

50-255

UTILITY PROGRAM TO MEET REQUIREMENTS OF IE
BULLETINS 79-02 & 79-14

— NOTICE —

THE ATTACHED FILES ARE OFFICIAL RECORDS OF THE
DIVISION OF DOCUMENT CONTROL. THEY HAVE BEEN
CHARGED TO YOU FOR A LIMITED TIME PERIOD AND
MUST BE RETURNED TO THE RECORDS FACILITY
BRANCH 016. PLEASE DO NOT SEND DOCUMENTS
CHARGED OUT THROUGH THE MAIL. REMOVAL OF ANY
PAGE(S) FROM DOCUMENT FOR REPRODUCTION MUST
BE REFERRED TO FILE PERSONNEL.

DEADLINE RETURN DATE _____

Docket # 50-255
Control # 8002200390
Date 7-14-80 of Documents
REGULATORY DOCKET FILE

RECORDS FACILITY BRANCH

ATTACHMENTS

- A Palisades Plant, NRC IE Bulletin 79-02 Program Overview, dated February 7, 1980
- B Palisades Plant, NRC IE Bulletin 79-14 Program Overview, dated February 7, 1980
- C Report on Inspection and Testing Program for Concrete Expansion Anchors in Accordance with IE Bulletin 79-02 and its Revisions, dated February 11, 1980
- D NRC IE Bulletin 79-14 Inspection and Analysis Program, dated February 7, 1980
- E List of Stress Problems and Evaluation Status
- F Proposed License DPR-20 Change

PALISADES PLANT
NRC IE BULLETIN 79-02
PROGRAM OVERVIEW

SCOPE

The scope of Consumers Power Company's activities to satisfy IE-79-02 at Palisades has principally involved inspecting anchor bolts and base plates, testing anchor bolts, repairing anchor bolt/base plate units and performing analyses to determine anchor bolt loads. Additionally, an evaluation of seismic piping supported by expansion anchors or through bolts on block walls (per 79-02 Rev 2) was performed and corrective action is being taken in accordance with our December 11, 1979 30-day response to IE-79-02 Rev 2.

The particular piping identified as seismic category I has been identified on a set of "billowed" P&ID (ie, MEXP's) drawings identified in our July 6, 1979 120-day response to 79-02.

Because of the fact that they require similar input (in many cases duplicate information) we have combined our effort for NRC IE Bulletins 79-02 and 79-14. We have contracted with Bechtel Power Corporation of Ann Arbor, Michigan to implement a program to fulfill the requirements of both 79-02 and 79-14.

For 79-02, a control package consisting of detailed engineering specifications and field implementation procedures has been prepared. These documents cover items such as testing, repairs, modifications, painting and procurement and contain within them specific acceptance criteria.

Specific items being included and dispositioned in the field inspection and testing program include:

1. Anchor spacing (including between adjacent plates if less than 10 inches) and edge distance to the free face of concrete, if less than the values in Table; plates hole size and plate edge distance, if less than the values in Table.
2. Measurement of thread engagement; to include shoulder-to-cone dimension, etc.
3. Gap distance, protrusion or inset distance (below concrete surface) for shell type anchors.
4. Identification of grouted base plates.
5. Test method and torque or tension values applied; anchor looseness and breakaway torque to loosen nut or bolt.
6. Calibration of testing equipment.
7. Serial numbers of testing equipment.
8. Measurements and observations during testing such as pull out of expansion anchor under tension load, degree expansion anchor leans in hole, etc.
9. Rework required.
10. Retests.
11. Identification of rejects.
12. Any other pertinent data or conditions observed during inspection or testing such as cracking of concrete, general condition of the anchors, and justification for establishing that an anchor is inaccessible.
13. Measurement of the thread length of bolt and shell, if bolt is to be installed.
14. Nomenclature and criteria used in defining the piping support.

The pipe supports, base plates and expansion anchors not meeting the acceptance criteria as a result of the inspection and testing performed are replaced, modified or reinstalled as required.

