8000	psi	Allowable material stress (= Fb)	Reference 3
Sa=	1.2788	g's	Horizontal peak spectral acceleration for 7 % damping	Per PB Seismic Design Criteria Guidelines, DG-C03 Revision 0
Sv=	0.1104	g's	Vertical peak spectral acceleration	Per PB Seismic Design Criteria Guidelines, DG-C03 Revision 0

Data							Dead Load and Seismic Stress Check		
No.	Width (in)	Height (in)	L Span (ft)	N Hangers	Average Tributary Span Per Vertical Support (ft)	Support Configuration	K1 (1)	All. Span (ft) (2)	Dead Load/Seismic Interaction Ratios
6	10	8	32	5	5.33	≥ 3 Spans	11.5485	7.08	0.75
7	10	6	16	3	4.00	≥ 3 Spans	5.4522	10.94	0.37

(1) Derived constant K1 in accordance to EPRI Report, "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems", Appendix C (page C-2)

(2) Allowable span calculated in accordance to EPRI Report, "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems", Appendix C (page C-1)

DUCT DEAD LOAD & SEISMIC EVALUATION SHEET

VNPAB - PIPEWAY # 3

ρ =	0.426	lb/in3	Duct wall material density (=1.5 * 0.284)	Increase factor determined to account for miscellaneous components
=b SSE=	8000	psi	Allowable material stress (= Fb)	Reference 3
Sa=	1.2618	g's	Horizontal peak spectral acceleration for 7 % damping	Per PB Seismic Design Criteria Guidelines, DG-C03 Revision 0
Sv=	0.1104	g's	Vertical peak spectral acceleration	Per PB Seismic Design Criteria Guidelines, DG-C03 Revision 0

Data							Dead Load and Seismic Stress Check		
No.	Width (in)	Height (in)	L Span (ft)	N Hangers	Average Tributary Span Per Vertical Support (ft)	Support Configuration	K1 (1)	All. Span (ft) (2)	Dead Load/Seismic Interaction Ratios
30A	12	14	22	3	5.50	Cantilever	4.1363	4.40	1.25 (3)

(1) Derived constant K1 in accordance to EPRI Report, "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems", Appendix C (page C-2)

(2) Allowable span calculated in accordance to EPRI Report, "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems", Appendix C (page C-1)

(3) Outlier - support will be added. Revised interaction ratio = 0.56.

DUCT DEAD LOAD & SEISMIC EVALUATION SHEET

VNPAB - PIPEWAY # 4

ρ =	0.426	lb/in3	Duct wall material density (=1.5 * 0.284)	Increase factor determinded to account for miscellaneous components
Fb SSE=	8000	psi	Allowable material stress (= Fb)	Reference 3
Sa=	0.8758	g's	Horizontal peak spectral accelerationfor 7 % damping	Per PB Seismic Design Criteria Guidelines, DG-C03 Revision 0
Sv=	0.1104	g's	Vertical peak spectral acceleration	Per PB Seismic Design Criteria Guidelines, DG-C03 Revision 0

Data							Dead Load and Seismic Stress Check		
No.	Width (in)	Height (in)	L Span (ft)	N Hangers	Average Tributary Span Per Vertical Support (ft)	Support Configuration	K1 (1)	All. Span (ft) (2)	Dead Load/Seismic Interaction Ratios
25	12	6	34.5	4	6.90	Cantilever	4.7691	4.93	1.40 (3)

(1) Derived constant K1 in accordance to EPRI Report, "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems", Appendix C (page C-2)

(2) Allowable span calculated in accordance to EPRI Report, "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems", Appendix C (page C-1)

(3) Outlier - support will be added. Revised interaction ratio = 0.63.

DUCT DEAD LOAD & SEISMIC EVALUATION SHEET

CREFS - CONTROL ROOM HVAC ROOM

ρ =	0.426	lb/in3	Duct wall material density (=1.5 * 0.284)	Increase factor determined to account for miscellaneous components
Fb SSE=	8000	psi	Allowable material stress (= Fb)	Reference 3
Sa=	1.512	g's	Horizontal peak spectral acceleration for 7 % damping	Per PB Seismic Design Criteria Guidelines, DG-C03 Revision 0
Sv=	0.1104	g's	Vertical peak spectral acceleration	Per PB Seismic Design Criteria Guidelines, DG-C03 Revision 0

Data							Dead Load and Seismic Stress Check			
No.	Width (in)	Height (in)	L Span (ft)	N Hangers	Average Tributary Span Per Vertical Support (ft)	Support Configuration	K1 (1)	All. Span (ft) (2)	Dead Load/Seismic Interaction Ratios	
43	46	12	42	5	7.00	Cantilever	2.6686	3.67	1.91	(3)
44	46	12	10.5	2	3.50	≥ 3 Spans	0.8150	14.86	0.24	
45	46	12	Judged to be acceptable							
46	46	12	Judged to be acceptable							
47	40	40	27	5	4.50	≥ 3 Spans	2.9136	6.69	0.67	
48	50	40	27	6	3.86	≥ 3 Spans	3.1370	6.08	0.63	
49	46	12	18	3	4.50	≥ 3 Spans	1.2955	11.78	0.38	

(1) Derived constant K1 in accordance to EPRI Report, "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems", Appendix C (page C-2)

(2) Allowable span calculated in accordance to EPRI Report, "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems", Appendix C (page C-1)

(3) Outlier - support will be added. Revised interaction ratio = 0.85.

ENCLOSURE 1
ATTACHMENT 3

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

LICENSE AMENDMENT REQUEST 241
EXTENDED POWER UPRATE
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

DUCTWORK ULTRASONIC THICKNESS MEASUREMENT RESULTS

1 page follows

1 All dampers shall be products of reputable manufacturers.
2 Rectangular ducts shall be constructed of galvanized steel in accordance with the latest standards of the American Society of Heating, Refrigeration and Air Conditioning Engineers and the SMACNA requirements for low, medium and high-pressure systems. Round ducts shall be either galvanized steel spiral pipe with four-ply lockseams, or galvanized metal sheets with continuous butt-welded seams reinforced with angular hoop braces. The CREFS and VNPAB HVAC systems are designed as low-pressure systems.
3 Hangers and supports shall be designed to support the weight of the duct or equipment and shall have a minimum factor of safety of five based on ultimate tensile strength of material used.
5. Support spacing for ducts shall not exceed approximately;
a. 96" for ducts whose greater dimension is under 18"
b. 66" plus or minus for ducts 18" – 60" on the maximum side.
The SRT walkdown SEWS are provided in an attachment to this report.

As part of the walkdown the SRT enlisted the help of the PBNP Ventilation System Engineer who is experienced in HVAC duct construction in order to identify and confirm the type of duct joints used in the construction of the ductwork. The results of this effort are discussed in Section 6.1.3 of this report.

Additionally the SRT enlisted the services of the PBNP ISI group in order to confirm the sheet metal gage used for the ductwork. The SRT selected 5 locations in the PAB and one location on the CREFS for ultrasonic testing in order to confirm that the ductwork gage met SMACNA requirements. Specification 6118-M-41 requires that the gage of the duct is two gages heavier than that required by SMACNA. Ductwork for the VNPAB and the CREFS were tested using ultrasonic testing with the following results as shown in the table below:

Duct Dimension (WxH)	Location	Measured (in)	SMACNA Required	6118-M-41 Spec Required
104"x26"	PAB EL 8' Area 4	0.057 (17 gage)	0.0516 (18gage)	0.0635 (16 gage)
76"x20"	PAB EL 8' Area 4	0.053	0.0396 (20 gage)	0.0516 (18 gage)
56"x26"	PAB EL 8' Area 4	0.043	0.0396 (20 gage)	0.0516 (18 gage)
48"x26"	PAB EL 8' Area 4	0.043	0.0336 (22 gage)	0.0396 (20 gage)
10"x8"	PAB EL 8' Area 4	0.033	0.0217 (26 gage)	0.0276 (24 gage)
50"x40"	CREFS Recirc Duct	0.040	0.0336 (22 gage)	0.0396 (20 gage)

The data show that the actual ductwork gages always exceed the SMACNA minimum required gages but not always by 2 gages. Sometimes the actual gage appears to be only one gage heavier. This could also be attributable to measurement precision. For this evaluation the SMACNA minimum gages will be used for the pressure evaluations

ENCLOSURE 1
ATTACHMENT 4

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

LICENSE AMENDMENT REQUEST 241
EXTENDED POWER UPRATE
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

DUCT SUMMARY TABLES

6 pages follow

DUCT DATA

VNPAB - PRIMARY AUXILIARY BUILDING

Data								
No.	Width (in)	Height (in)	L Span (ft)	N Hangers	Average Tributary Span Per Vertical Support (ft)	N Stiffeners	Average Tributary Span Per Stiffener (ft)	Support Configuration
1	104	26	59	11	4.92	21	2.68	≥ 3 Spans
2	48	26	59	11	4.92	21	2.68	≥ 3 Spans
3	56	26	46	10	4.18	18	2.42	≥ 3 Spans
4	76	20	46	10	4.18	18	2.42	≥ 3 Spans
5	10	6	13	1	6.50	0	13.00	1-2 Spans
8	40	20	56	11	4.67	20	2.67	≥ 3 Spans
9	4" pipe		Judged to be acceptable					
10	10	6	12	2	4.00	0	12.00	≥ 3 Spans
11A	36	20	21	3	5.25	5	3.50	≥ 3 Spans
11B	36	20	Judged to be acceptable					
12	34	20	Judged to be acceptable					
13A	34	18	Judged to be acceptable					
13B	34	16	11.67	1	5.83	4	2.33	1-2 Spans
14	34	14	26.25	1	13.13	6	3.75	1-2 Spans
14	14	34	26.25	1	13.13	6	3.75	1-2 Spans
15	30	12	65	8	7.22	16	3.82	≥ 3 Spans
16	40	20	26	4	5.20	11	2.17	≥ 3 Spans
17	24	8	9.67	2	4.00	3	2.42	Cantilever
18	16	18	57	7	7.13	0	57.00	≥ 3 Spans
19	24	12	40.5	4	8.10	9	4.05	≥ 3 Spans
20	4" SS		Judged to be acceptable					

Data								
No.	Width (in)	Height (in)	L Span (ft)	N Hangers	Average Tributary Span Per Vertical Support (ft)	N Stiffeners	Average Tributary Span Per Stiffener (ft)	Support Configuration
21	8	6	Judged to be acceptable					
22	18	12	19	2	6.33	1	9.50	≥ 3 Spans
23	18	8	19	2	6.33	0	19.00	≥ 3 Spans
24	12	6	19	2	6.33	0	19.00	≥ 3 Spans
26	26	16	22.33	3	5.58	7	2.79	≥ 3 Spans
27	16	30	34	3	8.50	13	2.43	≥ 3 Spans
28	20	16	35	4	7.00	12	2.69	≥ 3 Spans
29	30	12	22	3	5.50	6	3.14	≥ 3 Spans
32	54"Φ		Exhaust stack - calculations indicate as acceptable.					
33	12	6	Judged to be acceptable					
34	70	48	20	3	5.00	6	2.86	Cantilever
35	66	40	23.5	3	5.88	6	3.36	Cantilever
36	24	12	12	2	4.00	2	4.00	1-2 Spans
37	24	12	12	0	12.00	0	12.00	Cantilever
38	24	12	12	2	4.00	3	3.00	≥ 3 Spans
39	24	12	12	3	3.00	4	2.40	≥ 3 Spans
40A	8" Φ		Judged to be acceptable					
40B	10	8	Judged to be acceptable					
41	8"Φ		Judged to be acceptable					
42	10"Φ		Judged to be acceptable					

DUCT DATA

VNPAB - PIPEWAY # 1

Data								
No.	Width (in)	Height (in)	L Span (ft)	N Hangers	Average Tributary Span Per Vertical Support (ft)	N Stiffeners	Average Tributary Span Per Stiffener (ft)	Support Configuration
6	10	8	32	5	5.33	0	32.00	≥ 3 Spans
7	10	6	16	3	4.00	0	16.00	≥ 3 Spans

DUCT DATA

VNPAB - PIPEWAY # 3

Data								
No.	Width (in)	Height (in)	L Span (ft)	N Hangers	Average Tributary Span Per Vertical Support (ft)	N Stiffeners	Average Tributary Span Per Stiffener (ft)	Support Configuration
30A	12	14	22	3	5.50	0	22.00	Cantilever
30B	Inaccessible Hi Rad areas, judged to be acceptable (1)							
31	Inaccessible Hi Rad areas, judged to be acceptable (1)							

(1) See additional discussion in Reference 1

DUCT DATA

VNPAB - PIPEWAY # 4

Data								
No.	Width (in)	Height (in)	L Span (ft)	N Hangers	Average Tributary Span Per Vertical Support (ft)	N Stiffeners	Average Tributary Span Per Stiffener (ft)	Support Configuration
25	12	6	34.5	4	6.90	0	34.50	Cantilever

DUCT DATA

CREFS - CONTROL ROOM HVAC ROOM

Data								
No.	Width (in)	Height (in)	L Span (ft)	N Hangers	Average Tributary Span Per Vertical Support (ft)	N Stiffeners	Average Tributary Span Per Stiffener (ft)	Support Configuration
43	46	12	42	5	7.00	Note 1	-	Cantilever
44	46	12	10.5	2	3.50	Note 1	-	≥ 3 Spans
45	46	12	Judged to be acceptable					
46	46	12	Judged to be acceptable					
47	40	40	27	5	4.50			≥ 3 Spans
48	50	40	27	6	3.86	10	2.45	≥ 3 Spans
49	46	12	18	3	4.50	7	2.25	≥ 3 Spans

Note 1 - See additional discussion in Reference 1

ENCLOSURE 1
ATTACHMENT 5

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

LICENSE AMENDMENT REQUEST 241
EXTENDED POWER UPRATE
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PBNP VENTILATION MATERIAL SPECIFICATION

2 pages follow

4.3 Test Connections

a. Seller shall install 3/4 inch couplings welded to duct work, and capped, for pitot tube or other testing apparatus connections.

b. Test connections shall be located in the duct work downstream of all units or fans, and in plenums or duct work upstream of all units or fans. Where multiple zone systems are used, a connection shall be installed in each zone duct downstream of the point where the cold duct and hot duct join together. Care shall be used to see that these test connections are installed in straight runs and not close to turns of elbows where possible.

c. Where fans are in packaged units, a test connection shall be installed in the packaged unit housing upstream of the fan or fans.

4.4 Sheet Metal Work

a. Sheet metal WORK shall be required for all systems noted under Scope of Work and shall include furnishing and installation of intake and exhaust louvers and screens, plenum structures and casings (except where otherwise indicated on drawings), access doors, dampers, guards for fan drives, condensate collecting pans, close-off panels around coils, filters, or dampers, flexible connections, duct disconnect couplings, gaskets, fire dampers as required, ductwork, fittings, grilles, registers, outlets, air check valves, testing and testing records.

Ductwork shall comply with the following minimum requirements:

1. Rectangular ducts shall be constructed of galvanized steel in accordance with the latest standards of the American Society of Heating, Refrigerating and Air Conditioning Engineers and the SMACNA requirements for low, medium and high pressure systems. Note that all duct dimensions indicated are inside dimension of duct, not including flange dimensions.

2. Round ducts shall be either galvanized steel spiral pipe with four-ply lockseams, or

galvanized metal sheets with continuous butt welded seams reinforced with angular hoop braces. Note that all duct dimensions indicated are inside dimensions.

b. The terms "Low Pressure" and "Low Velocity" means velocities less than 2000 fpm and static pressures in duct of less than 2" of water.

c. The term "Medium Pressure" means pressure in the duct from 2" up thru 6" of water.

d. The term "High Pressure" means pressure in the duct over 6" and up to 19" of water.

e. Ductwork materials shall conform to the following requirements:

1. All ductwork shall be made of galvanized steel except where otherwise herein specified or indicated on the drawings.
2. Galvanized steel ductwork shall be fabricated from galvanized steel of the quality produced in the United States by The Ryerson Steel Co. under the trade name "Galvanneal" and furnished in the minimum gauges herein specified.

f. Welded Ductwork

All duct and fitting joints where welded duct construction or gas-tight construction is called for shall be continuous welded with Everdur rod.

g. All Duct Systems unless of welded construction shall have all joints continuous soldered or sealed with plastic coated duct tape as manufactured by Permacel, Arno Adhesive Tape Inc., or Duro Dyne Corp.

h. Ducts and plenums lined with insulation shall be increased in size to allow for the insulation thickness so that dimensions shown on the drawings will be net inside dimensions.

i. Duct elbows, including supply, exhaust, and return, shall be made with a centerline radius of 1.5 times the duct width parallel to the radius.

ENCLOSURE 1
ATTACHMENT 6

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

LICENSE AMENDMENT REQUEST 241
EXTENDED POWER UPRATE
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

CHARCOAL FILTER BANK CALCULATION

1 page follows

Charcoal filter bank calculation

Conditions:

1. Dimensions of filter bank are 107" x 180" x 120" high.
2. The unit has ten anchors (or more) on each of two adjacent sides (other sides not visible).
3. Assume a weight density of 35 pcf (GIP value for electrical cabinets) which is certainly heavier than the filter banks which are really air plena with filters in them.
4. Assume it responds at the peak of the PAB floor spectrum which for the SSE is 0.6g horizontal. Vertical acceleration peak is 0.11g which is based on 2/3 x ground spectral peak.

Check overturning moment (OTM) vs. restoring moment (RM):

W = [107 x 180 x 120]/1728 x 35 pcf = 47 kips

OTM = {0.6g x 60" + 0.11g x 107"/2} x W = 42W in-k

RM = 107"/2 x W = 53.5W in-k; therefore, the filter bank cannot uplift and there is no tension in the anchors.

Check anchors in shear

V = {0.6g x 47}/ 20 anchors = 1.41 kips

$V_{allowable}$ = 2.38 kip x RF_S where RF_S is the shear force reduction factor for anchorage in 3000 psi concrete and 2.38 kip is the ½" diameter concrete expansion anchor allowed load (GIP Appendix C.2.1)

RF_S = (3000/10000) + 0.65 = 0.95 (GIP Appendix C.2.7)

$V_{allowable}$ = 2.38 kip x 0.95 = 2.26 kip > 1.41 kip, so OK

ENCLOSURE 1
ATTACHMENT 7

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

LICENSE AMENDMENT REQUEST 241
EXTENDED POWER UPRATE
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

SEISMIC EVALUATION OUTLIERS

2 pages follow

- Roof Intake Enclosure for CREFS HVAC

  The CREFS air intake consists of ductwork, which penetrates the roof of the HVAC room in the Turbine Building. The ductwork then penetrates the west wall of the Turbine Building and terminates in a louvered metal enclosure. The SRT examined the ductwork above the HVAC Room (Photo 4) and found it to be rugged and judged seismically adequate. The intake enclosure is a relatively light gage enclosure that was also judged as seismically adequate.

- Charcoal Filter in W30 Fan Room

  The SRT examined the charcoal filter for Fans W-30 A & B. In the same room (about 20 ft away) there are charcoal filter banks with a footprint of 107" x 180". The visible 107" side has 10 - ½" concrete expansion anchors with two anchors having nuts that are raised. The 180" side cannot be fully viewed as it is adjacent to a wall but at least 10 anchors were counted, some of which again were missing nuts or for which the nuts were raised. The two other sides are inaccessible. The filter banks are about 10' high and are adjudged to have a natural frequency in excess of about 20 Hz. Since filter banks cannot uplift the anchors only need to resist base shear. There are a sufficient number of anchors visible to accomplish this therefore the filter banks are declared seismically adequate.

  The SEWS for Fans W-30 A & B include the charcoal filter assessment.

9.0 Outliers

The summary table below identifies the duct, supports, and equipment that have not met the screening guidelines and/or the analytical review criteria of Reference 2. The resolution for each outlier is provided in the following table.

No.	Area	Duct No.	Type	Description
1	PAB - Area 4	1	Hanger	Add a new trapeze support to the 104x26 duct (LAR 1)
2	PAB - Area 5	14	Hanger	Add a new trapeze support above the Containment Spray Pumps (LAR 6)
3	PAB - Area 5	26	Hanger	Replace existing "Z" shaped horizontal support with new shop fabricated support (LAR 7)
4	Pipeway 3 - Area 5	30A	Lateral Support	Add a lateral support to the end of the duct in Pipeway 3
5	Pipeway 3 - Area 5	25	Lateral Support	Add a lateral support to the end of the duct in Pipeway 4
6	Unit 1 RHR Hx Room - Area 8	37	Vertical Support	Add a knee brace support at duct corner near column line N/10
7	Unit 1 RHR Hx Room - Area 8	37	Duct Stiffeners	Add two horizontal stiffeners to the top of the EW duct near column line N/10

No.	Area	Duct No.	Type	Description
8	Unit 2 RHR Hx Room	36	Vertical Support	Fasten existing support to duct near column line N/13
9	CREFS	N/A	Fans (4 total)	A three way support will be installed for W14A&B and W13B1&B2 that will render the vibration isolators as ineffective. The identified corrosion will be cleaned and the load path and anchorage will be re-inspected to determine their effectiveness and repaired as required (W13B1 and W13B2) (see SEWS). By making the vibration isolators ineffective and by correcting any corrosion issues, the equipment fundamental frequencies will not fall in the range where seismic demand exceeds the seismic capacity.
10	CREFS	43	Lateral Support	Add new lateral support on the Intake Duct near the bellows (at entry to charcoal filter)
11	PAB - Area 4	1	Hanger	Shell anchor failed vertical capacity check. Refined analysis found to be acceptable. No additional resolution required.
12	PAB - Area 4	4	Hanger	Shell anchor failed vertical capacity check. Refined analysis found to be acceptable. No additional resolution required.

Note: A broken duct (Duct No. 39) support at the floor penetration near column line P/13 was reported to PBNP and will be repaired (see CAP 01157521)

HVAC System Outlier Sheets (HSOS) for each outlier are included as attachments to this report.

10.0 Conclusion

The CREFS and VNPAB exhaust systems were seismically verified using the guidelines and criteria in Reference 2. The ducts, dampers, fans, and supports for the subject systems are found to be acceptable for the application of Reference 2. Systems temperatures and PBNP seismic motions are also found to be acceptable.

The SRT consisted of experienced, licensed engineers with the appropriate required SQUG GIP qualifications.

Dr. Robert P. Kennedy performed the required Peer Review of the seismic verification. Dr. Kennedy's report (Reference 11) is provided in Attachment 12.6 and concludes that as long as outlier issues are resolved the reviewed ductwork and associated components will be seismically adequate for the PBNP seismic design ground motion level.

In plant screening walkdowns regarding HVAC system and duct support structural integrity were performed by the SRT in accordance with the Reference 2 guidelines. SEWS were developed for the components and ductwork included in walkdown.

ENCLOSURE 2

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

TRANSMITTAL OF INFORMATION TO SUPPORT
LICENSE AMENDMENT REQUEST 241
PBNP VNPAB AND CREFS SEISMIC EVALUATION

S&A REPORT NO. 09Q0839-R-001
PBNP VNPAB AND CREFS SEISMIC VERIFCATION
REVISION 1, DATED JULY 15, 2010

173 pages follow

Document: Report No. 09Q0839-R-001 Title: PBNP VNPAB and CREFS Seismic Verification

Document Type:
Criteria ☐ Interface ☐ Report ☒ Specification ☐ Other ☐ Drawing ☐

Project Name: PBNP VNPAB and CREFS Seismic Verification
Job No.: 09Q0839
Client: Nextera Energy / PBNP

This document has been prepared in accordance with the S&A Quality Assurance Program Manual, Revision 16 and project requirements:

Initial Issue (Rev. 0)	
Prepared by: Philip Gazda P.A. Gazda	Date: 11/12/09
Reviewed by: Walter Djordjevic W Djord	Date: 11/12/09
Approved by: Walter Djordjevic W Djord	Date: 11/12/09

Revision Record:

Revision No.	Prepared by/ Date	Reviewed by/ Date	Approved by/ Date	Description of Revision
1	P.A. Gazda/ 7/15/10 P.A. Gazda	W. Djordjevic/ 7/15/10 W Djord	W. Djordjevic 7/15/10 W Djord	Revised cover sheet, table of duct thicknesses, and outlier description table. Revised SEWS for project compliance. SUPERSEDES REVISION 0 IN ITS ENTIRETY.

S&A Stevenson & Associates	DOCUMENT APPROVAL SHEET Figure 2.8	CONTRACT NO. 09Q0839

TABLE of CONTENTS

1.0 Purpose

The purpose of this report to document the results of the seismic verification of the Point Beach Nuclear Plant (PBNP) Primary Auxiliary Building exhaust (VNPAB) and Control Room Emergency Filtration System (CREFS) ductwork, associated supports and components.

2.0 Background

NextEra Energy Point Beach, LLC submitted License Amendment Request (LAR) 241 to the NRC pursuant to 10 CFR50.90. The license amendment would revise the current licensing basis to implement the alternative source term (AST) through reanalysis of the radiological consequences of the Point Beach Nuclear Plant (PBNP) Final Safety Analysis Report, Chapter 14 Accidents.

During the review of LAR 241, the NRC staff expressed concern regarding the seismic adequacy of the Control Room Emergency Filtration System (CREFS) and Primary Auxiliary Building Ventilation System (VNPAB) credited in the PBNP AST analysis. In response, PBNP committed (Reference 1) to evaluate the seismic adequacy of CREFS and VNPAB ventilation systems credited in the AST analyses. The evaluation approach would be consistent with the approach used for the Edwin I. Hatch Nuclear Plant (Reference 9) to provide reasonable assurance that the credited post-accident ventilation systems would operate and retain pressure integrity during and following a seismic event.

The PBNP seismic verification evaluation was conducted in accordance with the guidelines provided in the Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment (SQUG GIP) (Reference 8) for fans, motors and heat exchangers, and the December 2006 Electric Power Research Institute (EPRI) Final Report 1014608, "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems, Revision to 1007896" for ducts, dampers and hangers (Reference 2). This seismic verification process was previously used at the Hatch Nuclear Plant (Reference 9) to provide reasonable assurance that a post LOCA ventilation system would retain pressure integrity during a seismic event. The NRC accepted and approved the Hatch seismic evaluation (see Reference 1 for discussion).

3.0 Methodology and Scope

The methodology in EPRI report "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems, Revision to 1007896" was used to evaluate the seismic adequacy of the PBNP Control Room Emergency Filtration System (CREFS) and Primary Auxiliary Building Ventilation System (VNPAB). The screening guidelines are primarily based on seismic experience data that show that most types of HVAC duct and damper systems exhibit extremely good performance under strong-motion seismic loading, with the pressure boundary being retained in all but a handful of cases.

The seismic verification evaluation for PBNP included the following key steps.

1. Identified the HVAC systems that required evaluation by conducting interviews with station engineers and reviewing station drawings and design specifications. The HVAC systems reviewed consisted of the Control Room Emergency Filtration System (CREFS) and Primary Auxiliary Building Ventilation System

(VNPAB) credited in the PBNP AST analysis. The components for these systems include:

- Control Room HVAC ductwork, dampers, filters, and fans required for the proposed accident mode of operation (makeup and recirculation with filtration).
- Control Room Bathroom HVAC.
- Control Room HVAC roof intake structure.
- Control Room HVAC control panel C-67 (located in the control room).
- PAB exhaust ductwork, dampers, filters and fans located on or below Elevations 8' and 26' that provide exhaust for various ECCS equipment, components and sumps. This also includes ductwork in Pipeways 1, 3, and 4. (Note that there is no ductwork in Pipeway 2 associated with the subject scope of work).
- PAB exhaust stack.
- Confirmation that the power supplies for fans W-13 B1 & B2 (Control Room Recirculation Fans), W-14 A & B (F-16 Control Room Charcoal Filter Fans), W21 A & B (PAB Exhaust Fans) and W30 A & B (F-23/F-29 PAB Exhaust Fans) were found to be seismically adequate in the original USI A-46 program for PBNP.

2. Conducted an in-plant screening review of the subject systems for structural integrity, support review, seismic interaction, and pressure boundary integrity.
3. Selected bounding/sample configurations for limited analytical review (LAR) evaluations in accordance with Section 4 of Reference 2.
4. Developed this report and supporting calculations.
5. Submitted this report and sample calculations to an independent reviewer, Dr. Robert P. Kennedy for a Peer Review. Dr. Kennedy conducted the peer review for the previously cited Hatch duct evaluation.

It should be noted that the HVAC ductwork and plena for most of the CREFS are covered with a lightweight insulating material that obstructs viewing of some of the duct supports and duct stiffeners. The material is in place not only for insulation but also to improve the leak tightness of the system. However, the recirculation duct for the CREFS is un-insulated which allowed the Seismic Review Team (SRT) to examine the construction, stiffener spacing, hanger spacing and type, and material condition of the ductwork. This examination of the recirculation duct indicated the same type and quality of construction as that found for the VNPAB system; therefore the SRT considered it reasonable to adjudge that the number and location of CREFS stiffeners and duct supports within the insulated CREFS systems conform to the SMACNA code (Reference 4) and PBNP Ventilation System Design Specification (Reference 3) requirements and that the duct construction is adequate. The dead load, seismic and pressure stresses in the CREFS ducts, duct stiffeners, and duct supports were evaluated based on this approach.

4.0 Applicability and Qualifications

This section addresses the applicability of the materials and components used in the PBNP VNPAB and CREFS construction. Temperature and seismic limits are also discussed along with the SRT and Independent Peer Reviewer qualifications.

4.1 Materials and Components

The PBNP CREFS and VNPAB HVAC systems consist of typical ducts, dampers, supports, registers, filters, louvers, and air diffusers that are discussed and addressed in Reference 2. These components were installed in accordance with the original Specification No. 6118-M-41 "Specification for Sheetmetal Ductwork Heating, Ventilating, and Air Conditioning Systems for the Point Beach Nuclear Plant" (Reference 3) which specified that the HVAC system be designed and installed in accordance with the requirements of the Sheet Metal and Air Conditioning Contractor's National Association, Inc (SMACNA) (Reference 4). As specified in Reference 3 the subject systems are constructed from galvanized sheet steel.

4.2 Temperature

The CREFS and VNPAB HVAC systems are low temperature systems with design temperatures well below the 400° F limit discussed in Reference 2.

4.3 Seismic Motion

The NRC Staff reviewed PBNP's USI A-46 implementation program and determined that the design basis ground spectra and resulting in-structure response spectra are considered conservative spectra (Reference 10).The same response spectra will be used for the seismic verification of the subject HVAC systems.

The screening and seismic verification guidelines given in Reference 2 are applicable to any HVAC duct and damper system at any plant elevation where the plant free-field ground motion 5% damped seismic design spectrum does not exceed the Seismic Motion Bounding Spectrum of the Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment and the horizontal zero period acceleration (ZPA) of the in-structure spectra at the HVAC support anchorage does not exceed 2.0g.

The following table presents the results of the GIP bounding spectrum vs. PBNP free field comparison and the comparison of the PBNP horizontal ZPAs vs. the 2.0g requirements.

Spectra location/damping/type	Reference 2 Criteria	PBNP ZPA (OBE x 2)	Result
Free field/5%/SSE	GIP Bounding Spectrum should envelope free field	Bounding Spectrum envelopes PBNP free field	Bounding Spectrum envelopes PBNP free field (Fig 1) - OK
PAB EL 8'/7%/OBE	PBNP ZPA < 2.0g (SSE)	0.17g	PBNP ZPA < 2.0g (SSE) -OK
PAB EL 26'/7%/OBE	PBNP ZPA < 2.0g (SSE)	0.20g	PBNP ZPA < 2.0g (SSE) -OK
Pipeway 1 EL. 23.5'/5%/OBE	PBNP ZPA < 2.0g (SSE)	0.32g	PBNP ZPA < 2.0g (SSE) –OK
Pipeway 3 aisle way EL. 26'/5%/OBE	PBNP ZPA < 2.0g (SSE)	0.22g	PBNP ZPA < 2.0g (SSE) -OK
Pipeway 3 EL. 47'/5%/OBE	PBNP ZPA < 2.0g (SSE)	0.32g	PBNP ZPA < 2.0g (SSE) -OK
Pipeway 4 EL. 26'/5%/OBE	PBNP ZPA < 2.0g (SSE)	0.30g	PBNP ZPA < 2.0g (SSE) -OK
Control Building Mechanical Equipment Room EL. 74'/5%/OBE	PBNP ZPA < 2.0g (SSE)	0.36g	PBNP ZPA < 2.0g (SSE) -OK

As shown in the above table the PBNP free field spectrum is enveloped by the GIP bounding spectrum and the horizontal ZPAs at all applicable hanger/duct attachment points are less than 2.0g for SSE.

4.4 Seismic Review Team (SRT) Qualifications

The SRT consisted of Mr. Walter Djordjevic and Mr. Philip Gazda of Stevenson & Associates (S&A). Messer Djordjevic and Gazda are both experienced engineers who meet the requirements for Seismic Capability Engineers (SCE) described in the SQUG GIP (Reference 8). They are degreed engineers who have completed the SQUG developed training course on seismic and have performed SQUG walkdowns at numerous nuclear plants. Messer Djordjevic and Gazda each have over 30 years of nuclear plant experience and are licensed professional engineers.

Messer Djordjevic and Gazda have studied and are familiar with the content and intent of Reference 2, the HVAC duct and support design requirements of SMACNA and the seismic experience data for HVAC duct and damper systems.

4.5 Peer Review

Dr. Robert P. Kennedy was enlisted to perform the independent peer review of the seismic verification. Dr. Kennedy is an industry seismic expert and performed an independent peer review of the seismic evaluation guidelines presented in Reference 2.

Dr. Kennedy served as the chairman of the independent Senior Seismic Review and Advisory Panel, which provided considerable technical review and advice during the development of the SQUG GIP approach for evaluating the seismic adequacy of 20 classes of equipment plus Cable and Conduit Raceway Systems and their supports.

The independent review consisted of a site visit and a review of the supporting calculations, Screening and Evaluation Worksheets (SEWS) and Limited Analytical Reviews (LARs). The results of the Dr. Kennedy's independent review are provided in Attachment 12.6 and discussed in Section 10.

5.0 In-Plant Screening Walkdown

The initial in-plant screening walkdowns were conducted over 5 days from August 31, 2009 through September 4, 2009 by the SRT. Follow-up walkdowns were performed on September 24 and 30, 2009. Prior to the walkdowns the SRT conducted interviews with plant staff to clearly identify the HVAC systems requiring the seismic verification. Plant documents were collected and reviewed to familiarize the SRT with the subject HVAC systems.

The following table provides a list of the PBNP design drawings that show the VNPAB and CREFS HVAC systems.

HVAC System	Drwg. No.	Rev.	Title
CREFS	M-109	19	Heating & Ventilation Turbine Building, Area 3, Plans at Elev. 44'-0" & 60'-0"
CREFS	M-113	14	Heating & Ventilation Turbine Building, Area 3, Sections & Details
VNPAB	M-116	10	Heating & Ventilation Auxiliary Building, Area 4, Elev. 8'-0"
VNPAB	M-119	6	Heating & Ventilation Auxiliary Building, Area 5, Elev. 8'-0"
VNPAB	M-122	6	Heating & Ventilation Auxiliary Building, Area 6, Elev. 8'-0"
VNPAB	M-134	7	Heating & Ventilation Auxiliary Building, Area 8, Elev. 8'-0", (-)5'-3", (-)19'-3"
VNPAB	M-135	5	Heating & Ventilation Auxiliary Building, Sections, Area 8
VNPAB	M-136	7	Heating & Ventilation Turbine Building, Area 5, Sections
VNPAB	M-145	5	Heating & Ventilation Auxiliary Building, Area 4, Elev. 8'-0", Sections
VNPAB	C-342	3	Auxiliary Bldg. Vent Stack, Elevations, Sections, Details

The original Point Beach Ventilation System Design Specification No. 6118-M-41 (Reference 3) was also reviewed. Key information given in the specification is provided below.

1. The work, equipment and materials shall conform to the requirements and recommendations of the following codes and standards.
    a. American Society of Heating, Refrigeration and Air Conditioning Engineers Guide.
    b. Sheet Metal and Air Conditioning Contractor's National Association (SMACNA), Duct Manual and Sheetmetal Construction for Ventilating and Air Conditioning Systems.

2. All dampers shall be products of reputable manufacturers.
3. Rectangular ducts shall be constructed of galvanized steel in accordance with the latest standards of the American Society of Heating, Refrigeration and Air Conditioning Engineers and the SMACNA requirements for low, medium and high-pressure systems. Round ducts shall be either galvanized steel spiral pipe with four-ply lockseams, or galvanized metal sheets with continuous butt-welded seams reinforced with angular hoop braces. The CREFS and VNPAB HVAC systems are designed as low-pressure systems.
4. Hangers and supports shall be designed to support the weight of the duct or equipment and shall have a minimum factor of safety of five based on ultimate tensile strength of material used.
5. Support spacing for ducts shall not exceed approximately;
    a. 96" for ducts whose greater dimension is under 18"
    b. 66" plus or minus for ducts 18" – 60" on the maximum side.

The SRT walkdown SEWS are provided in an attachment to this report.

As part of the walkdown the SRT enlisted the help of the PBNP Ventilation System Engineer who is experienced in HVAC duct construction in order to identify and confirm the type of duct joints used in the construction of the ductwork. The results of this effort are discussed in Section 6.1.3 of this report.

Additionally the SRT enlisted the services of the PBNP ISI group in order to confirm the sheet metal gage used for the ductwork. The SRT selected 5 locations in the PAB and one location on the CREFS for ultrasonic testing in order to confirm that the ductwork gage met SMACNA requirements. Specification 6118-M-41 requires that the gage of the duct is two gages heavier than that required by SMACNA. Ductwork for the VNPAB and the CREFS were tested using ultrasonic testing with the following results as shown in the table below:

Duct Dimension (WxH)	Location	Measured (in)	SMACNA Required	6118-M-41 Spec Required
104"x26"	PAB EL 8' Area 4	0.057 (17 gage)	0.0516 (18gage)	0.0635 (16 gage)
76"x20"	PAB EL 8' Area 4	0.053	0.0396 (20 gage)	0.0516 (18 gage)
56"x26"	PAB EL 8' Area 4	0.043	0.0396 (20 gage)	0.0516 (18 gage)
48"x26"	PAB EL 8' Area 4	0.043	0.0336 (22 gage)	0.0396 (20 gage)
10"x8"	PAB EL 8' Area 4	0.033	0.0217 (26 gage)	0.0276 (24 gage)
50"x40"	CREFS Recirc Duct	0.040	0.0336 (22 gage)	0.0396 (20 gage)

The data show that the actual ductwork gages always exceed the SMACNA minimum required gages but not always by 2 gages. Sometimes the actual gage appears to be only one gage heavier. This could also be attributable to measurement precision. For this evaluation the SMACNA minimum gages will be used for the pressure evaluations

which is conservative. Specification 6118-M-41 gages will conservatively be used for the dead load and seismic evaluations.

6.0 Walkdown and Screening Results

As described in Section 2.0 the methodology in EPRI report "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems, Revision to 1007896" was used to evaluate the seismic adequacy of the CREFS and Primary Auxiliary Building Ventilation System (VNPAB).

The function of the VNPAB exhaust ductwork is to remove and process air from the PAB. The function of the CREFS ductwork is to provide filtered air to the Control Room. Ductwork must remain intact during and after a seismic event. Duct distortions should not be large enough to restrict airflow. The walkdowns were performed considering these functional criteria.

As previously discussed the HVAC ductwork and plena for most of the CREFS are covered with a lightweight insulating material that obstructs viewing of some of the duct supports and duct stiffeners. The material is in place not only for insulation but also to improve the leak tightness of the system. However, the recirculation duct for the CREFS is un-insulated which allowed the Seismic Review Team (SRT) to examine the construction, stiffener spacing, hanger spacing and type, and material condition of the ductwork. This examination of the recirculation duct indicated the same type and quality of construction as that found for the VNPAB system; therefore the SRT considered it reasonable to adjudge that the number and location of CREFS stiffeners and duct supports within the insulated CREFS systems conform to the SMACNA code (Reference 4) and Reference 3 requirements and that the duct construction is adequate. The dead load, seismic and pressure stresses in the CREFS ducts, duct stiffeners, and duct supports were evaluated based on this approach.

This section addresses the structural integrity review, structural support system review, dampers, seismic interaction review, and pressure boundary integrity review. Figures 2 through 8 show the VNPAB exhaust and CREFS ductwork along with duct numbers used in the evaluation.

6.1 Structural Integrity Review

This section describes the analytical and walkdown results for the HVAC duct and duct support attributes that were examined by the SRT during the screening walkdowns. Section 6.1.1 addresses the stresses in the ducts. Sections 6.2.1 and 6.5 address the duct support stresses and the pressure stresses in the ducts.

6.1.1 Duct Stresses

Analytical evaluations were performed on HVAC duct and support configurations in accordance with the methodology given in Section 4 of Reference 2. These evaluations are documented in Reference 5.

The duct evaluation criteria are based primarily on the design approach used in SMACNA's construction standards for round and rectangular duct. The pressure boundary integrity review of the HVAC duct considers the combined effects of pressure, dead weight and seismic loads on the duct. The combined dead load and seismic stress

is checked against a factored allowable working stress for acceptance. Seismic stresses were determined using an equivalent static load approach. The allowable bending stress is 8 ksi for carbon steel per Reference 2.

Duct spans influence the seismic and dead load stresses in the duct. Reference 2, Appendix C provides the allowable span length criteria using the analytical guidelines presented Reference 2, Section 4. This criteria was used to check the HVAC duct spans.

Duct sections were evaluated in Reference 5 for dead load and seismic stresses using the methodology of Reference 2 when the duct has 3 or more spans. Ducts with less than 3 spans or cantilevered sections were evaluated similarly using equations that reflect the actual span conditions. The initial assessment was performed using the peak acceleration 'g' value for the applicable area of the plant. Only five duct sections exceeded the allowable stresses for the initial evaluation. Of the five, three sections are cantilevers and are discussed in Section 6.1.7. The other two sections were found acceptable when evaluated considering actual duct frequency and corresponding acceleration values or using actual duct density.

6.1.2 Tie Downs

VNPAB ductwork is often not positively secured to the horizontal angle cross-member of the trapeze hangers. As discussed in Sections 3 and 6, it is assumed that the CREFS ductwork has similar anchorage construction. The SRT judged that this is unimportant since most hangers consist of trapeze supports that "capture" the ductwork between the vertical support rods thereby ensuring that the ducts cannot fall off the hanger during a seismic event. The last hangers on cantilevered or terminated ducts in the PAB were examined and found to be positively secured to the end hanger.

6.1.3 Joints

As part of the walkdown the SRT enlisted the help of a PBNP Ventilation System Engineer who is experienced in HVAC duct construction in order to identify and confirm the type of duct joints used in the construction of the ductwork. The following joints were identified in the field:

1. Drive Slip (No. T-1, Fig. 3-1, Reference 2)
2. Standing S (No. T-10, Fig. 3-1, Reference 2)
3. Standing S (ALT) (No. T-11, Fig. 3-1, Reference 2)

The VNPAB ductwork has Drive Slip joints that are in place on all 4 sides of smaller rectangular ducts and on the vertical sides of larger rectangular ducts. Standing S and Standing S (ALT) joints are provided on the top and bottom sides of larger rectangular ducts.

The normal allowable bending stress for rectangular ducts may be increased by a factor of 1.7 for DBE loads as discussed in Section 4.1 of Reference 2. However as discussed in Section 4.2.1 of Reference 2 the use of Standing S and Standing S (ALT) duct joints requires the use of a 1.0 factor for the normal allowable bending stress.

As discussed in Sections 3 and 6 it is assumed that the CREFS ductwork is constructed similarly to the VNPAB ductwork.

6.1.4 Appurtenances

The SRT observed one large appurtenance attached to the VNPAB ductwork at the entrance of Pipeway 3 (Photo 1). The appurtenance consisted of a 6" diameter capped pipe approximately 3' long which is attached to the side of the duct. This pipe is assumed to be used as a temporary ventilation connection to the duct. It was also determined that the pipe is attached to a nearby post and therefore would not significantly load the duct. The SRT judged this to be acceptable. VNPAB duct access doors and registers appeared to be adequately fastened and attached.

The SRT also observed a large damper located in the mid-span portion of the CREFS ductwork that runs from the charcoal filter plenum to the plenum containing fans W-13B1 and W-13B2. The duct and damper at this location are structurally anchored to the concrete ceiling and was judged to be seismically acceptable (Photo 2). CREFS duct access doors and registers appeared to be adequately fastened and attached.

6.1.5 Flexibly Mounted Heavy Equipment

The CREFS fans W-14A and W-14B and W-13B1 and W-13B2 are mounted on vibration isolators (see SEWS) and have been determined to be outliers. The anchorage for these fans will be modified in order to provide an adequate connection for lateral seismic loads.

The anchorages for the four large fans in the PAB were previously modified to remove the vibration isolators. As shown on the SEWS for Fans W-30A and W-30B the new anchorage was designed for the lateral seismic loads. Fans W-21A and W-21B were also modified however it was not clear if after reviewing plant documentation that the anchorage was seismically designed. The SEWS for Fans W-21A and W-21B includes a calculation confirming the seismic adequacy of the anchorage.

The SRT observed the expansion joints connecting the ductwork to fans W-21A, W-21B, W30A and W30B. The expansion joints appeared to be rugged and in excellent condition. Sufficient 'slack' is available to accommodate the small seismic duct movements; therefore the expansion joints are acceptable.

6.1.6 Branch Flexibility

VNPAB main ductwork has a number of locations where small branch ducts or pipes are attached to provide exhausts for small rooms and/or sumps. The seismic lateral displacements of the main ducts were computed at these locations and they were determined to be less than 3/8". Therefore, branch flexibility is determined to be acceptable.

No branch lines or hard spots for the CREFS ductwork were observed by the SRT.

6.1.7 Cantilevered Ducts

The VNPAB ductwork has a number of small cantilever ducts that terminate in open areas or pipeways or small rooms. Larger ducts are cantilevered in the fan rooms above the W-21 A & B and W-30 A & B fans. The CREFS has one cantilevered duct. These ducts were evaluated in Reference 5. The results are listed below:

- The ducts in Pipeways 3 and 4 require the addition of a lateral support at the end of these cantilevers.
- The ducts above the W-21 A & B and W-30 A & B fans are found to be seismically adequate.
- Two small ducts had ductwork that extended up to 4' beyond the last hanger. This condition was found to seismically adequate.
- The intake duct for CREFS requires a lateral support at the flexible entry point to the filter plenum.

6.1.8 Duct Corrosion

The SRT did not observe any instances of duct corrosion in the PAB and found the material condition of the ductwork and duct hangers to be very good in general.

The only corrosion observation was in the CREFS on the anchorage of fans W13B1 and W13B2. This anchorage will be replaced as part of the seismic upgrade of the fan anchorages.

6.2 Support System Review

This section describes the results of the duct support analysis and the results of the walkdown for the support attributes discussed below.

6.2.1 Duct Support Assessment

Duct supports are found to consist primarily of trapeze supports made up of angles supported by threaded rods anchored to the concrete with concrete expansion anchors. In some case the rods are welded directly to steel embedded plates or other steel members. In some cases wall brackets made up of angle sections are also used.

The supports were evaluated using the methodology included in Appendix F of Reference 2. Checks were performed for the following:

- Dead load check
- Vertical capacity check
- Ductility check
- Rod hanger fatigue

The results of the review are provided in Reference 5. Supports that require modification are discussed in Section 9, Outliers.

