



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

ATTACHMENT 3

MEMORANDUM FOR: P. T. Kuo, Section Leader  
Structural Engineering Section B  
Structural and Geotechnical Engineering Branch  
Division of Engineering

FROM: Frank Rinaldi, Structural Engineer  
Structural Engineering Section B  
Structural and Geotechnical Engineering Branch  
Division of Engineering

SUBJECT: R. LANDSMAN'S CONCERNS ON INTEGRITY OF DIESEL GENERATOR  
BUILDING AT MIDLAND SITE

Enclosed please find the initial response to R. Landsman's concerns on the integrity of the Diesel Generator Building at the Midland site, as prepared during a working meeting on July 28, 1983, by myself and our consultants, John Matra and Gunnar Harstead.

*Frank Rinaldi*

Frank Rinaldi, Structural Engineer  
Structural Engineering Section B  
Structural and Geotechnical  
Engineering Branch  
Division of Engineering

Enclosure: As stated

cc: H. Denton	J. Knight
D. Eisenhut	G. Lear
R. DeYoung	J. Kane
E. Christenburg	R. Landsman
C. Bechhoefer	J. Matra
R. Vollmer	G. Harstead
R. Warnick	F. Rinaldi

REPLY TO R. B. LANDSMAN'S CONCERNS ON THE STRUCTURAL INTEGRITY OF THE  
DIESEL GENERATOR BUILDING FOR MIDLAND NUCLEAR POWER PLANT

INTRODUCTION:

The structural engineering staff and their consultants have reviewed and evaluated the structural adequacy of the Diesel Generator Building (DGB) to determine the functionality of the DGB and compliance of the design to the structural engineering requirements of NRC for the licensing of a nuclear power plant.

The Midland Nuclear Power Plant (NPP) has had a number of technical reviewers throughout the licensing period, Construction Permit (CP) and Operating License (OL) stages.

This report concentrates on the period following the determination by Consumer Power Co. (CPCo) that the fill material under the DGB did not meet the design specifications and that remedial actions were necessary. The applicant, under advice of their consultants, surcharged the structure with approximately 30 feet of sand and implemented a permanent dewatering program to correct the poor soil conditions under the DGB. In addition, electrical ducts were discovered to be supported by a competent foundation and were structurally connected to the base of the DGB. This condition imposed new loads on the structure in addition to all other design loads (Dead Loads, Live Loads, Tornado Loads, Earthquake Loads, Temperature Loads), and the abnormal differential settlement loads. Considerable cracks developed as a result of these additional loads. In order to eliminate this condition, the duct banks were released, thereby removing one of the abnormal loads.

The DGB is a reinforced concrete structure with three crosswalls that divide the structure into four cells. Each cell contains a 6 ft.-6 inch-thick concrete pedestal to support a diesel generator unit. The building is supported on continuous footings that are founded at el. 628 ft. and rest on backfill that extends down to approximately el. 603 ft. This rectangular boxlike structure covers an area of approximately 70 ft. by 155 ft. The exterior walls are 30 in. thick, and the interior walls are 18 in. thick. The foundations of the exterior and interior walls of the DGB consist of continuous reinforced concrete footings, 10 ft. wide and 2 ft. 6 inch thick, with their base at el. 628 ft. The walls rise from an elevation of 628 ft. (bottom of footing) to el. 690 ft. (top of roof slab).

Sections 3.8.3.4 and 3.8.3.5 of Supplement No. 2 to the Midland NPP Safety Evaluation Report summarize the NRC structural staff and consultants evaluation of the DGB. This document was modified during the (ASLB) hearing of December 10, 1982, by the additional written testimony of Frank Rinaldi, Franz Schauer, John Matra, and Gunnar Harstead and all oral correction introduced by the same witnesses. The adequacy of the DGB is based upon many analyses, reviews, and monitoring requirements which address normal loads, settlement loads and postulated environmental loads. Due to the fact that available measured and

predicted settlement data is not sufficiently refined to calculate structural component's stress by the use of a finite element analyses, the following quotations summarize the structural staff position for acceptance of the DGB:

- (a) The NRC Staff believes the actual measured settlement values are the best characterization of settlement at the Midland site.
- (b) The NRC Staff has not fully relied on these settlement values in any analyses to ascertain the acceptability of the DGB to withstand its design load over the lifetime of the plant. Instead, the Staff has looked at the current condition of the structure to estimate stresses due to settlement. To these it added stresses due to other design loads which are not presently on the structure but which have to be considered. The staff relied on Applicant's finite element analysis only for the latter stresses.
- (c) The NRC Staff finds the DGB to be structurally acceptable.
- (d) The NRC Staff is requiring a program of surveillance of the structure and for its foundation to ensure the continued safety of the structure.
- (e) The NRC Staff takes no position with respect to the acceptability of Applicant's finite element analysis of the DGB (as applicable to settlement effects).
- (f) The NRC Staff's acceptance of the DGB is subject to the outcome of Seismic Margin Review.

Summary of Landsman's Concerns:

The concerns documented by R. Landsman regarding the DGB by his memorandum to R. F. Warnick, Director, Office of Special Cases, Region III, dated July 19, 1983, transmitted to D. G. Eisenhut, Director, Division of Licensing, NRR, by memorandum dated July 21, 1983, were received by the undersigned on July 27, 1983. This memorandum identifies, in general, concerns previously discussed by the staff during internal meetings and at the ASLB December 1982 hearings related to the DGB. The undersigned fail to understand why R. Landsman has not chosen to participate more fully during these meetings, or why he had not documented his concerns during the review process. The concerns identified in his July 19, 1983 memorandum in some cases are not clear, do not give specific reference to transcripts and other official documents, and in some cases, references to various statements are not fully correct. We will first summarize our understanding of his concerns and then address them in the following order:

FIRST CONCERN: Claim of inadequacy of the Finite Element (FE) Analysis performed by the applicant for the DGB as applies to the following:

- (a) Effect of cracks on stiffness of DGB
- (b) Validity of straight line settlement data
- (c) Time dependency effects of settlements
- (d) Corley statement on cracks and time dependency effects of settlement
- (e) Staff's official position on FE analyses as stated by F. Schauer.

SECOND CONCERN:

- (a) Claim that the analyses performed by NRC staff consultant (NSWC) is not properly documented in the SSER #2 based on their testimony at ASLB hearing.
- (b) Claim that different analyses (Plastic) should have been used.
- (c) Claim that F. Rinaldi stated that the staff cannot rely on the results of the NSWC analyses using actual settlement values.

THIRD CONCERN: Claim that the crack evaluation used to determine the stress in the reinforcing steel is not an adequate practical engineering approach.

FOURTH CONCERN: Claim that the crack monitoring program accepted by the staff to evaluate the rebar stresses during the service life of the building is not adequate.

SUMMARY: Recommendation for new remedial structural fixes required to ensure structural integrity and provide adequate margins of safety.

Reply to Landman's Concern:

FIRST CONCERN

Part (a) In the design of reinforced concrete structures, the composite of concrete and rebars is modelled as homogeneous material with the concrete expected to crack under tensile loads. It is acceptable to assume concrete sections as uncracked for calculational purposes. The assumption of uncracked concrete neglects both the expected cracks and the stiffness of reinforcing bars which are compensating



effects in the calculation of stiffness. Also, a reduced stiffness would reduce moments and forces due to settlement, therefore, reducing some conservatism from the structural analyses.

In conclusion, we find the design practice of neglecting the cracks in an analysis of the reinforced concrete structure is acceptable. Note that extensive crack evaluation efforts have been carried out by the applicant and their consultants and by the staff and our consultants, to determine the effects of cracks on the structure.

Part (b)

The direct use of settlement data can give results which can be used to develop indications of the state of stress in the structure. The applicant used what they considered the best practical approach to determine the effects of the measured displacements on the structure, based on the available number of measured points and on the accuracy of the measurements.

The DGB is a stiff structure. The characterization of the boundary conditions used in the analyses should be consistent with that of a stiff structure; namely, linear. Also, settlement data has an inaccuracy inherent in the readings. The applicant's engineers claimed to have an accuracy no better than 1/8". Bending moments are proportional to the second derivative of displacement with respect to length and shear is proportional to the third derivative of displacement with respect to length. A mathematical error analysis shows that the accuracy diminishes with subsequent differentiation. Therefore, the accuracy of the moments and shears will be unreliable if the raw settlement data is used. Structural engineering judgment must be exercised in the formulation of the models and in the evaluation of the results.