GENERAL COMMENTS ON RESULTS TO DATE

As of January 29, 1980, the testing and load evaluation program has not been completed; however, sufficient work has been performed to allow an assessment to be made of the general condition of the anchors and base plates. A brief itemization of these conclusions follow:

1. The anchor bolts and base plates which have been inspected/tested have been dispositioned by repair to assure full compliance with the project specifications rather than using "accept as is engineering" dispositions.
2. As defined in our October 26, 1979 meeting with the NRC in Chicago and in our November 21, 1979 meeting with the NRC in Bethesda, we have chosen to test and inspect all the bolts for each large pipe base plate rather than simply one bolt per plate or some other sampling approach. Based on this approach, we have adequate assurance (based on documented test/inspection/corrective action) of the integrity of tested large pipe anchor bolt/base plate units. Inspections and needed repairs on anchor bolts and base plates on large piping in containment and in other areas which are physically inaccessible during operation will be completed prior to startup. The balance of bolts and base plates in accessible areas outside containment will be completed after plant startup.

3. To date, we have had to replace less than 4% of the expansion anchor bolts resulting from test or physical inspection findings. Due to the large number of anchor bolts tested/inspected to date (<1550), we believe this rate will not change, thus we can extrapolate the results to those not yet tested with confidence that more than 96% of the bolts need not be replaced.

4. We have concentrated on testing in containment and other areas inaccessible during operation in anticipation of being able to finish the balance of the work after startup; however, we have not wholly excluded normally accessible areas. We have significant quantities of test/inspection data on all safe shutdown systems both inside and outside containment. The test results do not vary by either area or system (for common hanger types) and thus we can extrapolate our results to uncompleted systems and areas.

5. During the initial pretesting walkdown performed to gather data on pipe and pipe support geometry (data needed to perform IE-79-14 analyses), an inspection record data sheet is completed for every support. Along with creating an as-built drawing during this work, any physical anomalies (eg, gaps, bolts missing, weld cracks, material deformations, etc) are noted. These are handled as maintenance items with further evaluation/repairs required for dispositioning. This basically constitutes a comprehensive inservice inspection program for the piping in this project scope. The corrective action resulting from dispositioning the inspection deficiencies for this

effort is upgrading the general condition of the piping system integrity.

This detailed as-built approach and the required dispositioning to date has covered piping 2½" and larger within the seismic category I scope.

Prior to startup, the physical anomalies significant to safety in containment and in other areas inaccessible during operation will be dispositioned. In addition, evaluation of accessible area anomalies will be performed to assure none of these findings result in a situation of inoperability.

6. Based on detailed engineering evaluation of the deficiencies identified to date, there is no adverse impact on the operability of the plant's safety systems. Extrapolating these results also indicate that the remaining piping to be tested is also operable. It is our intent to complete inspecting all anchor bolts and base plates on large bore piping in containment and other normally inaccessible areas prior to startup. Control of inspection and repair during operation will be in accordance with the plant's Technical Specifications.
7. The test results are not system, pipe size or plant area sensitive. Testing and inspection on small bore piping confirms this. The deficiencies noted do not constitute a significant adverse impact on the operability of the plant's safety systems. Physical anomalies identified on small piping are being corrected the same as findings on large piping. Safety factors of anchor bolts for small diameter piping are generally much larger than those found on computer analyzed piping systems. Anchor bolts on small diameter piping which have been pull tested satisfy the 95% confidence level criteria. In view of the foregoing, anchor bolt testing and base plate inspection will be discontinued on small diameter piping.

PALISADES PLANT
NRC IE BULLETIN 79-14
PROGRAM OVERVIEW

SCOPE

Pursuant to the fulfillment of the requirement of IE Bulletin 79-14 and its revisions and supplements, a comprehensive program has been formulated and is being implemented by Bechtel Power Corporation and Consumers Power Company. A review of the drawings and analysis associated with the plant seismic category I systems resulted in the determination that a large scale as-built piping evaluation program would be required to fulfill bulletin and future SEP requirements. Therefore, a thorough inspection, analysis and documentation program was prepared and is being executed on a long term basis.