The dead load check for the supports performed in Reference 5 included evaluations of the threaded rods, shell anchors, and angle members. Based on the SRT walkdown, the minimum diameter for the threaded rods and shell anchors is 3/8 inch and the

minimum angle size is L2x2x1/8. The evaluations were performed considering an average tributary span for the vertical supports using the minimum size of the component. The evaluations were in accordance with the AISC Manual of Steel Construction 9th Edition (Reference 7) and the Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment (Reference 8). All supports satisfied normal allowable stresses for the rods and shells. All supports satisfied the conservative evaluation for the angle members with the exception of six duct spans. Detailed evaluations were performed for these six sections considering a realistic weight distribution on the angle member and they were also found acceptable.

The vertical capacity check (5 times dead load) for the supports performed in Reference 5 included evaluations of the rods and shell anchors in accordance with Reference 2. The vertical capacity check focuses on the weak link in the support. Per Reference 5, the shell anchor capacity (per Reference 8) controlled over the threaded rod capacity (per Reference 7). All supports for all duct sections met the vertical capacity check.

The walkdown performed by the SRT indicated that the support configurations were primarily rod hanger trapeze supports. In accordance with Reference 2, supports constructed of threaded steel rods with fixed-end connections details behave in a ductile manner under horizontal motion. No additional ductility check is required and no hard spots were identified.

The rod fatigue evaluation is discussed in Section 6.2.9.

6.2.2 Beam clamps

The use of beams clamps was observed in an extremely small number of cases. In each case the clamp was oriented properly to preclude the clamp from slipping off the member it is connected to in a seismic event and therefore found to be acceptable.

6.2.3 Channel Nuts

The large majority of duct supports for the VNPAB and CREFS consist of threaded rod trapeze supports. Except for one hanger in the PAB Containment Spray Pump area the SRT did not observe the use of strut materials that would require the use of channel nuts. The noted hanger is assessed in LAR 6 and it is recommended to replace this hanger with a standard trapeze support.

6.2.4 Cast Iron Anchor Embedment

The use of cast iron embedments was not observed by the SRT.

6.2.5 Broken Hardware

One case of broken hardware was observed by the SRT (PAB, Unit 2, at the floor penetration adjacent to RHR cubicle). This item was reported to the station and will be repaired by PBNP under CAP 01157521.

6.2.6 Support Corrosion

No duct support corrosion was observed by the SRT.

6.2 7 Concrete Quality

The VNPAB and CREFS HVAC systems are supported primarily from the reinforced concrete floors (above and below) and walls in proximity to the ducts, plenums, fans and duct supports. The material condition of the concrete was found to be excellent by the SRT.

6.2.8 Welded Attachments

Welded duct attachments were not observed by the SRT

6.2.9 Rod Hanger Fatigue

Rod fatigue evaluations were performed in accordance with Reference 2, Appendix E. An evaluation was completed for the supports in the Auxiliary Building, in Pipeways 3, and 4 (Pipeway 1 has no rod hangers), and in the Control Room. The applicable 5% damped spectra was conservatively considered as enveloped by the 0.75g Bounding Rod Fatigue Spectra (Figure E-1 of Reference 2) for all areas except the Auxiliary Building Central where the applicable spectra was enveloped by the 0.5g Bounding Rod Fatigue Spectra. The screening chart for 3/8 inch diameter rods (Figure E-3) of Reference 2 indicated that all the rod supports were below the bounding values for weight and length.

Based on the above the rod fatigue check was performed and found to be acceptable.

6.3 Dampers

The dampers installed at PBNP consist primarily of curtain type fire dampers manufactured by Pacific Air Products (Reference 6) that are mounted in the ducts as they pass through concrete firewalls. The dampers were found to be to be rugged and are typical of those in the Earthquake Experience Equipment Class. The operators and actuators of other miscellaneous dampers are not constructed of cast iron and there is sufficient slack and flexibility for attached lines. The dampers appeared to be well anchored into the supporting concrete walls and damper operation will not be hindered by duct distortion. Photo 3 shows a typical duct/damper installation.

6.4 Seismic Interaction

The VNPAB ductwork is located in the PAB that contains Safety Related systems, structures and components (SSC). As such, these SSCs are seismically designed. The SRT did not identify any falling hazards or credible differential displacement hazards. Any small lines attached to the ductwork contained enough flexibility to absorb the small seismic displacements of the ductwork.

The CREFS ductwork is located in the Control Building Mechanical Equipment Room that is constructed of rugged reinforced concrete walls and slabs. The SRT did not identify any falling hazards or credible differential displacement hazards. Any small lines

attached to the ductwork contained enough flexibility to absorb the very small seismic displacements of the ductwork.

A conservative maximum lateral displacement was computed in Reference 5 by using long span duct sections with small cross sections. The displacement was determined to be less than 3/8 inch. This displacement is judged to be sufficiently small so as not to create any significant duct impact issues.

6.5 Pressure Boundary Integrity Review

As stated in Reference 2 earthquake experience and test data have demonstrated that duct systems that meet the SMACNA requirements performed well during earthquakes. The Design Specification (Reference 3) for the VNPAB and CREFS HAVC systems required that the ductwork be designed in accordance with SMACNA requirements. The SRT's walkdown included reviewing the sheetmetal gage, stiffener size and spacing, and duct dimensions to confirm the adherence to the SMACNA requirements.

Project calculations (Reference 5) were performed and confirmed that the duct stresses and duct stiffener stresses due to pressure loads are within the Reference 2 guidelines with the exception of Duct No 37. Per the walkdown notes, the top stiffeners for this duct are missing and must be installed at 2 locations along the duct span.

7.0 Selection of Bounding Configurations

This section addresses the selection of the bounding configurations for supports and ducts for limited analytical review and the treatment of inaccessible ducts.

7.1 Bounding Configurations (LARs)

The SRT selected seven support configurations and one bounding duct configuration that were judged to be unusual or heavily loaded for Limited Analytical Review (LAR). The LARs and the LAR tracking form are included as attachments to this report.

In addition all trapeze supports which are not evaluated in LARs were evaluated and found to be acceptable for the assessment criteria's dead load check and the 5 times dead load check (Vertical Capacity Check).

LAR 1 addresses a support for the 104x26 duct (Duct No. 1) that also supports one of the rods for an additional duct (52x22). The evaluation for dead load indicates that even when performing a detailed evaluation, the support angle is overstressed. The proposed solution is to add a new hanger at or near the existing hanger. The shell anchors did not meet the acceptance criteria for the vertical capacity check (5 times dead load) however a detailed lateral load evaluation was performed and the shell anchors were found to be acceptable. Since the shell anchors did not meet the initial acceptance criteria, the support is classified as an outlier (see Section 9.0 for additional discussion).

LAR 2 addresses a support for the 76x20 duct (Duct No. 4) that also supports a 72x14 duct, a 10x6 duct, and a 6" diameter steam pipe. All components of the support were acceptable for the dead load check. The ½ inch diameter shell anchors did not meet the acceptance criteria for the vertical capacity check (5 times dead load) however a detailed lateral load evaluation was performed and the shell anchors were found to be

acceptable. Since the shell anchors did not meet the initial acceptance criteria, the support is classified as an outlier (see Section 9.0 for additional discussion).

LAR 3 addresses a support for the 40x20 duct (Duct No. 16) that is attached to a cable tray support. Based on the relatively small weight applied to the support from the duct and the robust nature of the cable tray support, the support is acceptable by engineering judgment.

LAR 4 and LAR 5 address supports on the 54 inch diameter ductwork that leads to the Auxiliary Building Vent Stack. The supports are found to be acceptable.

LAR 6 addresses a support for the 34x14 duct (Duct No. 14). This support consists of a P1000 unistrut member that is connected by friction clamps to vertical conduits. The configuration is unacceptable by engineering judgment due to the orientation of the vertical orientation of the clamps and is considered an outlier. The unistrut member has a long span and also supports other miscellaneous components. The resolution for this LAR is to add a new trapeze support in very close proximity to the existing support.

LAR 7 supports a 26x16 duct (Duct No. 26) with a knee brace configuration that attaches to another duct support. Both ducts are supported by 2 rods that are attached to shell anchors in the ceiling. The knee brace configuration is unacceptable for dead load and is considered an outlier. All other components are acceptable for dead load and the vertical capacity check (5 times dead load). The resolution is to replace the existing knee brace with a more robust steel support.

LAR 8 evaluated the longitudinal seismic stresses of the heaviest duct section with a significantly long span. It was found to be acceptable.

Reference 2 states that when the selected configurations do not pass the analytical review, the selected population should be expanded. Several supports did not pass the analytical review requirements however all duct sections and supports were analyzed for the stresses due to dead load, seismic and pressure stresses. Therefore the requirement for expanding the selected population was satisfied. Reference 5 provides the results of the assessment.

7.2 Inaccessible Ducts

A small amount of ductwork was found to be inaccessible due to being in locked radiation areas or visually blocked by overhead items and construction scaffolds. These ducts have small cross sections and are very lightweight. Given this condition and based on the construction of the majority of the ducts and hangers that were examined during the walkdown, these inaccessible ducts were judged to be acceptable by the SRT.

These ducts are described in the following table.

Duct Location	Duct Size	Remarks
PAB EL. 8', Unit 1, 1Hx 3 A-B Room (M-119)	8" Dia	Small diameter lightweight duct that terminates in the room. OK by SRT judgment.
PAB EL. 8', Unit 2, 2Hx 3 A-B Room (M-119)	10"x 8"	Small lightweight duct that terminates in the room. OK by SRT judgment.
PAB EL. 8' and 26', aisle way at EL. 8' and ducting to and in Pipeway 3 (M-119)	14" x 6"	Small lightweight duct that runs from PAB EL. 8' to Pipeway 3. Visible portions appear to be well constructed and well supported. Duct terminates in Pipeway 3. See Section 9.1.3 for discussion on appurtenance. Ok by SRT judgment.

8.0 Miscellaneous

Miscellaneous items in addition to the VNPAB and CREFS ductwork and fans were examined by the SRT and are discussed below.

- MCCs for fans W-13 B1 & B2, W-14 A & B, W21 A & B and W30 A & B

  MCCS for the above listed fans were seismically evaluated during the PBNP initial SQUG program. The MCCs were found to be seismically adequate. The SEWS for MCCs 2B-42, 1B-42, 1B-32 and 2B-32 documenting the seismic verification of these components are included as an attachment to this report.

  The original SEWS for MCC 2B-42 required that the bolting for the MCC top supports be tightened. The SRT reviewed the top anchorage and confirmed that all visible top anchorage is now in place and tight.

- PAB Exhaust Stack

  The PAB exhaust stack is a tall steel plate stack that is located in the façade. The stack is laterally braced at two points. The exhaust stack was evaluated in Reference 5 and found to be seismically adequate.

- Control Panel C-67

  Control Panel C-67 provides the controls for the CREFS fans and dampers. This panel was examined by the SRT and found to be seismically adequate. The SEWS for this panel is included as an attachment to this report.

- Plena for Fans W-14 A & B and W-13 B1 & B2

  The plena for the listed fans were examined by the SRT and found to be seismically adequate. The evaluation of the plena is given in the SEWS for the subject fans.

- Roof Intake Enclosure for CREFS HVAC

  The CREFS air intake consists of ductwork, which penetrates the roof of the HVAC room in the Turbine Building. The ductwork then penetrates the west wall of the Turbine Building and terminates in a louvered metal enclosure. The SRT examined the ductwork above the HVAC Room (Photo 4) and found it to be rugged and judged seismically adequate. The intake enclosure is a relatively light gage enclosure that was also judged as seismically adequate.

- Charcoal Filter in W30 Fan Room

  The SRT examined the charcoal filter for Fans W-30 A & B. In the same room (about 20 ft away) there are charcoal filter banks with a footprint of 107" x 180". The visible 107" side has 10 - ½" concrete expansion anchors with two anchors having nuts that are raised. The 180" side cannot be fully viewed as it is adjacent to a wall but at least 10 anchors were counted, some of which again were missing nuts or for which the nuts were raised. The two other sides are inaccessible. The filter banks are about 10' high and are adjudged to have a natural frequency in excess of about 20 Hz. Since filter banks cannot uplift the anchors only need to resist base shear. There are a sufficient number of anchors visible to accomplish this therefore the filter banks are declared seismically adequate.

  The SEWS for Fans W-30 A & B include the charcoal filter assessment.

9.0 Outliers

The summary table below identifies the duct, supports, and equipment that have not met the screening guidelines and/or the analytical review criteria of Reference 2. The resolution for each outlier is provided in the following table.

No.	Area	Duct No.	Type	Description
1	PAB - Area 4	1	Hanger	Add a new trapeze support to the 104x26 duct (LAR 1)
2	PAB - Area 5	14	Hanger	Add a new trapeze support above the Containment Spray Pumps (LAR 6)
3	PAB - Area 5	26	Hanger	Replace existing "Z" shaped horizontal support with new shop fabricated support (LAR 7)
4	Pipeway 3 - Area 5	30A	Lateral Support	Add a lateral support to the end of the duct in Pipeway 3
5	Pipeway 3 - Area 5	25	Lateral Support	Add a lateral support to the end of the duct in Pipeway 4
6	Unit 1 RHR Hx Room - Area 8	37	Vertical Support	Add a knee brace support at duct corner near column line N/10
7	Unit 1 RHR Hx Room - Area 8	37	Duct Stiffeners	Add two horizontal stiffeners to the top of the EW duct near column line N/10

No.	Area	Duct No.	Type	Description
8	Unit 2 RHR Hx Room	36	Vertical Support	Fasten existing support to duct near column line N/13
9	CREFS	N/A	Fans (4 total)	A three way support will be installed for W14A&B and W13B1&B2 that will render the vibration isolators as ineffective. The identified corrosion will be cleaned and the load path and anchorage will be re-inspected to determine their effectiveness and repaired as required (W13B1 and W13B2) (see SEWS). By making the vibration isolators ineffective and by correcting any corrosion issues, the equipment fundamental frequencies will not fall in the range where seismic demand exceeds the seismic capacity.
10	CREFS	43	Lateral Support	Add new lateral support on the Intake Duct near the bellows (at entry to charcoal filter)
11	PAB - Area 4	1	Hanger	Shell anchor failed vertical capacity check. Refined analysis found to be acceptable. No additional resolution required.
12	PAB - Area 4	4	Hanger	Shell anchor failed vertical capacity check. Refined analysis found to be acceptable. No additional resolution required.

Note: A broken duct (Duct No. 39) support at the floor penetration near column line P/13 was reported to PBNP and will be repaired (see CAP 01157521)

HVAC System Outlier Sheets (HSOS) for each outlier are included as attachments to this report.

10.0 Conclusion

The CREFS and VNPAB exhaust systems were seismically verified using the guidelines and criteria in Reference 2. The ducts, dampers, fans, and supports for the subject systems are found to be acceptable for the application of Reference 2. Systems temperatures and PBNP seismic motions are also found to be acceptable.

The SRT consisted of experienced, licensed engineers with the appropriate required SQUG GIP qualifications.

Dr. Robert P. Kennedy performed the required Peer Review of the seismic verification. Dr. Kennedy's report (Reference 11) is provided in Attachment 12.6 and concludes that as long as outlier issues are resolved the reviewed ductwork and associated components will be seismically adequate for the PBNP seismic design ground motion level.

In plant screening walkdowns regarding HVAC system and duct support structural integrity were performed by the SRT in accordance with the Reference 2 guidelines. SEWS were developed for the components and ductwork included in walkdown.

Calculations were performed to ensure that duct stresses due to dead load, seismic and pressure loads met the Reference 2 acceptance criteria. Limited analytical review cases were select and analyzed for duct support and duct configurations. Duct supports were evaluated for dead load, vertical capacity check, and rod fatigue.

Outliers were identified that required upgrades. The appropriate documentation was put in place to track each outlier upgrade or modification.

Based on the above it has been determined that the PBNP CREFS and VNPAB exhaust system ductwork, supports, and associated components are seismically adequate for the PBNP earthquake pending the installation of the modifications to resolve the outliers.

11.0 References

1. NextEra Energy letter to the USNRC dated September 10, 2009 "License Amendment Request 241, Alternative Source Term, Commitment for Seismic Evaluation"
2. December 2006 Electric Power Research Institute (EPRI) Final Report 1014608, "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems, Revision to 1007896, "
3. Specification No. 6118-M-41 "Specification for Sheetmetal Ductwork Heating, Ventilating, and Air Conditioning Systems for the Point Beach Nuclear Plant".
4. Sheet Metal and Air Conditioning Contractor's National Association, Inc (SMACNA), Fourth Edition, 1969.
5. S&A Calculation 09Q0839-C-001
6. Pacific Air Products Co. Sheets 7108-1 thru 7108-3 showing fire dampers
7. AISC Manual of Steel Construction 9th edition
8. Seismic Qualification Utility Group Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment Revision 2, Corrected 2/14/92
9. Hatch Nuclear Plant Unit 1 Seismic Verification of the Turbine Building Exhaust Ductwork, 1302241-R-001, Revision 0, October 6, 2004
10. Safety Evaluation by the Office of Nuclear Regulation on the Wisconsin Electric Power Company Response to Supplement No. 1 to Generic Letter 87-02 for the Point Beach Nuclear Plant Units 1 and 2, Docket Nos. 50-266 and 50-301, NRC letter 98-0018 dated 7/7/1998
11. Independent Peer Review of Seismic Verification of Point Beach Nuclear Plant Primary Auxiliary Building Exhaust (VNPAB) and Control Room Emergency Filtration System (CREFS) Ductwork, Associated Supports, and Components, October 29, 2009, No RPK-91029

12.0 Attachments

12.1 Figures

1. PBNP free field spectrum vs. Bounding Spectrum
2. M-109, Heating & Ventilation Turbine Building, Area 3, EL. 44' & EL. 60'
3. M-116, Heating & Ventilation Auxiliary Building, Area 4, EL. 8'
4. M-119, Heating & Ventilation Auxiliary Building, Area 5, EL. 8'
5. M-122, Heating & Ventilation Auxiliary Building, Area 6, EL. 8'
6. M-134, Heating & Ventilation Auxiliary Building, Area 8, EL. 8', (-)5'-3", & (-)19'-3"
7. M-135, Heating & Ventilation Auxiliary Building, Area 8, Sections

8. M-145, Heating & Ventilation Auxiliary Building, Area 4, EL. 8' Sections

12.2 Photos

1. Pipeway 3 HVAC duct appurtenance
2. Damper with seismic supports on CREFS
3. Typical duct/damper installation
4. Intake ductwork for CREFS above fan room

12.3 SEWS

1. MCC 2B-42
2. MCC 1B-32
3. MCC 1B-42
4. MCC 2B-32
5. Panel C-67
6. Fan W-13B1
7. Fan W-13B2
8. Fan W-14A
9. Fan W-14B
10. Fan W-21A
11. Fan W-21B
12. Fan W-30A
13. Fan W-30B
14. VNPAB Exhaust – Area 4
15. VNPAB Exhaust – Area 5
16. VNPAB Exhaust – Area 6
17. VNPAB Exhaust – Area 8
18. CREFS

12.4 LARs

1. LAR Tracking Form
2. LAR 1
3. LAR 2
4. LAR 3
5. LAR 4
6. LAR 5
7. LAR 6
8. LAR 7
9. LAR 8

12.5 HSOS

1. HSOS 1
2. HSOS 2
3. HSOS 3
4. HSOS 4
5. HSOS 5
6. HSOS 6
7. HSOS 7
8. HSOS 8

9. HSOS 9
10. HSOS 10
11. HSOS 11
12. HSOS 12

12.6 Independent Peer Review of the Seismic Verification of PBNP VNPAB and CREFS

ATTACHMENTS
FIGURES

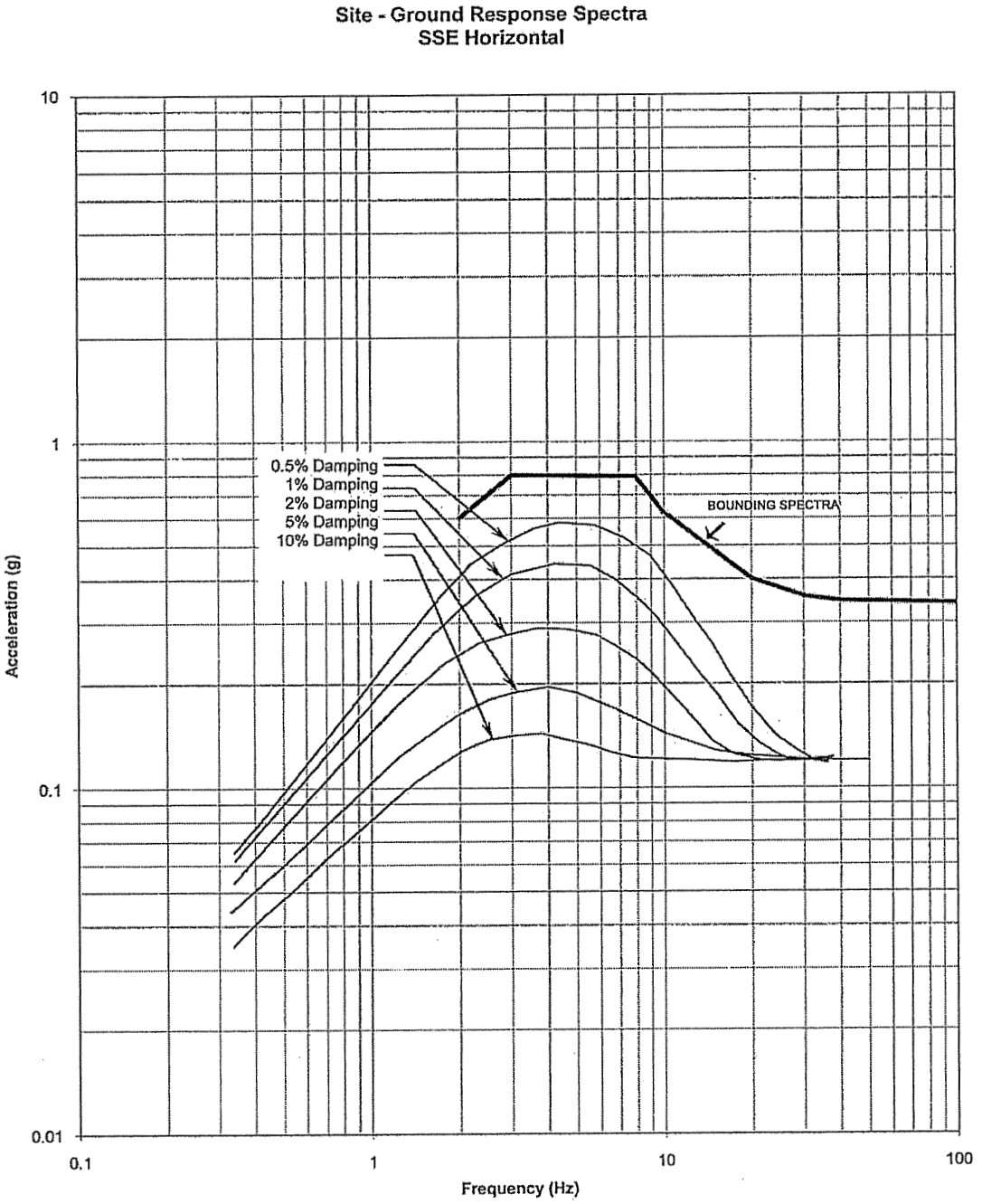


Figure 1 – PBNP Free Field Spectra vs. Bounding Spectrum

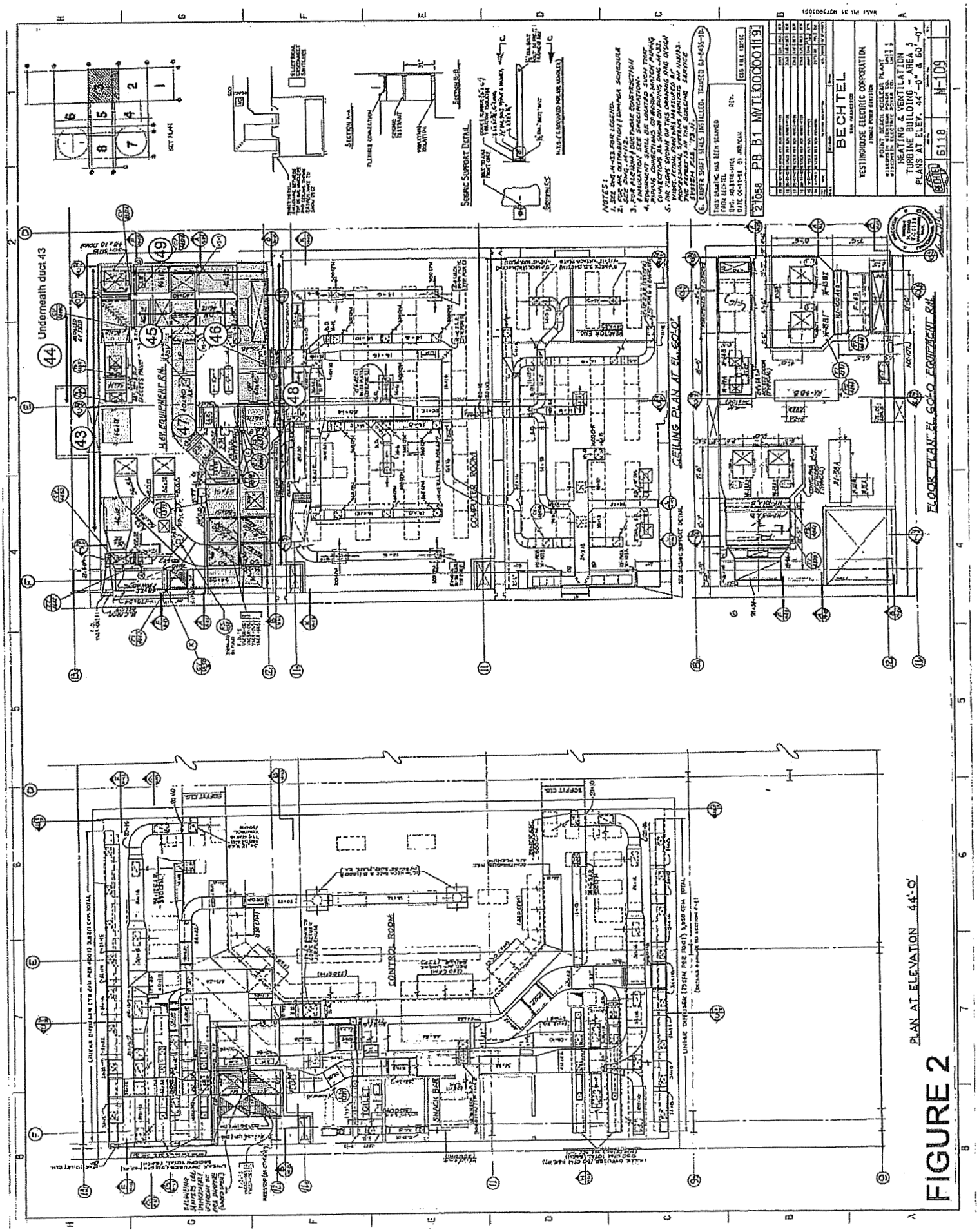
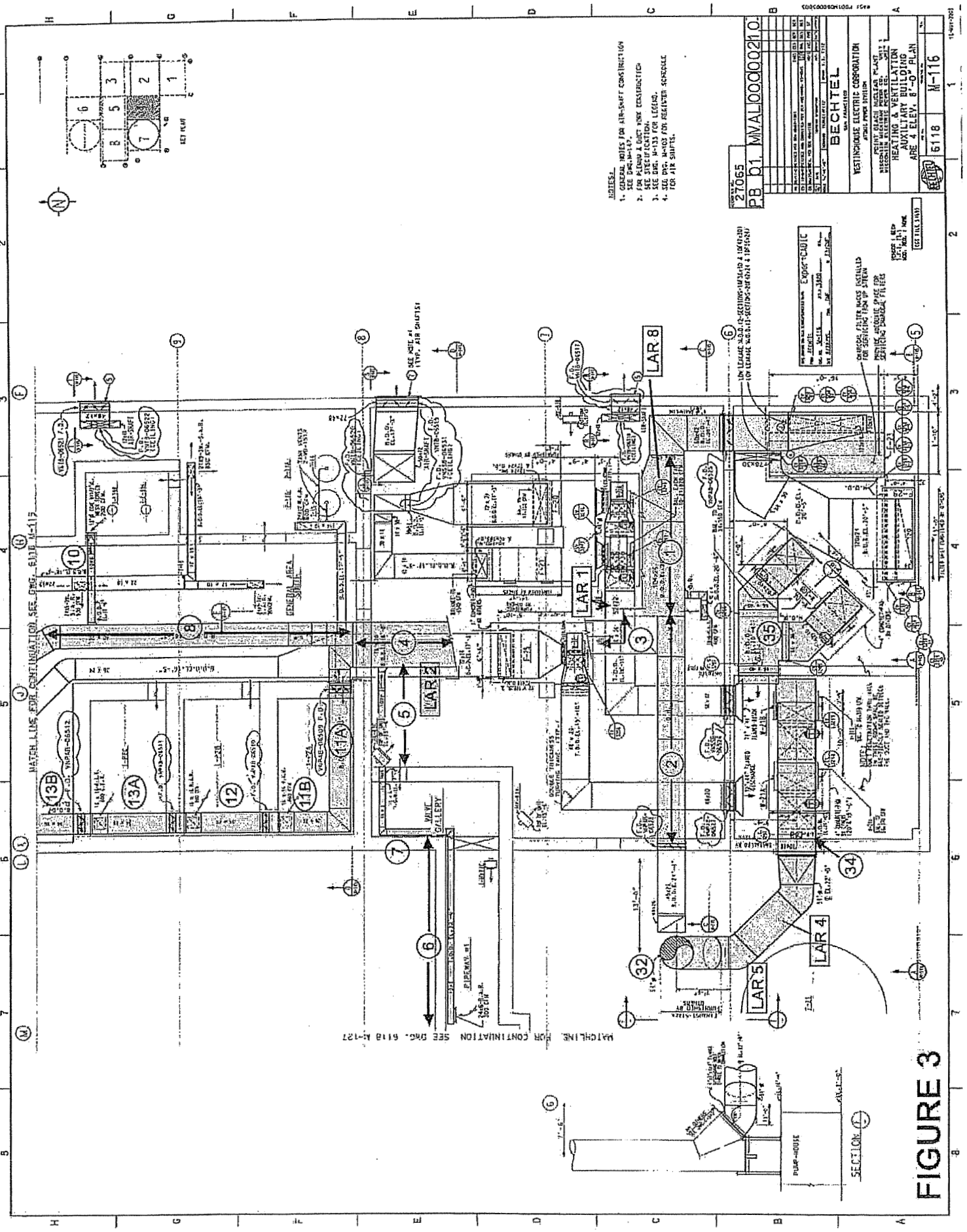

Underneath duct 43
HAIL EQUIPMENT RM.
COMPUTER ROOM
CEILING PLAN AT EL. 60'-0"
FLOOR PLAN AT EL. 60'-0" EQUIPMENT RM.
CONTROL ROOM
TOILET
SNACK BAR
PLAN AT ELEVATION 44'-0"
BECHTEL
WESTINGHOUSE ELECTRIC CORPORATION
POINT BEACH NUCLEAR PLANT
HEATING & VENTILATION
TURBINE BUILDING -- AREA 3
PLANS AT ELEV. 44'-0" & 60'-0"
M-109

FIGURE 2


27065
PB 01 MVAL0000021 0
BECHTEL
WESTINGHOUSE ELECTRIC CORPORATION
HEATING & VENTILATION
AUXILIARY BUILDING
ARE 4 ELEV. 8'-0" PLAN
6118
M-116
NOTES:
1. GENERAL NOTES FOR AIR-SHAFT CONSTRUCTION SEE DWG. M-147.
2. FOR PLENUM & DUCT HOOD CONSTRUCTION SEE SPECIFICATION.
3. SEE DWG. M-133 FOR LEGEND.
4. SEE DWG. M-103 FOR HEATER SCHEDULE FOR AIR SHAFTS.
LAR 1
LAR 2
LAR 4
LAR 5
LAR 8
MATCHLINE FOR CONTINUATION SEE DWG. 6118 M-127
SECTION
FIGURE 3

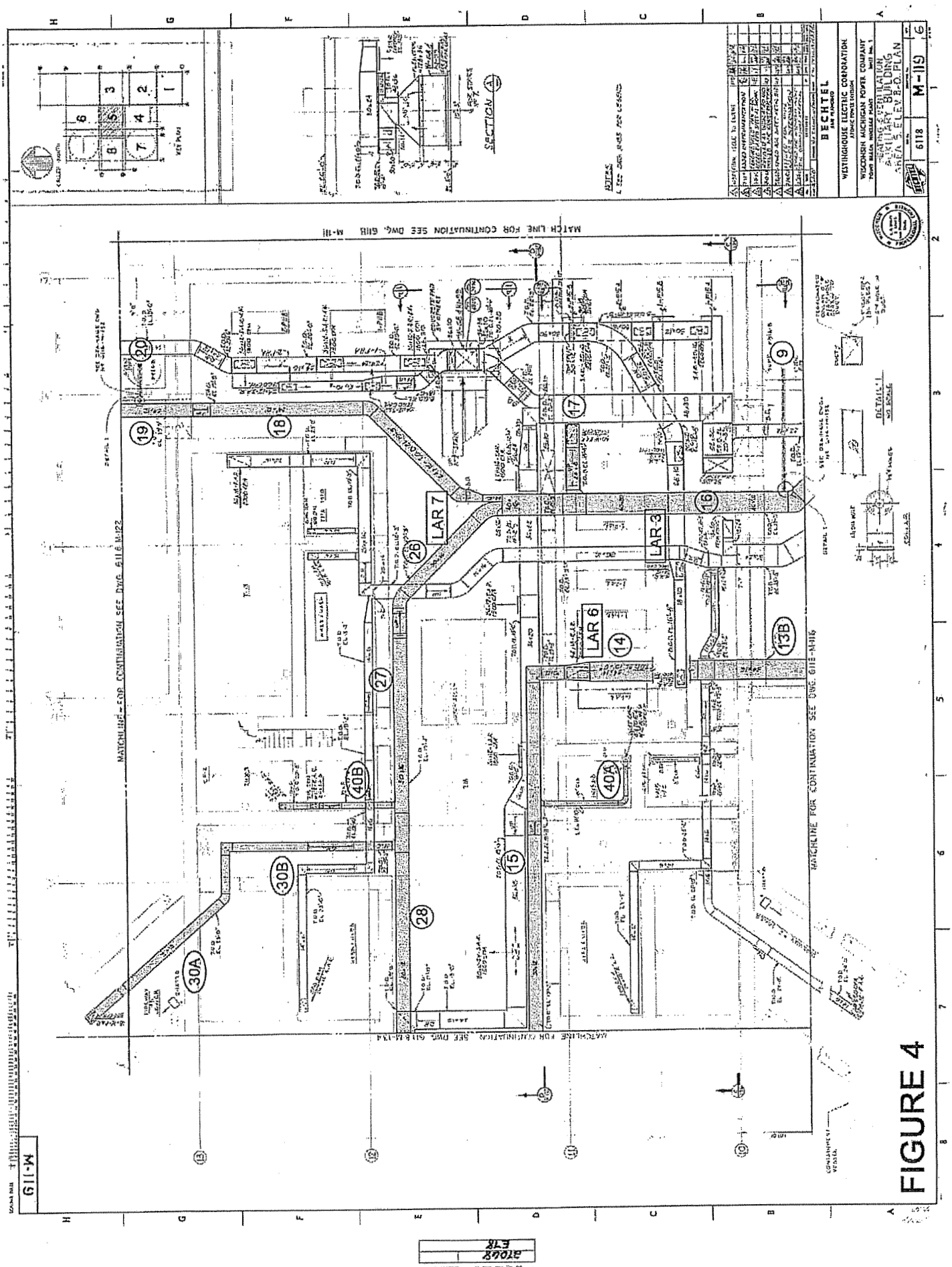

SECTION A
BECHTEL
WESTINGHOUSE ELECTRIC CORPORATION
WISCONSIN MICHIGAN POWER COMPANY
PRIMARY AUXILIARY BUILDING
AREA 5 ELEV 8'-0" PLAN
6118
M-119
MATCH LINE FOR CONTINUATION SEE DWG. 6118 M-111
MATCHLINE FOR CONTINUATION SEE DWG. 6118 M-122
MATCHLINE FOR CONTINUATION SEE DWG. 6118-M-116
MATCHLINE FOR CONTINUATION SEE DWG. 6118-M-124
LAR 7
LAR 3
LAR 6
DETAIL 1
M-119

FIGURE 4

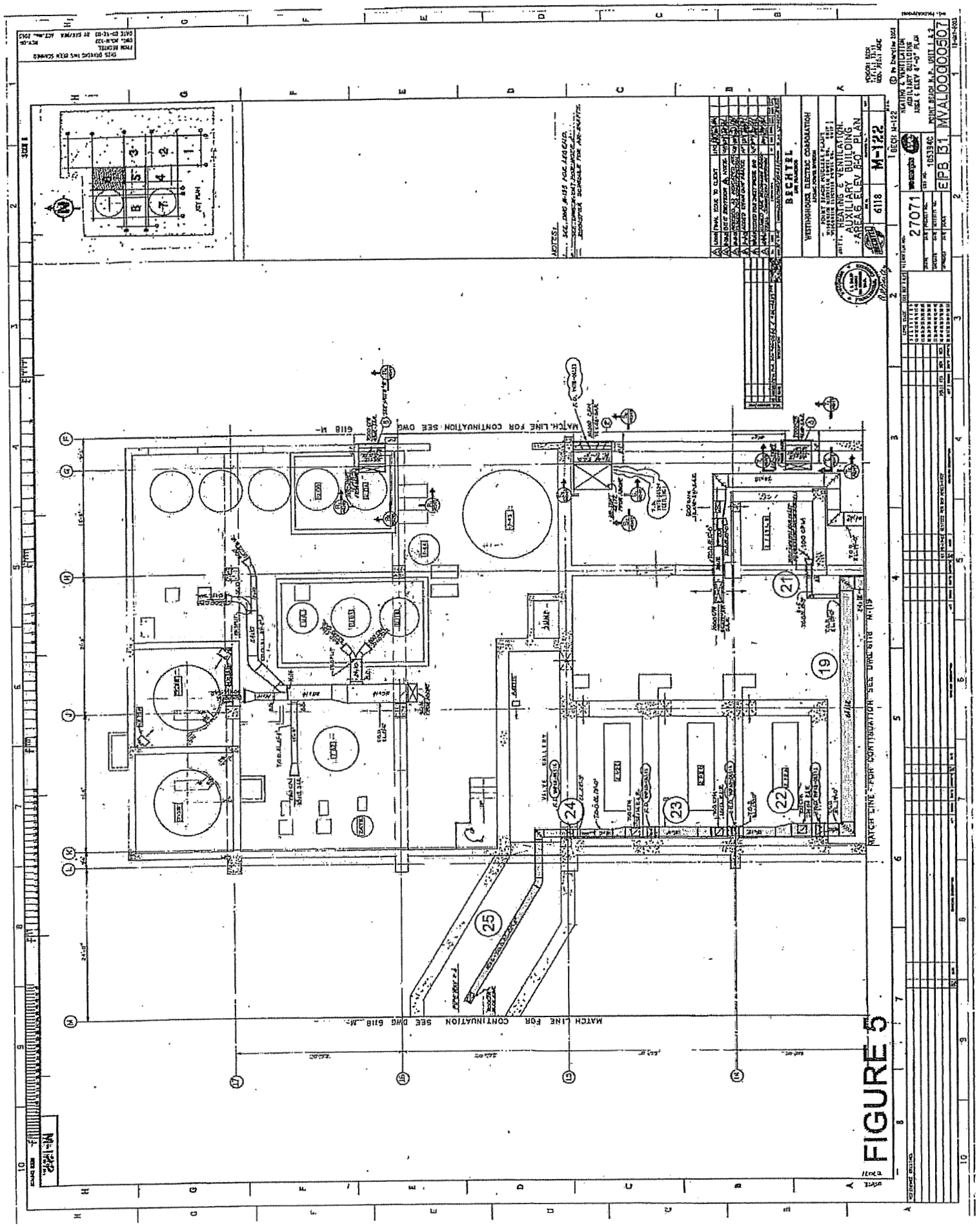

AUXILIARY BUILDING
AREA 6 ELEV 80' PLAN
M-122
BECHTEL
WESTINGHOUSE ELECTRIC CORPORATION
MATCH LINE FOR CONTINUATION SEE DWG 6118 M-
MATCH LINE FOR CONTINUATION SEE DWG 6118 M-119

FIGURE 5

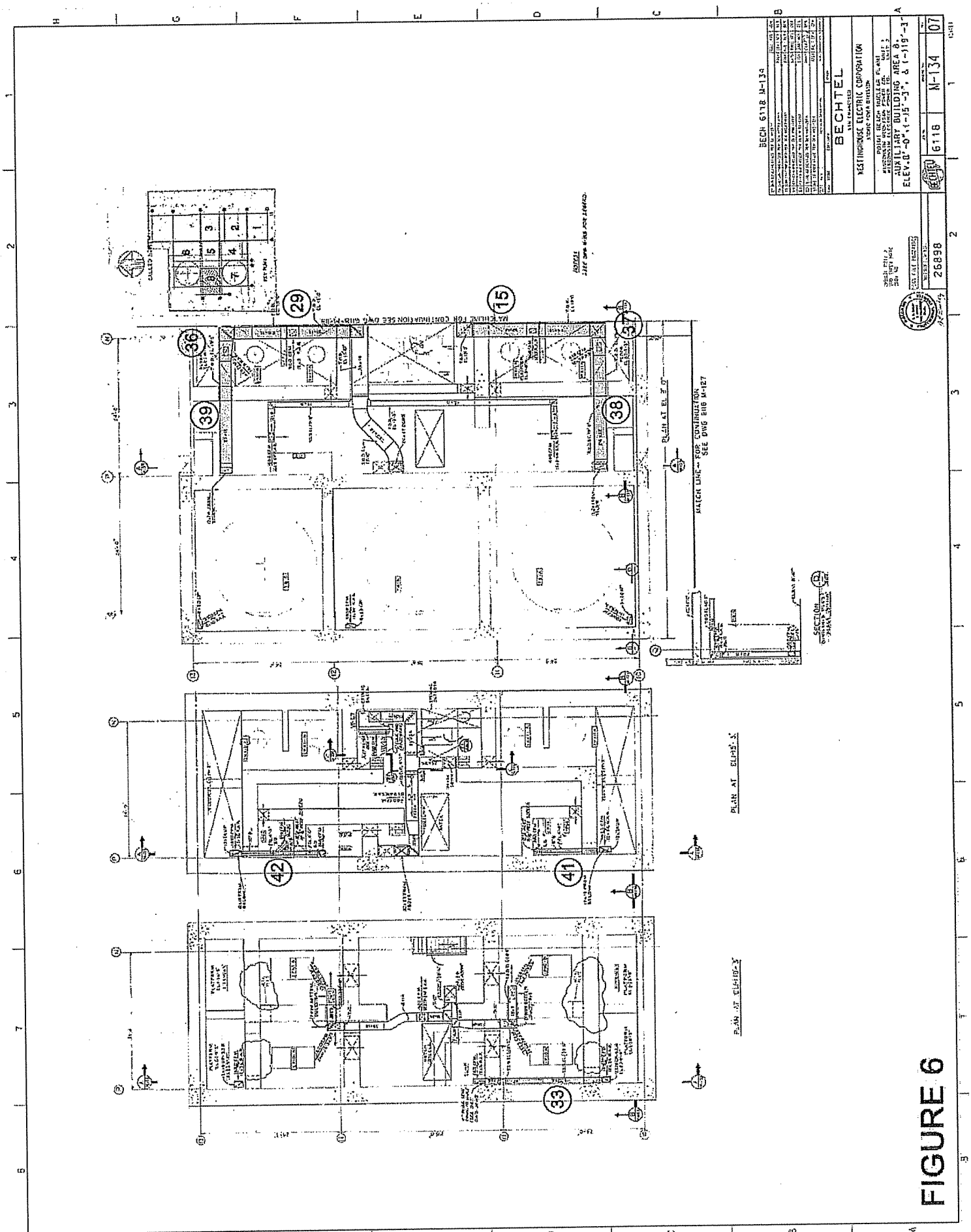

BECHTEL
WESTINGHOUSE ELECTRIC CORPORATION
AUXILIARY BUILDING AREA 8-
ELEV.8'-0",(-15'-3", & (-)19'-3"
6118
M-134
07
26898
PLAN AT EL 8'-0"
PLAN AT EL (-)19'-3"
SECTION
MATCH LINE — FOR CONTINUATION SEE DWG 6118 M-127

FIGURE 6

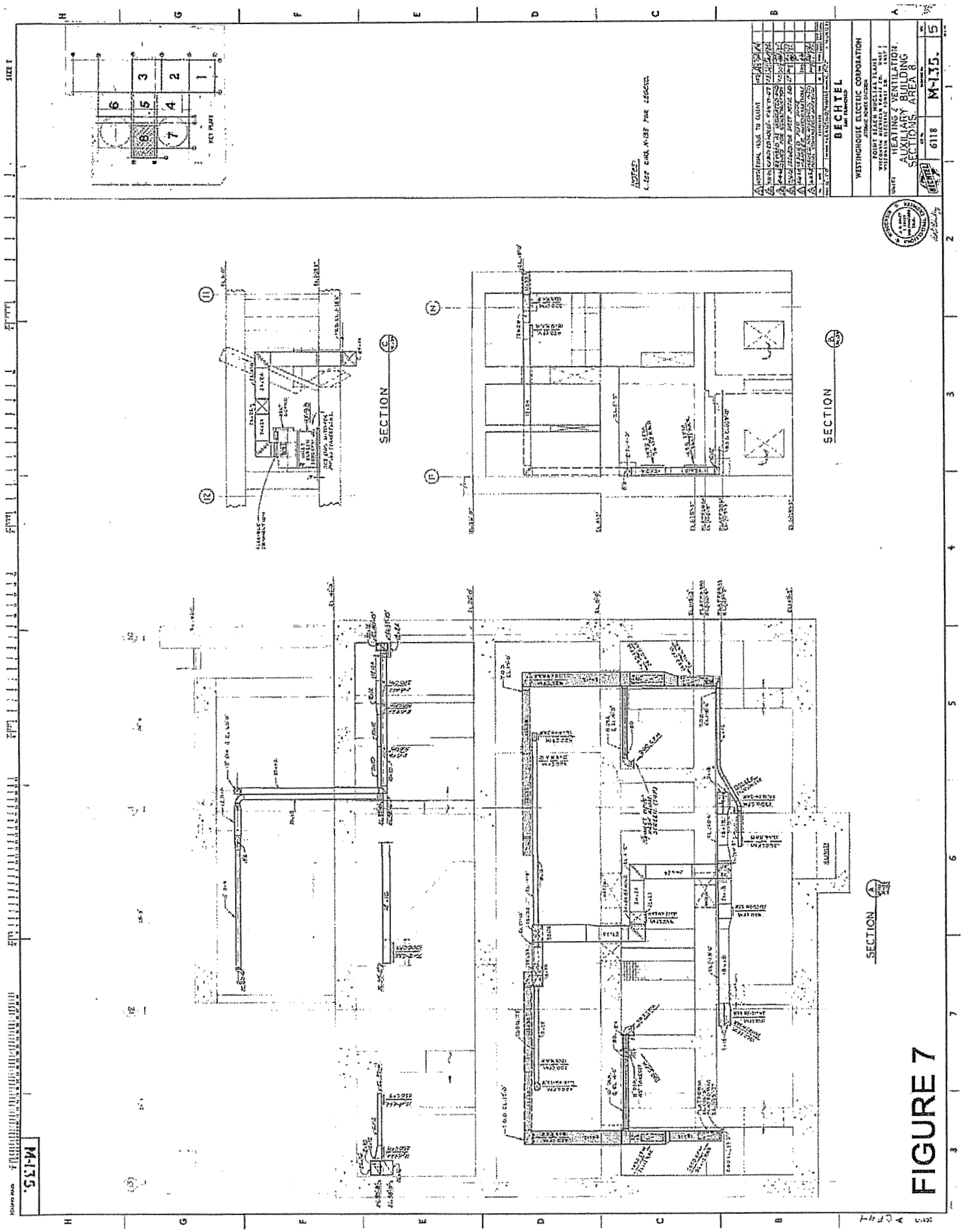

BECHTEL
WESTINGHOUSE ELECTRIC CORPORATION
HEATING & VENTILATION
AUXILIARY BUILDING
SECTIONS AREA 8
6118
M-135.
5
SECTION
SECTION
SECTION
SECTION
M-135.

FIGURE 7

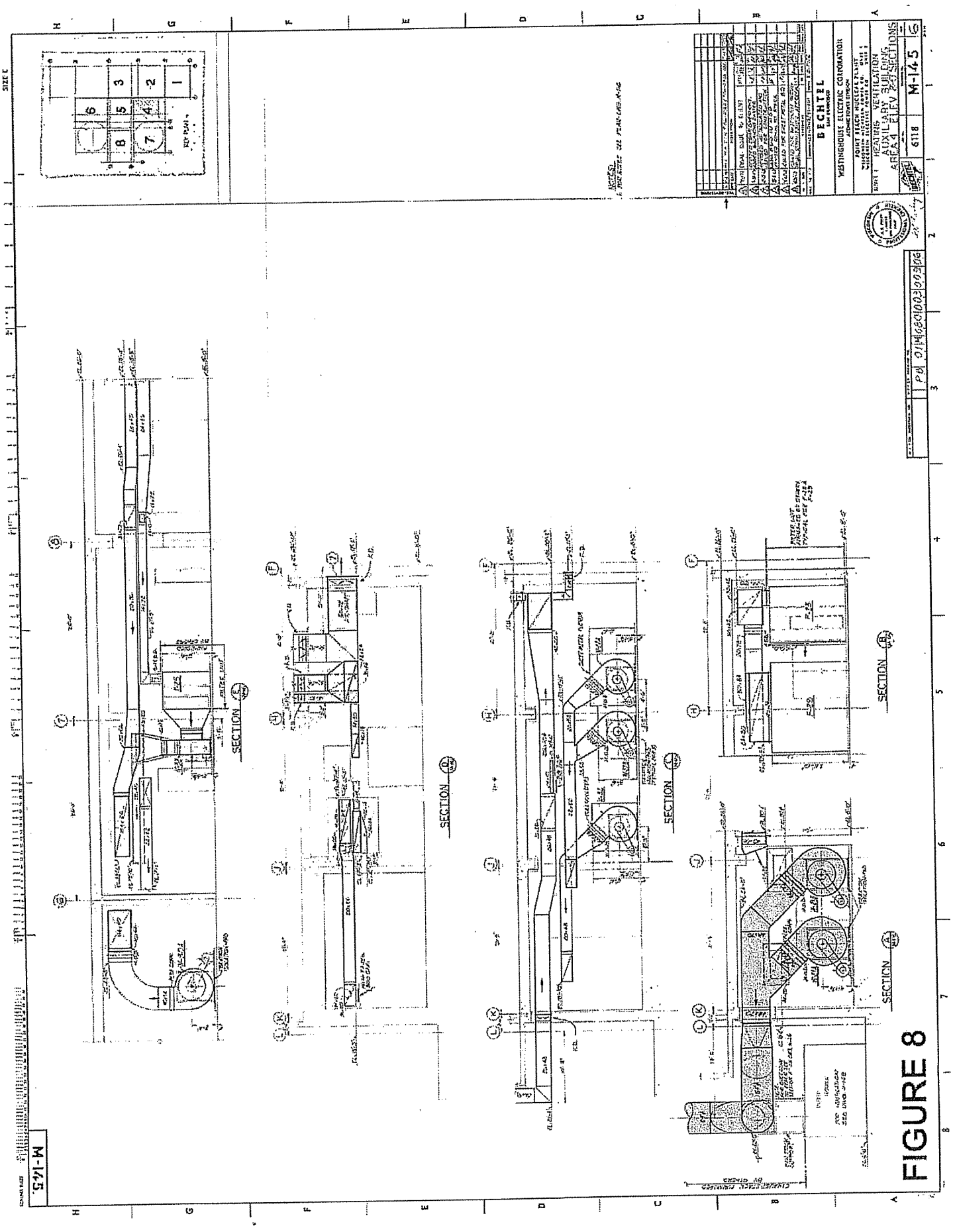

BECHTEL
WESTINGHOUSE ELECTRIC CORPORATION
POINT BEACH NUCLEAR PLANT
HEATING VENTILATION
AUXILIARY BUILDING
AREA 4 ELEV 27' SECTIONS
6118
M-145
SECTION
SECTION
SECTION
SECTION
SECTION

FIGURE 8

ATTACHMENTS
PHOTOS

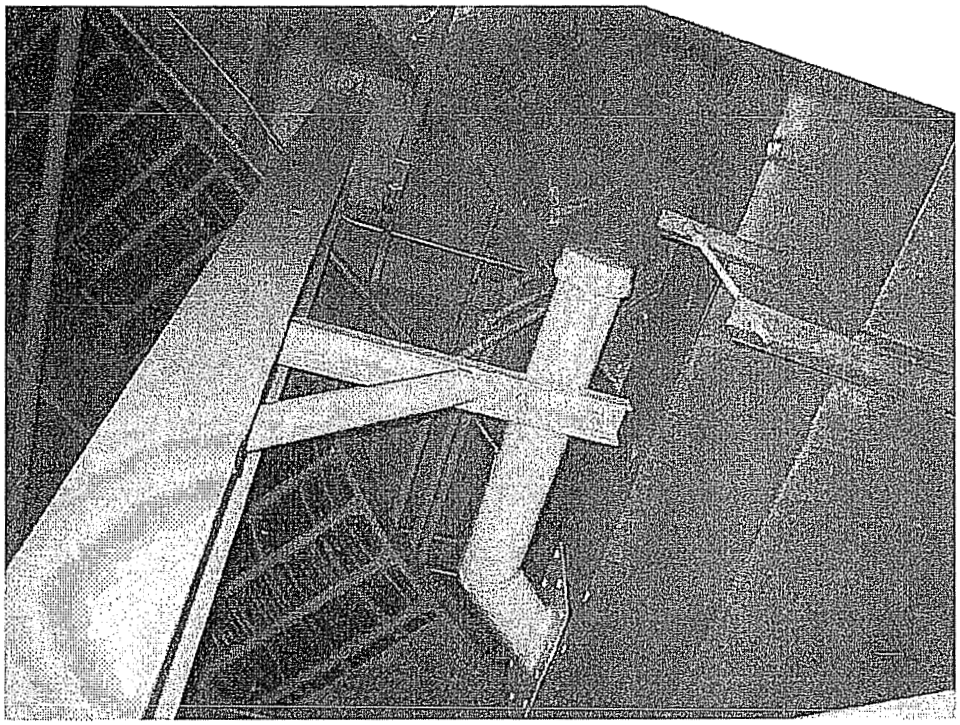


Photo 1 – Pipeway 3 appurtenance braced to large pipe support.

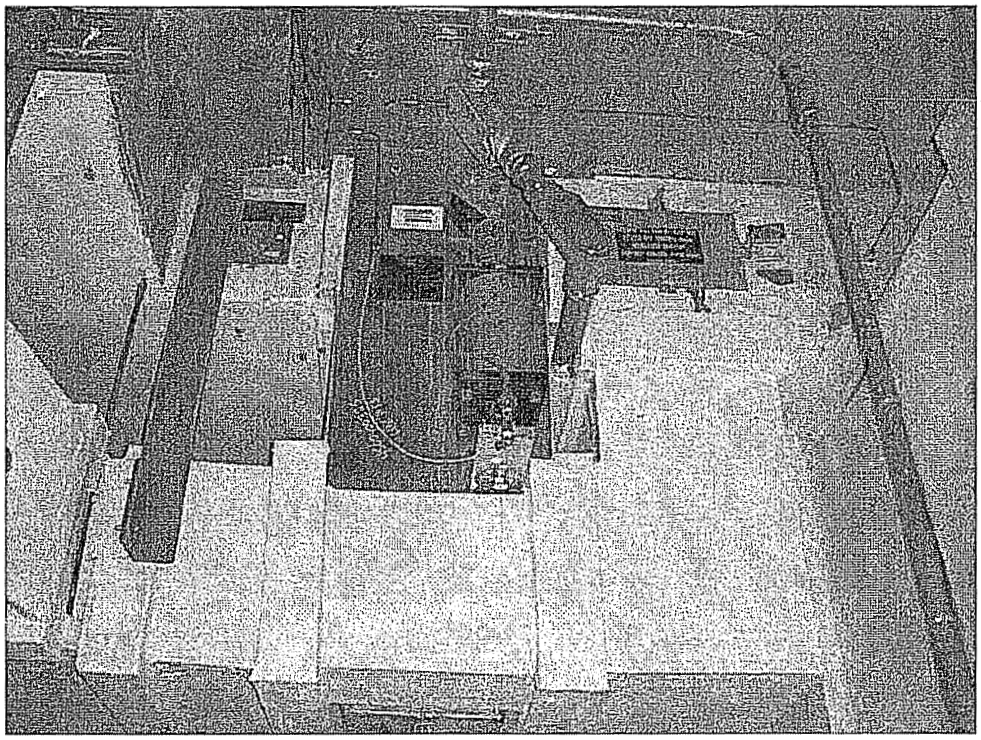


Photo 2 - Damper with seismic supports on CREFS

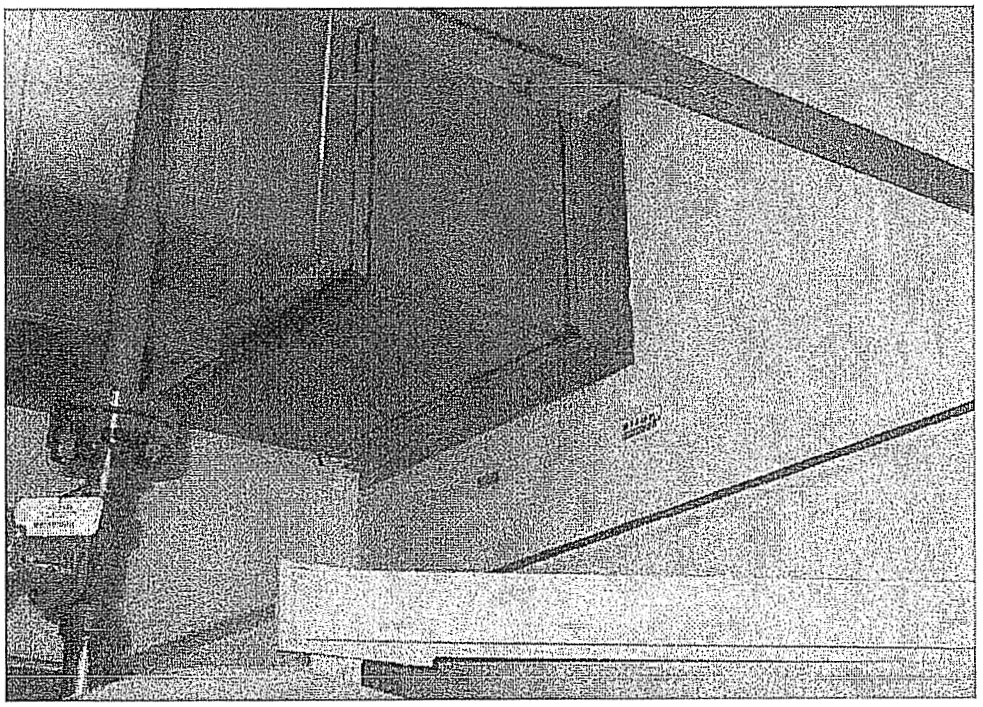


Photo 3 – Typical duct/damper installation

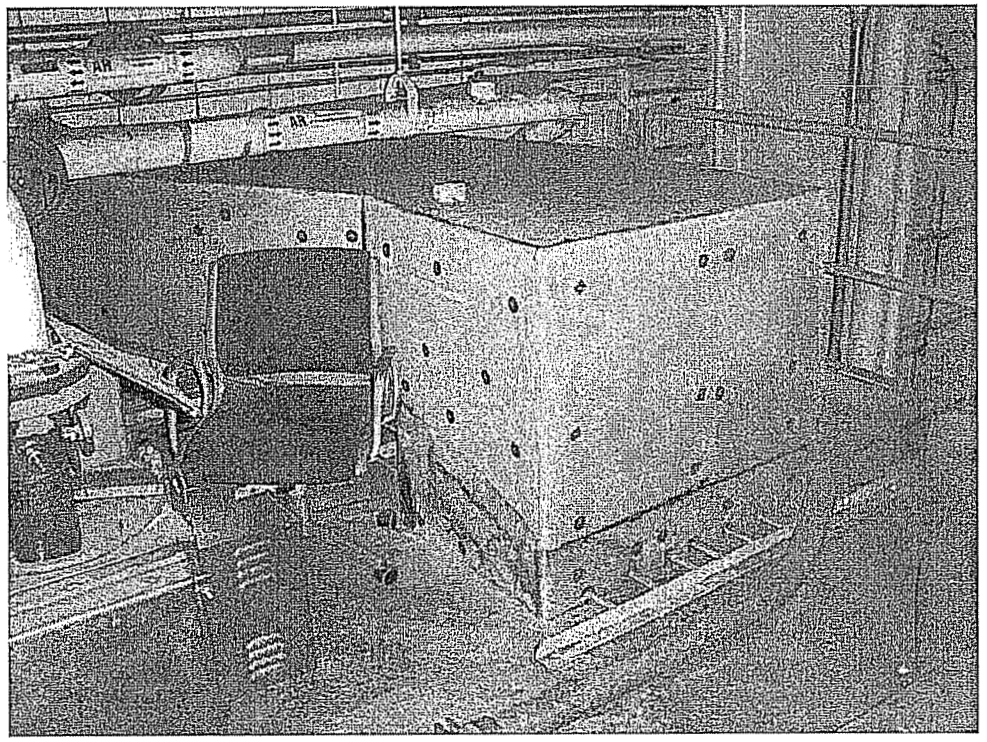


Photo 4 – Intake ductwork for CREFS above fan room

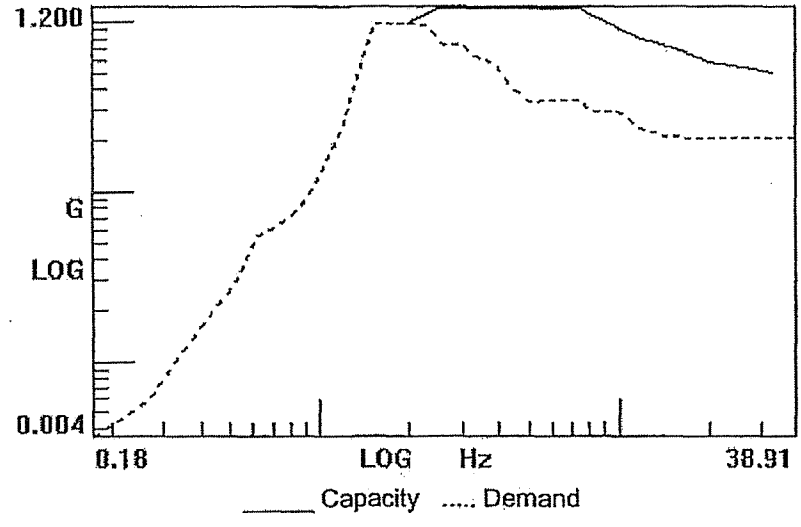
ATTACHMENTS
SEWS

SQ-002217

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 1 of 7
ID : 2B-42 (Rev. 3)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 26.00	Room, Row/Col : AREA 5
Manufacturer, Model, Etc. :		

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input	26.00
2.	Elevation of seismic input below about 40' from grade (grade = 8.00)	N/A
3.	Equipment has fundamental frequency above about 8 Hz (est. frequency =)	N/A
4.	Capacity based on: 1.50 * Bounding Spectrum	
5.	Demand based on: 1.00 * Conservative Design Floor Response Spectra	



	File	Record
Capacity	J:\APPDATA\GIPPER2\GIP\spectra.des	Label|Bounding Spectrum
Demand 1	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux Central Part|ELEVATION|26|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Area 5|BLDG-DAMP||EQ DAMP|5%
Demand 2	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux Central Part|ELEVATION|26|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Area 5|BLDG-DAMP||EQ DAMP|5%

Does capacity exceed demand? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 2 of 7
ID : 2B-42 (Rev. 3)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 26.00	Room, Row/Col : AREA 5
Manufacturer, Model, Etc. :		

CAVEATS - BOUNDING SPECTRUM

MCC/BS Caveat 1 - Earthquake Experience Data Base.	Yes
MCC/BS Caveat 2 - Rating of 600 V or Less.	Yes
MCC/BS Caveat 3 - Adjacent Cabinets Bolted Together.	Yes
MCC/BS Caveat 4 - Attached Weight of 100 Pounds or Less.	Yes
MCC/BS Caveat 5 - Externally Attached Items Rigidly Anchored.	N/A
MCC/BS Caveat 6 - General Configuration Similar to NEMA Standards.	Yes
MCC/BS Caveat 7 - Cutouts Not Large.	Yes
MCC/BS Caveat 8 - Doors/Buckets Secured.	Yes
MCC/BS Caveat 9 - Natural Frequency Relative to 8 Hz Limit Considered.	Yes
MCC/BS Caveat 10 - Adequate Anchorage.	Yes
MCC/BS Caveat 11 - Potential Chatter of Essential Relays Evaluated.	Yes
MCC/BS Caveat 12 - No Other Concerns	Yes

Is the intent of all the caveats met for Bounding Spectrum? Yes

ANCHORAGE

1. The sizes and locations of anchors have been determined.	Yes
2. Appropriate equipment characteristics have been determined (mass, CG, natural freq., damping, center of rotation).	Yes
3. The type of anchorage is covered by the GIP.	Yes
4. The adequacy of the anchorage installation has been evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	Yes
5. Factors affecting anchorage capacity or margin of safety have been considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking.	Yes
6. For bolted anchorages, any gaps under the base are less than 1/4 .	Yes
7. Factors affecting essential relays have been considered: gaps under the base, capacity reduction for expansion anchors.	Yes
8. The base has adequate stiffness and the effect of prying action on anchors has been considered.	Yes
9. The strength of the equipment base and the load path to the CG is adequate.	Yes
10. The adequacy of embedded steel, grout pads or large concrete pads have been evaluated.	Yes
11. The anchorage capacity exceeds the demand.	Yes

Are anchorage requirements met? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 3 of 7
ID : 2B-42 (Rev. 3)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 26.00	Room, Row/Col : AREA 5
Manufacturer, Model, Etc. :		

INTERACTION EFFECTS

1. Soft targets are free from impact by nearby equipment or structures.	Yes
2. If the equipment contains sensitive relays, it is free from all impact by nearby equipment or structures.	Yes
3. Attached lines have adequate flexibility.	Yes
4. Overhead equipment or distribution systems are not likely to collapse.	Yes
5. No other adverse concerns were found.	Yes

Is equipment free of interaction effects? Yes

IS EQUIPMENT SEISMICALLY ADEQUATE? **Yes**

COMMENTS

Rev. 3 SRT is D. P. Brown and R. K. Hanneman on 1/31/05

REF:
1) MR 01-128*N

SEWS Revisions

Rev 0. Original USI A-46 Seismic Verification
Rev 1. MR 93-041*A - Modification to 2B-42 compartment 11M to use it for a new power supply to W-14B Control Room Filter Fan - 7/25/96.
Rev 2. MR 96-033 - Replacement of MCC Control Power Transformers
Rev 3. MR 01-128*N

Description of Design Change:

The attached table lists the components that will be installed during the bucket upgrade. Also, new sheet metal buckets are being fabricated. The new buckets are of the same configuration as the existing buckets. The buckets are mounted into existing MCC's in the same manner as the existing buckets. Thus, the buckets themselves are qualified by comparison to the existing buckets.

Seismic Evaluation of Design Change:

Seismic Qualification Review Report, SQRR, SQ-002079, evaluated the applicability of the Cutler-Hammer seismic testing that is documented therein. The test report is applicable to the components tested provided they are used in MCC's and located where the Floor Response Spectra is <= that of the PAB 26 ft. Since 2B-42 is located in the PAB, el 26 ft, the Cutler-Hammer test report can be used to qualify the components listed in the attached table.

The seismic qualification records for 2B-42 are the Rev. 0, 1, 2 and 3 SEWS.

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 4 of 7
ID : 2B-42 (Rev. 3)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 26.00	Room, Row/Col : AREA 5
Manufacturer, Model, Etc. :		

This rev. 3 SEWS is identified as SQ-002217.

Evaluated by: Date:

1/31/05

1/31/05

R.K. Hanneman

Attachment: Table

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 5 of 7
ID : 2B-42 (Rev. 3)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 26.00	Room, Row/Col : AREA 5
Manufacturer, Model, Etc. :		

Table

Component	Part Number(s)	SQ-002079 Seismic Test	Notes
Circuit Breaker	HFD3015	Table 3	The "L" in the part number of the breaker referenced SQ-002079 is equipped with wire compression fittings. The breaker on the left requires lugged connections that are more positive than compression fittings. SQRR SQ-002079 qualifies this breaker.
Circuit Breaker	HFD3020 HFD3030 HFD3045 HFD3050 HFD3175	Table 3	Encompassed by the HFD3015L, 15 Amp, and HFD3225L, 225 Amp, breakers tested in SQ-002079.
Circuit Breaker Operating Handle	112D650G03	Table 3	Same style handle used for all sizes of breakers.
Control Power Transformer	C0150E2AXX	Table 3	The "XX" signifies no secondary fuse clips. The SQ-002079 report specifies part number C0150E2A, which includes the secondary fuseclip. The tested configuration envelops the configuration sans secondary fuseclip.
Control Power Transformer	C0250E2AXX	Table 3	The "XX" signifies no secondary fuse clips. The SQ-002079 report specifies part numbers C0150E2A and C0500E2A, which includes the secondary fuseclip. The tested configurations envelope the configuration sans secondary fuseclip.
Control Power Fuse	Bussmann BAF 3 Amp	Table 3	Encompassed by the 1 and 6 Amp fuses tested in SQ-002079.
Control Power Fuse	Bussmann BAF 6 Amp	Table 3	Same part as tested in SQ-002079.
Control Power Fuseblock	NDNF1-WH	Table 3	Same part as tested in SQ-002079.
Control Power Terminal Blocks, Mounting Support Bar	C382MF9 (9-point), C382MF3B (3-point), 412A958G02	Table 3	Maximum number of terminal points used in MCC 2B42: 21, which is encompassed by the terminal blocks tested in SQ-002079.
Full-Voltage Reversing Starter	A200M1CAC, A201K1CA	Table 2	Both starters vertically mounted in the same bucket. The configuration tested in SQ-002079 envelopes this configuration.
Full-Voltage Non-Reversing Starter	A201K1CA	Table 1	The configuration tested in SQ-002079 envelopes this configuration.

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 6 of 7
ID : 2B-42 (Rev. 3)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 26.00	Room, Row/Col : AREA 5
Manufacturer, Model, Etc. :		

Component	Part Number(s)	SQ-002079 Seismic Test	Notes
Full-Voltage Non-Reversing Starter	A201K2CA	Table 2	The configuration tested in SQ-002079 envelopes this configuration.
Full-Voltage Non-Reversing Starter	A200M4CAC	Table 1	The configuration tested in SQ-002079 envelopes this configuration.
Overload Relay	AA13A AA23A AA43A	Table 3	The "PB" at the end of the part number in the report stands for "panel mount" (P) with the additional alarm contact (B). The "A" at the end of this part number to the left stands for "starter mount." The configuration of the starter mount is judged to be as rigid as the panel mount. No additional amplification needs to be added to starter mount overload relays. Qualified by comparison to SQ-002079.
Overload Relay Reset Pushbutton	1427B27G07	Table 3	SQ-002079 encompasses the size 1 and size 2 full-voltage reversing (FVR) starters
Overload Relay Reset Pushbutton	1427B27G02	Table 3	SQ-002079 encompasses the size 3 and size 4 full-voltage non-reversing (FVNR) starters.
Overload Relay Reset Pushbutton	1427B27G01	Table 3	SQ-002079 encompasses the Size 1 and Size 2 full-voltage non-reversing (FVNR) starters.
Overload Heater Elements	Various Sizes	Table 3	Existing overload heater elements reused from 2B42, therefore they do not need to be evaluated.
Auxiliary Relay	NBF22F	Table 2	The tested relay, NBF44F (see below), envelops this relay.
Auxiliary Relay	NBF44F	Table 2	Same part as tested in SQ-002079
Elapsed Time Indicator	4714A17H46	Table 3	Same part as tested in SQ-002079.
Momentary Pushbutton with 6 Contact Blocks	10250T101 10250T1 10250T2 10250T3 10250T51 10250T53	Table 3	Same parts as tested in SQ-002079.

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 7 of 7
ID : 2B-42 (Rev. 3)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 26.00	Room, Row/Col : AREA 5
Manufacturer, Model, Etc. :		

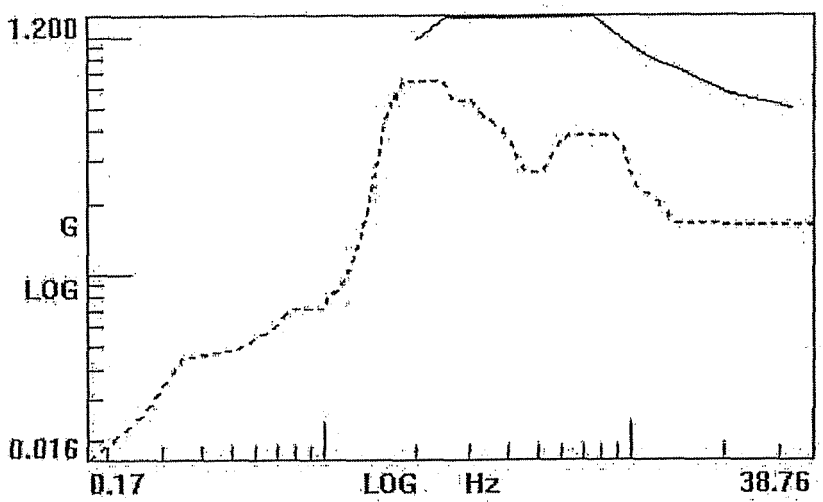
Component	Part Number(s)	SQ-002079 Seismic Test	Notes
3-Position Spring Return Right-to-Center, Maintained Left Selector Switch with 6 Contact Blocks	10250T1353 10250T1 10250T2 10250T3 10250T51 10250T53	Table 3	Same parts as tested in SQ-002079, except for 10250T1343. This is a 3-position spring return-to-center selector switch with one contact block with two normally open (NO) contacts (10250T2). Selector switch 10250T1343 is similar to 10250T1353, which was tested in SQ-002079. Therefore, 10250T1343 is qualified by similarity.
Indicating Light with Red Lens Cap	10250T181N, 10250TC1N (red lens) 10250TC6N (white lens) 10250TC2N (green lens)	Table 3	Indicating light, 10250T181N is the same part as tested in SQ-002079. 10250TC1N red lens was tested. Other lenses are same except for color.

SQ-002167

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 1 of 4
ID : 1B-32 (Rev. 3)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input	8.00
2.	Elevation of seismic input below about 40' from grade (grade = 8.00)	N/A
3.	Equipment has fundamental frequency above about 8 Hz (est. frequency =)	N/A
4.	Capacity based on:	1.50 * Bounding Spectrum
5.	Demand based on:	1.00 * Conservative Design Floor Response Spectra



_____ Capacity ..... Demand

	File	Record
Capacity	J:\APPDATA\GIPPER2\GIP\spectra.des	Label|Bounding Spectrum
Demand 1	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux North and South Wings|ELEVATION|8|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Areas 4 & 6|BLDG-DAMP|EQ DAMP|5%
Demand 2	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux North and South Wings|ELEVATION|8|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Areas 4 & 6|BLDG-DAMP|EQ DAMP|5%

Does capacity exceed demand? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes *Sheet 2 of 4*
ID : 1B-32 (Rev. 3)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

CAVEATS - BOUNDING SPECTRUM

MCC/BS Caveat 1 - Earthquake Experience Data Base.	Yes
MCC/BS Caveat 2 - Rating of 600 V or Less.	Yes
MCC/BS Caveat 3 - Adjacent Cabinets Bolted Together.	Yes
MCC/BS Caveat 4 - Attached Weight of 100 Pounds or Less.	Yes
MCC/BS Caveat 5 - Externally Attached Items Rigidly Anchored.	N/A
MCC/BS Caveat 6 - General Configuration Similar to NEMA Standards.	Yes
MCC/BS Caveat 7 - Cutouts Not Large.	Yes
MCC/BS Caveat 8 - Doors/Buckets Secured.	Yes
MCC/BS Caveat 9 - Natural Frequency Relative to 8 Hz Limit Considered.	Yes
MCC/BS Caveat 10 - Adequate Anchorage.	Yes
MCC/BS Caveat 11 - Potential Chatter of Essential Relays Evaluated.	Yes
MCC/BS Caveat 12 - No Other Concerns	Yes

Is the intent of all the caveats met for Bounding Spectrum? Yes

ANCHORAGE

1. The sizes and locations of anchors have been determined.	Yes
2. Appropriate equipment characteristics have been determined (mass, CG, natural freq., damping, center of rotation).	Yes
3. The type of anchorage is covered by the GIP.	Yes
4. The adequacy of the anchorage installation has been evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	Yes
5. Factors affecting anchorage capacity or margin of safety have been considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking.	Yes
6. For bolted anchorages, any gaps under the base are less than 1/4 .	Yes
7. Factors affecting essential relays have been considered: gaps under the base, capacity reduction for expansion anchors.	Yes
8. The base has adequate stiffness and the effect of prying action on anchors has been considered.	Yes
9. The strength of the equipment base and the load path to the CG is adequate.	Yes
10. The adequacy of embedded steel, grout pads or large concrete pads have been evaluated.	Yes
11. The anchorage capacity exceeds the demand.	Yes

Are anchorage requirements met? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 3 of 4
ID : 1B-32 (Rev. 3)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

INTERACTION EFFECTS

1. Soft targets are free from impact by nearby equipment or structures.	Yes
2. If the equipment contains sensitive relays, it is free from all impact by nearby equipment or structures.	Yes
3. Attached lines have adequate flexibility.	Yes
4. Overhead equipment or distribution systems are not likely to collapse.	Yes
5. No other adverse concerns were found.	Yes

Is equipment free of interaction effects? Yes

IS EQUIPMENT SEISMICALLY ADEQUATE? **Yes**

COMMENTS

The SRT is D. N. Carter & D. P. Brown on 12/18/2003.

References:

[1] MR 03-007
[2] SQ-002079

SEWS Revisions:

Rev 0. Original USI A-46 Seismic Verification
Rev 1. MR 93-041*A - MR 93-041*A modifies 1B-32 compartment 9B to use it for a new power supply to W-14A Control Room Filter Fan - 7/25/96.
Rev 2. MR 96-032 - Replacement of MCC Control Power Transformers
Rev 3. MR 03-007

Description of Change:

Modification MR 03-007 repowers Service Water (SW) to 1P-29 Auxiliary Feedwater (AFW) pump suction motor operated valve (MOV) 1AF-4006 from B-train motor control center (MCC) 1B42 to A-train MCC 1B32. This will involve installing a new conduit and cables for the new valve control circuit.

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 4 of 4
ID : 1B-32 (Rev. 3)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

This modification will require the installation of new MCC breaker bucket 1B52-3213F in MCC 1B32. The new bucket will be placed in current spaces 1B00-3213D and 1B00-3213F.

Seismic Evaluation of Change:

The components in the bucket are as follows:

1. Cutler Hammer model HFD3015 breaker.
2. Cutler Hammer series A200 starter.
3. Cutler Hammer model C0150E2AXX control power transformer.
4. Terminal block rated for 600 Vac and 40 A.
5. Bussmann BAF style control power fuse (3 Amp).

The breaker, starter, control power transformer and terminal block were tested by Trentec as documented in SQ-002079. Trentec also tested a 1A and 6A style BAF fuse. The 3A fuse used here is comparable to the fuses tested and is acceptable by comparison to the tested fuses. Therefore, all the components in the breaker are seismically qualified.

As part of the original USI A-46 seismic evaluation for 1B-32, the anchorage calculation (using Anchor Version 4.0) for 1B-32 estimated a weight of 800# per MCC section. The replacement CPTs (Control Power Tranformers) installed in MR 96-032 (See Rev. 2 SEWS) increase the weight of the MCC by about 175# from an estimated 5600# to 5775#. The new bucket being added in this modification weighs less than 100# (estimated). The total load increase from this modification and MR 96-032 is approximately 5% of the total MCC load. The original anchorage calculation had a minimum safety factor of 2.474. This load increase will have a negligible affect on the safety factors. Therefore the anchors are acceptable for the revised loads. 1/5/04

The seismic qualification record for 1B-32 is the Rev. 0, 1, 2, & 3 SEWS.

This evaluationvis identified as SQ-002167.

Evaluated by: Date:

1/5/04

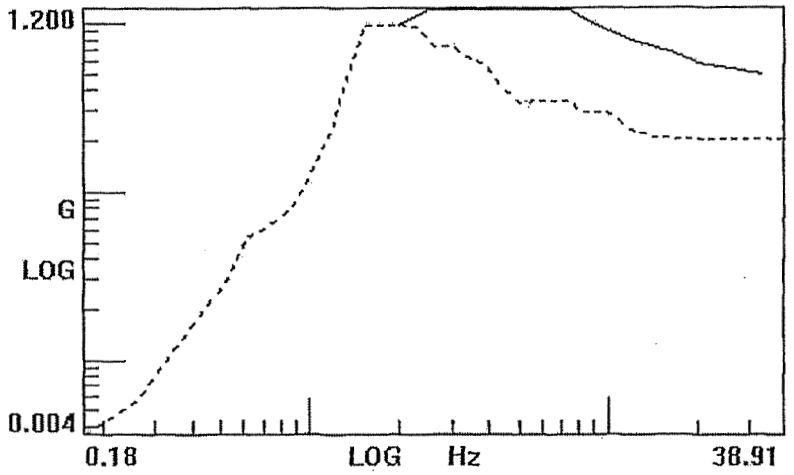
1-5-04

SQ-002078

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 1 of 7
ID : 1B-42 (Rev. 4)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 26.00	Room, Row/Col : AREA 5
Manufacturer, Model, Etc. :		

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input		26.00
2.	Elevation of seismic input below about 40' from grade (grade = 8.00)		N/A
3.	Equipment has fundamental frequency above about 8 Hz (est. frequency =)		N/A
4.	Capacity based on:	1.50 * Bounding Spectrum	
5.	Demand based on:	1.00 * Conservative Design Floor Response Spectra	



_____ Capacity ..... Demand

	File	Record
Capacity	J:\APPDATA\GIPPER2\GIP\spectra.des	Label|Bounding Spectrum
Demand 1	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux Central Part|ELEVATION|26|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Area 5|BLDG-DAMP|EQ DAMP|5%
Demand 2	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux Central Part|ELEVATION|26|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Area 5|BLDG-DAMP|EQ DAMP|5%

Does capacity exceed demand? Yes

REC'D OCT 24 2002

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 2 of 7
ID : 1B-42 (Rev. 4)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 26.00	Room, Row/Col : AREA 5
Manufacturer, Model, Etc. :		

CAVEATS - BOUNDING SPECTRUM

MCC/BS Caveat 1 - Earthquake Experience Data Base.	Yes
MCC/BS Caveat 2 - Rating of 600 V or Less.	Yes
MCC/BS Caveat 3 - Adjacent Cabinets Bolted Together.	Yes
MCC/BS Caveat 4 - Attached Weight of 100 Pounds or Less.	N/A
MCC/BS Caveat 5 - Externally Attached Items Rigidly Anchored.	N/A
MCC/BS Caveat 6 - General Configuration Similar to NEMA Standards.	Yes
MCC/BS Caveat 7 - Cutouts Not Large.	Yes
MCC/BS Caveat 8 - Doors/Buckets Secured.	Yes*
MCC/BS Caveat 9 - Natural Frequency Relative to 8 Hz Limit Considered.	Yes
MCC/BS Caveat 10 - Adequate Anchorage.	Yes
MCC/BS Caveat 11 - Potential Chatter of Essential Relays Evaluated.	Yes*
MCC/BS Caveat 12 - No Other Concerns	Yes

Is the intent of all the caveats met for Bounding Spectrum? Yes

ANCHORAGE

1. The sizes and locations of anchors have been determined.	Yes
2. Appropriate equipment characteristics have been determined (mass, CG, natural freq., damping, center of rotation).	Yes
3. The type of anchorage is covered by the GIP.	Yes
4. The adequacy of the anchorage installation has been evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	Yes
5. Factors affecting anchorage capacity or margin of safety have been considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking.	Yes
6. For bolted anchorages, any gaps under the base are less than 1/4 .	Yes
7. Factors affecting essential relays have been considered: gaps under the base, capacity reduction for expansion anchors.	Yes
8. The base has adequate stiffness and the effect of prying action on anchors has been considered.	Yes
9. The strength of the equipment base and the load path to the CG is adequate.	Yes
10. The adequacy of embedded steel, grout pads or large concrete pads have been evaluated.	Yes
11. The anchorage capacity exceeds the demand.	Yes

Are anchorage requirements met? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 3 of 7
ID : 1B-42 (Rev. 4)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 26.00	Room, Row/Col : AREA 5
Manufacturer, Model, Etc. :		

INTERACTION EFFECTS

1. Soft targets are free from impact by nearby equipment or structures.	Yes*
2. If the equipment contains sensitive relays, it is free from all impact by nearby equipment or structures.	Yes*
3. Attached lines have adequate flexibility.	Yes*
4. Overhead equipment or distribution systems are not likely to collapse.	Yes*
5. No other adverse concerns were found.	Yes

Is equipment free of interaction effects? Yes

IS EQUIPMENT SEISMICALLY ADEQUATE? Yes

COMMENTS

Rev. 4 SRT: D P Brown and D N Carter Date: 10/7/2002

References:
1- MR-01- 128*C
2- IWP 01-128*C-1B
3- IWP 01-128*C-1F
4- IWP 01-128*C-1J
5- IWP 01-128*C-2C
6- IWP 01-128*C-2F
7- IWP 01-128*C-2J
8- IWP 01-128*C-3C
9- IWP 01-128*C-3F
10- IWP 01-128*C-3J
11- IWP 01-128*C-4F
12- IWP 01-128*C-4J
13- IWP 01-128*C-4M
14- IWP 01-128*C-5J
15- IWP 01-128*C-5M
16- IWP 01-128*C-6C
17- IWP 01-128*C-6F
18- IWP 01-128*C-6M
20- IWP 01-128*C-7C
21- IWP 01-128*C-7F
22- IWP 01-128*C-8K

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 4 of 7
ID : 1B-42 (Rev. 4)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 26.00	Room, Row/Col : AREA 5
Manufacturer, Model, Etc. :		

23- IWP 01-128*C-9M
24- IWP 01-128*C-10C
25- IWP 01-128*C-10F
26- IWP 01-128*C-11B
27- IWP 01-128*C-11F
28. WE Calculation 85-010, rev. 01
29. WE Calculation Addendum N-97-0154-00-A
30. Seismic Qualification Review Report (SQRR) SQ-002079
31. Rev. 0 SEWS for 1B-42, SQ-000020

SEWS Revisions:
Rev. 0 - A-46 Walkdown (SQ-000020)
Rev. 1 - MR 91-116 (SQ-001244)
Rev. 2 - MR 93-041*A (SQ-001249)
Rev. 3 - MR 96-032 (SQ-001471)
Rev. 4 - MR 01-128*C: Replace/upgrade MCC buckets

Description of Design Change:

The scope of this modification is to replace Motor Control Center (MCC) 1B-42 breaker buckets 1B52-421B, 1F, 1J, 2C, 2F, 2J, 3C, 3F, 3J, 4F, 4J, 4M, 5J, 5M, 6C, 6F, 6M, 7C, 7F, 8K, 8M, 9M, 10C, 10F, 11B and 11F with new Cutler Hammer (C/H) breaker buckets. These new buckets shall be equipped with the same components as the existing buckets (i.e. breaker, starter, transformer, etc.); however, the new breaker will have an interrupting capability higher than the available short circuit current. In addition, this modification will replace the SPACE door covers for cubicles 1B00-421C, 6J, 7H, 9F, 9H, 10M, 11D, 11G, 12B, 12D and 12G. All other MCC 1B-42 breaker buckets will be replaced by MR 01-128*D.

The purpose of this modification is to improve personnel and equipment protection by replacing the 1B-42 breakers that have been identified as being overdutied under maximum fault conditions in PBNP Calculation Addendum N-97-0154-00-A, "Refinements to Electrical AC Power Distribution System Short Circuit Analysis." It should also be noted that this modification is one of many modifications (MR 01-128*A-S) that will resolve maximum fault conditions concerns identified by calculation addendum N-97-0154-00-A.

The components of the replacement buckets have been seismically qualified by shake table testing. The test report has been evaluated by SQRR and is documented on SQ-002079. The new buckets are supported in the MCC in the same manner as the existing buckets.

The doors in front of spaces, (i.e., those places in the MCC where there is no bucket), will be replaced, with new doors. The existing doors are held in place by a minimum of two (2) screws. The new doors will be held in place on one side by a minimum of one (1) hinge, which is attached to the MCC cabinet

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 5 of 7
ID : 1B-42 (Rev. 4)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 26.00	Room, Row/Col : AREA 5
Manufacturer, Model, Etc. :		

by two screws. The other side of the door is held in place by a minimum of one screw. This arrangement is the same as used on the doors in front of the MCC buckets.

CAVEATS:

MCC/BS Caveat 8 - Doors/Buckets secured. The IWP's listed in the references above, contain steps in section 3.0 to document re-engaging the mounting screws and closing of the door.
MCC/BS Caveat 11 - The MCC's contain relays and other seismically sensitive equipment. All these items were seismically qualified by shake table testing, see the SQRR in SQ-002079

INTEACTION EFECTS:

1. The MCC buckets are internal to the MCC. Therefore, no new soft targets are created. The replacement doors are made of steel, and do not contain soft targets.
2. The MCC's contain relays and other seismically sensitive equipment. All these items were seismically qualified by shake table testing, see the SQRR in SQ-002079.
3. No new lines were attached by mod MR 01-128*C
4. No new otherhead equipment was added by mod MR 01-128*C.

Seismic Evaluation of Design Change:

The original A-46 SEWS, SQ-000020, was reviewed. It refers to WE calculation 85-010, rev. 01 for justification of the anchorage for the MCC's. The calculation uses an estimated weight for the MCC. The new MCC buckets do not weigh significantly more than the existing MCC buckets. Therefore, the existing calculation is still acceptable for providing justification for the MCC.

The mounting of the existing MCC buckets in the MCC was compared to the mounting of the new buckets. The new buckets are supported by the MCC in the same manner in which the existing buckets are mounted. The new buckets do not require any changes to the MCC. Four (4) points, two (2) on each side of the bucket, support both the existing and new buckets. Both old and new buckets have a retaining latch at the front of the bucket. Thus, the new buckets are similar to those in the existing earthquake data base (MCC/BS Caveat 1).

The new doors are held in place by at least one hinge, with two screws, and at least one screw on the opposite side from the hinge. This arrangement is the same as that for the doors in front of buckets. The SRT has evaluated this arrangement as being sufficient to hold the door closed during a seismic event.

SRT has determined that the MCC has sufficient strength capacity to remain functional before, during and after a seismic event.

Subcomponents:

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 6 of 7
ID : 1B-42 (Rev. 4)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 26.00	Room, Row/Col : AREA 5
Manufacturer, Model, Etc. :		

The following items are sub-components of 1B-42:

1B52-421B PWR TO 1SI-850B RHR PUMP SUMP B SUCTION
1B52-421F PWR TO 1SI-852B LOW HEAD SI CORE DELUGE ISOL
1B52-421J PWR TO 1SI-866B CORE DELUGE INJ LINE OUTBD ISOL
1B52-421M PWR TO 1SI-860B CONT SPRAY PUMP DISCH REDUN ISOL
1B52-422C PWR TO 1SI-896B SI PUMP SUCTION
1B52-422F PWR TO 1SI-878C RV SAFETY INJECTION
1B52-422J PWR TO 1SI-878B COLD LEG INJ TO T-34B OUT ISOL
1B52-422M PWR TO 1SI-860D CONT SPRAY PUMP DISCH REDUN ISOL
1B52-423C PWR TO 1SI-851B RHR PUMP SUCT FROM CONT SUMP B
1B52-423F PWR TO 1SI-856B RWST OUT TO P-10A/B SUCTION HDR
1B52-423J PWR TO 1SI-870B CONT SPRAY PUMP SUCT FROM T-13
1B52-423M PWR TO 1SI-871B CONT SPRAY PUMP SUCT FROM HX-11B
1B52-424C PWR TO 1SI-825B RWST OUTLET TO P-15A/B SI PUMP
1B52-424F PWR TO 1SI-841B SI ACCUMULATOR OUTLET
1B52-424J PWR TO 1CC-738B RHR HX SHELL SIDE INLET
1B52-424M PWR TO 1RH-701 RCS TO P-10A/B RHR PUMP SUCT HDR
1B52-425F PWR TO 1SI-826A SI PUMP SUCTION/BAST SERIES ISOL
1B52-425J PWR TO 1SI-826B SI PUMP SUCT/BAST PARALLEL ISOL
1B52-425M PWR TO 1CV-350 (1P-4A/B) BA XFR PMP 1P-2A-C CHG PMP SUCT
1B52-426C PWR TO 1CC-719 CONT EQUIP CC SUP HDR OUTBD ISOL
1B52-426F PWR TO 1CV-1298 (1HX-2) REGEN HX OUT/RC LOOP A COLD LEG
1B52-426M PWR TO 1RC-427 RC LOOP B COLD LEG TO CVCS LETDOWN ISOL
1B52-427C PWR TO 1RC-596 (1T-2) PRT DRAIN TO 1T-16 RCDT
1B52-427F PWR TO 1RC-516 PZR RC-430 PWR-OPER RELIEF INLET
1B52-427M PWR TO P-12B SFP COOLING PUMP
1B52-428C PWR TO AF-4021 AFP DISCHARGE TO 1HX-1B SG
1B52-428F PWR TO 1AF-4006 AFP SUCTION FROM SERVICE WATER
1B52-428H PWR TO C-55 (D-24) SEC BATTERY CHGR PWR SUP SELECTOR PNL
1B52-428K SPARE
1B52-428M PWR TO W-13B2 CR RECIRC FAN
1B52-429B PWR TO X-17B (1FFCP-02A/02B/2FFCP-01A/01B) PAB HTPB XFMR
1B52-429DL PWR TO XL-10 (LD-10) EMERGENCY SOUTH LIGHTING XFMR
1B52-429DR PWR TO 1GY-04 INST MG GENERATOR SET (NOT USED)
1B52-429K PWR TO K-5A (G-01) EDG STARTING AIR COMP MOTOR-DRIVEN
1B52-429M PWR TO W-12C G-02 ROOM EXHAUST FAN
1B52-4210C PWR TO 1SW-2908 CONT RECIRC HX EMERGENCY FCV
1B52-4210F PWR TO 1SW-2880 TB COOLER SERVICE WATER INLET
1B52-4210J PWR TO SW-2930B SFP HX OUTLET
1B52-4211B SPARE
1B52-4211D SPARE

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 7 of 7
ID : 1B-42 (Rev. 4)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 26.00	Room, Row/Col : AREA 5
Manufacturer, Model, Etc. :		

1B52-4211F SPARE
1B52-4211M PWR TO W-2A PAB EXHAUST STACK FAN
1B52-4212M PWR TO W-30A (F-23/F-29) PAB EXHAUST FILTER FAN

The seismic qualification records for 1B-42 is the Rev. 0, 1, 2, 3 and 4 SEWS.