The as-built piping evaluation program includes seismic category I piping in the plant. Initial emphasis will be on large piping and piping which is inaccessible during normal plant operation. All large seismic category I piping systems are being walked down for as-built information, reanalyzed per field inspection data, modified where necessary and represented by updated drawings. The only exception to the above involves certain portions of the primary coolant piping inside the shield wall. These parts of the main loop piping are short, large diameter, simple runs supported only by vessel nozzles in high radiation fields. Due to the uniqueness of such highly toleranced pieces, walkdown and reanalysis was judged unnecessary. In view of the scope of the program, the time required for the ultimate completion of the program is expected to be quite lengthy. With this

understanding, an effort is continually being made to evaluate the inspection data and analytical results to assess the condition of the design and installation of the seismic category I piping systems. This assessment provides a reasonable basis for interim plant operation based upon the assurance that the condition of the anchor bolts, baseplates, pipe supports and piping itself is satisfactory for safe plant operation.

SYSTEM EVALUATION

Approximately 72 seismic category I piping systems are scheduled for walkdown, analysis, modification where required and documentation through drawings. These stress problems involve only large piping. Large piping analysis criteria are based upon FSAR requirements as stated and implied in Appendix A of the FSAR. Other piping analysis requirements are based upon catalog component guidelines as posed by the manufacturers of U-bolts, hanger rods, clamps, etc.

The piping and pipe support analyses have progressed well beyond a sample size. More than 40% of the piping systems have been analyzed. The nature of the majority of the deficiencies recorded are with respect to more conservative design bases and installation practices employed in current designs and are not believed to constitute a significant problem with regard to safe plant operation for an interim period. Any deficiencies judged to be significant will be subject to modification before a return to plant operation. In order to identify deficiencies, interim criteria have been posed to define component or system acceptability for interim operation. Such criteria have an engineering basis

despite being less restrictive than FSAR requirements or hanger and pipe support manufacturer guidelines.

The interim criteria described in subsequent attachments are somewhat less restrictive than those of the Palisades Plant FSAR or those offered by piping system component manufacturers. In general, the updated system and component analysis reflects a more thorough evaluation consistent with state-of-the-art analysis capabilities. The present analyses reflect greater computer capacity which obviates piping system decoupling assumptions and which enables the analysis to encompass all significant dynamic modes in seismic analyses. The analysis has been upgraded to account for friction loads on supports. The interim criteria reflect not only a more precise analysis but a better understanding of the component products and a more realistic design basis for the piping itself according to more recent editions of the USAS B31.1 Power Piping Code than that which was used to design Palisades Plant piping. In short, the interim criteria reflect an upgraded analysis of a better understood product.

It is the intent of Consumers Power Company to use the interim criteria to form the basis for short term pipe support modifications. Adherence to these criteria insures that no safety problem exists during plant operation for the system of consideration. It has been concluded that plant operation is justifiable when all large piping and pipe supports inside containment meet the interim criteria. Concurrent efforts with regard to a review of piping systems outside containment is being conducted with respect to decoupling effects. This effort will be completed and any needed modifications made prior to startup. During operation, all accessible piping systems and supports will be modified where necessary to

meet FSAR and any other pertinent design criteria.

SUMMARY

In summary, a very comprehensive program has been initiated to fulfill the requirements of IE Bulletin 79-14. A total reanalysis of the piping systems was initiated to support the anchor bolt program and to consolidate the various piping analyses (deadweight, thermal and seismic) to prepare for SEP requirements and to ensure consistency with drawings and the field. The results achieved to date imply that seismic category I systems will meet the posed interim criteria and thereby assure the operability of safety systems during a design basis seismic event. Detailed analyses of certain systems has yielded a good amount of confidence that there are few deviations from FSAR requirements when all as-built parameters are evaluated and when all catalog information is reasonably specified. Any deviations which do exist will not compromise the structural integrity of the piping systems. Detailed, concurrent evaluation of anchor bolt-base plate and pipe-pipe support data during operation will provide the opportunity to make repairs on an expedient basis and to avoid unnecessary activity in high exposure areas. The analysis provides resolution to Licensing Event Report 80-001 transmitted by telegram January 9, 1980.