This rev. 4 SEWS is SQ-002078.

Evaluated by: Date:

10/7/02

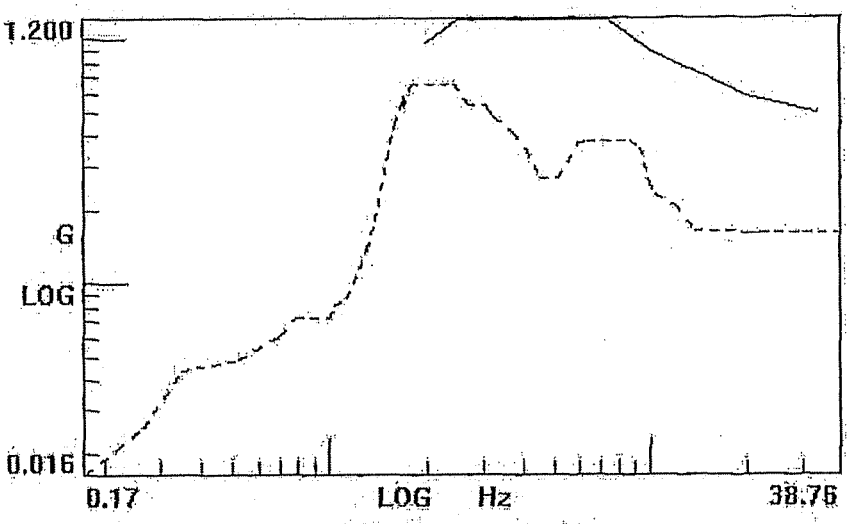
10-22-02

SQ-001702

Wisconsin Electric Power Company - Point Beach Nucler Plant SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 1 of 4
ID : 2B-32 (Rev. 4)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 6
Manufacturer, Model, Etc. :		

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input	8.00
2.	Elevation of seismic input below about 40' from grade (grade = 8.00)	N/A
3.	Equipment has fundamental frequency above about 8 Hz (est. frequency =)	N/A
4.	Capacity based on: 1.50 * Bounding Spectrum	
5.	Demand based on: 1.00 * Conservative Design Floor Response Spectra	



	File	Record
Capacity	C:\GIP\GIP\spectra.des	Label|Bounding Spectrum
Demand 1	C:\GIP\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux North and South Wings|ELEVATION|8|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Areas 4 & 6|BLDG-DAMP|EQ DAMP|5%
Demand 2	C:\GIP\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux North and South Wings|ELEVATION|8|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Areas 4 & 6|BLDG-DAMP|EQ DAMP|5%

Does capacity exceed demand? Yes

Wisconsin Electric Power Company - Point Beach Nucler Plant SCREENING EVALUATION WORK SHEET (SEWS)	GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 2 of 4

ID : 2B-32 (Rev. 4)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 6
Manufacturer, Model, Etc. :		

CAVEATS - BOUNDING SPECTRUM

MCC/BS Caveat 1 - Earthquake Experience Data Base.	Yes
MCC/BS Caveat 2 - Rating of 600 V or Less.	Yes
MCC/BS Caveat 3 - Adjacent Cabinets Bolted Together.	Yes
MCC/BS Caveat 4 - Attached Weight of 100 Pounds or Less.	N/A
MCC/BS Caveat 5 - Externally Attached Items Rigidly Anchored.	N/A
MCC/BS Caveat 6 - General Configuration Similar to NEMA Standards.	Yes
MCC/BS Caveat 7 - Cutouts Not Large.	Yes
MCC/BS Caveat 8 - Doors/Buckets Secured.	Yes
MCC/BS Caveat 9 - Natural Frequency Relative to 8 Hz Limit Considered.	Yes
MCC/BS Caveat 10 - Adequate Anchorage.	Yes
MCC/BS Caveat 11 - Potential Chatter of Essential Relays Evaluated.	Yes
MCC/BS Caveat 12 - No Other Concerns	Yes

Is the intent of all the caveats met for Bounding Spectrum? Yes

ANCHORAGE

1. The sizes and locations of anchors have been determined.	Yes
2. Appropriate equipment characteristics have been determined (mass, CG, natural freq., damping, center of rotation).	Yes
3. The type of anchorage is covered by the GIP.	Yes
4. The adequacy of the anchorage installation has been evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	Yes
5. Factors affecting anchorage capacity or margin of safety have been considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking.	Yes
6. For bolted anchorages, any gaps under the base are less than 1/4 .	Yes
7. Factors affecting essential relays have been considered: gaps under the base, capacity reduction for expansion anchors.	Yes
8. The base has adequate stiffness and the effect of prying action on anchors has been considered.	Yes
9. The strength of the equipment base and the load path to the CG is adequate.	Yes
10. The adequacy of embedded steel, grout pads or large concrete pads have been evaluated.	Yes
11. The anchorage capacity exceeds the demand.	Yes

Are anchorage requirements met? Yes

Wisconsin Electric Power Company - Point Beach Nuclear Plant SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 3 of 4
ID : 2B-32 (Rev. 4)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 6
Manufacturer, Model, Etc. :		

INTERACTION EFFECTS

1. Soft targets are free from impact by nearby equipment or structures.	Yes
2. If the equipment contains sensitive relays, it is free from all impact by nearby equipment or structures.	Yes
3. Attached lines have adequate flexibility.	Yes
4. Overhead equipment or distribution systems are not likely to collapse.	Yes
5. No other adverse concerns were found.	Yes

Is equipment free of interaction effects? Yes

IS EQUIPMENT SEISMICALLY ADEQUATE? **Yes**

COMMENTS

The SRT is D. N. Carter and N. Juraydini on 2/3/00.

SUMMARY OF CHANGES TO THE COMPONENT
Remove the spare 50A breaker and replace with a 20A breaker, and install new wireway at the MCC.

SEWS Revisions
Rev 0. Original USI A-46 Seismic Verification
Rev 1. MR 91-116 - ECR 95-117. Relocation of motor starter from 1B52-4210M (1B-42) to 2B2-3213G (2B-32) - 10/09/95.
Rev 2. MR 93-041*A - Modification of 2B-32 compartment 8H to use it for a new power supply to W-13B1 Control Room HVAC Supply Fan
Rev 3. MR 96-033 - Replacement of MCC Control Power Transformers
Rev 4. MR 98-024*H - Water Treatment Area Redundant Isolation Valve Motor Operator Modification.

References:
[1] EPRI NP-7148-SL, "Procedure for Evaluating Nuclear Power Plant Relay Seismic Functionality"
[2] MR 98-024*H, "Water Treatment Area Redundant Isolation Valve Motor Operator Modification"
[3] IWP 98-024*H-02, "Water Treatment Area Isolation Valve SW-527 Modification (Electrical)"
[4] Drawing SK-MR98-024*H, Sh. 7, "Wireway Plan & Sections", Rev. 00
[5] Drawing SK-MR98-024*H, Sh. 8, "Wireway Support Detail", Rev. 00

MR 98-024*H Description:

1. MR 98-024*H:
Replace the operator for existing gate valve SW-527 with a Limitorque SMB-00 motor operator, and relabel the valve SW-4478. The valve will be powered from a new 20A breaker which replaces the existing spare 50A

Wisconsin Electric Power Company - Point Beach Nuclear Plant SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 4 of 4
ID : 2B-32 (Rev. 4)	Class : 1. Motor Control Centers	
Description : 480V MOTOR CONTROL CENTER PAB SAFEGUARDS		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 6
Manufacturer, Model, Etc. :		

breaker in MCC 2B32, and install new wireway at the MCC. A local FVR starter with transformer will be installed in the new local control panel NSW-4478 near the valve. NSW-4478 will also contain a three-position spring-return-to-center control switch for local operation, valve position indication lights, and terminal blocks. New cables will be run in existing cable trays JU06 through JU13, and FU03 through FU06. New cables will also run in new conduits. A local disconnect switch B29-SW-4478 will be installed near NSW-4478. And a new pull box PB-4478 will be installed near the valve SW-4478.

2. IWP 98-024*H-02:
a) Assemble and install new local control panel NSW-4478.
b) Remove spare 50A breaker and replace with 20A breaker in MCC 2B32, and install new wireway at the MCC (scope of this SEWS).
c) Install new local disconnect switch B29-SW-4478.
d) Install new conduit and pull box PB-4478.
e) Run new cables for MOV SW-4478 and associated components.

Seismic Qualification Evaluation:

This modification removes the spare 50A breaker and replaces it with a 20A breaker in the MCC, and installs a new wireway at one side of the MCC. The new wireway is is supported by three (3) cantilever supports through a L2x2x1/4 angle using two (2) bolts. A N2544 Unistrut makes up the cantilever part of each suport, which attaches to a N1000 Unistrut that is secured to the wall with two (2) 3/8" Hilti bolts.

The 20A breaker is a typical component of MCCs, and therefore, is represented by the seismic experience database.

The wireway supports were tug tested and detemined to be adequately installed.

No spacial interactions are observed.

Based on the above discussion, the new breaker is acceptable.

The change does not affect the equipment weight or center of gravity. Previous anchorage evaluation is still valid.

This document is identified as SQ-001702.

Evaluated by: Date:

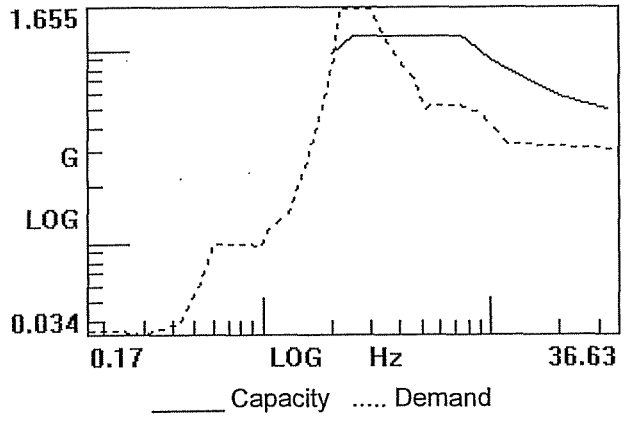
Mahil Juraya 2/10/00

David N Carter. 3-6-00.

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 1 of 7
ID : C-67 (Rev. 0)	Class : 20. Instrumentation and Control Panels and Cabinets	
Description : CONTROL ROOM AIR CONDITIONING CONTROL PANEL		
Building : CB	Floor El. : 44.00	Room, Row/Col : Area 3
Manufacturer, Model, Etc. :		

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input		44.00
2.	Elevation of seismic input below about 40' from grade (grade = 8.00)		N/A
3.	Equipment has fundamental frequency above about 8 Hz (est. frequency =)		N/A
4.	Capacity based on:	1.50 * Bounding Spectrum	
5.	Demand based on:	1.00 * Conservative Design Floor Response Spectra	



	File	Record
Capacity	J:\APPDATA\GIPPER2\GIP\spectra.des	Label|Bounding Spectrum
Demand 1	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Control Building|ELEVATION|44|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2 |LOCATION|Area 3|BLDG-DAMP||EQ DAMP|5%
Demand 2	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Control Building|ELEVATION|44|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2 |LOCATION|Area 3|BLDG-DAMP||EQ DAMP|5%

Does capacity exceed demand? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 2 of 7
ID : C-67 (Rev. 0)	Class : 20. Instrumentation and Control Panels and Cabinets	
Description : CONTROL ROOM AIR CONDITIONING CONTROL PANEL		
Building : CB	Floor El. : 44.00	Room, Row/Col : Area 3
Manufacturer, Model, Etc. :		

CAVEATS - BOUNDING SPECTRUM

I&C/BS Caveat 1 - Earthquake Experience Equipment Class.	Yes
I&C/BS Caveat 2 - Computers and Programmable Controllers Evaluated Separately.	N/A
I&C/BS Caveat 3 - Strip Chart Recorders Evaluated.	N/A
I&C/BS Caveat 4 - Structural Adequate.	Yes
I&C/BS Caveat 5 - Adjacent Cabinets or Panels Bolted Together.	N/A
I&C/BS Caveat 6 - Drawers or Equipment on Slides Restrained.	N/A
I&C/BS Caveat 7 - Doors Secured.	Yes
I&C/BS Caveat 8 - Sufficient Slack and Flexibility of Attached Lines.	Yes
I&C/BS Caveat 9 - Adequate Anchorage.	Yes
I&C/BS Caveat 10 - Potential Chatter of Essential Relays Evaluated.	N/A
I&C/BS Caveat 11 - No Other Concerns.	Yes

Is the intent of all the caveats met for Bounding Spectrum? Yes

ANCHORAGE

1. The sizes and locations of anchors have been determined.	Yes
2. Appropriate equipment characteristics have been determined (mass, CG, natural freq., damping, center of rotation).	Yes
3. The type of anchorage is covered by the GIP.	Yes
4. The adequacy of the anchorage installation has been evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	Yes
5. Factors affecting anchorage capacity or margin of safety have been considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking.	Yes
6. For bolted anchorages, any gaps under the base are less than 1/4 .	Yes
7. Factors affecting essential relays have been considered: gaps under the base, capacity reduction for expansion anchors.	N/A
8. The base has adequate stiffness and the effect of prying action on anchors has been considered.	Yes
9. The strength of the equipment base and the load path to the CG is adequate.	Yes
10. The adequacy of embedded steel, grout pads or large concrete pads have been evaluated.	Yes
11. The anchorage capacity exceeds the demand.	Yes

Are anchorage requirements met? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 3 of 7
ID : C-67 (Rev. 0)	Class : 20. Instrumentation and Control Panels and Cabinets	
Description : CONTROL ROOM AIR CONDITIONING CONTROL PANEL		
Building : CB	Floor El. : 44.00	Room, Row/Col : Area 3
Manufacturer, Model, Etc. :		

INTERACTION EFFECTS

1. Soft targets are free from impact by nearby equipment or structures.	Yes
2. If the equipment contains sensitive relays, it is free from all impact by nearby equipment or structures.	N/A
3. Attached lines have adequate flexibility.	Yes
4. Overhead equipment or distribution systems are not likely to collapse.	Yes
5. No other adverse concerns were found.	Yes

Is equipment free of interaction effects? Yes

IS EQUIPMENT SEISMICALLY ADEQUATE? **Yes**

COMMENTS

Walkdown Engineers: W. Djordjevic & P. A. Gazda (09/03/09)

Panel C-67 controls CREFS HVAC room. It is a NEMA Hoffman box 66"H x 30"W x 12"D. It is anchored at the top with 2 -3/8" CEAs to concrete wall and secured to a knee-braced frame which in turn is anchored to concrete wall. This panel estimated weight is 500 lbs based on a density of 35 pcf and it is deemed rigid (f1> 33Hz). Each 3/8" anchor can resist about 1500 lbs so the gross seismic capacity is 6g ignoring the bottom anchorage. Therefore, Panel C-67 is declared seismically adequate.

No credible potential seismic interaction was noted.

Evaluated by: W. Djordjevic, PE Date: 9/03/2009

P.A.Gazda, PE 9/03/2009

Attachment: Walkdown Pictures

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 4 of 7
ID : C-67 (Rev. 0)	Class : 20. Instrumentation and Control Panels and Cabinets	
Description : CONTROL ROOM AIR CONDITIONING CONTROL PANEL		
Building : CB	Floor El. : 44.00	Room, Row/Col : Area 3
Manufacturer, Model, Etc. :		

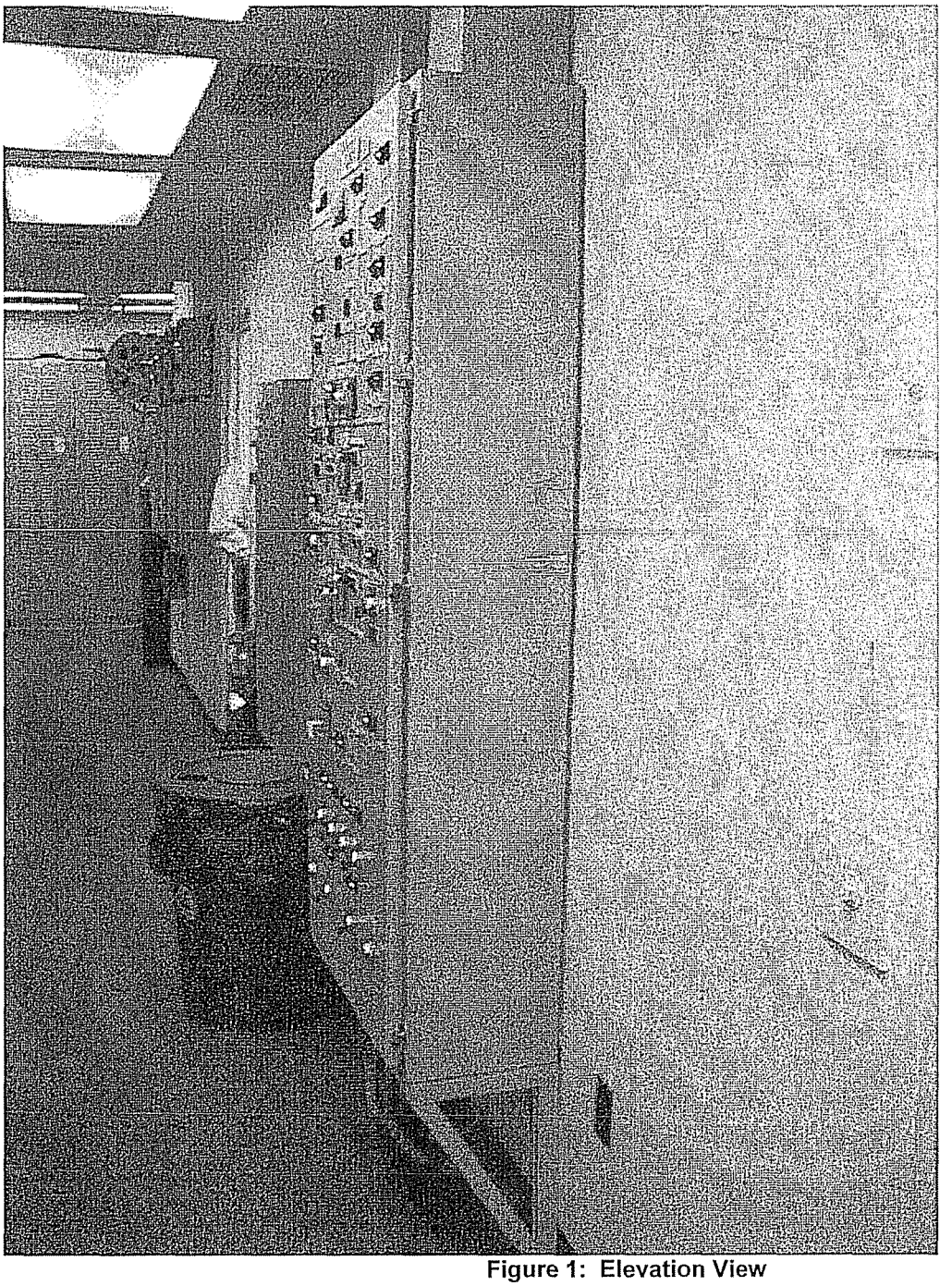


Figure 1: Elevation View

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 5 of 7
ID : C-67 (Rev. 0)	Class : 20. Instrumentation and Control Panels and Cabinets	
Description : CONTROL ROOM AIR CONDITIONING CONTROL PANEL		
Building : CB	Floor El. : 44.00	Room, Row/Col : Area 3
Manufacturer, Model, Etc. :		

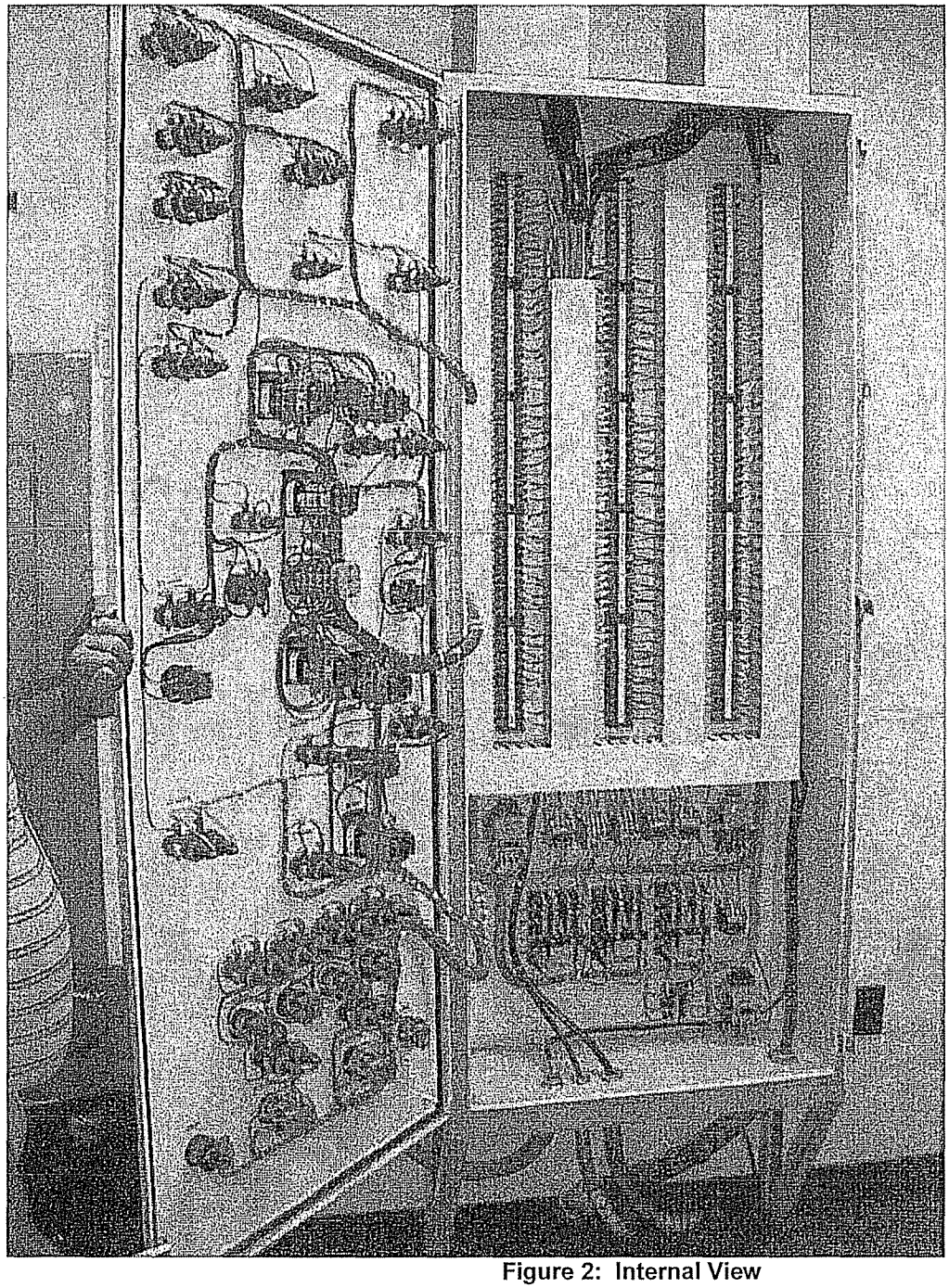


Figure 2: Internal View

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 6 of 7
ID : C-67 (Rev. 0)	Class : 20. Instrumentation and Control Panels and Cabinets	
Description : CONTROL ROOM AIR CONDITIONING CONTROL PANEL		
Building : CB	Floor El. : 44.00	Room, Row/Col : Area 3
Manufacturer, Model, Etc. :		

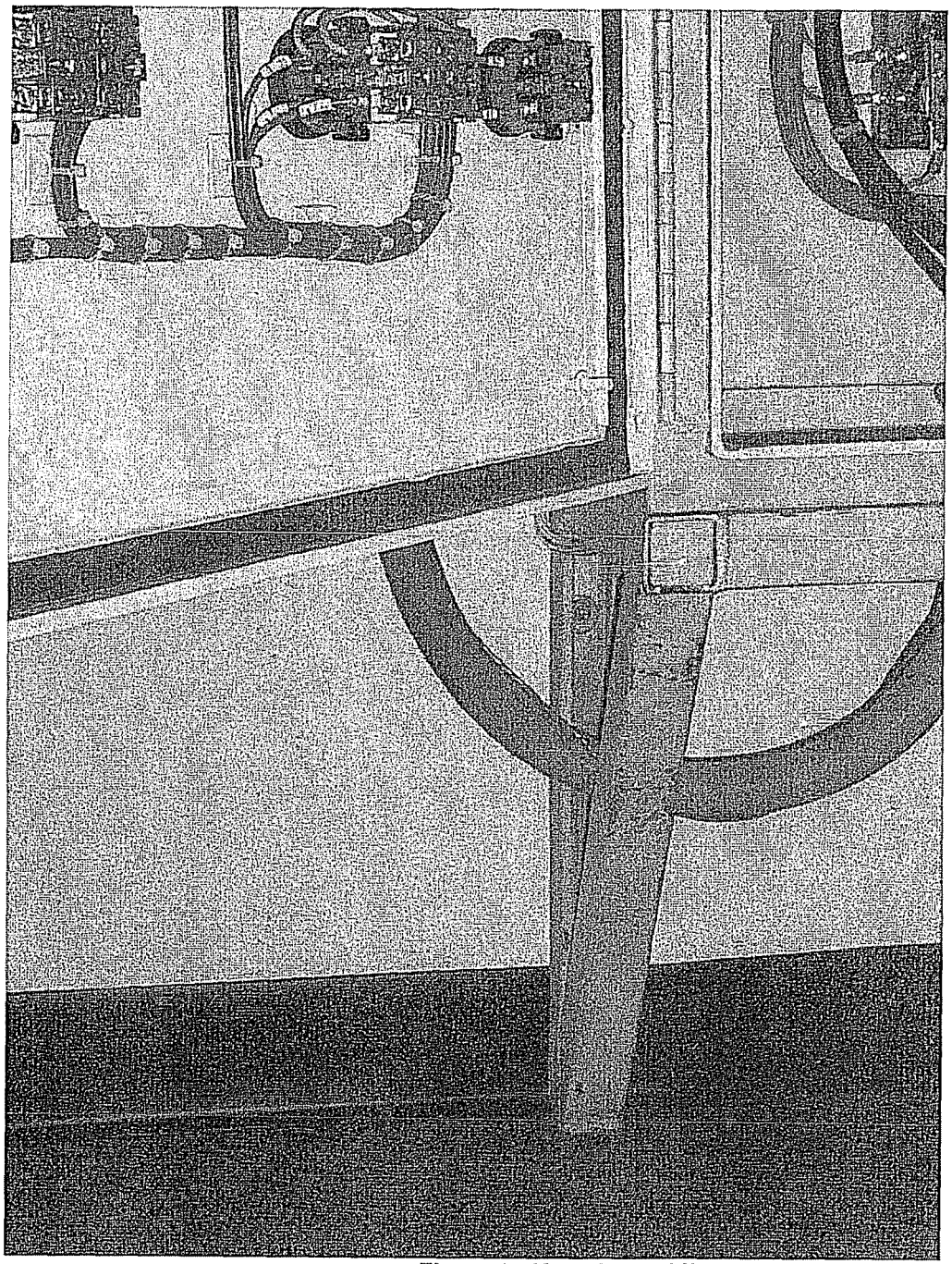


Figure 3: Knee-braced Frame to Wall

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 7 of 7
ID : C-67 (Rev. 0)	Class : 20. Instrumentation and Control Panels and Cabinets	
Description : CONTROL ROOM AIR CONDITIONING CONTROL PANEL		
Building : CB	Floor El. : 44.00	Room, Row/Col : Area 3
Manufacturer, Model, Etc. :		

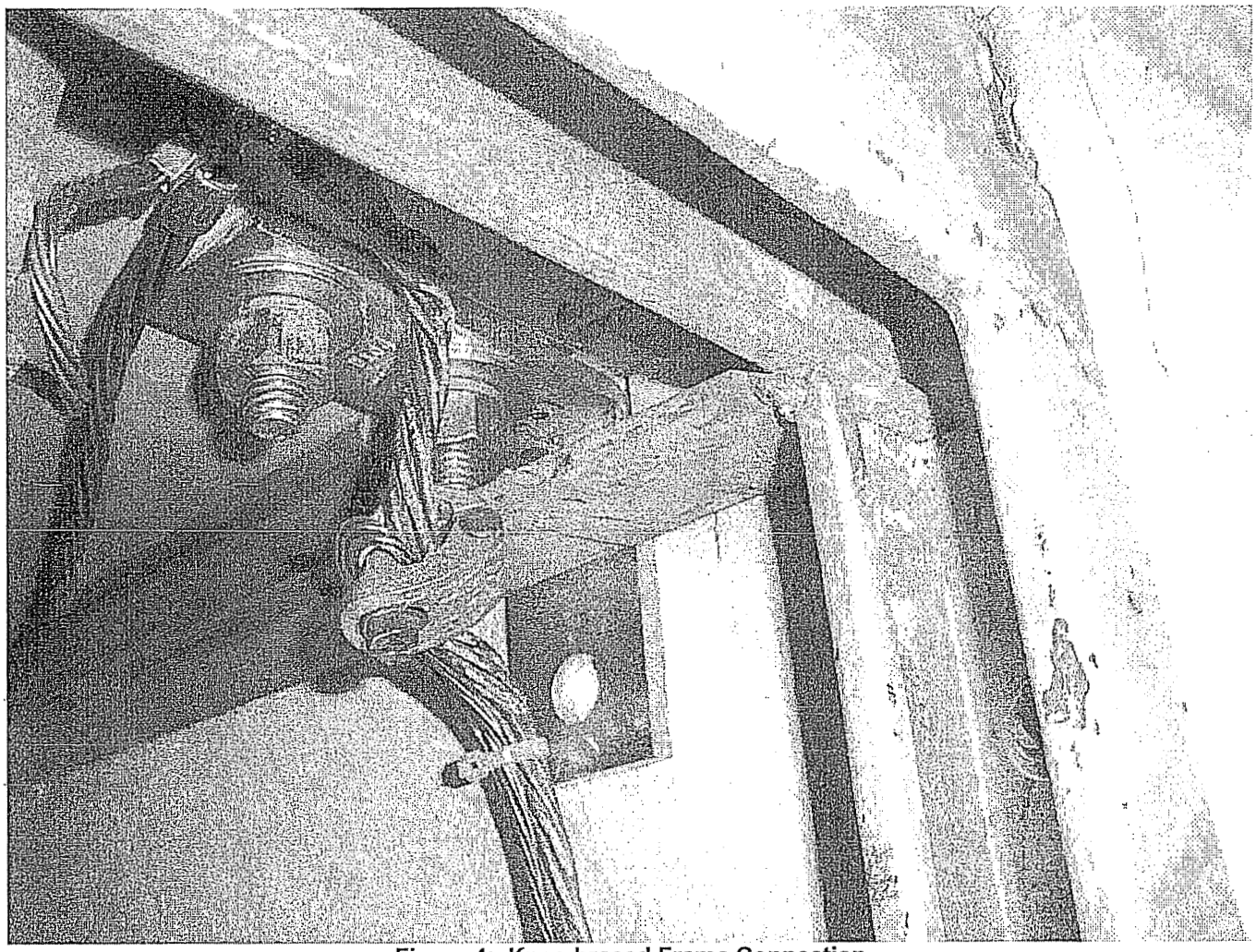
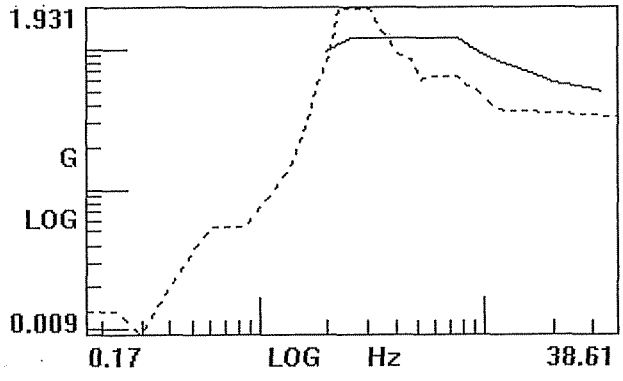


Figure 4: Knee-braced Frame Connection

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 1 of 8
ID : W-13B1 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input	60.00
2.	Elevation of seismic input below about 40' from grade (grade = 8.00)	N/A
3.	Equipment has fundamental frequency above about 8 Hz (est. frequency =)	N/A
4.	Capacity based on: 1.50 * Bounding Spectrum	
5.	Demand based on: 1.00 * Conservative Design Floor Response Spectra	



	File	Record
Capacity	J:\APPDATA\GIPPER2\GIP\spectra.des	Label|Bounding Spectrum
Demand 1	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Control Building|ELEVATION|60|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2 |LOCATION|Area 3|BLDG-DAMP||EQ DAMP|5%
Demand 2	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Control Building|ELEVATION|60|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2 |LOCATION|Area 3|BLDG-DAMP||EQ DAMP|5%

Does capacity exceed demand? No

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 2 of 8
ID : W-13B1 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

CAVEATS - BOUNDING SPECTRUM

FAN/BS Caveat 1 - Earthquake Experience Equipment Class.	Yes
FAN/BS Caveat 2 - Drive Motor and Fan Mounted on Common Base.	Yes
FAN/BS Caveat 3 - Long Shafts Supported at Fan and at Motor.	Yes
FAN/BS Caveat 4 - No Possibility of Excessive Duct Distortion Causing Binding or Misalignment of Fan.	Yes
FAN/BS Caveat 5 - Base Vibration Isolation System Checked.	No
FAN/BS Caveat 6 - Sufficient Slack and Flexibility of Attached Lines.	Yes
FAN/BS Caveat 7 - Adequate Anchorage.	No
FAN/BS Caveat 8 - No Other Concerns	No

Is the intent of all the caveats met for Bounding Spectrum? No

ANCHORAGE

1. The sizes and locations of anchors have been determined.	Yes
2. Appropriate equipment characteristics have been determined (mass, CG, natural freq., damping, center of rotation).	Yes
3. The type of anchorage is covered by the GIP.	Yes
4. The adequacy of the anchorage installation has been evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	No
5. Factors affecting anchorage capacity or margin of safety have been considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking.	Yes
6. For bolted anchorages, any gaps under the base are less than 1/4 .	Yes
7. Factors affecting essential relays have been considered: gaps under the base, capacity reduction for expansion anchors.	N/A
8. The base has adequate stiffness and the effect of prying action on anchors has been considered.	Yes
9. The strength of the equipment base and the load path to the CG is adequate.	Yes
10. The adequacy of embedded steel, grout pads or large concrete pads have been evaluated.	Yes
11. The anchorage capacity exceeds the demand.	No

Are anchorage requirements met? No

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 3 of 8
ID : W-13B1 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

INTERACTION EFFECTS

1. Soft targets are free from impact by nearby equipment or structures.	Yes
2. If the equipment contains sensitive relays, it is free from all impact by nearby equipment or structures.	N/A
3. Attached lines have adequate flexibility.	Yes
4. Overhead equipment or distribution systems are not likely to collapse.	Yes
5. No other adverse concerns were found.	Yes

Is equipment free of interaction effects? Yes

IS EQUIPMENT SEISMICALLY ADEQUATE? **No**

COMMENTS

Walkdown Engineers: W. Djordjevic & P. A. Gazda (09/04/09)

Ref. 1. Dwg No. P6118-M37-078-2

W13B1 & B2 are outliers. They are located on rubber vibration isolators beneath C4x1.5" rails. The motors are restrained by z-clips and/or "top hat" clips longitudinally (axial w.r.t. direction of channel) and vertically (1/4" thick) but not transversely. The fans have no restraint in any direction. The units rest directly on the concrete floor inside each plenum. There are existing embedded channels over which the rails are mounted and they are secured by ½" shells. The top hats and z-clips are also secured by ½" shells. The shells in W13B1 & B2 are corroded. The conceptual fix is to run an angle along side the channels of both the fans and motors to capture them transversely and to put z-clips at the ends of the fan rail using the existing shells (replace studs) in a manner similar to the motor configurations.

The plena housings are estimated to be 1/8" thickness and they have internal anchorage of 3/8" concrete expansion anchors at approximately 20" centers. The W13B1 & B2 housing is 68"H x 93"D x 13.5 ft long. These plena are light and react relatively small duct reaction loads so they clearly cannot overturn and have sufficient anchorage to resist base shear so they are seismically acceptable.

No adverse potential interactions are noted since the fans are fully contained within their respective plena.

The fans are outliers for three reasons:
1. The fans are supported on vibration isolators which are unacceptable.
2. The floor response spectrum exceeds the bounding spectrum below approximatley 4 Hz.
3. Some of the anchorage shells are corroded.

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 4 of 8
ID : W-13B1 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

Evaluated by: W.Djordjevic, PE Date: 9/04/2009

P.A.Gazda, PE 9/04/2009

Attachment: Walkdown Pictures

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 5 of 8
ID : W-13B1 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

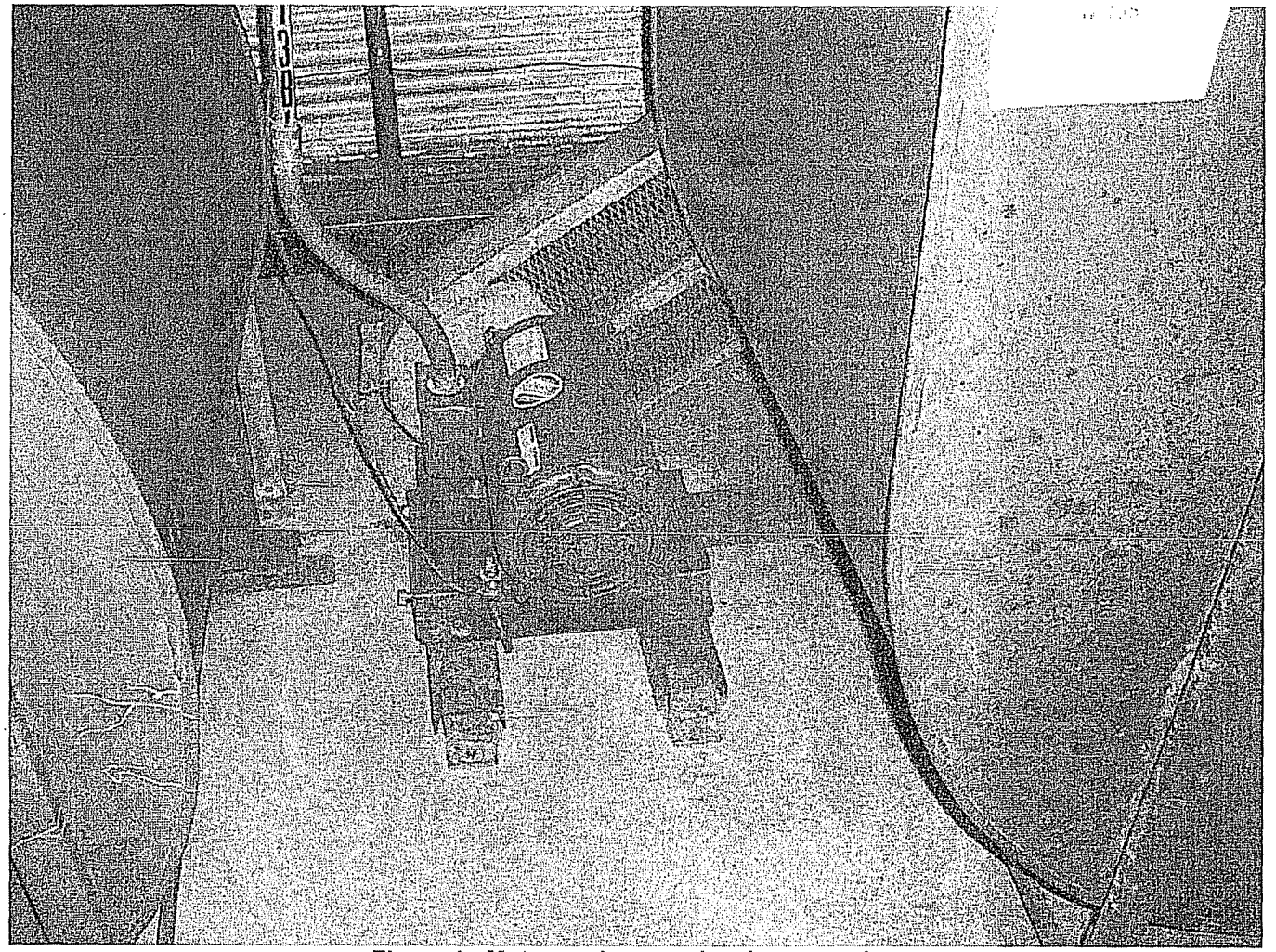


Figure 1: Motor anchorage showing corrosion

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 6 of 8
ID : W-13B1 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

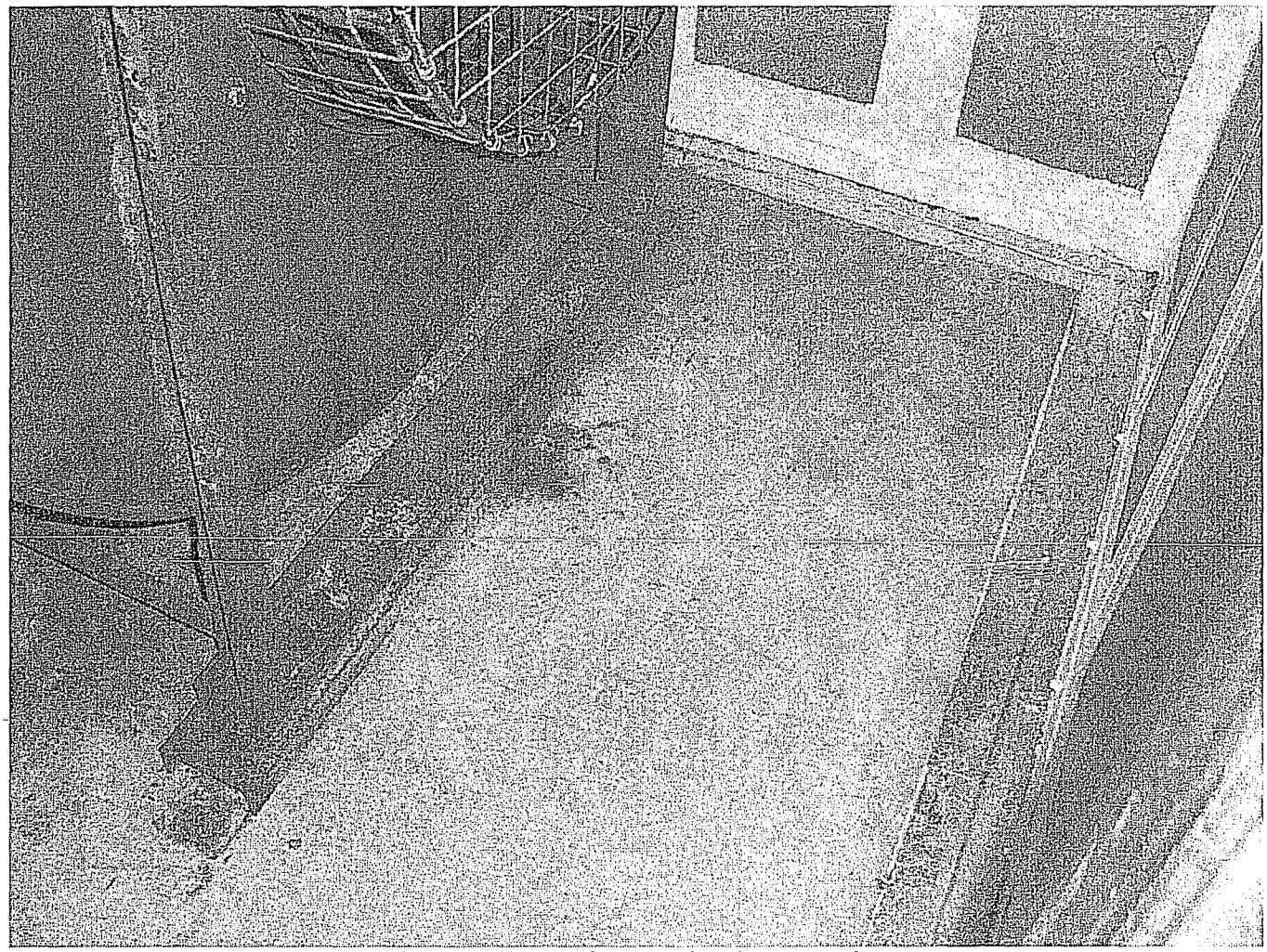


Figure 2: Fan anchorage showing corrosion

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 7 of 8
ID : W-13B1 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

Figure 3: Fan rail on isolator

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 8 of 8
ID : W-13B1 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

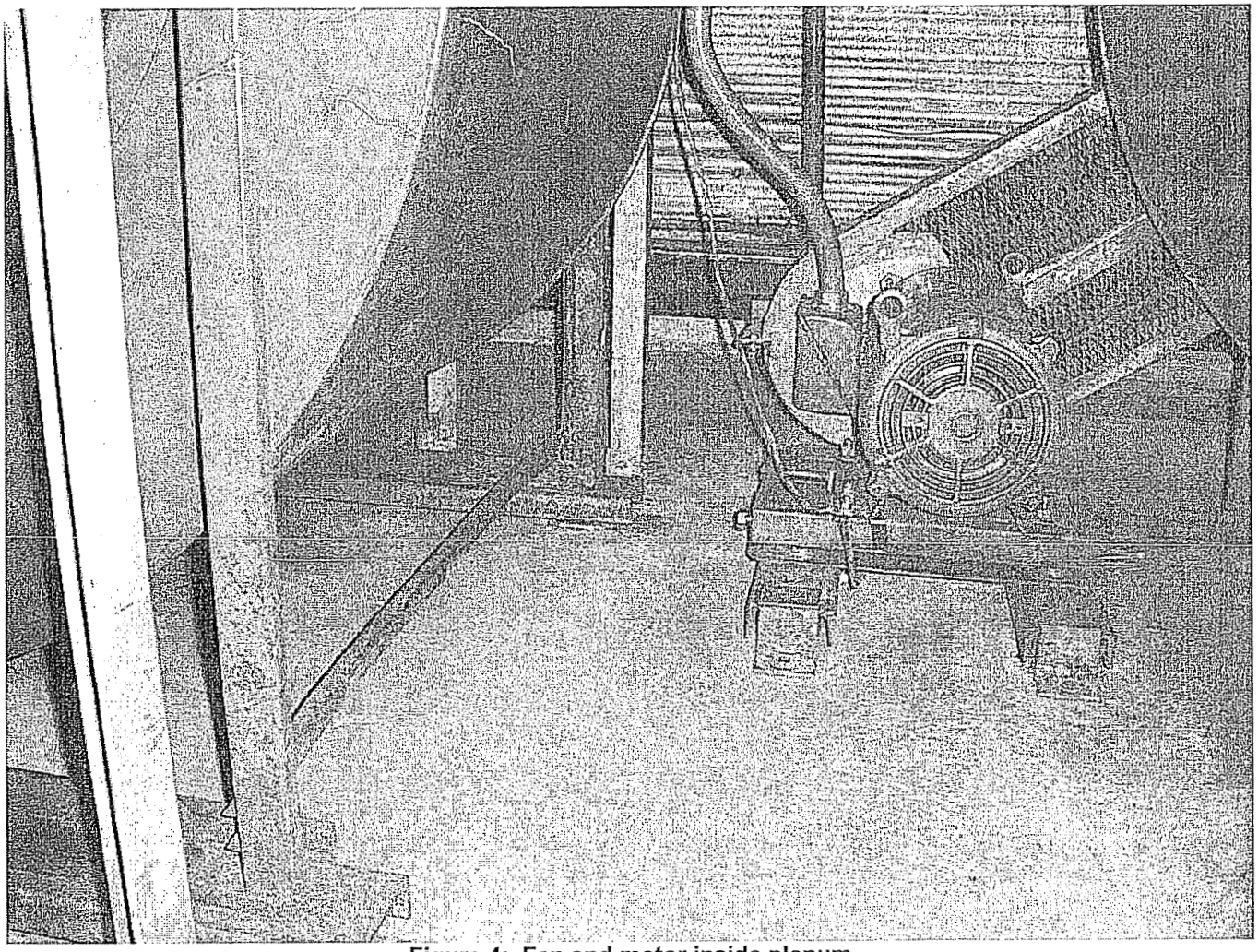
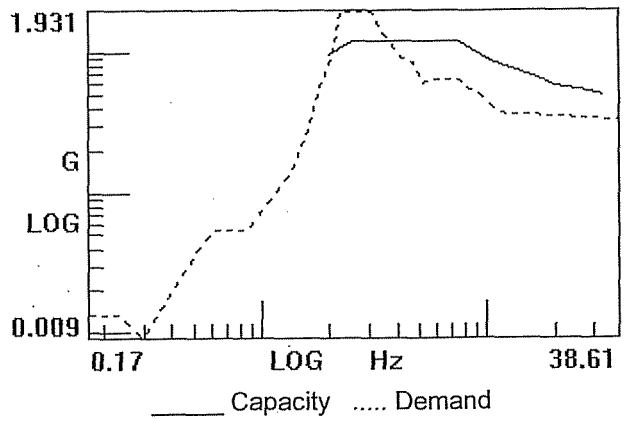


Figure 4: Fan and motor inside plenum

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 1 of 8
ID : W-13B2 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input		60.00
2.	Elevation of seismic input below about 40' from grade (grade = 8.00)		N/A
3.	Equipment has fundamental frequency above about 8 Hz (est. frequency =)		N/A
4.	Capacity based on:	1.50 * Bounding Spectrum	
5.	Demand based on:	1.00 * Conservative Design Floor Response Spectra	



	File	Record
Capacity	J:\APPDATA\GIPPER2\GIP\spectra.des	Label|Bounding Spectrum
Demand 1	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Control Building|ELEVATION|60|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2 |LOCATION|Area 3|BLDG-DAMP||EQ DAMP|5%
Demand 2	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Control Building|ELEVATION|60|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2 |LOCATION|Area 3|BLDG-DAMP||EQ DAMP|5%

Does capacity exceed demand? No

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 2 of 8
ID : W-13B2 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

CAVEATS - BOUNDING SPECTRUM

FAN/BS Caveat 1 - Earthquake Experience Equipment Class.	Yes
FAN/BS Caveat 2 - Drive Motor and Fan Mounted on Common Base.	Yes
FAN/BS Caveat 3 - Long Shafts Supported at Fan and at Motor.	Yes
FAN/BS Caveat 4 - No Possibility of Excessive Duct Distortion Causing Binding or Misalignment of Fan.	Yes
FAN/BS Caveat 5 - Base Vibration Isolation System Checked.	No
FAN/BS Caveat 6 - Sufficient Slack and Flexibility of Attached Lines.	Yes
FAN/BS Caveat 7 - Adequate Anchorage.	No
FAN/BS Caveat 8 - No Other Concerns	No

Is the intent of all the caveats met for Bounding Spectrum? No

ANCHORAGE

1. The sizes and locations of anchors have been determined.	Yes
2. Appropriate equipment characteristics have been determined (mass, CG, natural freq., damping, center of rotation).	Yes
3. The type of anchorage is covered by the GIP.	Yes
4. The adequacy of the anchorage installation has been evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	No
5. Factors affecting anchorage capacity or margin of safety have been considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking.	Yes
6. For bolted anchorages, any gaps under the base are less than 1/4 .	Yes
7. Factors affecting essential relays have been considered: gaps under the base, capacity reduction for expansion anchors.	N/A
8. The base has adequate stiffness and the effect of prying action on anchors has been considered.	Yes
9. The strength of the equipment base and the load path to the CG is adequate.	Yes
10. The adequacy of embedded steel, grout pads or large concrete pads have been evaluated.	Yes
11. The anchorage capacity exceeds the demand.	No

Are anchorage requirements met? No

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 3 of 8
ID : W-13B2 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

INTERACTION EFFECTS

1. Soft targets are free from impact by nearby equipment or structures.	Yes
2. If the equipment contains sensitive relays, it is free from all impact by nearby equipment or structures.	N/A
3. Attached lines have adequate flexibility.	Yes
4. Overhead equipment or distribution systems are not likely to collapse.	Yes
5. No other adverse concerns were found.	Yes

Is equipment free of interaction effects? Yes

IS EQUIPMENT SEISMICALLY ADEQUATE? **No**

COMMENTS

Walkdown Engineers: W. Djordjevic & P. A. Gazda (09/04/09)

Ref. 1. Dwg No. P6118-M37-078-2

W13B1 & B2 are outliers. They are located on rubber vibration isolators beneath C4x1.5" rails. The motors are restrained by z-clips and/or "top hat" clips longitudinally (axial w.r.t. direction of channel) and vertically (1/4" thick) but not transversely. The fans have no restraint in any direction. The units rest directly on the concrete floor inside each plenum. There are existing embedded channels over which the rails are mounted and they are secured by ½" shells. The top hats and z-clips are also secured by ½" shells. The shells in W13B1 & B2 are corroded. The conceptual fix is to run an angle along side the channels of both the fans and motors to capture them transversely and to put z-clips at the ends of the fan rail using the existing shells (replace studs) in a manner similar to the motor configurations.

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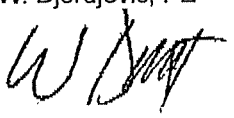
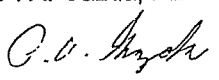
1. The fans are supported on vibration isolators which are unacceptable.
2. The floor response spectrum exceeds the bounding spectrum below approximatley 4 Hz.
3. Some of the anchorage shells are corroded.

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 4 of 8
ID : W-13B2 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

Evaluated by: W. Djordjevic, PE Date: 9/04/2009



P. A. Gazda, PE 9/04/2009



Attachment: Walkdown Pictures

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 5 of 8
ID : W-13B2 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

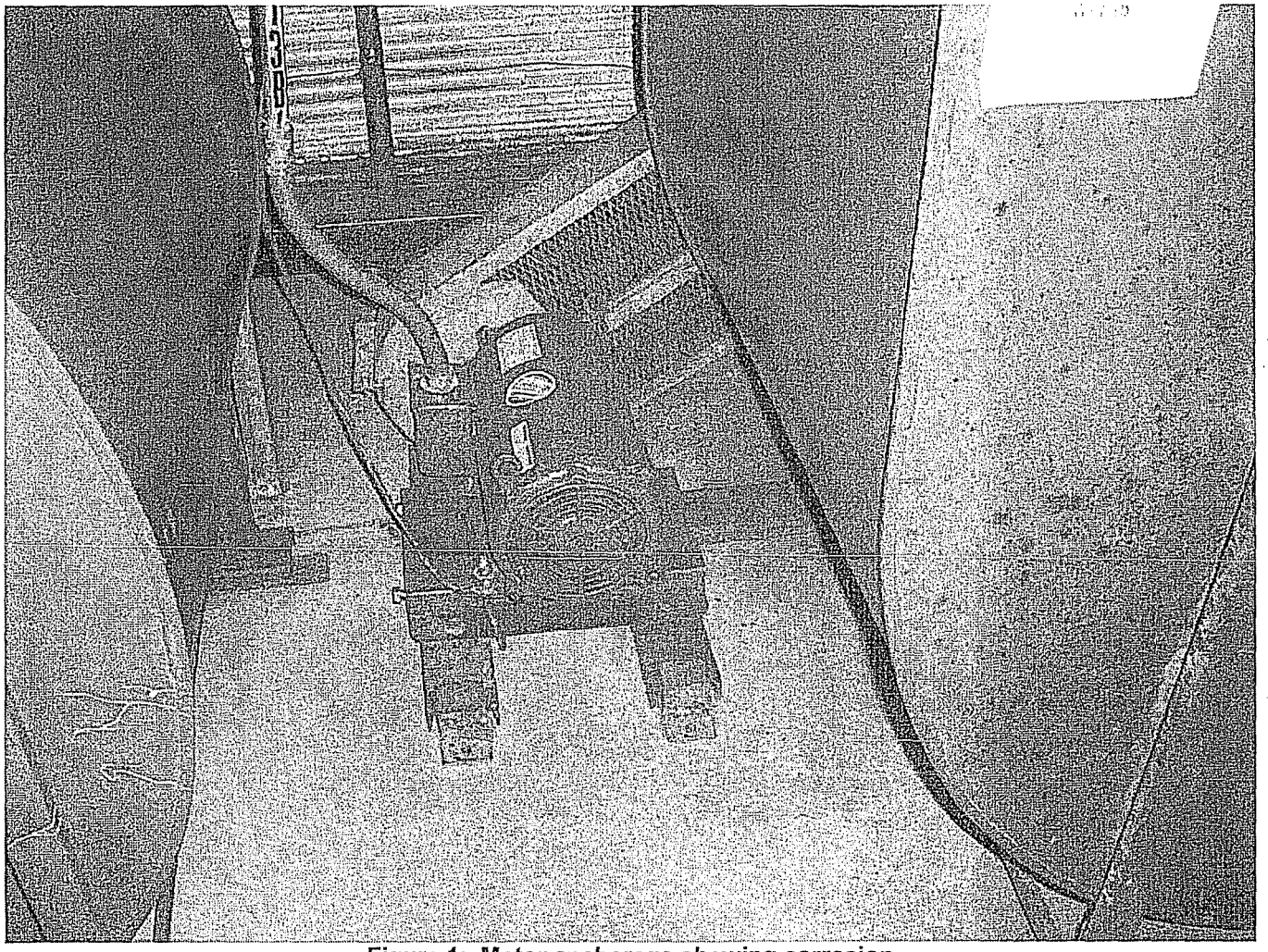


Figure 1: Motor anchorage showing corrosion

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 6 of 8
ID : W-13B2 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

Figure 2: Fan anchorage showing corrosion

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 7 of 8
ID : W-13B2 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

Figure 3: Fan rail on isolator

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 8 of 8
ID : W-13B2 (Rev. 0)	Class : 9. Fans	
Description : CONTROL ROOM RECIRC FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

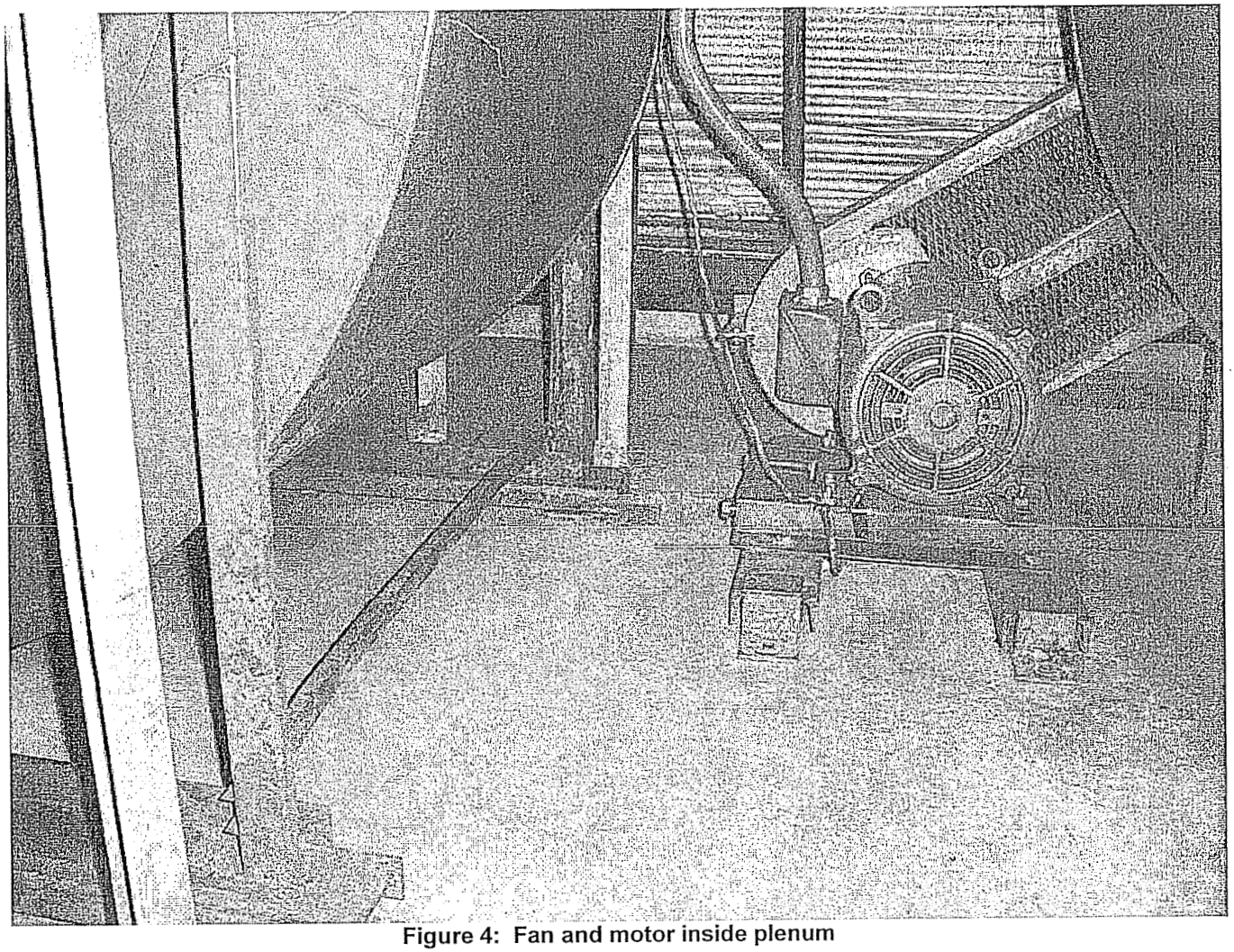
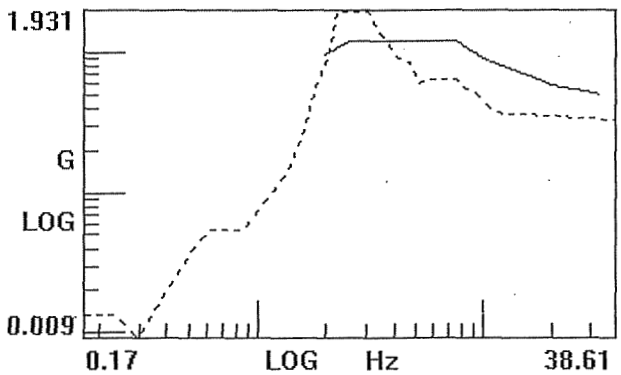


Figure 4: Fan and motor inside plenum

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 1 of 8
ID : W-14A (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input		60.00
2.	Elevation of seismic input below about 40' from grade (grade = 8.00)		N/A
3.	Equipment has *fundamental frequency* above about 8 Hz (est. frequency =)		N/A
4.	Capacity based on:	1.50 * Bounding Spectrum	
5.	Demand based on:	1.00 * Conservative Design Floor Response Spectra	



_____ Capacity ..... Demand

	File	Record
Capacity	J:\APPDATA\GIPPER2\GIP\spectra.des	Label|Bounding Spectrum
Demand 1	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Control Building|ELEVATION|60|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2 |LOCATION|Area 3|BLDG-DAMP||EQ DAMP|5%
Demand 2	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Control Building|ELEVATION|60|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2 |LOCATION|Area 3|BLDG-DAMP||EQ DAMP|5%

Does capacity exceed demand? No

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 2 of 8
ID : W-14A (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

CAVEATS - BOUNDING SPECTRUM

FAN/BS Caveat 1 - Earthquake Experience Equipment Class.	Yes
FAN/BS Caveat 2 - Drive Motor and Fan Mounted on Common Base.	Yes
FAN/BS Caveat 3 - Long Shafts Supported at Fan and at Motor.	Yes
FAN/BS Caveat 4 - No Possibility of Excessive Duct Distortion Causing Binding or Misalignment of Fan.	Yes
FAN/BS Caveat 5 - Base Vibration Isolation System Checked.	No
FAN/BS Caveat 6 - Sufficient Slack and Flexibility of Attached Lines.	Yes
FAN/BS Caveat 7 - Adequate Anchorage.	No
FAN/BS Caveat 8 - No Other Concerns	Yes

Is the intent of all the caveats met for Bounding Spectrum? No

ANCHORAGE

1. The sizes and locations of anchors have been determined.	Yes
2. Appropriate equipment characteristics have been determined (mass, CG, natural freq., damping, center of rotation).	Yes
3. The type of anchorage is covered by the GIP.	Yes
4. The adequacy of the anchorage installation has been evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	Yes
5. Factors affecting anchorage capacity or margin of safety have been considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking.	Yes
6. For bolted anchorages, any gaps under the base are less than 1/4 .	Yes
7. Factors affecting essential relays have been considered: gaps under the base, capacity reduction for expansion anchors.	N/A
8. The base has adequate stiffness and the effect of prying action on anchors has been considered.	Yes
9. The strength of the equipment base and the load path to the CG is adequate.	Yes
10. The adequacy of embedded steel, grout pads or large concrete pads have been evaluated.	Yes
11. The anchorage capacity exceeds the demand.	No

Are anchorage requirements met? No

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 3 of 8
ID : W-14A (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

INTERACTION EFFECTS

1. Soft targets are free from impact by nearby equipment or structures.	Yes
2. If the equipment contains sensitive relays, it is free from all impact by nearby equipment or structures.	N/A
3. Attached lines have adequate flexibility.	Yes
4. Overhead equipment or distribution systems are not likely to collapse.	Yes
5. No other adverse concerns were found.	Yes

Is equipment free of interaction effects? Yes

IS EQUIPMENT SEISMICALLY ADEQUATE? **No**

COMMENTS

Walkdown Engineers: W. Djordjevic & P. A. Gazda (09/04/09)

Ref. 1. Dwg No. P6118-M37-080-1, Sh 3 of 3

W14A & B are outliers. They are located on rubber vibration isolators beneath C4x1.5" rails. The motors are restrained by z-clips and/or "top hat" clips longitudinally (axial w.r.t. direction of channel) and vertically (1/4" thick) but not transversely. The fans have no restraint in any direction. The units rest directly on the concrete floor inside each plenum. There are existing embedded channels over which the rails are mounted and they are secured by ½" shells. The top hats and z-clips are also secured by ½" shells. The conceptual fix is to run an angle along side the channels of both the fans and motors to capture them transversely and to put z-clips at the ends of the fan rail using the existing shells (replace studs) in a manner similar to the motor configurations.

The plena housings are estimated to be 1/8" thickness and they have internal anchorage of 3/8" concrete expansion anchors at approximately 20" centers. The W14A&B housing dimension is 68"H x 62"D x 20 ft long. These plena are light and react relatively small duct reaction loads so they clearly cannot overturn and have sufficient anchorage to resist base shear so they are seismically acceptable.

No adverse potential interactions are noted since the fans are fully contained within their respective plena.

The fans are outliers for two reasons:
1. The fans are supported on vibration isolators which are unacceptable.
2. The floor response spectrum exceeds the bounding spectrum below approximatley 4 Hz.

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 4 of 8
ID : W-14A (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

Evaluated by: W. Djordjevic, PE Date: 9/04/2009

P. A. Gazda, PE 9/04/2009

Attachment: Walkdown Pictures

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 5 of 8
ID : W-14A (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

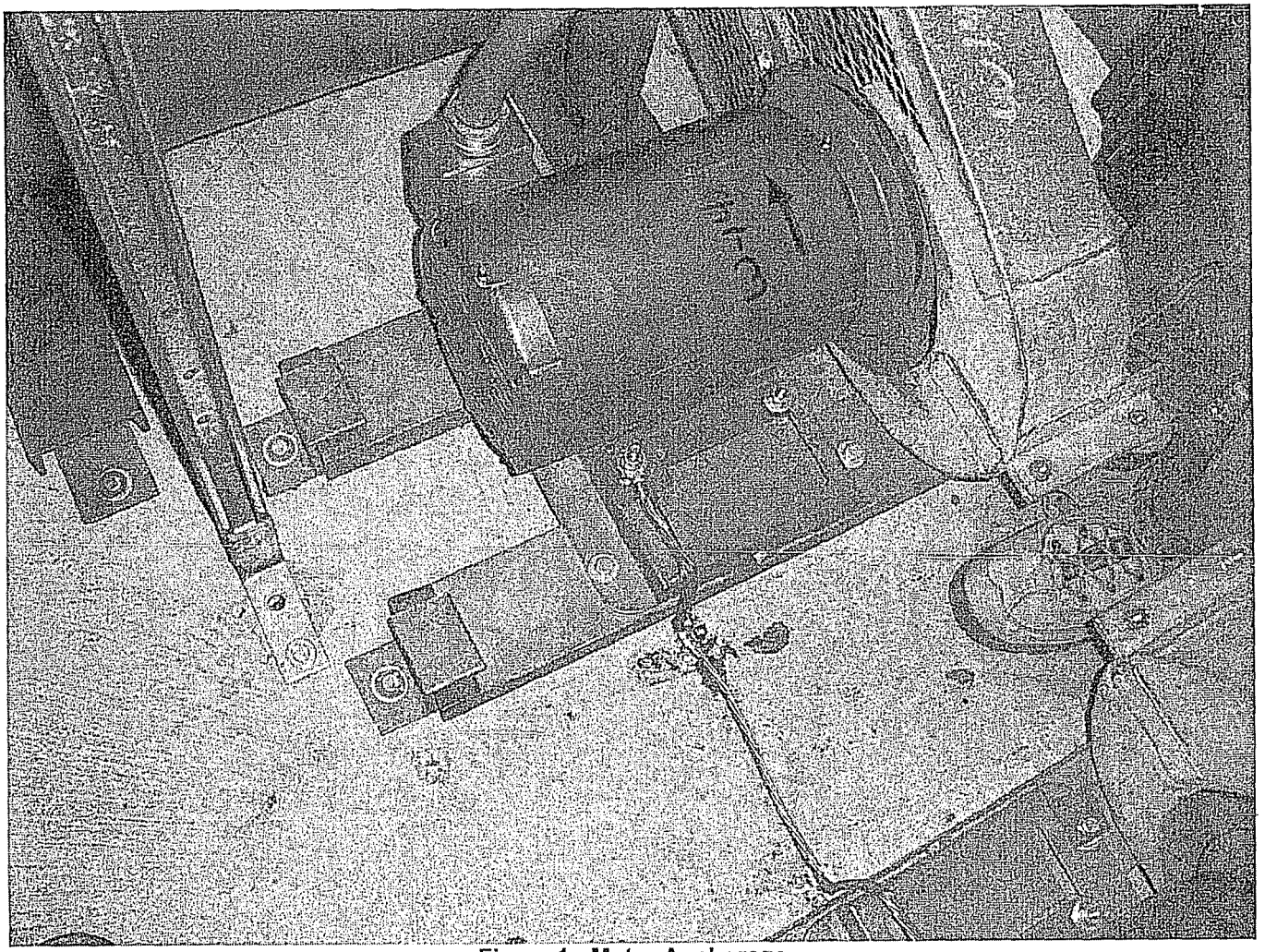


Figure 1: Motor Anchorage

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 6 of 8
ID : W-14A (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

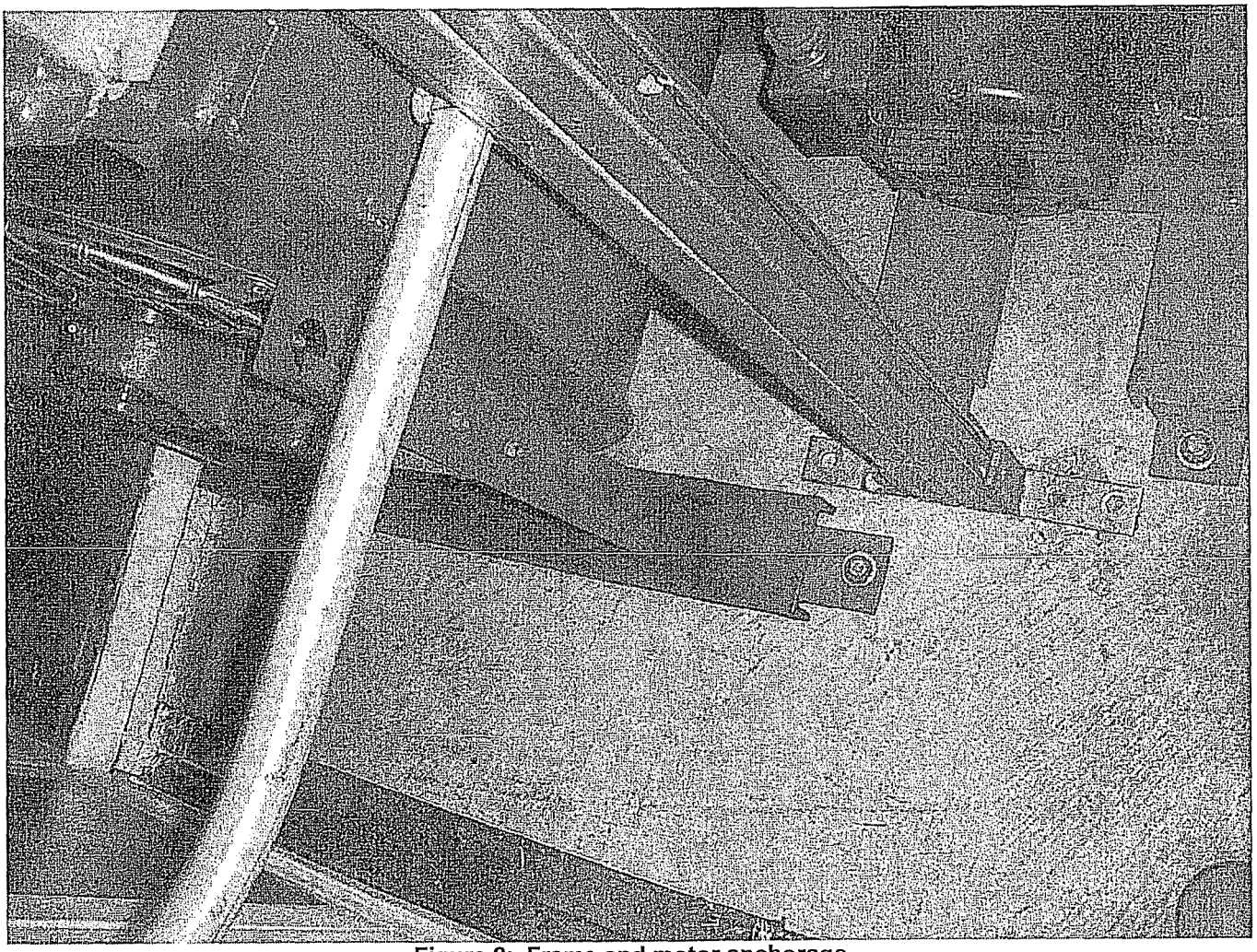


Figure 2: Frame and motor anchorage

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 7 of 8
ID : W-14A (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

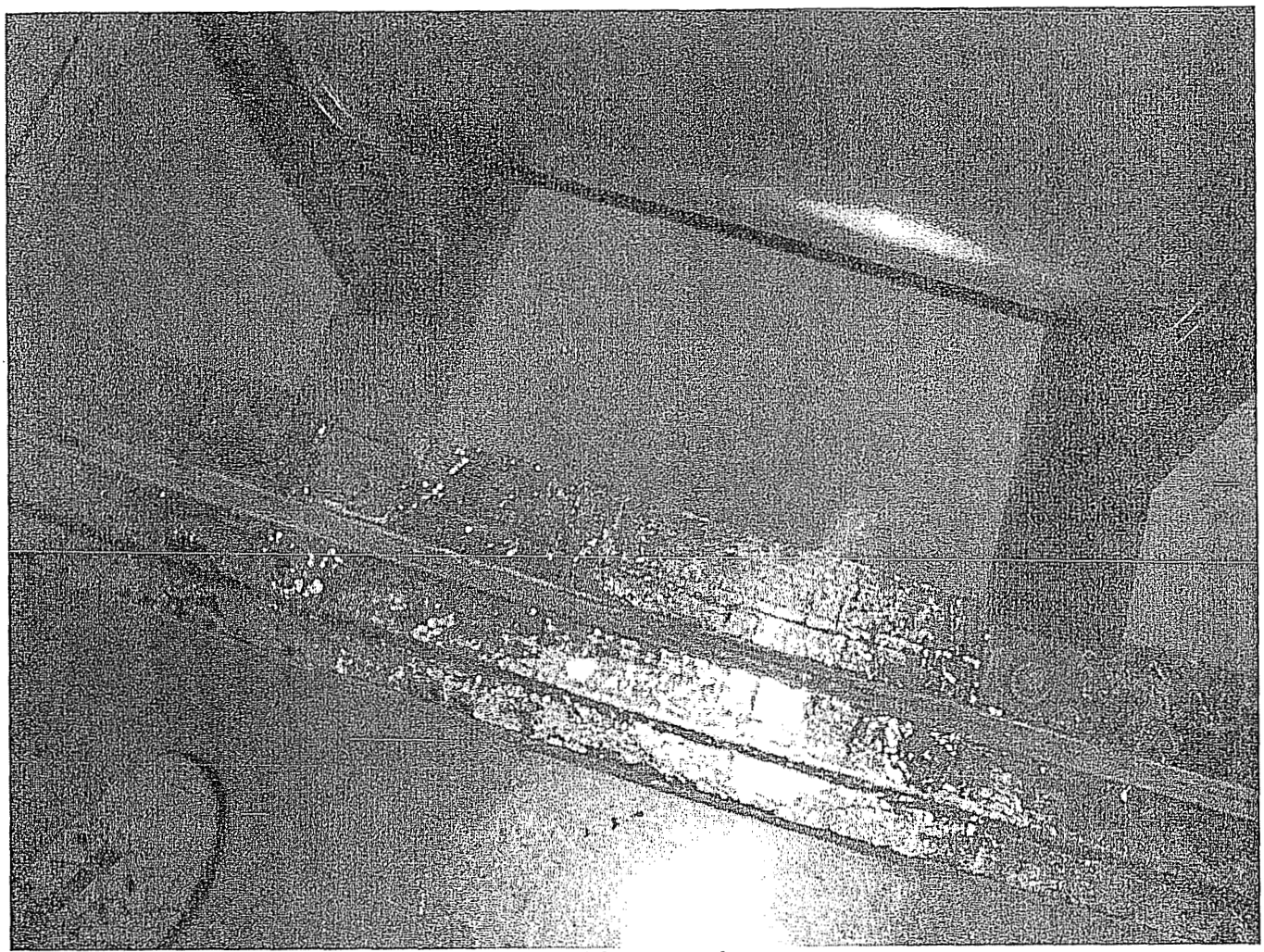


Figure 3: Plenum anchorage

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 8 of 8
ID : W-14A (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

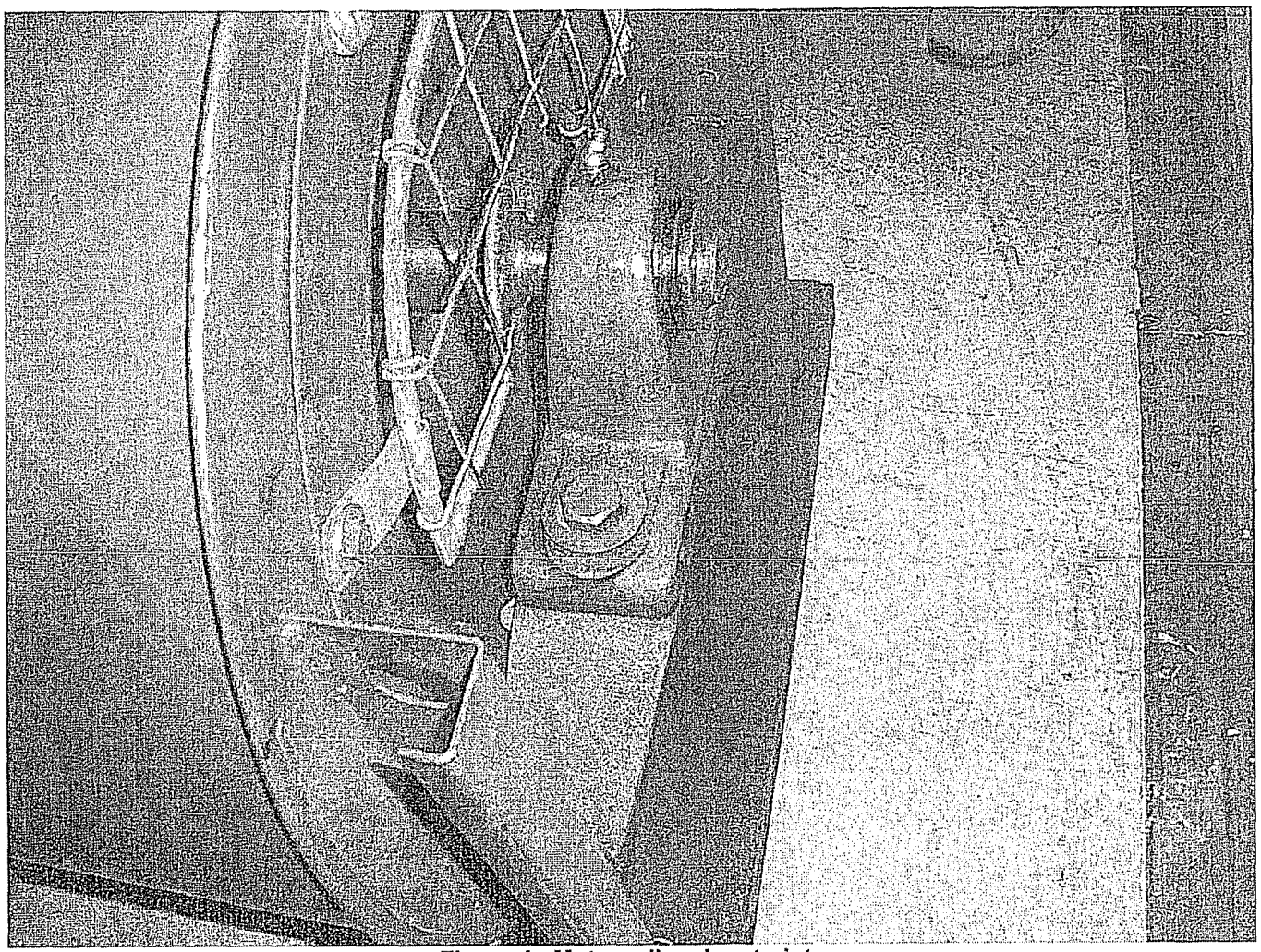
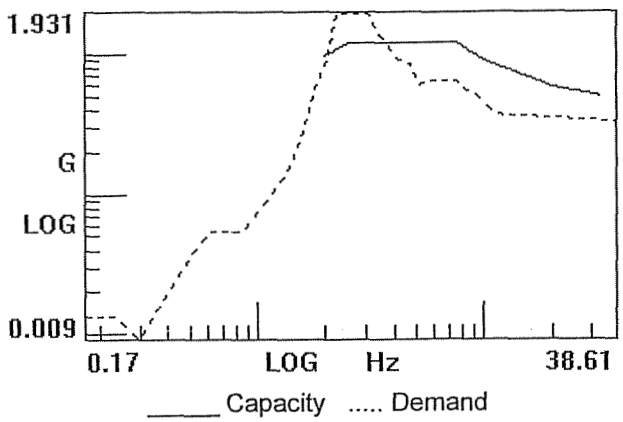


Figure 4: Motor rail end restraints

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 1 of 8
ID : W-14B (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input		60.00
2.	Elevation of seismic input below about 40' from grade (grade = 8.00)		N/A
3.	Equipment has fundamental frequency above about 8 Hz (est. frequency =)		N/A
4.	Capacity based on:	1.50 * Bounding Spectrum	
5.	Demand based on:	1.00 * Conservative Design Floor Response Spectra	



	File	Record
Capacity	J:\APPDATA\GIPPER2\GIP\spectra.des	Label|Bounding Spectrum
Demand 1	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Control Building|ELEVATION|60|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2 |LOCATION|Area 3|BLDG-DAMP||EQ DAMP|5%
Demand 2	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Control Building|ELEVATION|60|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2 |LOCATION|Area 3|BLDG-DAMP||EQ DAMP|5%

Does capacity exceed demand? No

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 2 of 8
ID : W-14B (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

CAVEATS - BOUNDING SPECTRUM

FAN/BS Caveat 1 - Earthquake Experience Equipment Class.	Yes
FAN/BS Caveat 2 - Drive Motor and Fan Mounted on Common Base.	Yes
FAN/BS Caveat 3 - Long Shafts Supported at Fan and at Motor.	Yes
FAN/BS Caveat 4 - No Possibility of Excessive Duct Distortion Causing Binding or Misalignment of Fan.	Yes
FAN/BS Caveat 5 - Base Vibration Isolation System Checked.	No
FAN/BS Caveat 6 - Sufficient Slack and Flexibility of Attached Lines.	Yes
FAN/BS Caveat 7 - Adequate Anchorage.	No
FAN/BS Caveat 8 - No Other Concerns	Yes

Is the intent of all the caveats met for Bounding Spectrum? No

ANCHORAGE

1. The sizes and locations of anchors have been determined.	Yes
2. Appropriate equipment characteristics have been determined (mass, CG, natural freq., damping, center of rotation).	Yes
3. The type of anchorage is covered by the GIP.	Yes
4. The adequacy of the anchorage installation has been evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	Yes
5. Factors affecting anchorage capacity or margin of safety have been considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking.	Yes
6. For bolted anchorages, any gaps under the base are less than 1/4 .	Yes
7. Factors affecting essential relays have been considered: gaps under the base, capacity reduction for expansion anchors.	N/A
8. The base has adequate stiffness and the effect of prying action on anchors has been considered.	Yes
9. The strength of the equipment base and the load path to the CG is adequate.	Yes
10. The adequacy of embedded steel, grout pads or large concrete pads have been evaluated.	Yes
11. The anchorage capacity exceeds the demand.	No

Are anchorage requirements met? No

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 3 of 8
ID : W-14B (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

INTERACTION EFFECTS

1. Soft targets are free from impact by nearby equipment or structures.	Yes
2. If the equipment contains sensitive relays, it is free from all impact by nearby equipment or structures.	N/A
3. Attached lines have adequate flexibility.	Yes
4. Overhead equipment or distribution systems are not likely to collapse.	Yes
5. No other adverse concerns were found.	Yes

Is equipment free of interaction effects? Yes

IS EQUIPMENT SEISMICALLY ADEQUATE? No

COMMENTS

Walkdown Engineers: W. Djordjevic & P. A. Gazda (09/04/09)

Ref. 1. Dwg No. P6118-M37-080-1, Sh 3 of 3

W14A & B are outliers. They are located on rubber vibration isolators beneath C4x1.5" rails. The motors are restrained by z-clips and/or "top hat" clips longitudinally (axial w.r.t. direction of channel) and vertically (1/4" thick) but not transversely. The fans have no restraint in any direction. The units rest directly on the concrete floor inside each plenum. There are existing embedded channels over which the rails are mounted and they are secured by ½" shells. The top hats and z-clips are also secured by ½" shells. The conceptual fix is to run an angle along side the channels of both the fans and motors to capture them transversely and to put z-clips at the ends of the fan rail using the existing shells (replace studs) in a manner similar to the motor configurations.

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SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 4 of 8
ID : W-14B (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

Evaluated by: W. Djordjevic, PE Date: 9/04/2009

P. A. Gazda, PE 9/04/2009

Attachment: Walkdown Pictures

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 5 of 8
ID : W-14B (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

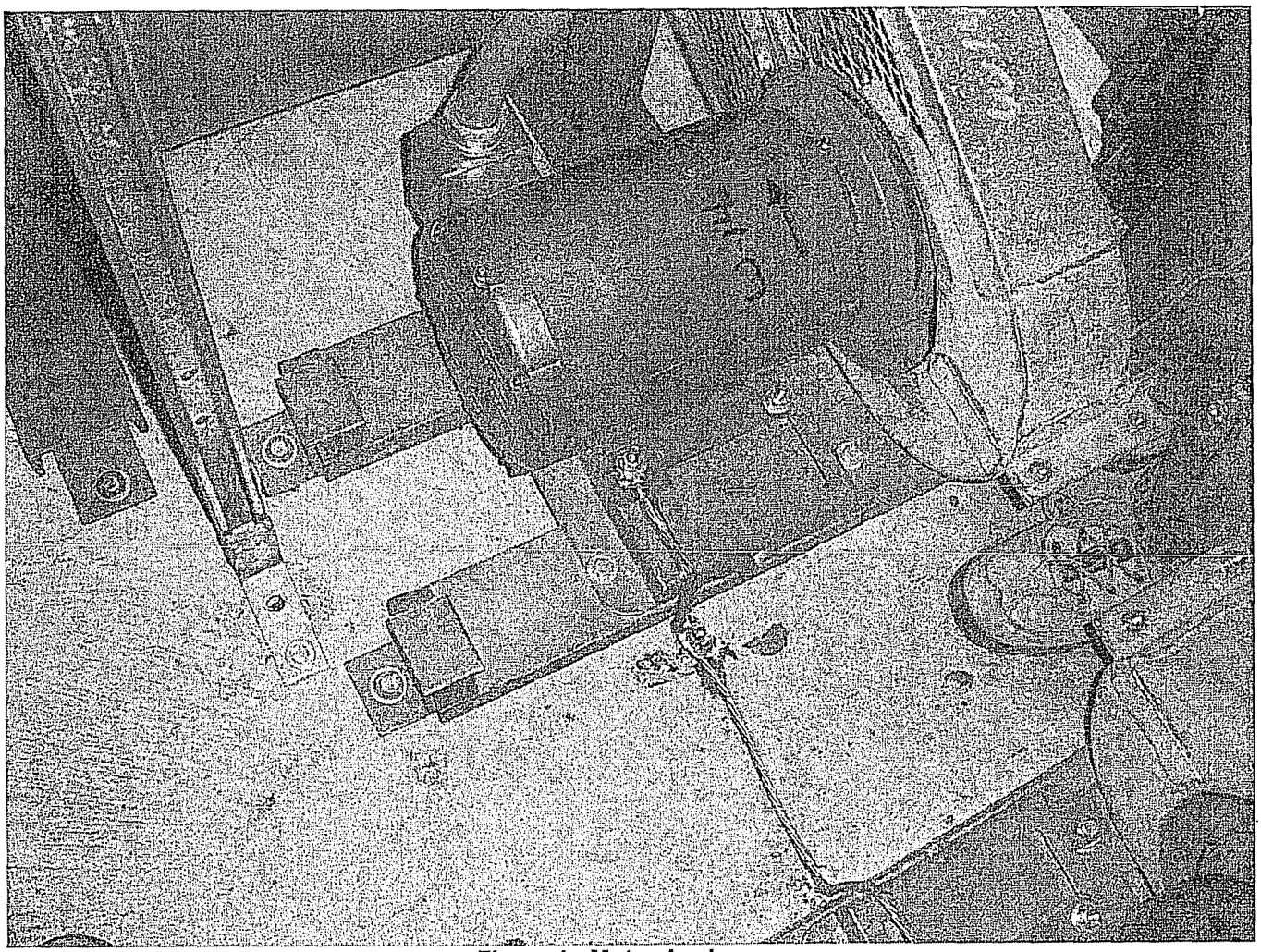


Figure 1: Motor Anchorage

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 6 of 8
ID : W-14B (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

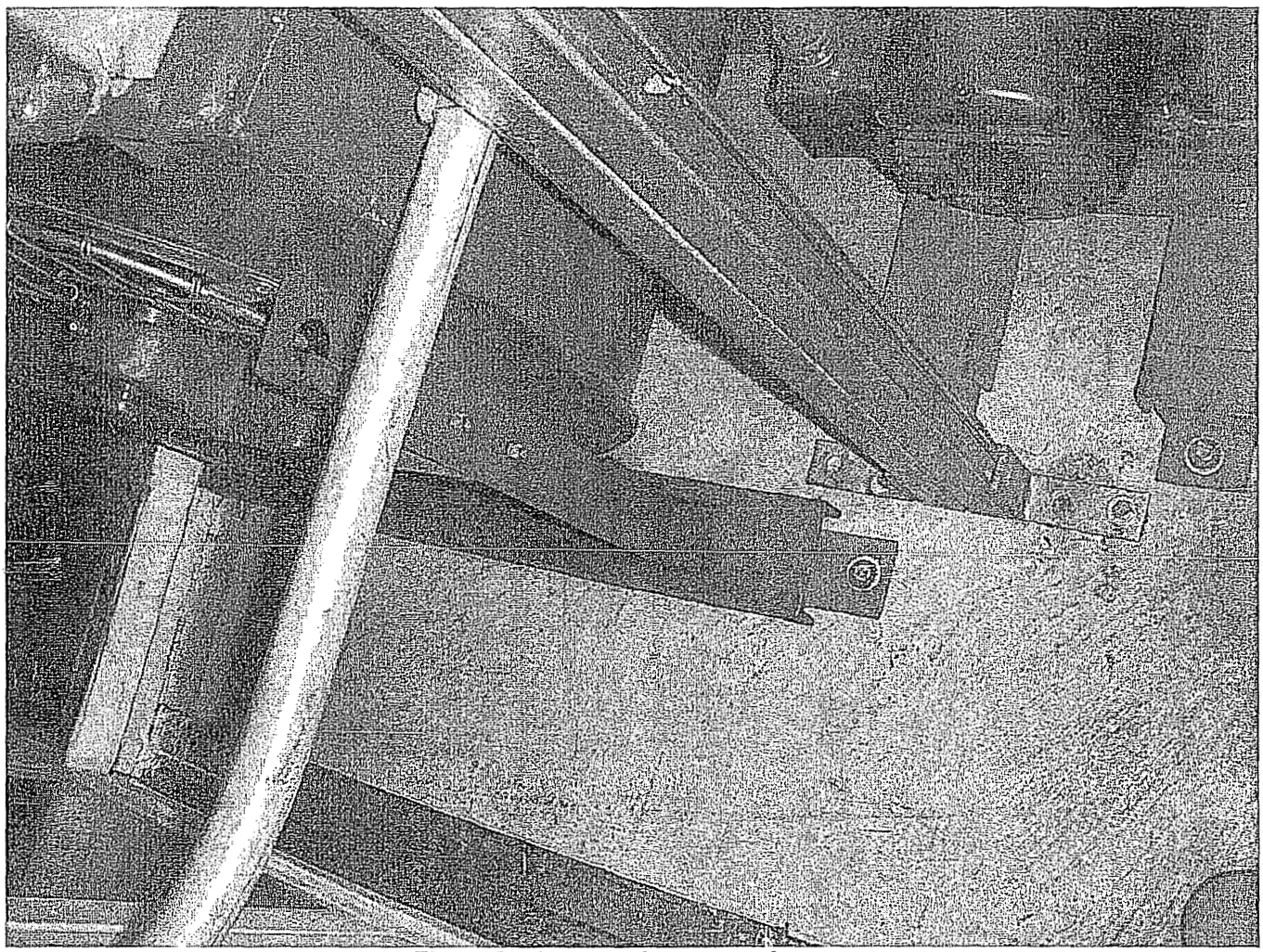


Figure 2: Frame and motor anchorage

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 7 of 8
ID : W-14B (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

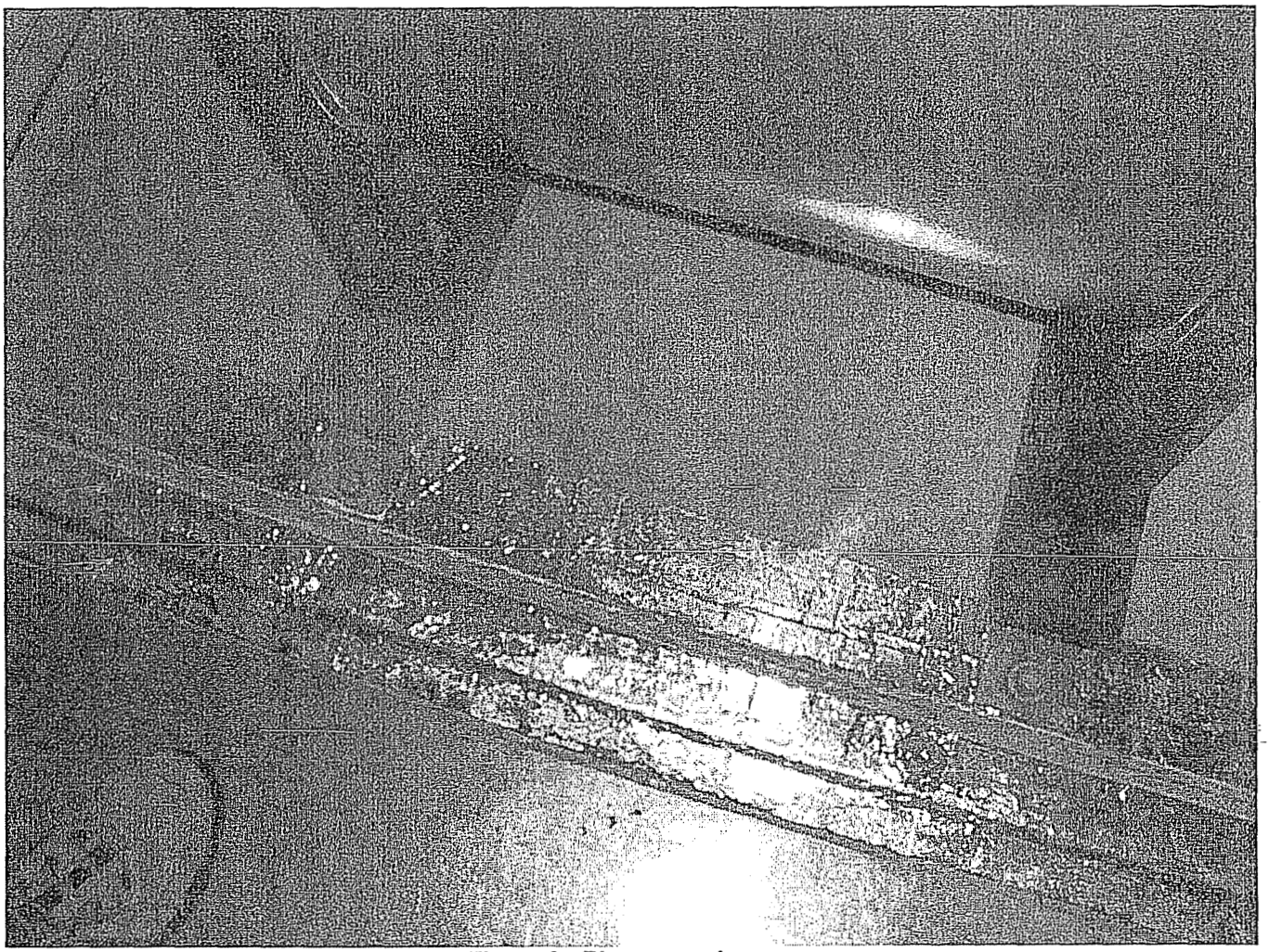


Figure 3: Plenum anchorage

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: No Sheet 8 of 8
ID : W-14B (Rev. 0)	Class : 9. Fans	
Description : F-16 CONTROL ROOM CHARCOAL FILTER FAN		
Building : CB	Floor El. : 60.00	Room, Row/Col : AREA 3
Manufacturer, Model, Etc. :		

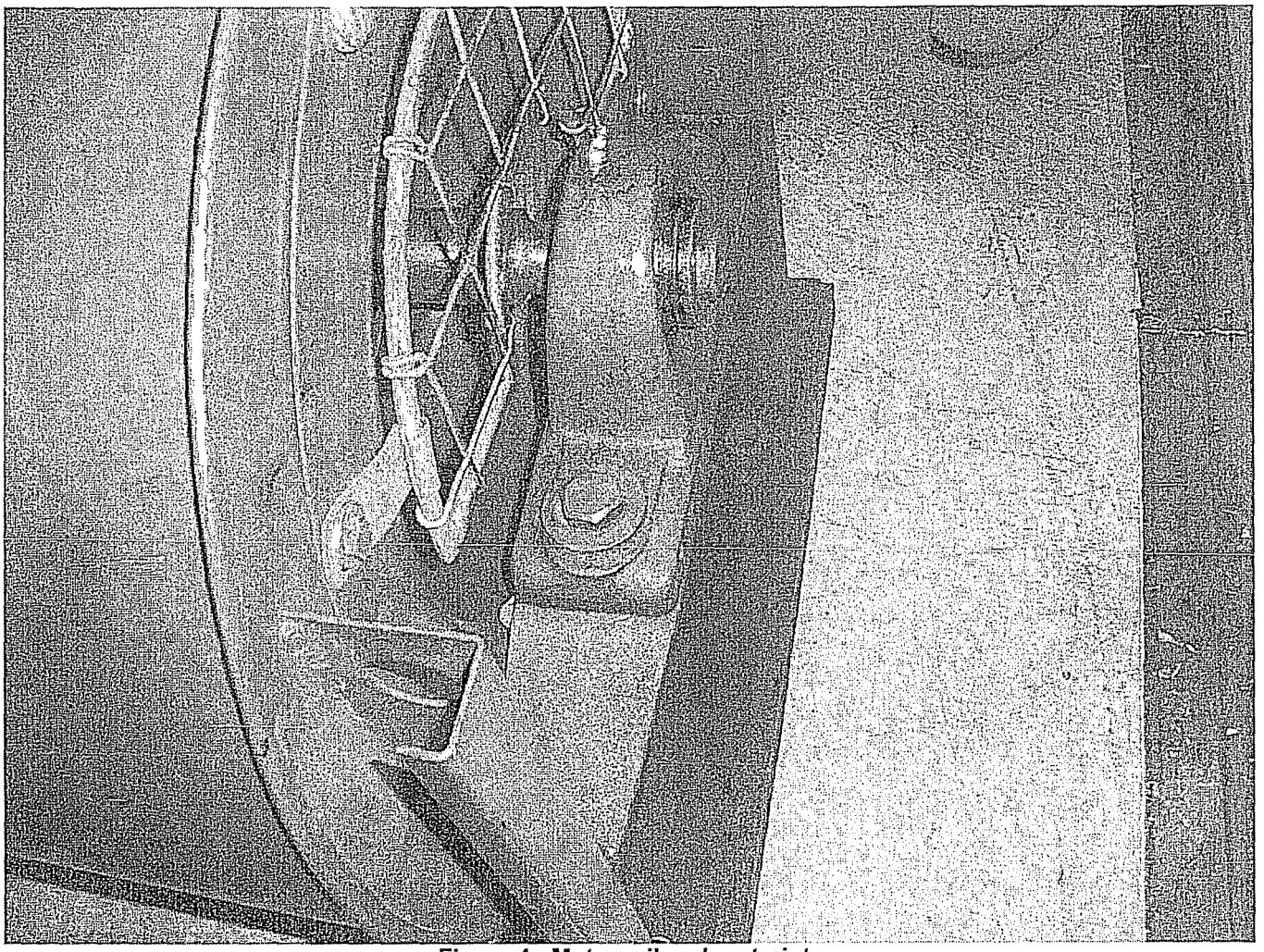
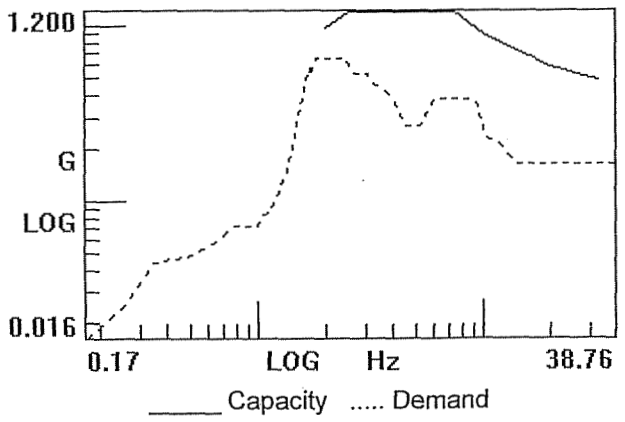


Figure 4: Motor rail end restraints

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 1 of 13
ID : W-21A (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input	8.00
2.	Elevation of seismic input below about 40' from grade (grade = 8.00)	N/A
3.	Equipment has fundamental frequency above about 8 Hz (est. frequency =)	N/A
4.	Capacity based on: 1.50 * Bounding Spectrum	
5.	Demand based on: 1.00 * Conservative Design Floor Response Spectra	



	File	Record
Capacity	J:\APPDATA\GIPPER2\GIP\spectra.des	Label|Bounding Spectrum
Demand 1	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux North and South Wings|ELEVATION|8|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Areas 4 & 6|BLDG-DAMP||EQ DAMP|5%
Demand 2	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux North and South Wings|ELEVATION|8|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Areas 4 & 6|BLDG-DAMP||EQ DAMP|5%

Does capacity exceed demand? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 2 of 13
ID : W-21A (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

CAVEATS - BOUNDING SPECTRUM

FAN/BS Caveat 1 - Earthquake Experience Equipment Class.	Yes
FAN/BS Caveat 2 - Drive Motor and Fan Mounted on Common Base.	Yes
FAN/BS Caveat 3 - Long Shafts Supported at Fan and at Motor.	Yes
FAN/BS Caveat 4 - No Possibility of Excessive Duct Distortion Causing Binding or Misalignment of Fan.	Yes
FAN/BS Caveat 5 - Base Vibration Isolation System Checked.	Yes
FAN/BS Caveat 6 - Sufficient Slack and Flexibility of Attached Lines.	Yes
FAN/BS Caveat 7 - Adequate Anchorage.	Yes
FAN/BS Caveat 8 - No Other Concerns	Yes

Is the intent of all the caveats met for Bounding Spectrum? Yes

ANCHORAGE

1. The sizes and locations of anchors have been determined.	Yes
2. Appropriate equipment characteristics have been determined (mass, CG, natural freq., damping, center of rotation).	Yes
3. The type of anchorage is covered by the GIP.	Yes
4. The adequacy of the anchorage installation has been evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	Yes
5. Factors affecting anchorage capacity or margin of safety have been considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking.	Yes
6. For bolted anchorages, any gaps under the base are less than 1/4 .	Yes
7. Factors affecting essential relays have been considered: gaps under the base, capacity reduction for expansion anchors.	N/A
8. The base has adequate stiffness and the effect of prying action on anchors has been considered.	Yes
9. The strength of the equipment base and the load path to the CG is adequate.	Yes
10. The adequacy of embedded steel, grout pads or large concrete pads have been evaluated.	Yes
11. The anchorage capacity exceeds the demand.	Yes

Are anchorage requirements met? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 3 of 13
ID : W-21A (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

INTERACTION EFFECTS

1. Soft targets are free from impact by nearby equipment or structures.	Yes
2. If the equipment contains sensitive relays, it is free from all impact by nearby equipment or structures.	N/A
3. Attached lines have adequate flexibility.	Yes
4. Overhead equipment or distribution systems are not likely to collapse.	Yes*
5. No other adverse concerns were found.	Yes

Is equipment free of interaction effects? Yes

IS EQUIPMENT SEISMICALLY ADEQUATE? **Yes**

COMMENTS

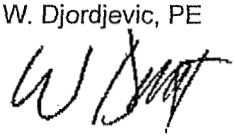
Walkdown Engineers: W. Djordjevic & P. A. Gazda (8/31/09)

Ref. 1. Dwg P6118-M37-023-1, Sh 3 of 3

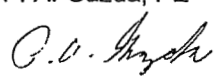
Fans W21A&B are positively anchored clearly and recently modified. There are no vibration isolators. They are each anchored by 6 - ¾" concrete expansion anchors. The footprint is 60" x 84" with 3 anchors spaced equally on each 60" side.

Possible interactions are an overhead cast iron pipe, which is continuously supported such that it cannot credibly disengage from its supports to fall; and cable "pigtails" which are deemed too light to be of consequence even if they were to fall.

Evaluated by: W. Djordjevic, PE Date: 8/31/09



P. A. Gazda, PE 8/31/09



Attachment: ANCHOR Report
: Walkdown Pictures

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 4 of 13
ID : W-21A (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

ANCHOR Report

Earthquake :
Response Spectrum : Instructure Conservative
Frequency : GIP - Flexible
Percent Damping : GIP - 5.00

Spectral Values :

Direction	Acceleration (g's)
North - South	0.647
East - West	0.647
Vertical	0.107

Angle (N-S Direction makes with the X Axis) : 0.00
Combination Criteria : SRSS

Weights :
Number of Weights : 1

No	Weight	X	Y	Z
1	3200.00	30.000	44.000	52.250

Forces :
Number of External Forces : 0

Moments :
Number of External Moments : 0

Allowables :
Anchor :
Number of Anchor types : 1

						Tension	Shear	
				Ultimate	Ultimate	Inter	Inter	Saf
No.	Dia	Manufact	Product	Tension	Shear	Coeff	Coeff	Fact
1	3/4	Hilti	Kwik-Bolt (N)	4690.00	5480.00	1.00	0.30	1.00

Concrete :
Ultimate Stress : 3000.00 psi.
Reduction Factor : 0.85

Weld :
Allowable Stress : 30600 psi.

Surfaces :
Number of Surfaces : 1
Surface Orientation

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 5 of 13
ID : W-21A (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

	Direction Comp	Direction Comp	Direction Comp
No	Nx	Ny	Nz
1	0.000	0.000	1.000

Anchor Pattern for Surface # 1

Legend for Anchor Patterns

Anchor Bolts :

Concrete Lines :

Concrete Points :

Weld Lines :

Geometry :
Anchor :
Number of Anchors : 6

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 6 of 13
ID : W-21A (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

No.	Anch Id	X Coord	Y Coord	Z Coord	Surf Id
1	1	2.000	2.000	0.000	1
2	1	30.000	2.000	0.000	1
3	1	58.000	2.000	0.000	1
4	1	2.000	86.000	0.000	1
5	1	30.000	86.000	0.000	1
6	1	58.000	86.000	0.000	1

Concrete Lines :
# of elements per line : 4
Number of Concrete Lines : 0

Concrete Points :
Number of Concrete Points : 6

No.	X Coord	Y Coord	Z Coord	Surf Id	Conc-Pt Area
1	2.000	2.000	0.000	1	16.000
2	58.000	2.000	0.000	1	16.000
3	30.000	2.000	0.000	1	16.000
4	2.000	86.000	0.000	1	16.000
5	58.000	86.000	0.000	1	16.000
6	30.000	86.000	0.000	1	16.000

Weld Lines :
# of elements per line : 4
Number of Weld Lines : 0

Determination of Reduction Factors :
Reduction Factor Input for Anchor # 1

Adequately Installed : Yes
Embedment Length : (3.25 in. Min Reqd. to achieve full capacity) := 3.25 in.
Gap at Threaded Anchor : 0.00 in.
Edge Distance - Edge 1 : 7.50 in.
Crack Size : 0.000 in. - Cracks Affect <= 50% Bolts
Essential Relays in Cabinet : Yes
Adequate Equipment Base Strength and Structural Load Path : Yes
Embedment Steel and Pads Adequately Installed : Yes

Reduction Factor Input for Anchor # 2

Adequately Installed : Yes
Embedment Length : (3.25 in. Min Reqd. to achieve full capacity) := 3.25 in.
Gap at Threaded Anchor : 0.00 in.
Edge Distance - Edge 1 : 7.50 in.

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 7 of 13
ID : W-21A (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

Crack Size : 0.000 in. - Cracks Affect <= 50% Bolts
Essential Relays in Cabinet : Yes
Adequate Equipment Base Strength and Structural Load Path : Yes
Embedment Steel and Pads Adequately Installed : Yes

Reduction Factor Input for Anchor # 3

Adequately Installed : Yes
Embedment Length : (3.25 in. Min Reqd. to achieve full capacity) := 3.25 in.
Gap at Threaded Anchor : 0.00 in.
Edge Distance - Edge 1 : 7.50 in.
Crack Size : 0.000 in. - Cracks Affect <= 50% Bolts
Essential Relays in Cabinet : Yes
Adequate Equipment Base Strength and Structural Load Path : Yes
Embedment Steel and Pads Adequately Installed : Yes

Reduction Factor Input for Anchor # 4

Adequately Installed : Yes
Embedment Length : (3.25 in. Min Reqd. to achieve full capacity) := 3.25 in.
Gap at Threaded Anchor : 0.00 in.
Edge Distance - Edge 1 : 7.50 in.
Crack Size : 0.000 in. - Cracks Affect <= 50% Bolts
Essential Relays in Cabinet : Yes
Adequate Equipment Base Strength and Structural Load Path : Yes
Embedment Steel and Pads Adequately Installed : Yes

Reduction Factor Input for Anchor # 5

Adequately Installed : Yes
Embedment Length : (3.25 in. Min Reqd. to achieve full capacity) := 3.25 in.
Gap at Threaded Anchor : 0.00 in.
Edge Distance - Edge 1 : 7.50 in.
Crack Size : 0.000 in. - Cracks Affect <= 50% Bolts
Essential Relays in Cabinet : Yes
Adequate Equipment Base Strength and Structural Load Path : Yes
Embedment Steel and Pads Adequately Installed : Yes

Reduction Factor Input for Anchor # 6

Adequately Installed : Yes
Embedment Length : (3.25 in. Min Reqd. to achieve full capacity) := 3.25 in.
Gap at Threaded Anchor : 0.00 in.
Edge Distance - Edge 1 : 7.50 in.
Crack Size : 0.000 in. - Cracks Affect <= 50% Bolts
Essential Relays in Cabinet : Yes
Adequate Equipment Base Strength and Structural Load Path : Yes
Embedment Steel and Pads Adequately Installed : Yes

Reduction Factors Data Current : Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 8 of 13
ID : W-21A (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

	Anc	Pall/	Pallr/												
No	Id	Vall	Vallr	RT	RN	RL	RG	RS	RE	RF	RC	RR	RP	RB	RM
1	1	2638.13	N/A	1.00	1.00	1.00	1.00	1.00	1.00	0.75	1.00	0.75	1.00	1.00	1.00
		3904.50	N/A	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.75	1.00	1.00	1.00
2	1	2638.13	N/A	1.00	1.00	1.00	1.00	1.00	1.00	0.75	1.00	0.75	1.00	1.00	1.00
		3904.50	N/A	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.75	1.00	1.00	1.00
3	1	2638.13	N/A	1.00	1.00	1.00	1.00	1.00	1.00	0.75	1.00	0.75	1.00	1.00	1.00
		3904.50	N/A	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.75	1.00	1.00	1.00
4	1	2638.13	N/A	1.00	1.00	1.00	1.00	1.00	1.00	0.75	1.00	0.75	1.00	1.00	1.00
		3904.50	N/A	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.75	1.00	1.00	1.00
5	1	2638.13	N/A	1.00	1.00	1.00	1.00	1.00	1.00	0.75	1.00	0.75	1.00	1.00	1.00
		3904.50	N/A	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.75	1.00	1.00	1.00
6	1	2638.13	N/A	1.00	1.00	1.00	1.00	1.00	1.00	0.75	1.00	0.75	1.00	1.00	1.00
		3904.50	N/A	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.75	1.00	1.00	1.00

Legend :

N/A	= Not Applicable
Pall	= Allowable Pull without Reduced Inspection
Vall	= Allowable Shear without Reduced Inspection
Pallr	= Allowable Pull with Reduced Inspection
Vallr	= Allowable Shear with Reduced Inspection
*	= Outlier
X	= Reduction Factor Not Used
RT	= Reduction Factor for Type of Anchorage
RN	= Reduction Factor for Installation Adequacy
RL	= Reduction Factor for Embedment
RG	= Reduction Factor for Gap at Anchors
RS	= Reduction Factor for Spacing
RE	= Reduction Factor for Edge Distance
RF	= Reduction Factor for Concrete Strength
RC	= Reduction Factor for Concrete Cracks
RR	= Reduction Factor for Essential Relays
RP	= Reduction Factor for Base Stiffness and Prying Action
RB	= Reduction Factor for Base Strength and Load Path
RM	= Reduction Factor for Embed. Steel and Pads

Analysis Results :

Analysis Performed : Yes

Type of Analysis : Regular

	Spectral Accelerations (G's)			
No	N-S	E-W	Vertical	Safety Factor
1	0.647	0.259	0.043	4.756
2	-0.647	-0.259	-0.043	5.104
3	-0.647	0.259	0.043	4.756
4	0.647	-0.259	-0.043	5.104
5	0.647	-0.259	0.043	4.756
6	-0.647	0.259	-0.043	5.104
7	0.647	0.259	-0.043	5.104
8	-0.647	-0.259	0.043	4.756

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 9 of 13
ID : W-21A (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

9	0.259	0.647	0.043	6.567
10	-0.259	-0.647	-0.043	6.820
11	0.259	-0.647	0.043	6.567
12	-0.259	0.647	-0.043	6.820
13	-0.259	0.647	0.043	6.567
14	0.259	-0.647	-0.043	6.820
15	0.259	0.647	-0.043	6.820
16	-0.259	-0.647	0.043	6.567
17	0.259	0.259	0.107	10.013
18	-0.259	-0.259	-0.107	13.162
19	0.259	0.259	-0.107	13.162
20	-0.259	-0.259	0.107	10.013
21	-0.259	0.259	0.107	10.013
22	0.259	-0.259	-0.107	13.162
23	0.259	-0.259	0.107	10.013
24	-0.259	0.259	-0.107	13.162

Minimum Safety Factor : 4.756

The anchorage can withstand 4.756 times greater seismic demand

The large Safety Factor will more than account for excentricities of the concrete expansion anchors.

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 10 of 13
ID : W-21A (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

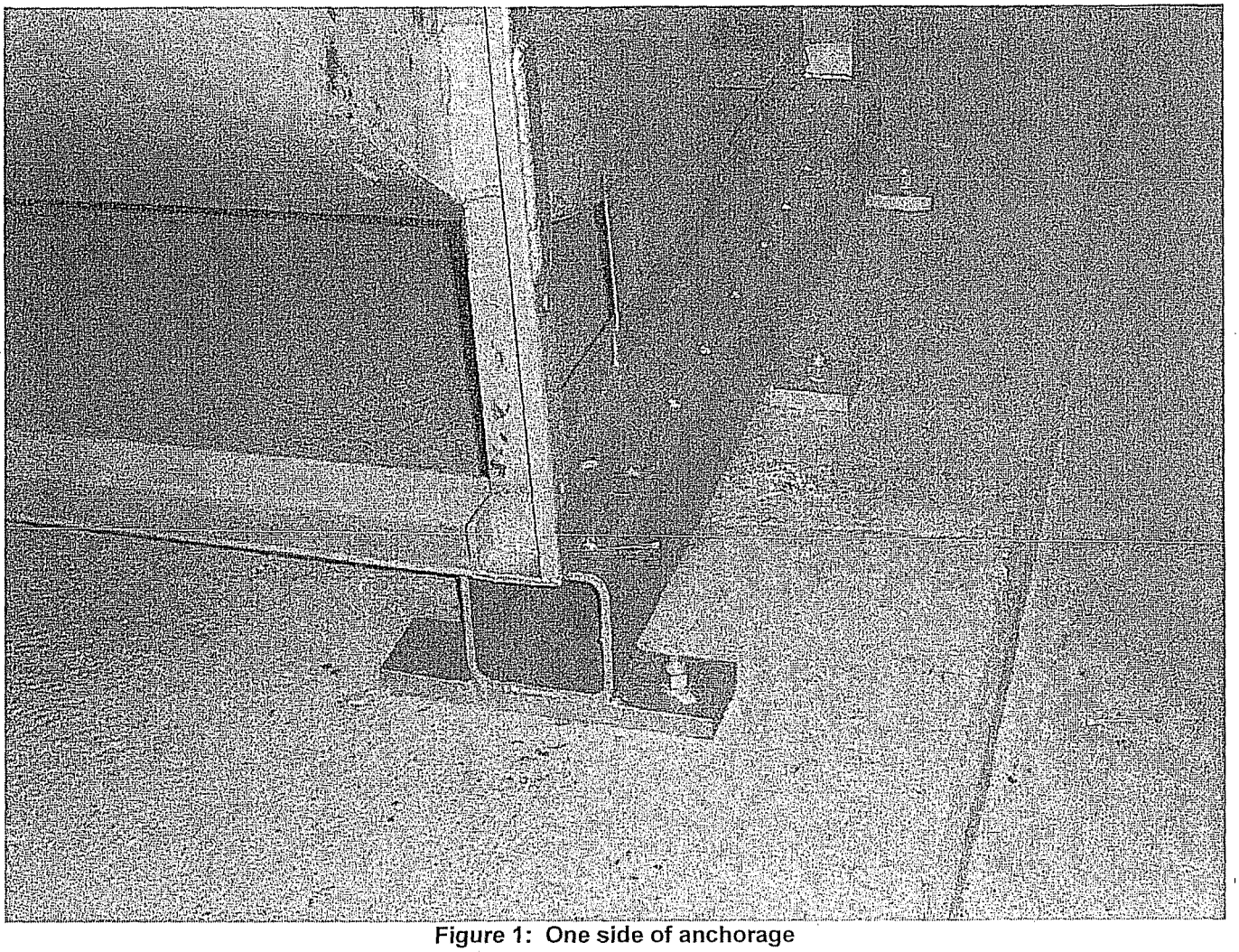


Figure 1: One side of anchorage

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 11 of 13
ID : W-21A (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

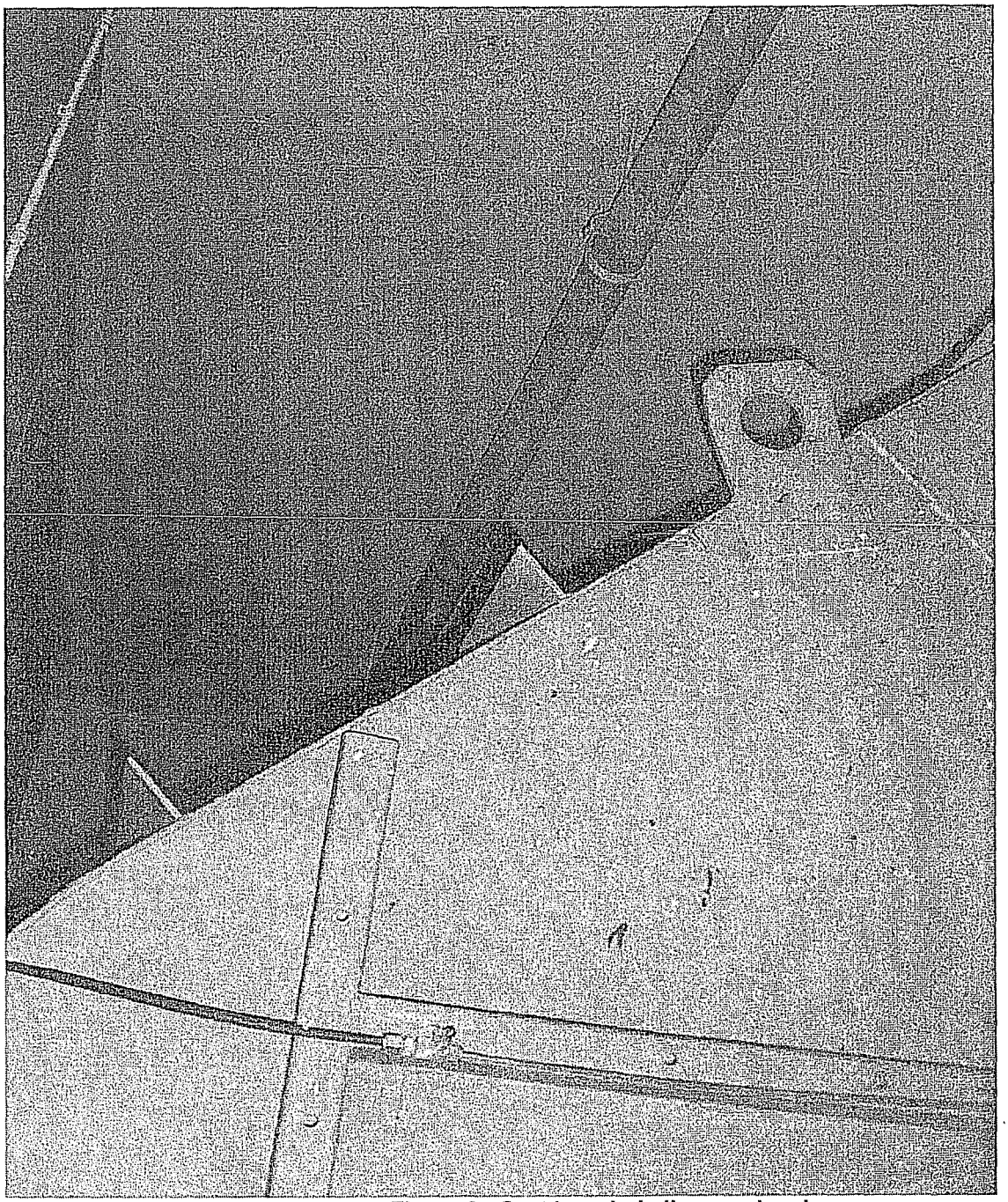


Figure 2: Cast iron drain line overhead

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 12 of 13
ID : W-21A (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

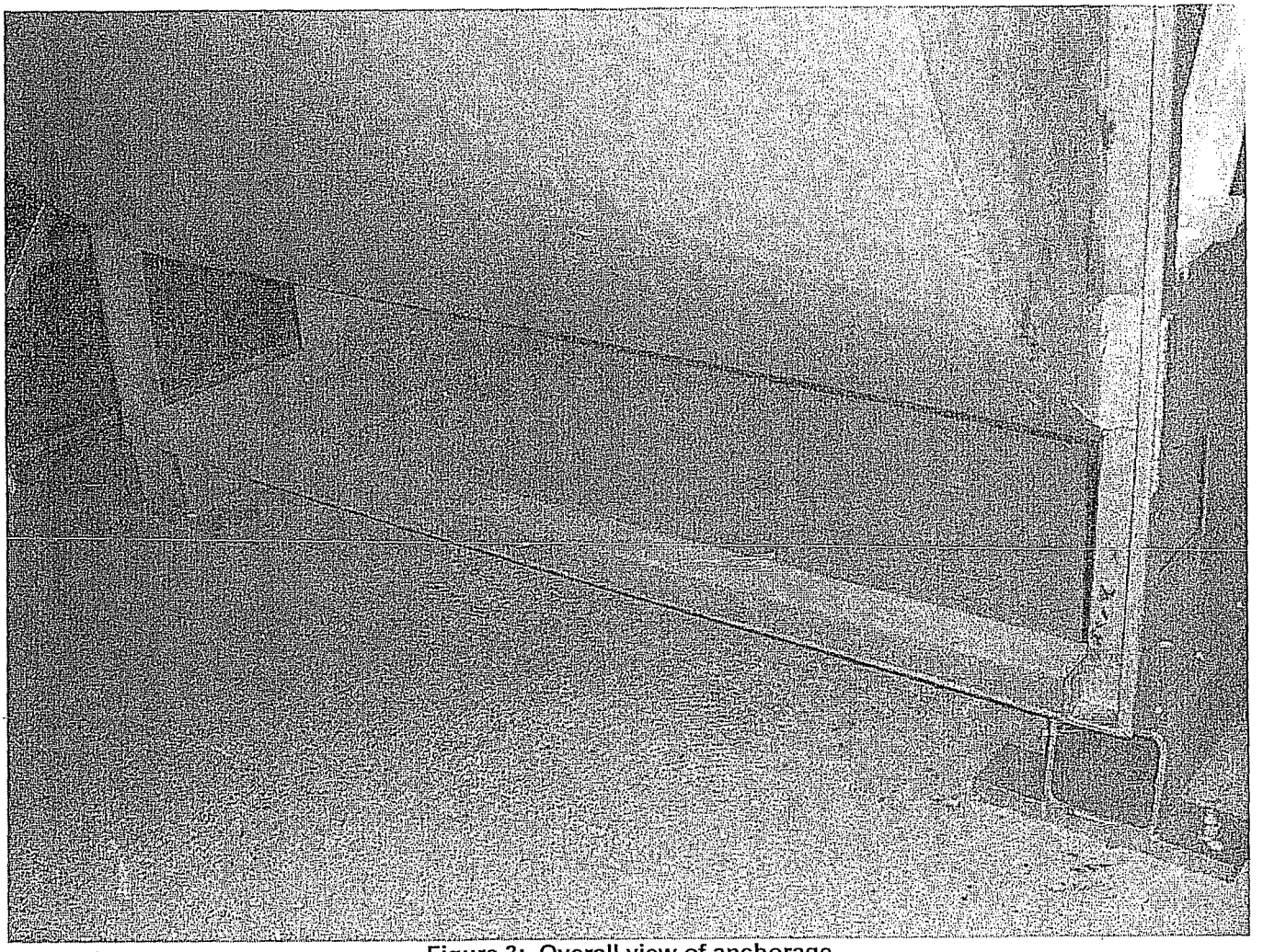


Figure 3: Overall view of anchorage

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 13 of 13
ID : W-21A (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

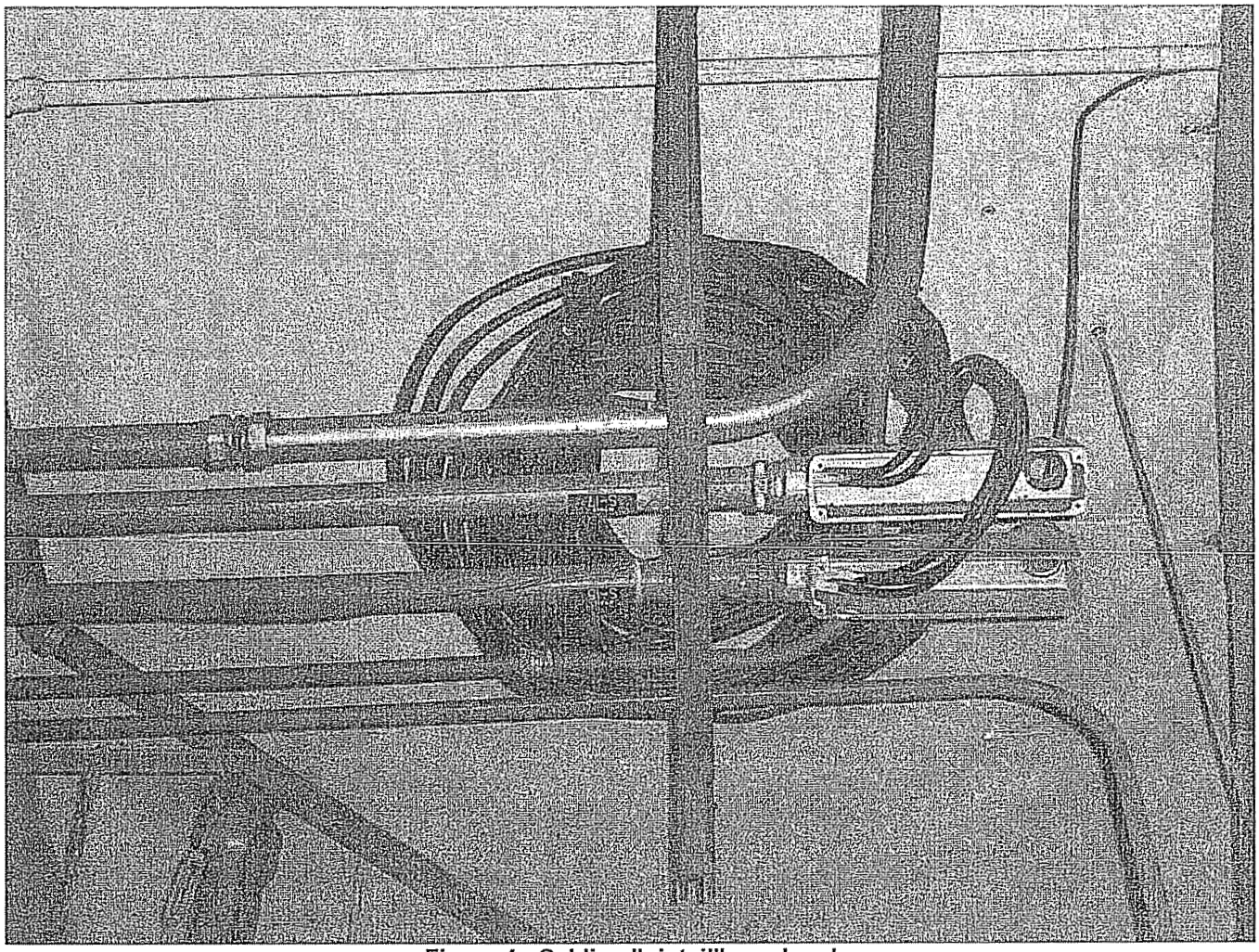
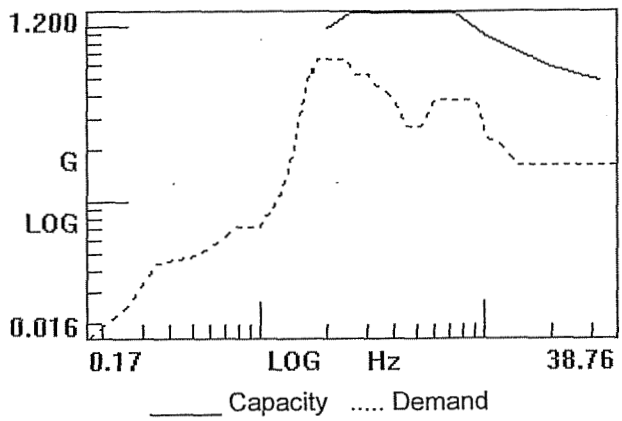


Figure 4: Cabling "pigtail" overhead

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 1 of 3
ID : W-21B (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input	8.00
2.	Elevation of seismic input below about 40' from grade (grade = 8.00)	N/A
3.	Equipment has fundamental frequency above about 8 Hz (est. frequency =)	N/A
4.	Capacity based on: 1.50 * Bounding Spectrum	
5.	Demand based on: 1.00 * Conservative Design Floor Response Spectra	



	File	Record
Capacity	J:\APPDATA\GIPPER2\GIP\spectra.des	Label|Bounding Spectrum
Demand 1	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux North and South Wings|ELEVATION|8|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Areas 4 & 6|BLDG-DAMP||EQ DAMP|5%
Demand 2	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux North and South Wings|ELEVATION|8|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Areas 4 & 6|BLDG-DAMP||EQ DAMP|5%

Does capacity exceed demand? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 2 of 3
ID : W-21B (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

CAVEATS - BOUNDING SPECTRUM

FAN/BS Caveat 1 - Earthquake Experience Equipment Class.	Yes
FAN/BS Caveat 2 - Drive Motor and Fan Mounted on Common Base.	Yes
FAN/BS Caveat 3 - Long Shafts Supported at Fan and at Motor.	Yes
FAN/BS Caveat 4 - No Possibility of Excessive Duct Distortion Causing Binding or Misalignment of Fan.	Yes
FAN/BS Caveat 5 - Base Vibration Isolation System Checked.	Yes
FAN/BS Caveat 6 - Sufficient Slack and Flexibility of Attached Lines.	Yes
FAN/BS Caveat 7 - Adequate Anchorage.	Yes
FAN/BS Caveat 8 - No Other Concerns	Yes

Is the intent of all the caveats met for Bounding Spectrum? Yes

ANCHORAGE

1. The sizes and locations of anchors have been determined.	Yes
2. Appropriate equipment characteristics have been determined (mass, CG, natural freq., damping, center of rotation).	Yes
3. The type of anchorage is covered by the GIP.	Yes
4. The adequacy of the anchorage installation has been evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	Yes
5. Factors affecting anchorage capacity or margin of safety have been considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking.	Yes
6. For bolted anchorages, any gaps under the base are less than 1/4 .	Yes
7. Factors affecting essential relays have been considered: gaps under the base, capacity reduction for expansion anchors.	N/A
8. The base has adequate stiffness and the effect of prying action on anchors has been considered.	Yes
9. The strength of the equipment base and the load path to the CG is adequate.	Yes
10. The adequacy of embedded steel, grout pads or large concrete pads have been evaluated.	Yes
11. The anchorage capacity exceeds the demand.	Yes

Are anchorage requirements met? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 3 of 3
ID : W-21B (Rev. 0)	Class : 9. Fans	
Description : PAB EXHAUST STACK FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

INTERACTION EFFECTS

1. Soft targets are free from impact by nearby equipment or structures.	Yes
2. If the equipment contains sensitive relays, it is free from all impact by nearby equipment or structures.	N/A
3. Attached lines have adequate flexibility.	Yes
4. Overhead equipment or distribution systems are not likely to collapse.	Yes*
5. No other adverse concerns were found.	Yes

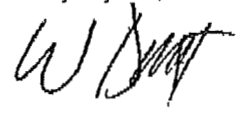
Is equipment free of interaction effects? Yes

IS EQUIPMENT SEISMICALLY ADEQUATE? Yes

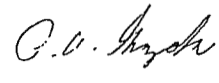
COMMENTS

Identical to W21A (see notes, photographs and anchorage analysis for W21A)

Evaluated by: W. Djordjevic, PE Date: 8/31/09



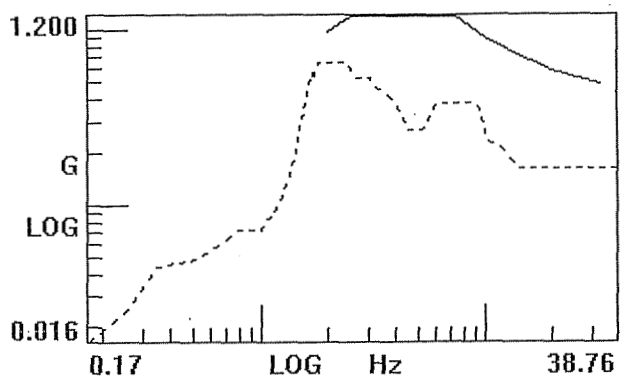
P. A. Gazda, PE 8/31/09



SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 1 of 5
ID : W-30A (Rev. 0)	Class : 9. Fans	
Description : F-23/F-29 PAB EXHAUST FILTER FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input	8.00
2.	Elevation of seismic input below about 40' from grade (grade = 8.00)	N/A
3.	Equipment has fundamental frequency above about 8 Hz (est. frequency =)	N/A
4.	Capacity based on: 1.50 * Bounding Spectrum	
5.	Demand based on: 1.00 * Conservative Design Floor Response Spectra	



	File	Record
Capacity	J:\APPDATA\GIPPER2\GIP\spectra.des	Label|Bounding Spectrum
Demand 1	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux North and South Wings|ELEVATION|8|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Areas 4 & 6|BLDG-DAMP||EQ DAMP|5%
Demand 2	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux North and South Wings|ELEVATION|8|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Areas 4 & 6|BLDG-DAMP||EQ DAMP|5%

Does capacity exceed demand? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 2 of 5
ID : W-30A (Rev. 0)	Class : 9. Fans	
Description : F-23/F-29 PAB EXHAUST FILTER FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

CAVEATS - BOUNDING SPECTRUM

FAN/BS Caveat 1 - Earthquake Experience Equipment Class.	Yes
FAN/BS Caveat 2 - Drive Motor and Fan Mounted on Common Base.	Yes
FAN/BS Caveat 3 - Long Shafts Supported at Fan and at Motor.	Yes
FAN/BS Caveat 4 - No Possibility of Excessive Duct Distortion Causing Binding or Misalignment of Fan.	Yes
FAN/BS Caveat 5 - Base Vibration Isolation System Checked.	Yes
FAN/BS Caveat 6 - Sufficient Slack and Flexibility of Attached Lines.	Yes
FAN/BS Caveat 7 - Adequate Anchorage.	Yes
FAN/BS Caveat 8 - No Other Concerns	Yes

Is the intent of all the caveats met for Bounding Spectrum? Yes

ANCHORAGE

1. The sizes and locations of anchors have been determined.	Yes
2. Appropriate equipment characteristics have been determined (mass, CG, natural freq., damping, center of rotation).	Yes
3. The type of anchorage is covered by the GIP.	Yes
4. The adequacy of the anchorage installation has been evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	Yes
5. Factors affecting anchorage capacity or margin of safety have been considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking.	Yes
6. For bolted anchorages, any gaps under the base are less than 1/4 .	Yes
7. Factors affecting essential relays have been considered: gaps under the base, capacity reduction for expansion anchors.	N/A
8. The base has adequate stiffness and the effect of prying action on anchors has been considered.	Yes
9. The strength of the equipment base and the load path to the CG is adequate.	Yes
10. The adequacy of embedded steel, grout pads or large concrete pads have been evaluated.	Yes
11. The anchorage capacity exceeds the demand.	Yes

Are anchorage requirements met? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 3 of 5
ID : W-30A (Rev. 0)	Class : 9. Fans	
Description : F-23/F-29 PAB EXHAUST FILTER FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

INTERACTION EFFECTS

1. Soft targets are free from impact by nearby equipment or structures.	Yes
2. If the equipment contains sensitive relays, it is free from all impact by nearby equipment or structures.	N/A
3. Attached lines have adequate flexibility.	Yes
4. Overhead equipment or distribution systems are not likely to collapse.	Yes
5. No other adverse concerns were found.	Yes

Is equipment free of interaction effects? Yes

IS EQUIPMENT SEISMICALLY ADEQUATE? Yes

COMMENTS

Walkdown Engineers: W. Djordjevic & P. A. Gazda (8/31/09)

Ref. 1. S&A Calc. No. 98Q0020-C-001, Rev. 1., "PAB Fans W30A and W30B Anchorage Qualification"

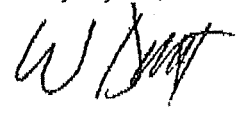
The W30A&B fans are also seismically designed (by Stevenson & Associates, Ref. 1) with no vibration isolators.

In the same room (about 20 ft away) there are charcoal filter banks in the rooms with a footprint of 107" x 180". The visible 107" side has 10 - ½" concrete expansion anchors with two anchors having nuts that are raised. The 180" side cannot be fully viewed as it is adjacent to a wall but at least 10 anchors were counted, some of which again were missing nuts or for which the nuts were raised. The two other sides are inaccessible. The filter banks are about 10' high and are adjudged to have a natural frequency in excess of about 20 Hz. Since they cannot uplift the anchors only need to resist base shear and there are sufficient visible anchors to accomplish this so they are declared seismically adequate. They pose no interaction potential risk to the fans.

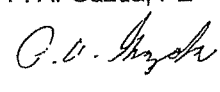
No issues found.

No potential seismic interactions noted.

Evaluated by: W. Djordjevic, PE Date: 8/31/09



P. A. Gazda, PE 8/31/09



Attachment: Walkdown Pictures

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 4 of 5
ID : W-30A (Rev. 0)	Class : 9. Fans	
Description : F-23/F-29 PAB EXHAUST FILTER FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

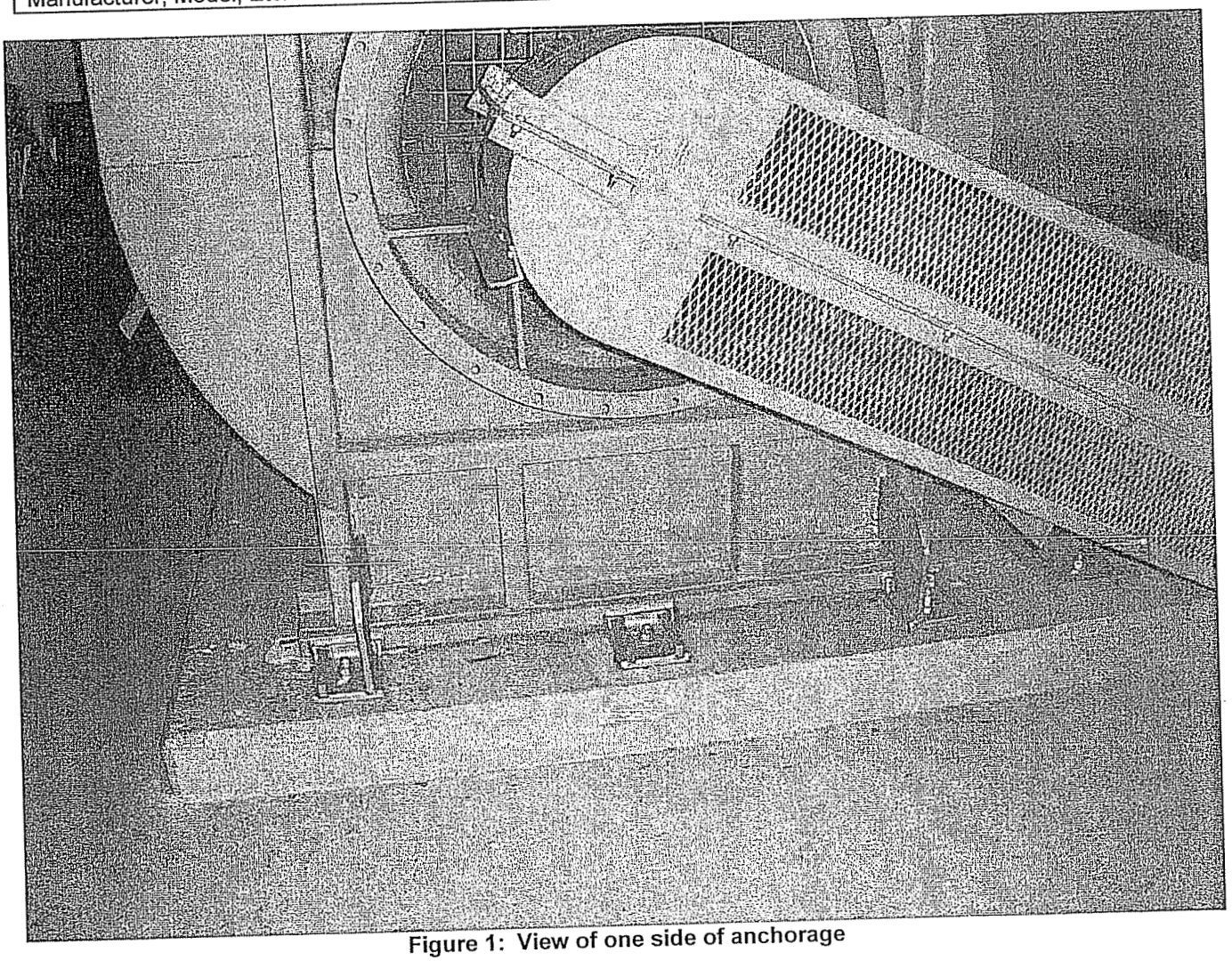


Figure 1: View of one side of anchorage

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 5 of 5
ID : W-30A (Rev. 0)	Class : 9. Fans	
Description : F-23/F-29 PAB EXHAUST FILTER FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

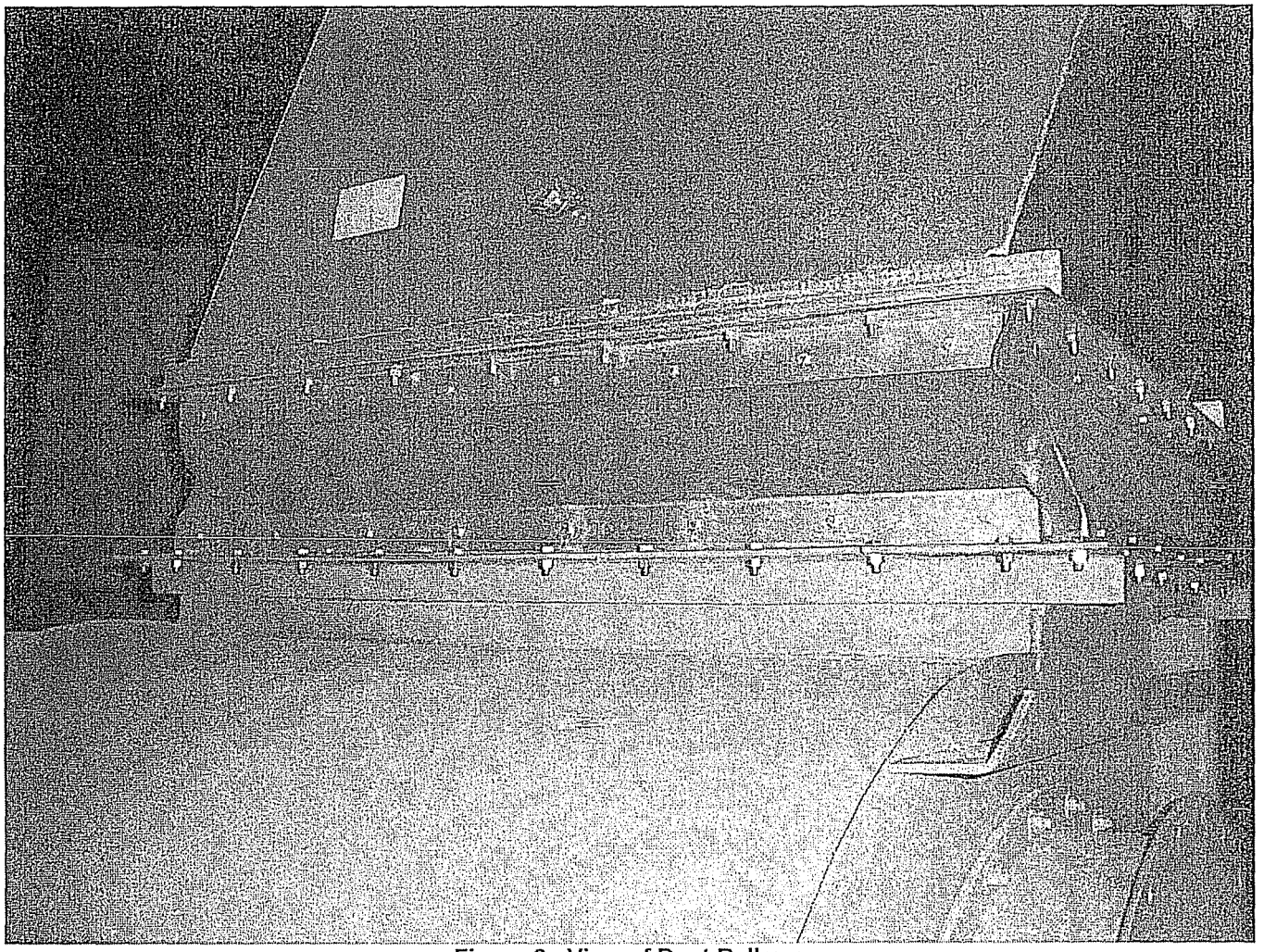
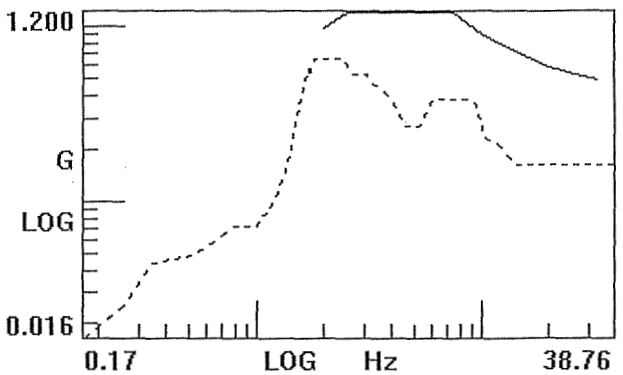


Figure 2: View of Duct Bellows

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 1 of 5
ID : W-30B (Rev. 0)	Class : 9. Fans	
Description : F-23/F-29 PAB EXHAUST FILTER FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

SEISMIC CAPACITY VS DEMAND

1.	Elevation where equipment receives seismic input	8.00
2.	Elevation of seismic input below about 40' from grade (grade = 8.00)	N/A
3.	Equipment has fundamental frequency above about 8 Hz (est. frequency =)	N/A
4.	Capacity based on: 1.50 * Bounding Spectrum	
5.	Demand based on: 1.00 * Conservative Design Floor Response Spectra	



	File	Record
Capacity	J:\APPDATA\GIPPER2\GIP\spectra.des	Label|Bounding Spectrum
Demand 1	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux North and South Wings|ELEVATION|8|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Areas 4 & 6|BLDG-DAMP||EQ DAMP|5%
Demand 2	J:\APPDATA\GIPPER2\PROJ0032\spectra.des	PLANT|Point Beach|BUILDING|Aux North and South Wings|ELEVATION|8|DIRECTION|Horizontal|EARTHQUAKE|OBE x 2|LOCATION|Areas 4 & 6|BLDG-DAMP||EQ DAMP|5%

Does capacity exceed demand? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 2 of 5
ID : W-30B (Rev. 0)	Class : 9. Fans	
Description : F-23/F-29 PAB EXHAUST FILTER FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

CAVEATS - BOUNDING SPECTRUM

FAN/BS Caveat 1 - Earthquake Experience Equipment Class.	Yes
FAN/BS Caveat 2 - Drive Motor and Fan Mounted on Common Base.	Yes
FAN/BS Caveat 3 - Long Shafts Supported at Fan and at Motor.	Yes
FAN/BS Caveat 4 - No Possibility of Excessive Duct Distortion Causing Binding or Misalignment of Fan.	Yes
FAN/BS Caveat 5 - Base Vibration Isolation System Checked.	Yes
FAN/BS Caveat 6 - Sufficient Slack and Flexibility of Attached Lines.	Yes
FAN/BS Caveat 7 - Adequate Anchorage.	Yes
FAN/BS Caveat 8 - No Other Concerns	Yes

Is the intent of all the caveats met for Bounding Spectrum? Yes

ANCHORAGE

1. The sizes and locations of anchors have been determined.	Yes
2. Appropriate equipment characteristics have been determined (mass, CG, natural freq., damping, center of rotation).	Yes
3. The type of anchorage is covered by the GIP.	Yes
4. The adequacy of the anchorage installation has been evaluated (weld quality and length, nuts and washers, expansion anchor tightness, etc.)	Yes
5. Factors affecting anchorage capacity or margin of safety have been considered: embedment length, anchor spacing, free-edge distance, concrete strength/condition, and concrete cracking.	Yes
6. For bolted anchorages, any gaps under the base are less than 1/4 .	Yes
7. Factors affecting essential relays have been considered: gaps under the base, capacity reduction for expansion anchors.	N/A
8. The base has adequate stiffness and the effect of prying action on anchors has been considered.	Yes
9. The strength of the equipment base and the load path to the CG is adequate.	Yes
10. The adequacy of embedded steel, grout pads or large concrete pads have been evaluated.	Yes
11. The anchorage capacity exceeds the demand.	Yes

Are anchorage requirements met? Yes

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 3 of 5
ID : W-30B (Rev. 0)	Class : 9. Fans	
Description : F-23/F-29 PAB EXHAUST FILTER FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

INTERACTION EFFECTS

1. Soft targets are free from impact by nearby equipment or structures.	Yes
2. If the equipment contains sensitive relays, it is free from all impact by nearby equipment or structures.	N/A
3. Attached lines have adequate flexibility.	Yes
4. Overhead equipment or distribution systems are not likely to collapse.	Yes
5. No other adverse concerns were found.	Yes

Is equipment free of interaction effects? Yes

IS EQUIPMENT SEISMICALLY ADEQUATE? Yes

COMMENTS

Walkdown Engineers: W. Djordjevic & P. A. Gazda (8/31/09)

Ref. 1. S&A Calc. No. 98Q0020-C-001, Rev. 1., "PAB Fans W30A and W30B Anchorage Qualification"

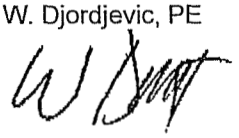
The W30A&B fans are also seismically designed (by Stevenson & Associates, Ref. 1) with no vibration isolators.

In the same room (about 20 ft away) there are charcoal filter banks in the rooms with a footprint of 107" x 180". The visible 107" side has 10 - ½" concrete expansion anchors with two anchors having nuts that are raised. The 180" side cannot be fully viewed as it is adjacent to a wall but at least 10 anchors were counted, some of which again were missing nuts or for which the nuts were raised. The two other sides are inaccessible. The filter banks are about 10' high and are adjudged to have a natural frequency in excess of about 20 Hz. Since they cannot uplift the anchors only need to resist base shear and there are sufficient visible anchors to accomplish this so they are declared seismically adequate. They pose no interaction potential risk to the fans.

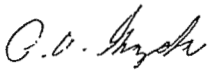
No issues found.

No potential seismic interactions noted.

Evaluated by: W. Djordjevic, PE Date: 8/31/09



P. A. Gazda, PE 8/31/09



Attachment: Walkdown Pictures

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 4 of 5
ID : W-30B (Rev. 0)	Class : 9. Fans	
Description : F-23/F-29 PAB EXHAUST FILTER FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

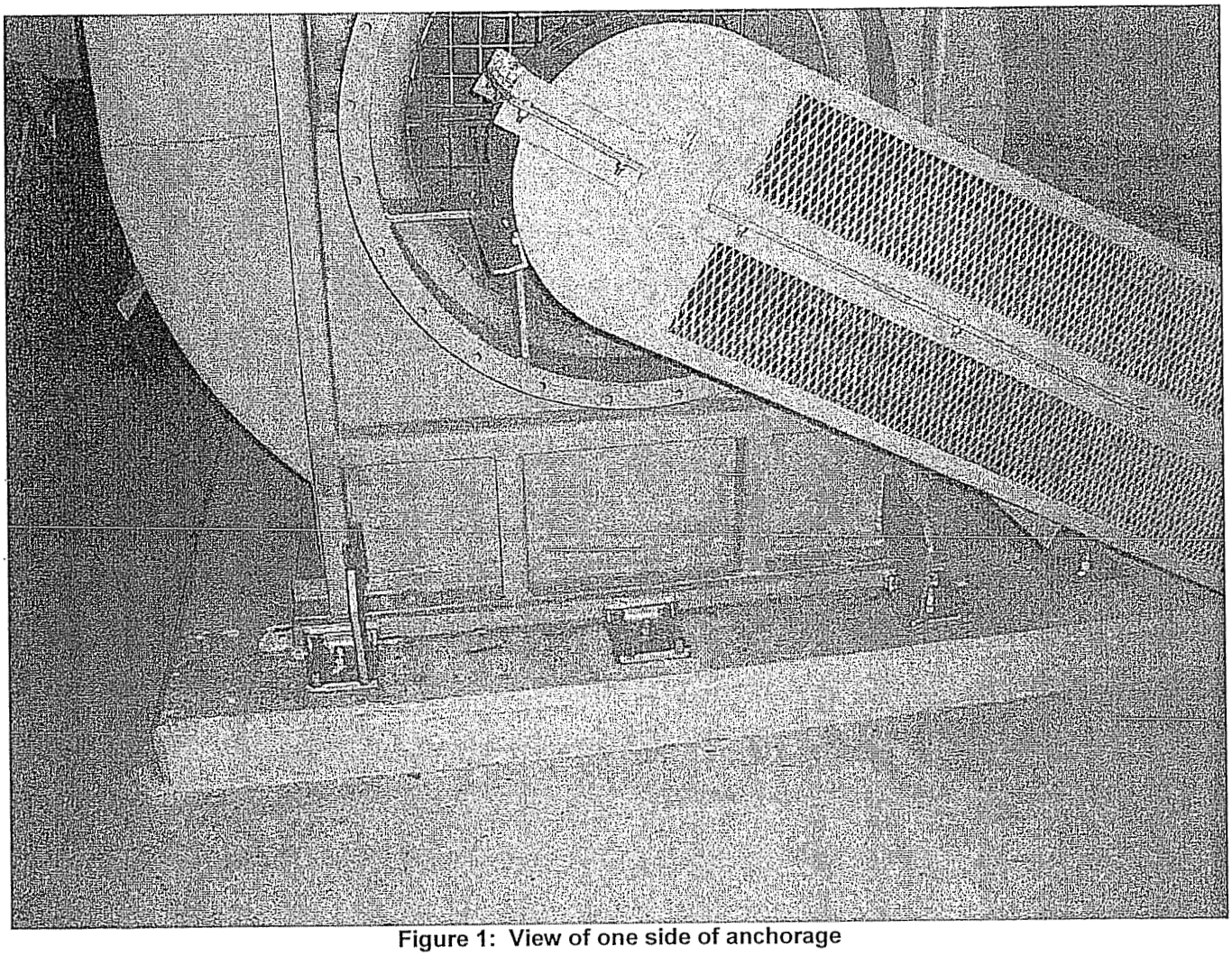


Figure 1: View of one side of anchorage

SCREENING EVALUATION WORK SHEET (SEWS)		GIP Rev 2, Corrected, 2/14/92 Status: Yes Sheet 5 of 5
ID : W-30B (Rev. 0)	Class : 9. Fans	
Description : F-23/F-29 PAB EXHAUST FILTER FAN		
Building : PAB	Floor El. : 8.00	Room, Row/Col : AREA 4
Manufacturer, Model, Etc. :		

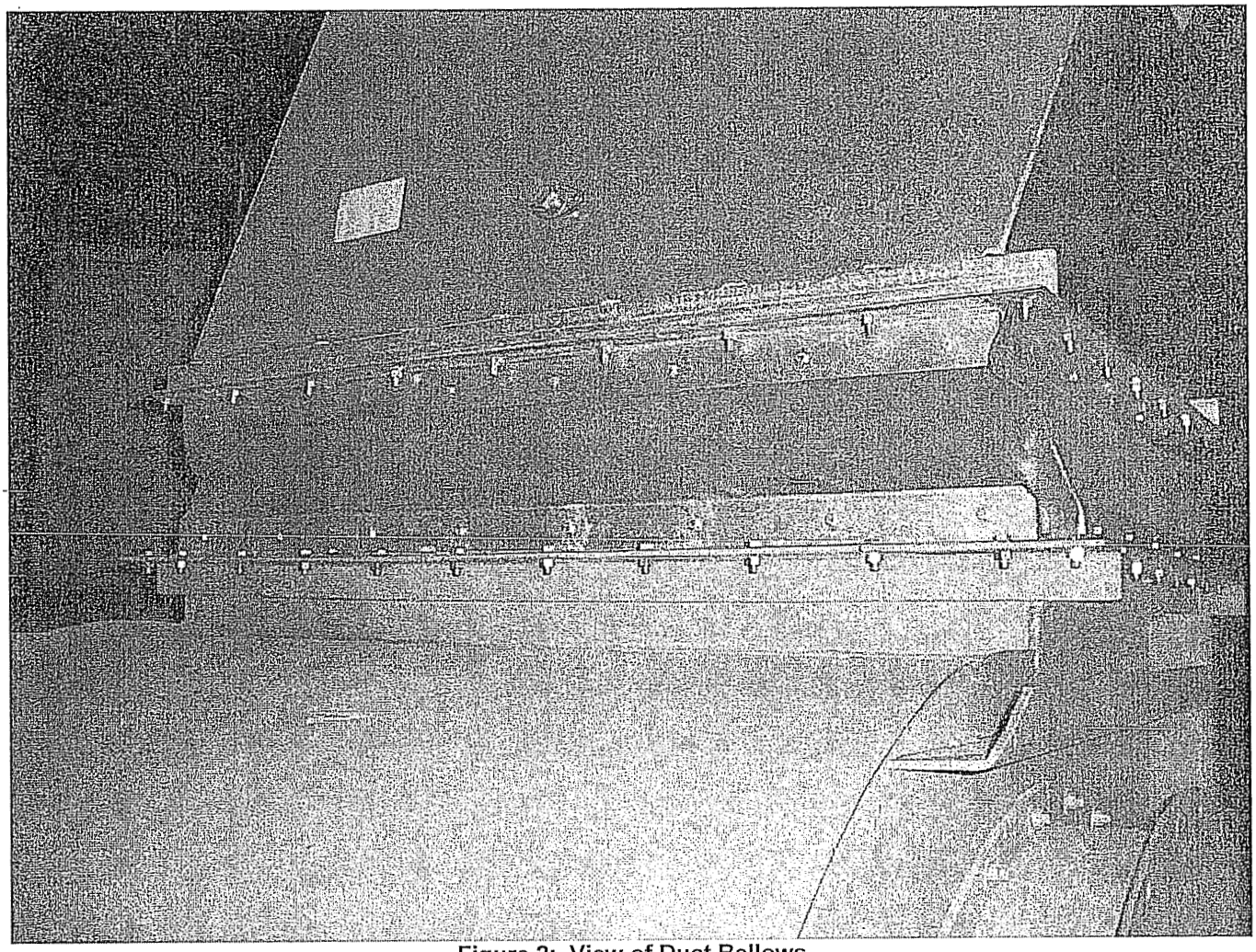


Figure 2: View of Duct Bellows

Exhibit 5-1 Sheet 1 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. VNPAB Exhaust Area 4

Damper Equipment I.D. See M-116

System Description and Boundaries

PAB Exhaust system. El 8' Area 4

HVAC System Locations and Reference Drawings M-116

Duct Materials and Sizes Galvanized Carbon Steel - See M-116

Linear Weight:

Duct		Insulation		Total	References
	+		=		
	+		=		
	+		=		

Concurrent Pressure and Temeprature Low Temp & Low Pressure System

Applicability	Y	N	U	N/A
1. Operating temperature less than the temperature limitations in Table 2-1	X			
2. Plant ground spectrum enveloped by the SQUG Bounding Spectrum (Figure 2-1) and ZPAh is less than 2.0g	X			
Does duct meet applicability criteria?	X			
Pressure Boundary Integrity Review				
1. Is pressure boundary integrity required?	X			
IF the answer to the above question is NO, SKIP THIS SECTION and proceed to the Structural Integrity Review				
2. Stiffener spacings are within the guidelines	X			
3. Bolted flanged joints satisfy SMACNA requirements				X
4. No point-supported round duct (Calculation shows Duct OK)	X			
5. Flexible bellows can accommodate motions	X			
6. No additional concerns	X			
Are the above caveats met?	X			

Exhibit 5-1 Sheet 2 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. VNPAB Exhaust Area 4

Damper Equipment I.D. See M-116

Structural Integrity Review	Y	N	U	N/A
1. Support spans satisfy the criteria	X			
2. Ducts are properly tied-down to the supports	X			
3. Industry standard duct joints are utilized	X			
4. Slip joints can accommodate displacements				X
5. Round duct joints exclude riveted lap joints	X			
6. Appurtenances are positively attached to duct				X
7. Heavy in-line equipment is adequately restrained				X
8. No stiff branch with flexible header (See note 7 & 8)	X			
9. Cantilevered duct section is attached to last support	X			
10. Ducts are free of corrosion detrimental to integrity	X			
11. System is free of obvious damage or defects	X			
12. No other concerns	X			
Are the above caveats met?	X			

Support Review	Y	N	U	N/A
1. Beam clamps are oriented to preclude slipping off the support				X
2. Channel nuts have teeth or ridges				X
3. No cast iron inserts	X			
4. No broken or obviously defective hardware	X			
5. Support is free of excessive corrosion	X			
6. Welded joints appear to be of good quality				X
7. Anchorage appears adequate (LARS 1 & 2)	X			
8. No stiff supports or hard spots in long flexible duct runs	X			
9. No short, fixed ended heavily loaded rod hangers subject to potential fatigue failure	X			
10. No additional concerns (LAR 1 shows angle overstress)		X		
Are the above caveats met?		X		

Damper Review	Y	N	U	N/A
1. Damper is similar to and bounded by the seismic experience data for dampers in Attachment B	X			
2. Damper operator/actuator not of cast iron	X			
3. Attached lines have sufficient slack and flexibility	X			
4. Damper controls mounted separately from the damper adequately anchored				X
5. Motor or pneumatic operator mounted on the damper has adequate anchorage and load path				X
6. Duct at the damper location free from signs of distortion that could interfere with damper operation	X			
7. No other adverse concerns	X			
Are the above caveats met?	X			

Exhibit 5-1 Sheet 3 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. VNPAB Exhaust Area 4

Damper Equipment I.D. See M-116

Seismic Interaction Review	Y	N	U	N/A
1. Free from impact by nearby equipment	X			
2. No collapse of overhead equipment, distribution systems or masonry walls	X			
3. Able to accommodate differential displacements	X			
4. No other adverse concerns	X			
Are the above caveats met?	X			
IS THE HVAC DUCT AND DAMPER SYSTEM SEISMICALLY ADEQUATE?		X		

Supports Selected for Analytical Review 1) Duct 1 2) Duct 4 3) Duct 32 4) Duct 32

Duct System Selected for Analytical Review 1) Duct 1

Comments

1) One support on Duct 1 chosen for A.R.
2) One support on Duct 4 chosen for A.R.
3) Two supports on Duct 32 chosen for A.R.
4) See SEWS for fans W21A&B and W30A&B
5) Dampers found to be well attached and acceptable
6) Supports for Ducts 5, 6 & 7 judged adequate
7) Branch Duct 5 judged OK since Duct 4 can not move laterally at wall penetration
8) Branch Duct 10 judged OK

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE		9/23/2009
Print or Type Name/Title	Signature	Date
Walter Djordjevic, PE		9/23/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-1 Sheet 1 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. VNPAB Exhaust Area 5

Damper Equipment I.D. See M-119

System Description and Boundaries

PAB Exhaust system. El 8' Area 5

HVAC System Locations and Reference Drawings M-119

Duct Materials and Sizes Galvanized Carbon Steel - See M-119

Linear Weight:

Duct		Insulation		Total	References
	+		=		
	+		=		
	+		=		

Concurrent Pressure and Temeprature Low Temp & Low Pressure System

Applicability	Y	N	U	N/A
1. Operating temperature less than the temperature limitations in Table 2-1	X			
2. Plant ground spectrum enveloped by the SQUG Bounding Spectrum (Figure 2-1) and ZPAh is less than 2.0g	X			
Does duct meet applicability criteria?	X			
Pressure Boundary Integrity Review				
1. Is pressure boundary integrity required?	X			
IF the answer to the above question is NO, SKIP THIS SECTION and proceed to the Structural Integrity Review				
2. Stiffener spacings are within the guidelines	X			
3. Bolted flanged joints satisfy SMACNA requirements				X
4. No point-supported round duct	X			
5. Flexible bellows can accommodate motions				X
6. No additional concerns	X			
Are the above caveats met?	X			

Exhibit 5-1 Sheet 2 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. VNPAB Exhaust Area 5

Damper Equipment I.D. See M-119

Structural Integrity Review	Y	N	U	N/A
1. Support spans satisfy the criteria	X			
2. Ducts are properly tied-down to the supports	X			
3. Industry standard duct joints are utilized	X			
4. Slip joints can accommodate displacements				X
5. Round duct joints exclude riveted lap joints	X			
6. Appurtenances are positively attached to duct	X			
7. Heavy in-line equipment is adequately restrained				X
8. No stiff branch with flexible header (See notes 4&5)	X			
9. Cantilevered duct section is attached to last support (See note 6)		X		
10. Ducts are free of corrosion detrimental to integrity	X			
11. System is free of obvious damage or defects	X			
12. No other concerns	X			
Are the above caveats met?		X		

Support Review	Y	N	U	N/A
1. Beam clamps are oriented to preclude slipping off the support (Duct 14)		X		
2. Channel nuts have teeth or ridges	X			
3. No cast iron inserts	X			
4. No broken or obviously defective hardware	X			
5. Support is free of excessive corrosion	X			
6. Welded joints appear to be of good quality				X
7. Anchorage appears adequate	X			
8. No stiff supports or hard spots in long flexible duct runs	X			
9. No short, fixed ended heavily loaded rod hangers subject to potential fatigue failure	X			
10. No additional concerns (Duct 14 support and Duct 17 cantilever)		X		
Are the above caveats met?		X		

Damper Review	Y	N	U	N/A
1. Damper is similar to and bounded by the seismic experience data for dampers in Attachment B	X			
2. Damper operator/actuator not of cast iron	X			
3. Attached lines have sufficient slack and flexibility	X			
4. Damper controls mounted separately from the damper adequately anchored				X
5. Motor or pneumatic operator mounted on the damper has adequate anchorage and load path				X
6. Duct at the damper location free from signs of distortion that could interfere with damper operation	X			
7. No other adverse concerns	X			
Are the above caveats met?	X			

Exhibit 5-1 Sheet 3 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. VNPAB Exhaust Area 5

Damper Equipment I.D. See M-119

Seismic Interaction Review	Y	N	U	N/A
1. Free from impact by nearby equipment	X			
2. No collapse of overhead equipment, distribution systems or masonry walls	X			
3. Able to accommodate differential displacements	X			
4. No other adverse concerns	X			
Are the above caveats met?	X			
IS THE HVAC DUCT AND DAMPER SYSTEM SEISMICALLY ADEQUATE?		X		

Supports Selected for Analytical Review 1) Duct 14 2) Duct 26

Duct System Selected for Analytical Review None

Comments

1) One support on Duct 14 chosen for A.R.

2) One support on Duct 26 chosen for A.R.

3) Ducts 40A, 40B, 30A are inaccessible due to high radiation. The ducts are small and the visible portions appear well constructred and well supported. Judged OK

4) Vent exhaust pipes on Duct 16 and Duct 19 do not pose a risk of a hard spot since the attachments points are near locations where the main ducts penetrates the wall.

5) Duct 17 cantilevers 4 feet past last support. Calculation 09Q0839-C-001 shows it is OK

6) Pipeway 3 Duct is a long cantilever that requires an end lateral support.

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE		9/23/2009
Print or Type Name/Title	Signature	Date
Walter Djordjevic, PE		9/23/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-1 Sheet 1 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. VNPAB Exhaust Area 6

Damper Equipment I.D. See M-122

System Description and Boundaries

PAB Exhaust system. El 8' Area 6

HVAC System Locations and Reference Drawings M-122

Duct Materials and Sizes Galvanized Carbon Steel - See M-122

Linear Weight:

Duct		Insulation		Total	References
	+		=		
	+		=		
	+		=		

Concurrent Pressure and Temeprature Low Temp & Low Pressure System

Applicability	Y	N	U	N/A
1. Operating temperature less than the temperature limitations in Table 2-1	X			
2. Plant ground spectrum enveloped by the SQUG Bounding Spectrum (Figure 2-1) and ZPAh is less than 2.0g	X			
Does duct meet applicability criteria?	X			
Pressure Boundary Integrity Review				
1. Is pressure boundary integrity required?	X			
IF the answer to the above question is NO, SKIP THIS SECTION and proceed to the Structural Integrity Review				
2. Stiffener spacings are within the guidelines	X			
3. Bolted flanged joints satisfy SMACNA requirements				X
4. No point-supported round duct				X
5. Flexible bellows can accommodate motions				X
6. No additional concerns	X			
Are the above caveats met?	X			

Exhibit 5-1 Sheet 2 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. VNPAB Exhaust Area 6

Damper Equipment I.D. See M-122

Structural Integrity Review		Y	N	U	N/A
1. Support spans satisfy the criteria		X			
2. Ducts are properly tied-down to the supports		X			
3. Industry standard duct joints are utilized		X			
4. Slip joints can accommodate displacements					X
5. Round duct joints exclude riveted lap joints					X
6. Appurtenances are positively attached to duct					X
7. Heavy in-line equipment is adequately restrained					X
8. No stiff branch with flexible header		X			
9. Cantilevered duct section is attached to last support	(Note 2)		X		
10. Ducts are free of corrosion detrimental to integrity		X			
11. System is free of obvious damage or defects		X			
12. No other concerns		X			
Are the above caveats met?			X		

Support Review	Y	N	U	N/A
1. Beam clamps are oriented to preclude slipping off the support	X			
2. Channel nuts have teeth or ridges				X
3. No cast iron inserts	X			
4. No broken or obviously defective hardware	X			
5. Support is free of excessive corrosion	X			
6. Welded joints appear to be of good quality				X
7. Anchorage appears adequate	X			
8. No stiff supports or hard spots in long flexible duct runs	X			
9. No short, fixed ended heavily loaded rod hangers subject to potential fatigue failure	X			
10. No additional concerns	X			
Are the above caveats met?	X			

Damper Review	Y	N	U	N/A
1. Damper is similar to and bounded by the seismic experience data for dampers in Attachment B	X			
2. Damper operator/actuator not of cast iron	X			
3. Attached lines have sufficient slack and flexibility				X
4. Damper controls mounted separately from the damper adequately anchored				X
5. Motor or pneumatic operator mounted on the damper has adequate anchorage and load path				X
6. Duct at the damper location free from signs of distortion that could interfere with damper operation	X			
7. No other adverse concerns	X			
Are the above caveats met?	X			

Exhibit 5-1 Sheet 3 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. VNPAB Exhaust Area 6

Damper Equipment I.D. See M-122

Seismic Interaction Review	Y	N	U	N/A
1. Free from impact by nearby equipment	X			
2. No collapse of overhead equipment, distribution systems or masonry walls	X			
3. Able to accommodate differential displacements	X			
4. No other adverse concerns	X			
Are the above caveats met?	X			
IS THE HVAC DUCT AND DAMPER SYSTEM SEISMICALLY ADEQUATE?		X		

Supports Selected for Analytical Review None

Duct System Selected for Analytical Review None

Comments

1) Duct 21 which is a branch is attached to duct 19 near a support point therefore there is no concern regarding a stiff branch and flexible header.

2) Pipeway 4 Duct is a long cantilever that requires a lateral support at the end.

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE		9/23/2009
Print or Type Name/Title	Signature	Date
Walter Djordjevic, PE		9/23/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-1 Sheet 1 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. VNPAB Exhaust Area 8

Damper Equipment I.D. None

System Description and Boundaries

PAB Exhaust system. El 8', - 5'-3" and - 19'-3".

HVAC System Locations and Reference Drawings M-134 and M-135

Duct Materials and Sizes Galvanized Carbon Steel - See M-119

Linear Weight:

Duct		Insulation		Total	References
	+		=		
	+		=		
	+		=		

Concurrent Pressure and Temeprature Low Temp & Low Pressure System

Applicability	Y	N	U	N/A
1. Operating temperature less than the temperature limitations in Table 2-1	X			
2. Plant ground spectrum enveloped by the SQUG-Bounding Spectrum (Figure 2-1) and ZPAh is less than 2.0g	X			
Does duct meet applicability criteria?	X			
Pressure Boundary Integrity Review				
1. Is pressure boundary integrity required?	X			
IF the answer to the above question is NO, SKIP THIS SECTION and proceed to the Structural Integrity Review				
2. Stiffener spacings are within the guidelines (Duct 37)		X		
3. Bolted flanged joints satisfy SMACNA requirements				X
4. No point-supported round duct (Only very small ducts, Ducts 41&42)				X
5. Flexible bellows can accommodate motions				X
6. No additional concerns	X			
Are the above caveats met?		X		

Exhibit 5-1 Sheet 2 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. VNPAB Exhaust Area 8

Damper Equipment I.D. None

	Y	N	U	N/A
Structural Integrity Review				
1. Support spans satisfy the criteria (Duct 15)		X		
2. Ducts are properly tied-down to the supports (Duct 29)		X		
3. Industry standard duct joints are utilized	X			
4. Slip joints can accommodate displacements				X
5. Round duct joints exclude riveted lap joints				X
6. Appurtenances are positively attached to duct				X
7. Heavy in-line equipment is adequately restrained				X
8. No stiff branch with flexible header	X			
9. Cantilevered duct section is attached to last support	X			
10. Ducts are free of corrosion detrimental to integrity	X			
11. System is free of obvious damage or defects	X			
12. No other concerns	X			
Are the above caveats met?		X		
Support Review				
1. Beam clamps are oriented to preclude slipping off the support				X
2. Channel nuts have teeth or ridges				X
3. No cast iron inserts	X			
4. No broken or obviously defective hardware (Duct 39)		X		
5. Support is free of excessive corrosion	X			
6. Welded joints appear to be of good quality				X
7. Anchorage appears adequate	X			
8. No stiff supports or hard spots in long flexible duct runs	X			
9. No short, fixed ended heavily loaded rod hangers subject to potential fatigue failure	X			
10. No additional concerns	X			
Are the above caveats met?		X		
Damper Review				
1. Damper is similar to and bounded by the seismic experience data for dampers in Attachment B				X
2. Damper operator/actuator not of cast iron				X
3. Attached lines have sufficient slack and flexibility				X
4. Damper controls mounted separately from the damper adequately anchored				X
5. Motor or pneumatic operator mounted on the damper has adequate anchorage and load path				X
6. Duct at the damper location free from signs of distortion that could interfere with damper operation				X
7. No other adverse concerns				X
Are the above caveats met?				

Exhibit 5-1 Sheet 3 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. VNPAB Exhaust Area 8

Damper Equipment I.D. None

Seismic Interaction Review	Y	N	U	N/A
1. Free from impact by nearby equipment	X			
2. No collapse of overhead equipment, distribution systems or masonry walls	X			
3. Able to accommodate differential displacements	X			
4. No other adverse concerns	X			
Are the above caveats met?	X			
IS THE HVAC DUCT AND DAMPER SYSTEM SEISMICALLY ADEQUATE?		X		

Supports Selected for Analytical Review None

Duct System Selected for Analytical Review None

Comments

1) Duct 37 has top stiffeners either missing or bent - Outlier

2) Duct 15 is unsupported at Duct 15 & 37 junction - Add support - Outlier

3) Duct 29 has a support at the Duct 29 & 36 junction which is not screwed to the duct and could allow duct to slip off - Outlier

4) Duct 39 has broken support at floor penetration - Outlier

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

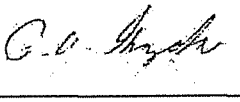
Philip A. Gazda, PE		9/23/2009
Print or Type Name/Title	Signature	Date
Walter Djordjevic, PE		9/23/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-1 Sheet 1 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. CREFS, Control Room ceiling ducts and control room bathroom

Damper Equipment I.D. See M-109

System Description and Boundaries

Control Room Emergency Filtration System (CREFS)

HVAC System Locations and Reference Drawings M-109

Duct Materials and Sizes Galvanized Carbon Steel with flexible insulation. See M-109

Linear Weight:

Duct		Insulation		Total	References
	+		=		
	+		=		
	+		=		

Concurrent Pressure and Temeprature Low Temp & Low Pressure System

Applicability	Y	N	U	N/A
1. Operating temperature less than the temperature limitations in Table 2-1	X			
2. Plant ground spectrum enveloped by the SQUG Bounding Spectrum (Figure 2-1) and ZPAh is less than 2.0g	X			
Does duct meet applicability criteria?	X			
Pressure Boundary Integrity Review *				
1. Is pressure boundary integrity required?	X			
IF the answer to the above question is NO, SKIP THIS SECTION and proceed to the Structural Integrity Review				
2. Stiffener spacings are within the guidelines	X			
3. Bolted flanged joints satisfy SMACNA requirements				X
4. No point-supported round duct	X			
5. Flexible bellows can accommodate motions	X			
6. No additional concerns	X			
Are the above caveats met?	X			

Exhibit 5-1 Sheet 2 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. CREFS

Damper Equipment I.D. See M-109

Structural Integrity Review *	Y	N	U	N/A
1. Support spans satisfy the criteria	X			
2. Ducts are properly tied-down to the supports	X			
3. Industry standard duct joints are utilized	X			
4. Slip joints can accommodate displacements				X
5. Round duct joints exclude riveted lap joints				X
6. Appurtenances are positively attached to duct	X			
7. Heavy in-line equipment is adequately restrained	X			
8. No stiff branch with flexible header	X			
9. Cantilevered duct section is attached to last support (Intake Duct)		X		
10. Ducts are free of corrosion detrimental to integrity	X			
11. System is free of obvious damage or defects	X			
12. No other concerns	X			
Are the above caveats met?		X		

Support Review *	Y	N	U	N/A
1. Beam clamps are oriented to preclude slipping off the support				X
2. Channel nuts have teeth or ridges				X
3. No cast iron inserts	X			
4. No broken or obviously defective hardware	X			
5. Support is free of excessive corrosion	X			
6. Welded joints appear to be of good quality	X			
7. Anchorage appears adequate	X			
8. No stiff supports or hard spots in long flexible duct runs	X			
9. No short, fixed ended heavily loaded rod hangers subject to potential fatigue failure	X			
10. No additional concerns	X			
Are the above caveats met?	X			

Damper Review *	Y	N	U	N/A
1. Damper is similar to and bounded by the seismic experience data for dampers in Attachment B	X			
2. Damper operator/actuator not of cast iron	X			
3. Attached lines have sufficient slack and flexibility	X			
4. Damper controls mounted separately from the damper adequately anchored	X			
5. Motor or pneumatic operator mounted on the damper has adequate anchorage and load path	X			
6. Duct at the damper location free from signs of distortion that could interfere with damper operation	X			
7. No other adverse concerns	X			
Are the above caveats met?	X			

Exhibit 5-1 Sheet 3 of 3

SCREENING AND EVALUATION WORK SHEET (SEWS)

HVAC System I.D. CREFS

Damper Equipment I.D. See M-109

Seismic Interaction Review	Y	N	U	N/A
1. Free from impact by nearby equipment	X			
2. No collapse of overhead equipment, distribution systems or masonry walls	X			
3. Able to accommodate differential displacements	X			
4. No other adverse concerns	X			
Are the above caveats met?	X			
IS THE HVAC DUCT AND DAMPER SYSTEM SEISMICALLY ADEQUATE?		X		

Supports Selected for Analytical Review None

Duct System Selected for Analytical Review None

Comments

* 1) The HVAC ductwork and plena for most of the CREFS are covered with a lightweight insulating material that obstructs viewing of some of the duct supports and duct stiffeners. The material is in place not only for insulation but also to improve the leak tightness of the system. However, the recirculation duct for the CREFS is un-insulated which allowed the SRT to examine the construction, stiffener spacing, hanger spacing and type, and material condition of the ductwork. This examination of the recirculation duct indicated the same type and quality of construction as that found for the VNPAB system; therefore the SRT considered it reasonable to adjudge that the number and location of CREFS stiffeners and duct supports within the insulated CREFS systems conform to the SMACNA code requirements and that the duct construction is adequate. The dead load, seismic and pressure stresses in the CREFS ducts, duct stiffeners, and duct supports were evaluated based on this approach.

2) The intake duct is separated from the charcoal filter plenum by a rubber bellows therefore the duct is a cantilever in the lateral direction. - Outlier

3) The control room ceiling ducts and bathroom exhaust were examined by the SRT. Ceiling panels were removed to examine the ducts. The ducts vary in size from 24"x24" to approximately 16"x10". The small ducts are generally supported by strut anchors on approximately 8' centers. These insulated ducts are very lightweight and are judged acceptable by the SRT.

In general all Control Room ceiling and bathroom exhaust ducts appear well constructed and well supported and judged OK by SRT.

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE	C. A. Gazda	9/21/2009
Print or Type Name/Title	Signature	Date
Walter Djordjevic, PE	W Djordjevic	9/21/2009
Print or Type Name/Title	Signature	Date

ATTACHMENTS
LARs

Exhibit 5-3 Sheet 1 of 1

HVAC DUCT SUPPORT
ANALYTICAL REVIEW TRACKING SUMMARY

HVAC Duct System Designation	Plant Location	Selection Number	Final Resolution	Initials/ Date
VNPAB	Aux Bldg	LAR No. 1	Add new support	MMD/10-16-09
VNPAB	Aux Bldg	LAR No. 2	Acceptable	MMD/10-16-09
VNPAB	Aux Bldg	LAR No. 3	Acceptable	MMD/10-16-09
VNPAB	Aux Bldg	LAR No. 4	Acceptable	MMD/10-16-09
VNPAB	Aux Bldg	LAR No. 5	Acceptable	MMD/10-16-09
VNPAB	Aux Bldg	LAR No. 6	Add new support	MMD/10-16-09
VNPAB	Aux Bldg	LAR No. 7	Add new steel	MMD/10-16-09

Exhibit 5-2 Sheet 1 of 2

DUCT SUPPORT ANALYTICAL REVIEW DATA SHEET

HVAC Duct System: VNPAB Selection No.: LAR No. 1

Plant Location: Auxiliary Building Central El. 8'-0"

Description and Sketch

See attached sheet.

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE		10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE		10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-2
LAR No. 1
Sheet 2 of 2

The hanger for the 104x26 duct with a tributary span equal to one half of 113" also supports the 52x22 duct with an 11' span.

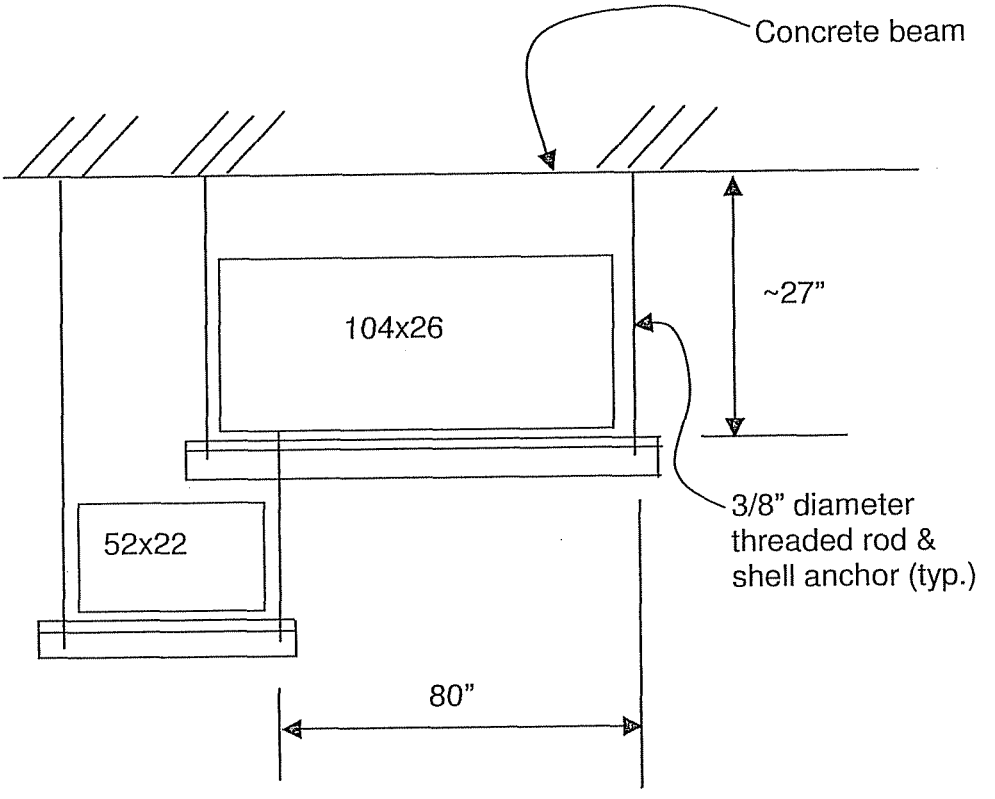


Exhibit 5-2 Sheet 1 of 2

DUCT SUPPORT ANALYTICAL REVIEW DATA SHEET

HVAC Duct System: VNPAB Selection No.: LAR No. 2

Plant Location: Auxiliary Building Central El. 8'-0"

Description and Sketch

See attached sheet.

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE		10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE		10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-2
LAR No. 2
Sheet 2 of 2

LAR No. 2

Multiple ducts and a pipe are attached to the duct support. Tributary length for both ducts is 58".

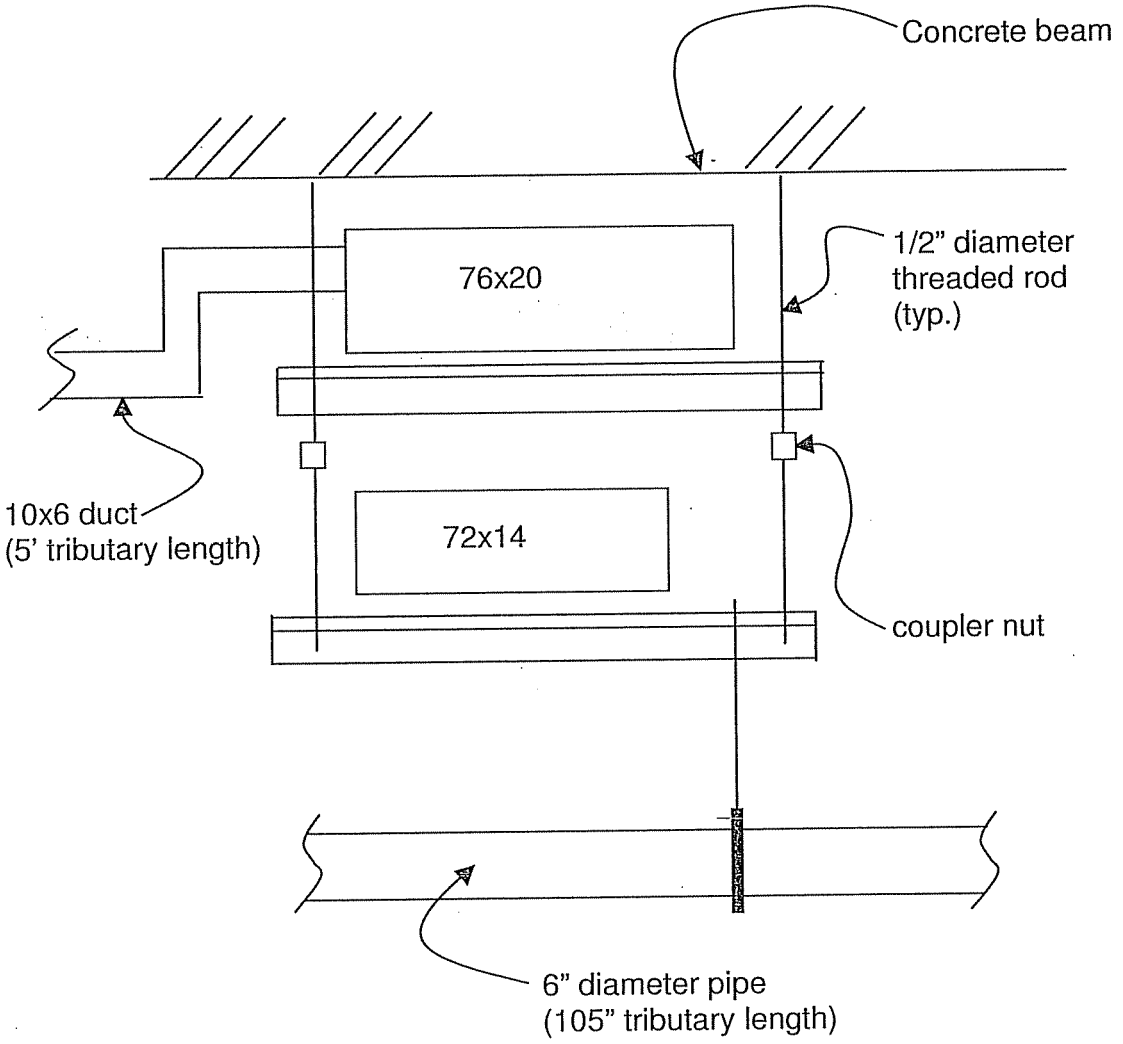


Exhibit 5-2 Sheet 1 of 2

DUCT SUPPORT ANALYTICAL REVIEW DATA SHEET

HVAC Duct System: VNPAB Selection No.: LAR No. 3

Plant Location: Auxiliary Building Central El. 8'-0"

Description and Sketch

See attached sheet.

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE		10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE		10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-2
LAR No. 3

Sheet 2 of 2

LAR No. 3

Duct attached to cable tray support that supports an 18" ladder cable tray and 5 conduits. Tributary length for the duct is 75".

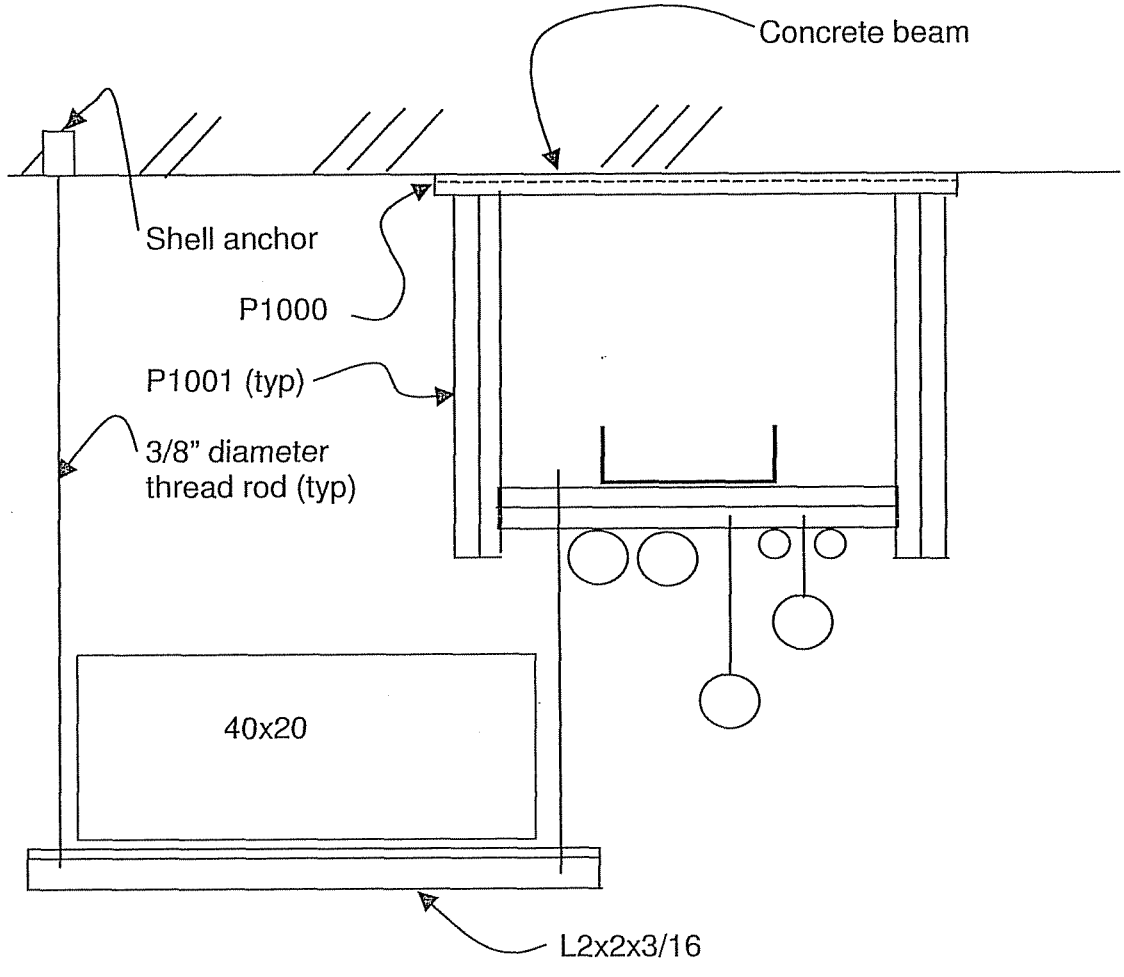


Exhibit 5-2 Sheet 1 of 2

DUCT SUPPORT ANALYTICAL REVIEW DATA SHEET

HVAC Duct System: VNPAB Selection No.: LAR No. 4

Plant Location: Auxiliary Building Central El. 8'-0"

Description and Sketch

See attached sheet.

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE		10/16/2009
Print or Type Name/Title	Signature	Date

Marlene M. Delaney, PE		10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-2
LAR No. 4

Support for 54" diameter duct – support cannot fall off blocked by RMWT.
Anchorage blocked by fireproofing (assume welding).

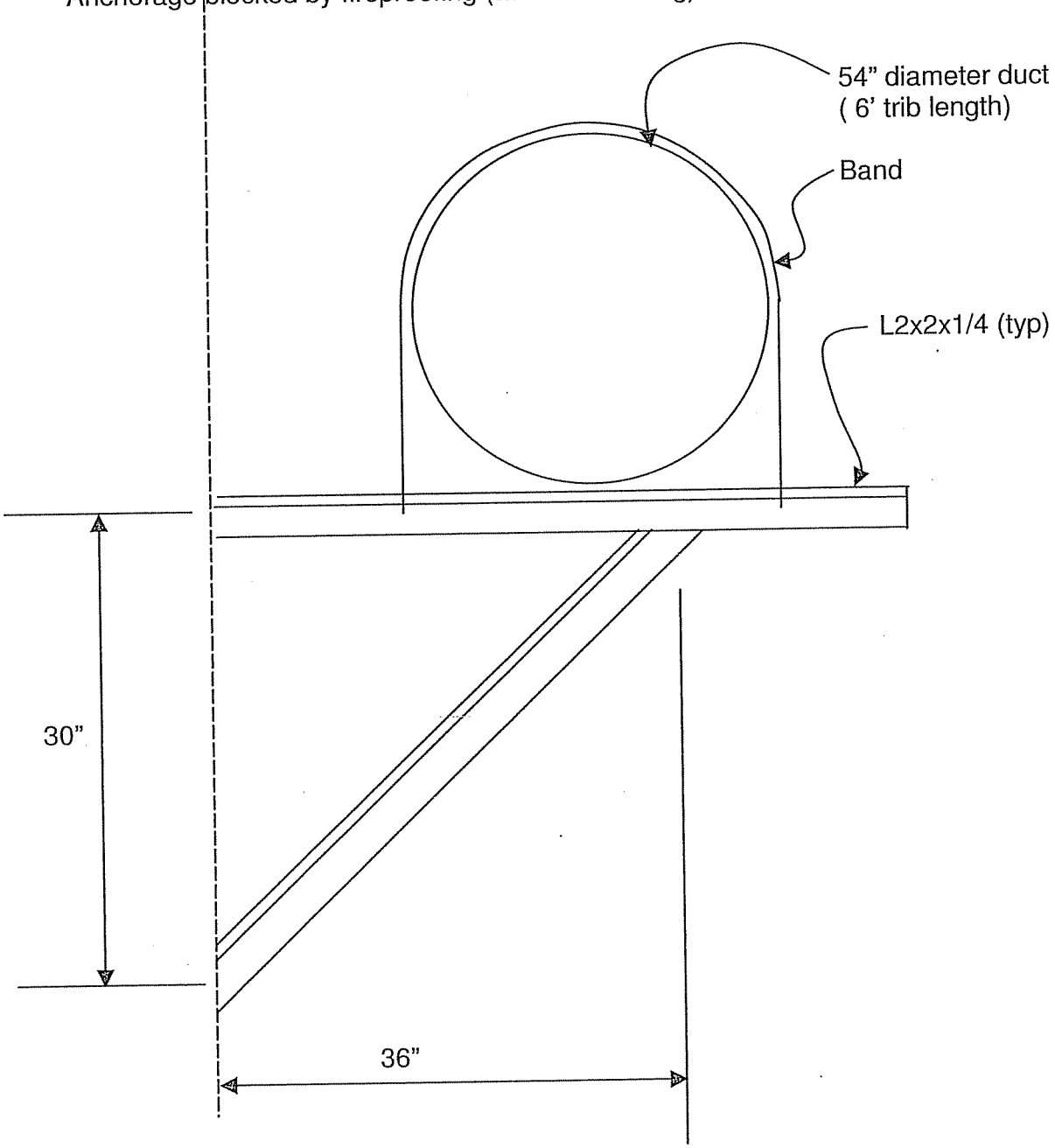


Exhibit 5-2 Sheet 1 of 3

DUCT SUPPORT ANALYTICAL REVIEW DATA SHEET

HVAC Duct System: VNPAB Selection No.: LAR No.5

Plant Location: Auxiliary Building Central El. 8'-0"

Description and Sketch

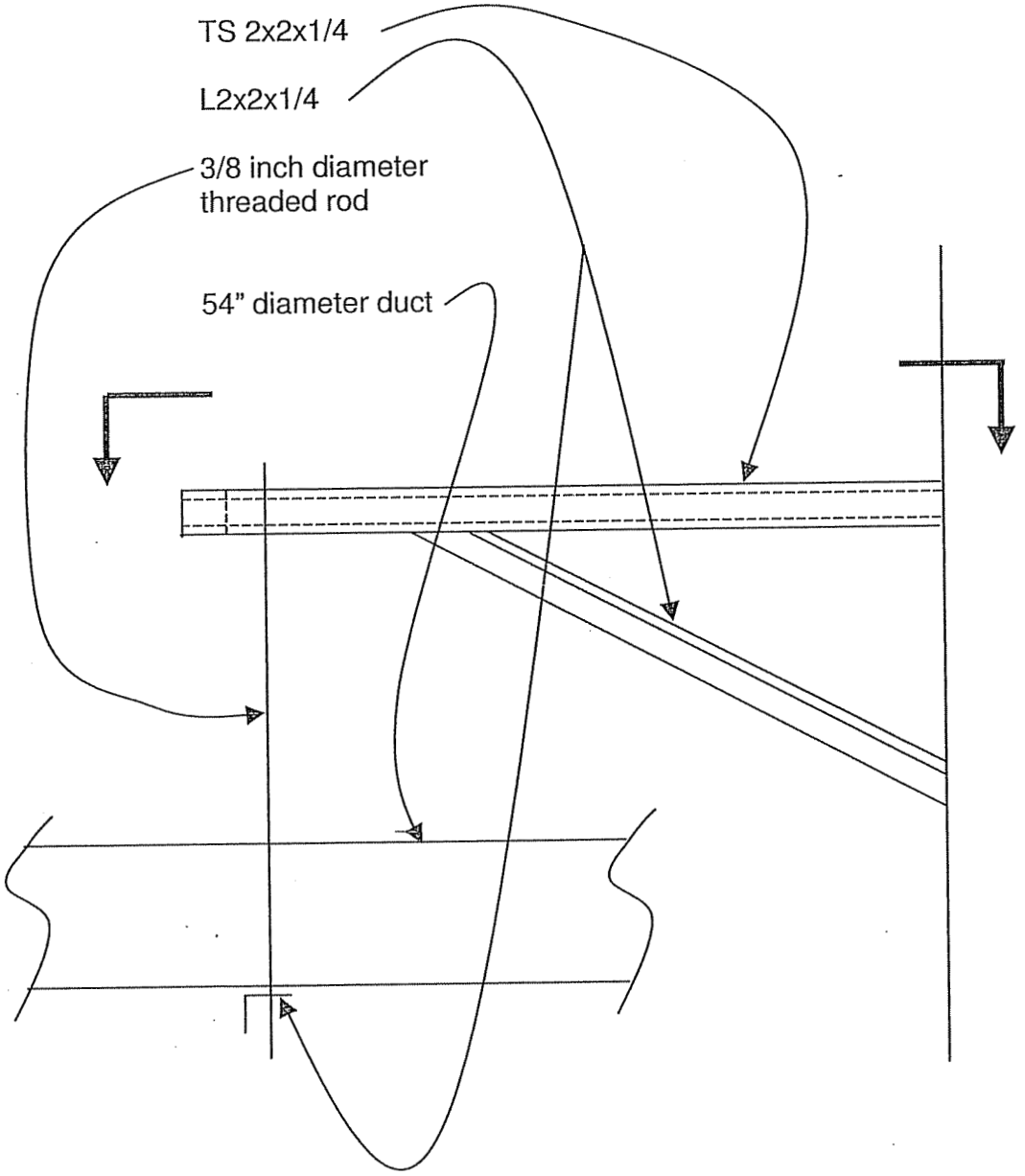
See attached sheet.

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE		10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE		10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-2
LAR No. 5

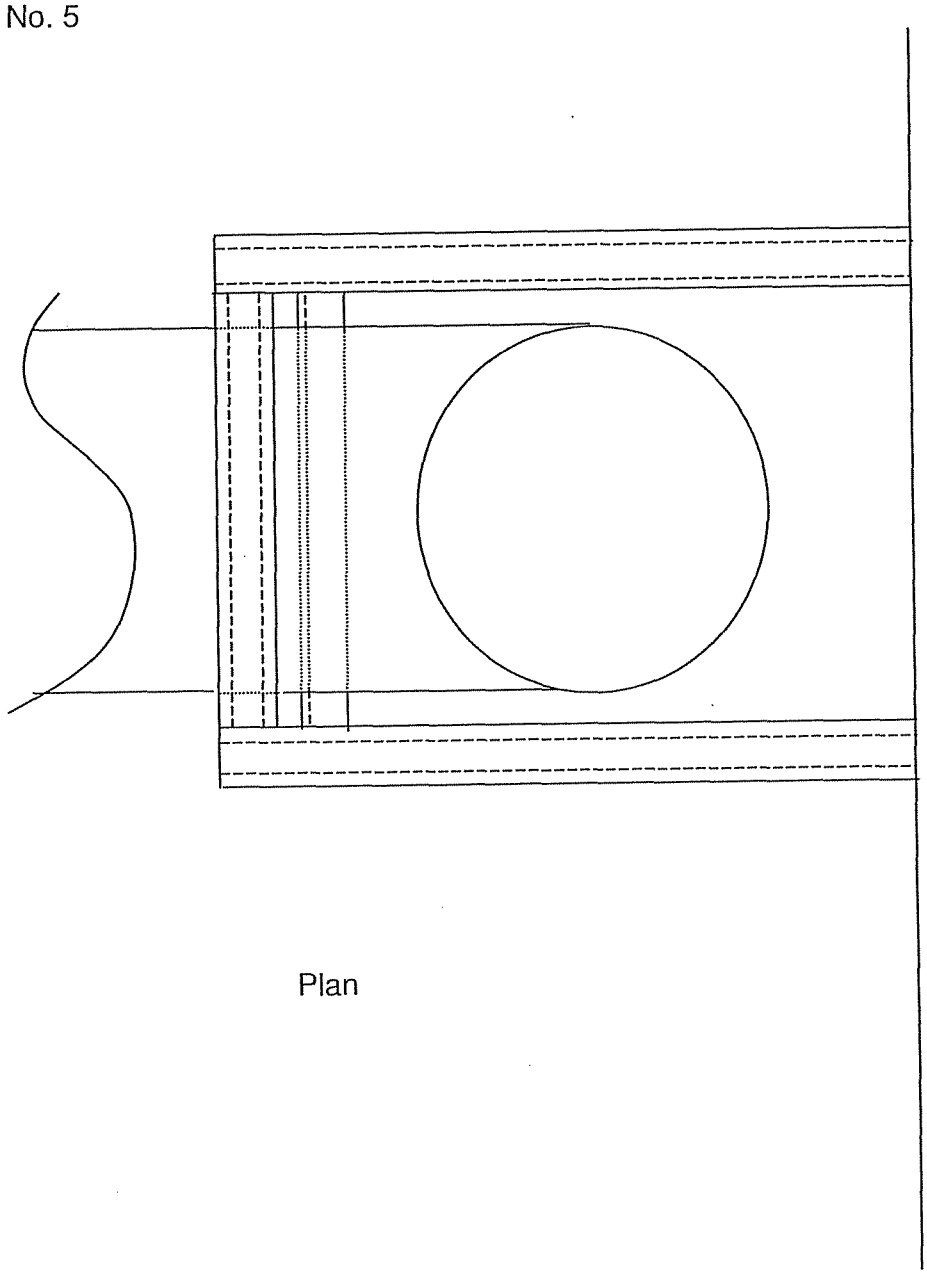
Support for 54" diameter duct



Elevation

Exhibit 5-2
LAR No. 5

Sheet 3 of 3



Plan

Exhibit 5-2 Sheet 1 of 2

DUCT SUPPORT ANALYTICAL REVIEW DATA SHEET

HVAC Duct System: VNPAB Selection No.: LAR No. 6

Plant Location: Auxiliary Building Central El. 8'-0"

Description and Sketch

See attached sheet.

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE		10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE		10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-2
LAR No. 6

The hanger for the 34x14 duct is supported by a horizontal unistrut member clamped to conduits.

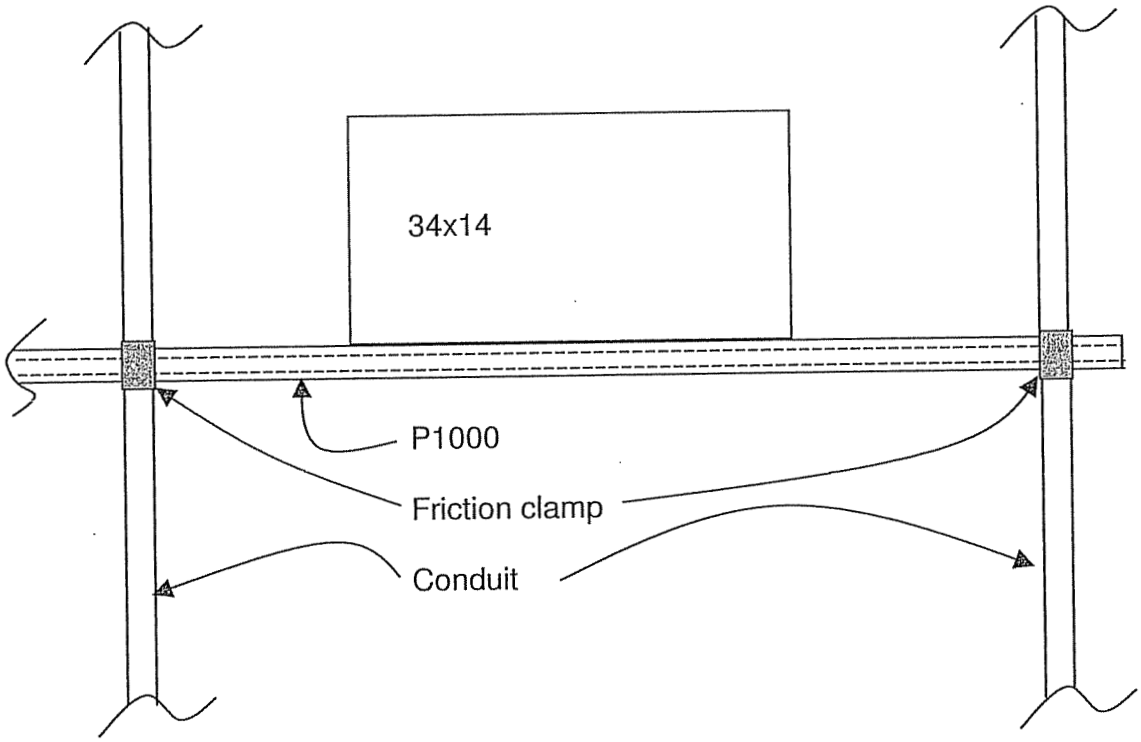


Exhibit 5-2 Sheet 1 of 2

DUCT SUPPORT ANALYTICAL REVIEW DATA SHEET

HVAC Duct System: VNPAB Selection No.: LAR No. 7

Plant Location: Auxiliary Building Central El. 8'-0"

Description and Sketch

See attached sheet.

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE		10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE		10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-2
LAR No. 7

The support for duct 26x16 is attached to a cable tray support and to the support for a duct 26x16.

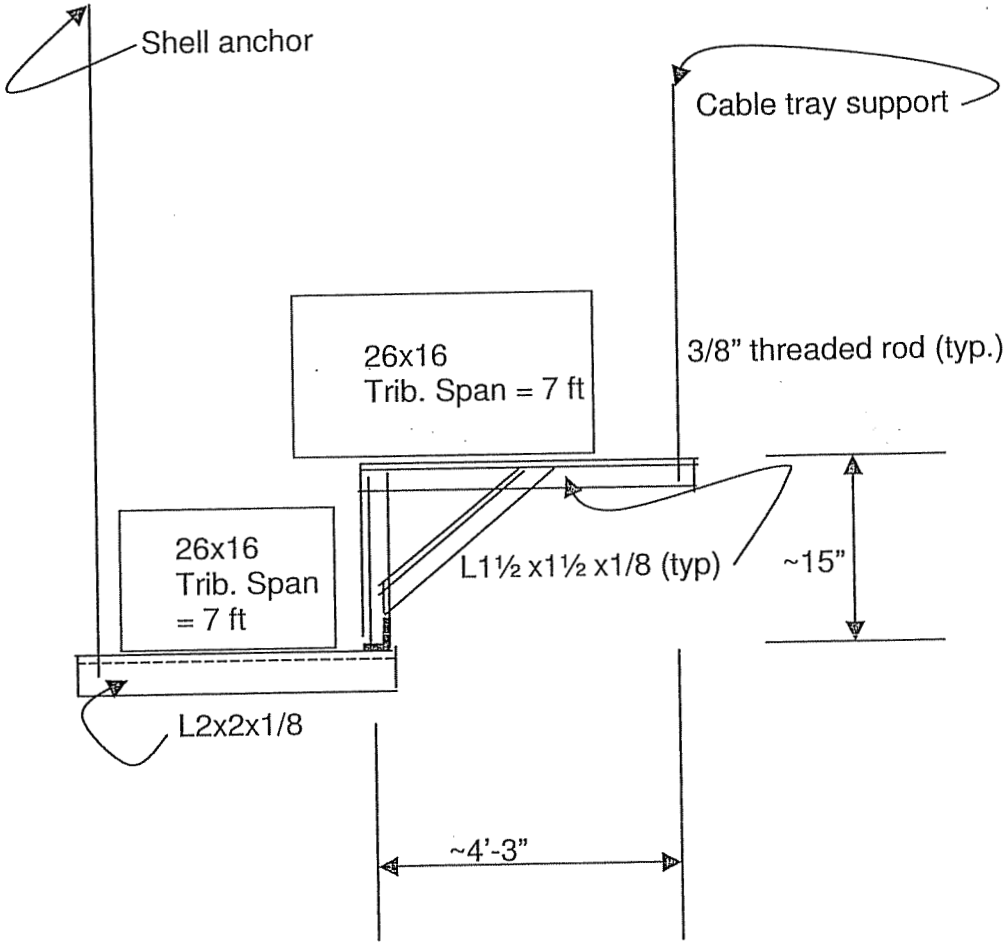


Exhibit 5-4 Sheet 1 of 2

HVAC DUCT SYSTEM
ANALYTICAL REVIEW DATA SHEET

HVAC Duct System: VNPAB Selection No.: LAR No. 8

Plant Location: VNPAB El. 8'-0" Duct no. 1

Description and Sketch

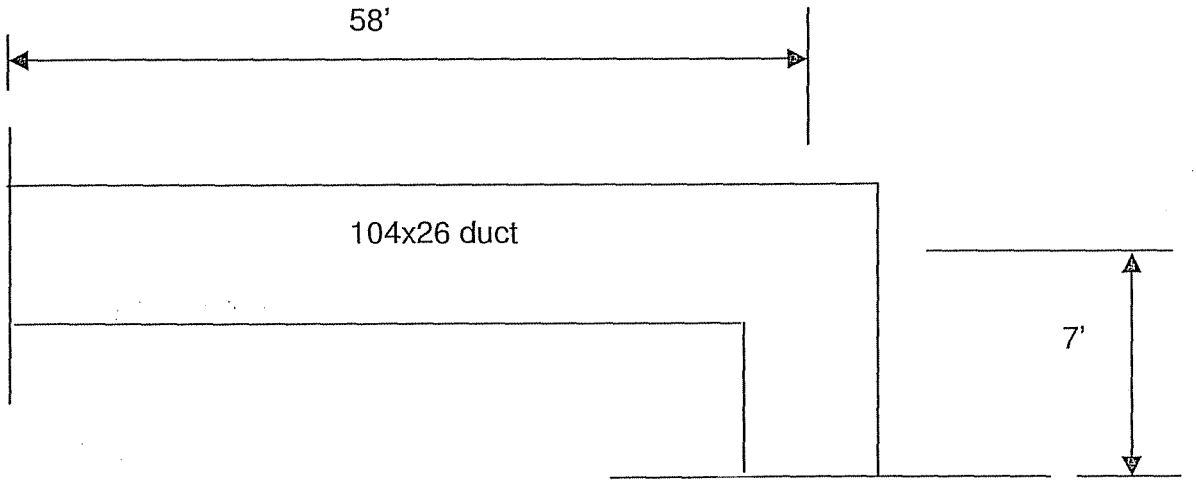
see attached sketch

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE	C. A. Gazda	10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE	Marlene M Delaney	10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-4
LAR No. 8

Consider the longitudinal load due to seismic for the largest duct in the evaluation.



ATTACHMENTS
HSOS

Exhibit 5-5 Sheet 1 of 1

HVAC SYSTEM OUTLIER SHEET (HSOS)

OUTLIER NO. 1

1. OUTLIER IDENTIFICATION AND LOCATION

HVAC System I.D. VNPAB

Location Area 4 -Auxiliary Building El. 8'-0" Duct no. 1

2. OUTLIER ISSUE IDENTIFICATION

a. Identify the screening guidelines that are not met, or indicate if the analytical review selection fails the analysis criteria.

Applicability		Damper Review	
Pressure Boundary Integrity		Interaction Effects	
Structural Integrity Review		Support Analytical Review	x (LAR 1)
Support Review		Duct Analytical Review	

b. Describe all the reasons for the outlier:

The horizontal angle of the support is overstressed due to dead load because of an additional duct attached to the angle.

3 PROPOSED METHOD OF OUTLIER RESULTION (OPTIONAL)

a. Define the proposed method(s) for resolving the outlier:

Add a new vertical trapeze support at or near the existing overstressed support.

b. Provide information needed to implement proposed method(s) for resolving the outlier:

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

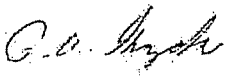
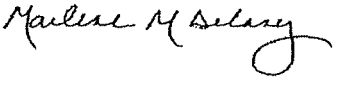
Philip A. Gazda, PE		10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE		10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-5 Sheet 1 of 1

HVAC SYSTEM OUTLIER SHEET (HSOS)

OUTLIER NO. 2

1. OUTLIER IDENTIFICATION AND LOCATION

HVAC System I.D. VNPAB

Location Area 5 - Aux Bldg. El. 8'-0" -Duct no. 14

2. OUTLIER ISSUE IDENTIFICATION

a. Identify the screening guidelines that are not met, or indicate if the analytical review selection fails the analysis criteria.

Applicability		Damper Review	
Pressure Boundary Integrity		Interaction Effects	
Structural Integrity Review		Support Analytical Review	x (LAR 6)
Support Review		Duct Analytical Review	

b. Describe all the reasons for the outlier:

The existing support is not adequate since it utilizes friction clamps attached to vertically spanning conduits.

3 PROPOSED METHOD OF OUTLIER RESULTION (OPTIONAL)

a. Define the proposed method(s) for resolving the outlier:

Add a new support at or near the existing support. The existing support cannot be removed because other components are attached to it.

b. Provide information needed to implement proposed method(s) for resolving the outlier:

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE	G.A. Gazda	10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE	Marlene M Delaney	10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-5 Sheet 1 of 1

HVAC SYSTEM OUTLIER SHEET (HSOS)

OUTLIER NO. 3

1. OUTLIER IDENTIFICATION AND LOCATION

HVAC System I.D. VNPAB

Location Area 5 - Aux Bldg. El 8'-0" - Duct no. 26

2. OUTLIER ISSUE IDENTIFICATION

a. Identify the screening guidelines that are not met, or indicate if the analytical review selection fails the analysis criteria.

Applicability		Damper Review	
Pressure Boundary Integrity		Interaction Effects	
Structural Integrity Review		Support Analytical Review	x (LAR 7)
Support Review		Duct Analytical Review	

b. Describe all the reasons for the outlier:

The existing structural steel that supports two duct sections is overstressed due to the dead load of the ducts.

3 PROPOSED METHOD OF OUTLIER RESULTION (OPTIONAL)

a. Define the proposed method(s) for resolving the outlier:

Replace the existing horizontal steel assembly (Z shaped member) with a new fabricated support.

b. Provide information needed to implement proposed method(s) for resolving the outlier:

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE	G.A. Gazda	10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE	Marlene M Delaney	10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-5 Sheet 1 of 1

HVAC SYSTEM OUTLIER SHEET (HSOS)

OUTLIER NO. 4

1. OUTLIER IDENTIFICATION AND LOCATION

HVAC System I.D. VNPAB

Location Pipeway 3 Area 5 Duct no. 30A

2. OUTLIER ISSUE IDENTIFICATION

a. Identify the screening guidelines that are not met, or indicate if the analytical review selection fails the analysis criteria.

Applicability		Damper Review	
Pressure Boundary Integrity		Interaction Effects	
Structural Integrity Review	x	Support Analytical Review	
Support Review		Duct Analytical Review	

b. Describe all the reasons for the outlier:

The cantilevered duct section is not acceptable for dead load and seismic stresses.

3 PROPOSED METHOD OF OUTLIER RESULTION (OPTIONAL)

a. Define the proposed method(s) for resolving the outlier:

Add a lateral support at the end of the duct span.

b. Provide information needed to implement proposed method(s) for resolving the outlier:

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE	C.A. Gazda	10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE	Marlene M Delaney	10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-5 Sheet 1 of 1

HVAC SYSTEM OUTLIER SHEET (HSOS)

OUTLIER NO. 5

1. OUTLIER IDENTIFICATION AND LOCATION

HVAC System I.D. VNPAB

Location Pipeway 4 - Duct 25

2. OUTLIER ISSUE IDENTIFICATION

a. Identify the screening guidelines that are not met, or indicate if the analytical review selection fails the analysis criteria.

Applicability		Damper Review	
Pressure Boundary Integrity		Interaction Effects	
Structural Integrity Review	x	Support Analytical Review	
Support Review		Duct Analytical Review	

b. Describe all the reasons for the outlier:

The cantilevered duct section is not acceptable for dead load and seismic stresses.

3 PROPOSED METHOD OF OUTLIER RESULTION (OPTIONAL)

a. Define the proposed method(s) for resolving the outlier:

Add a lateral support at the end of the duct span.

b. Provide information needed to implement proposed method(s) for resolving the outlier:

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE	C.A. Gazda	10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE	Marlene M Delaney	10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-5 Sheet 1 of 1

HVAC SYSTEM OUTLIER SHEET (HSOS)

OUTLIER NO. 6

1. OUTLIER IDENTIFICATION AND LOCATION

HVAC System I.D. VNPAB

Location Unit 1 RHR Hx Room Area 8

2. OUTLIER ISSUE IDENTIFICATION

a. Identify the screening guidelines that are not met, or indicate if the analytical review selection fails the analysis criteria.

Applicability		Damper Review	
Pressure Boundary Integrity		Interaction Effects	
Structural Integrity Review	x	Support Analytical Review	
Support Review		Duct Analytical Review	

b. Describe all the reasons for the outlier:

The duct is a cantilever section without a lateral support at the end of the run where it turns into another duct section.

3 PROPOSED METHOD OF OUTLIER RESULTION (OPTIONAL)

a. Define the proposed method(s) for resolving the outlier:

Add a lateral knee brace support at the duct corner near column line N/10.

b. Provide information needed to implement proposed method(s) for resolving the outlier:

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE	C.A. Gazda	10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE	Marlene M Delaney	10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-5 Sheet 1 of 1

HVAC SYSTEM OUTLIER SHEET (HSOS)

OUTLIER NO. 7

1. OUTLIER IDENTIFICATION AND LOCATION

HVAC System I.D. VNPAB

Location Unit 1 RHR Hx Room - Area 8 - Duct no. 37

2. OUTLIER ISSUE IDENTIFICATION

a. Identify the screening guidelines that are not met, or indicate if the analytical review selection fails the analysis criteria.

Applicability		Damper Review	
Pressure Boundary Integrity	x	Interaction Effects	
Structural Integrity Review		Support Analytical Review	
Support Review		Duct Analytical Review	

b. Describe all the reasons for the outlier:

Top stiffeners are missing at 2 locations.

3 PROPOSED METHOD OF OUTLIER RESULTION (OPTIONAL)

a. Define the proposed method(s) for resolving the outlier:

Add two horizontal stiffeners at the top of the EW duct near column line N/10.

b. Provide information needed to implement proposed method(s) for resolving the outlier:

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE	C. A. Gazda	10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE	Marlene M Delaney	10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-5 Sheet 1 of 1

HVAC SYSTEM OUTLIER SHEET (HSOS)

OUTLIER NO. 8

1. OUTLIER IDENTIFICATION AND LOCATION

HVAC System I.D. VNPAB

Location Unit 2 RHR Hx Room - Duct No. 38

2. OUTLIER ISSUE IDENTIFICATION

a. Identify the screening guidelines that are not met, or indicate if the analytical review selection fails the analysis criteria.

Applicability		Damper Review	
Pressure Boundary Integrity		Interaction Effects	
Structural Integrity Review	x	Support Analytical Review	
Support Review		Duct Analytical Review	

b. Describe all the reasons for the outlier:

The end support of the duct does not have a positive connection between the duct and the support such that the duct could slide off the angle member.

3 PROPOSED METHOD OF OUTLIER RESULTION (OPTIONAL)

a. Define the proposed method(s) for resolving the outlier:

Fasten existing support to the duct near column line N/13.

b. Provide information needed to implement proposed method(s) for resolving the outlier:

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE	C.A. Gazda	10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE	Marlene M Delaney	10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-5 Sheet 1 of 1

HVAC SYSTEM OUTLIER SHEET (HSOS)

OUTLIER NO. 9

1. OUTLIER IDENTIFICATION AND LOCATION

HVAC System I.D. CREFS

Location Fans W14A & B, W13B1 & B2

2. OUTLIER ISSUE IDENTIFICATION

a. Identify the screening guidelines that are not met, or indicate if the analytical review selection fails the analysis criteria.

Applicability	x	Damper Review	
Pressure Boundary Integrity		Interaction Effects	
Structural Integrity Review		Support Analytical Review	
Support Review		Duct Analytical Review	

b. Describe all the reasons for the outlier:

Vibration isolators are used at the anchorage of the subject fans which are not seismically qualified.

3 PROPOSED METHOD OF OUTLIER RESULTION (OPTIONAL)

a. Define the proposed method(s) for resolving the outlier:

Provide seismic anchorage details at the fans.

b. Provide information needed to implement proposed method(s) for resolving the outlier:

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE	C.A. Gazda	10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE	Marlene M Delaney	10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-5 Sheet 1 of 1

HVAC SYSTEM OUTLIER SHEET (HSOS)

OUTLIER NO. 10

1. OUTLIER IDENTIFICATION AND LOCATION

HVAC System I.D. CREFS

Location Duct No. 43

2. OUTLIER ISSUE IDENTIFICATION

a. Identify the screening guidelines that are not met, or indicate if the analytical review selection fails the analysis criteria.

Applicability		Damper Review	
Pressure Boundary Integrity		Interaction Effects	
Structural Integrity Review	x	Support Analytical Review	
Support Review		Duct Analytical Review	

b. Describe all the reasons for the outlier:

The cantilevered duct section is not acceptable for dead load and seismic stresses.

3 PROPOSED METHOD OF OUTLIER RESULTION (OPTIONAL)

a. Define the proposed method(s) for resolving the outlier:

Add a lateral support at the intake duct near the bellows.

b. Provide information needed to implement proposed method(s) for resolving the outlier:

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE	C.A. Gazda	10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE	Marlene M Delaney	10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-5 Sheet 1 of 1

HVAC SYSTEM OUTLIER SHEET (HSOS)

OUTLIER NO. 11

1. OUTLIER IDENTIFICATION AND LOCATION

HVAC System I.D. VNPAB

Location Duct No. 1

2. OUTLIER ISSUE IDENTIFICATION

a. Identify the screening guidelines that are not met, or indicate if the analytical review selection fails the analysis criteria.

Applicability		Damper Review	
Pressure Boundary Integrity		Interaction Effects	
Structural Integrity Review		Support Analytical Review	x
Support Review		Duct Analytical Review	

b. Describe all the reasons for the outlier:

The shell anchorage was overstressed for the vertical capacity check. A refined analysis eliminated the overstress condition.

3 PROPOSED METHOD OF OUTLIER RESULTION (OPTIONAL)

a. Define the proposed method(s) for resolving the outlier:

No additional resolution required.

b. Provide information needed to implement proposed method(s) for resolving the outlier:

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

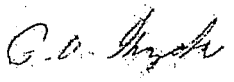
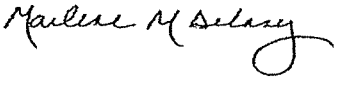
Philip A. Gazda, PE		10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE		10/16/2009
Print or Type Name/Title	Signature	Date

Exhibit 5-5 Sheet 1 of 1

HVAC SYSTEM OUTLIER SHEET (HSOS)

OUTLIER NO. 12

1. OUTLIER IDENTIFICATION AND LOCATION

HVAC System I.D. VNPAB

Location Duct No. 4

2. OUTLIER ISSUE IDENTIFICATION

a. Identify the screening guidelines that are not met, or indicate if the analytical review selection fails the analysis criteria.

Applicability		Damper Review	
Pressure Boundary Integrity		Interaction Effects	
Structural Integrity Review		Support Analytical Review	x
Support Review		Duct Analytical Review	

b. Describe all the reasons for the outlier:

The shell anchorage was overstressed for the vertical capacity check. A refined analysis eliminated the overstress condition.

3 PROPOSED METHOD OF OUTLIER RESULTION (OPTIONAL)

a. Define the proposed method(s) for resolving the outlier:

No additional resolution required.

b. Provide information needed to implement proposed method(s) for resolving the outlier:

CERTIFICATION: (Signatures of at least two Seismic Capability Engineers are required; one of whom is a licensed professional engineer.)

Philip A. Gazda, PE	C. A. Gazda	10/16/2009
Print or Type Name/Title	Signature	Date
Marlene M. Delaney, PE	Marlene M Delaney	10/16/2009
Print or Type Name/Title	Signature	Date

ATTACHMENTS
KENNEDY INDEPENDENT PEER REVIEW REPORT

Independent Peer Review of Seismic Verification of Point Beach Nuclear Plant (PBNP) Primary Auxiliary Building Exhaust (VNPAB) and Control Room Emergency Filtration System (CREFS) Ductwork, Associated Supports, and Components

Robert P. Kennedy
October 29, 2009

1. Introduction

I have performed an independent peer review of the seismic verification of the Point Beach Nuclear Plant (PBNP) Primary Auxiliary Building Exhaust (VNPAB) and Control Room Emergency Filtration System (CREFS) ductwork, associated supports, and components documented in Refs. 1 and 2. This seismic verification was conducted by Mr. Walter Djordievic and Mr. Phil Gazda of Stevenson & Associates (S&A) and was performed in accordance with the criteria presented in Ref. 3. I am very familiar with the qualifications of both Messrs. Djordjevic and Gazda and can attest to their qualifications to perform these seismic verifications in accordance with the Ref. 3 criteria.

Previously (February 7, 2004), I performed a peer review of the seismic evaluation guidelines presented in an earlier version of Ref. 3. All of my previous review comments have been incorporated into Ref. 3. Therefore, I support the use of the Ref. 3 guidelines for the seismic verification of HVAC ductwork and damper systems.

Within my experience, these Ref. 3 guidelines were initially applied for the seismic verification of the Turbine Building exhaust ductwork for Hatch Nuclear Plant Unit 1. I performed (November, 2004) the independent peer review of that seismic verification. Subsequently, the U.S. Nuclear Regulatory Commission has accepted and approved this Hatch seismic verification of ductwork.

A primary goal of my independent peer review of the Point Beach Nuclear Plant (PBNP) seismic verification of HVAC ductwork presented in Refs. 1 and 2 was to verify that it was conducted in accordance with the criteria of Ref. 3 in at least the same degree of rigor as that previously performed for Hatch Unit 1.

2. Scope of Peer Review

Initially (September 25), I conducted a one day peer review seismic walkdown of the PBNP ductwork, associated supports, and component which were being assessed by the S&A engineers. My walkdown was subsequent to the seismic walkdowns previously conducted by the S&A engineers. I was accompanied by Mr. Phil Gazda of S&A during my walkdown. The purpose of my walkdown was to assess:

(1) the extent to which the Ref. 3 guidelines were being followed,

(2) the thoroughness with which the seismic walkdown had been conducted,

(3) the reasonableness of the assumptions being made, and of the preliminary results obtained, and

(4) whether I observed any potential deficiencies not previously identified by S&A engineers.

During my peer review seismic walkdown, I observed essentially 100% of all ductwork, and components being assessed by S&A engineers that were accessible outside of locked radiation areas. I also observed a significant fraction of ductwork supports visible from the floor. I did not request that fan plena be opened so that I could observe the fan mounting therein. However, through a review of the Seismic Evaluation Work Sheets (SEWS), I have confirmed that the Seismic Review Team (SRT) did open these fan plena and observed the fan mounting therein. For example, see the photos attached to the SEWS between Pages 70 and 123 of Ref. 1.

In addition to my peer review walkdown, I have reviewed Ref. 1 which documents the seismic verification performed, and Ref. 2 which provides the analytical reviews performed for this verification. The purpose of these reviews was to:

(1) confirm compliance with the Ref. 3 guidelines,

(2) fully understand the methodology and basis for any assumptions made by the SRT for situations which could not be observed,

(3) appropriateness of all calculations,

(4) completeness in describing and resolving outliers, and

(5) adequacy of documentation of the seismic verification program.

I did not perform any numerical check of calculations since such checks are a checker function, and not a peer review function. However, I did note that all calculations do appropriately contain the initials of both the preparer and the reviewer.

3. Overall Findings

This experience based seismic verification of the Point Beach Nuclear Plant Primary Auxiliary Building exhaust and Control Room Emergency Filtration System ductwork, associated supports, and components is of very high quality. It fully complies with the guidelines of Ref. 3. The documentation is excellent. The walkdown team performed a very thorough and competent evaluation. I didn't identify any open issues

not considered by the walkdown team. I concur with the methodology used, and all assumptions made by the SRT. I fully concur with the findings and conclusions of Ref. 1.

So long as the outlier issues identified in Section 9 of Ref. 1 are resolved as suggested therein, I have confidence in the seismic adequacy of the reviewed ductwork, supports, and associated components for the Point Beach Nuclear Plant design ground motion level.

References

1. *PBNP VNPAB and CREFS Seismic Verification,* Report No. 09Q0839-R-001, Stevenson & Associates, October 2009

2. *Analysis and Documentation for Report 09Q0839-R-001,* Calculation No. 09Q0839-C-001, Stevenson & Associates, October 2009

3. *Seismic Evaluation Guidelines for HVAC Duct and Damper Systems,* Final Report 1014608, Revision to Report 1007896, Electric Power Research Institute (EPRI), December 2006