The applicant performed many of the analyses to represent various stages of construction, including a completed model, a 40-year life-model and a model using no soil support in an area where we could not rely on the competence of the soil.

Attempts to directly use the raw settlement data resulted in anomalies such as tension in the soil and moments and forces in the structure that cannot be justified by prudent engineering judgment, analyses, and observations of the structure.

In conclusion we state that the use of the straight line or other representation using the available settlement data cannot produce credible results. Therefore, the staff did develop a conservative estimate of the state of stress of the structure based on the crack-evaluation and added these results to the stress levels for the environmental loads as per code requirements. However, we like to point out that several loads (DL, LL, T) were added twice. Also, the controlling load combination is the one with the tornado load. The applicant did not account for venting of the structure in their analysis, but the drawings and site visits indicated that considerable venting is provided. We like to point out that these two factors add a great deal of conservatism to the results. In addition, the effects of future settlement was considered in the applicant analysis, but the staff will rely on the monitoring program.

Part (c) The fact that settlement took place over a period of time was accounted for in the applicant's and in NSWC's analyses. Settlements that took place prior to the completion of construction has less effect on the final stresses in the structure, for the following reasons:

- a. The partially constructed structure is less stiff and, therefore, moments and forces were minimized
- b. reinforced concrete that had not yet been installed could not be subjected to stresses resulting from previous settlement. We, therefore, find that the time dependent effect was used to our satisfaction.

Part (d) We recommend contacting W. G. Corley and request his direct comments to R. Landsman's in First Concern Part (d).

*Was this done?*

Part (e) F. Schauer did make the statement identified by R. Landsman during the ASLB hearing of December 10, 1982 (p. 11149). However, we suggest that R. Landsman read the cross-examination by the ASLB on page 11150 of the December 10, 1983 hearing to fully understand the staff position as stated by F. Schauer.

The answers provided on that page of the transcripts states that one cannot fully rely on all of the analyses, and that engineering judgment needs to be exercised.

### Second Concern

Part (a) The summary report of the NSWC analyses was entered into evidence at the ASLB, December 10, 1982, hearing. It was discussed in detail by J. Matra and commented on by F. Rinaldi, G. Harstead, and F. Schauer. In summary, that

report stated the following points:

1. The behavior of this structure as shown by the results of the analyses is inconsistent with respect to the actual observations in the structure as far as crack locations. (Not for duct bank impingement consideration).
2. Analyses of the partial structure, including duct impingement, resulted in very high stresses in the walls at the duct banks. With these stresses over twenty times yield, a great possibility of cracks in these areas existed. A comparison between the crack mapping survey at this time of construction (3/78 to 1/79) and the analyses are in good agreement as far as the location of structural cracks in the area of the duct banks are concerned. However, the analyses show that other areas of the DGB walls still have high stresses and in probability should also be cracked. But no cracks were observed in these areas.
3. In all cases where the duct banks have been released, the measured or predicted settlement values imposed on the analytical models resulted in very high stresses in areas where no cracks now exist. Thus, indicating that these settlement values as such were not seen by this structure.
4. Imposing the measured settlement values on a partially completed model, and then considering these values as part of the total settlement values for the completed structure, without considering the following effects:
  - (a) redistribution of loads once yield is reached,
  - (b) the relaxation effects,
  - (c) the accuracy of the measured data, and
  - (d) the location of the measured settlement value relative to the footings where the actual displaced values were input are discussed, but not actually input into the analysis,

can and does lead to large errors. Thus, this structure will never undergo the differential settlements as predicted nor the patterns of settlement indicated in the measured and or predicted settlements.

Also, as indicated in the reply to First Concern Part (b), the results indicate tension in the soil and moments and forces in the structure that cannot be accounted for using



sound engineering practice.

The analyses indicated that the direct use of the limited number of actual measured settlement data in the engineering analyses cannot be used without proper structural engineering judgment. The analyses were used in selecting a crack monitoring point for the service life of the DGB (a location of high stress as per these analyses, but having no major cracks was selected).

Part (b) The elastic analyses performed by the applicant give correct and conservative indications of stress for non-settlement loads. This is concluded after having reviewed the structural model, the analyses and the results. If an elastic analysis shows a region of high bending moment such that reinforcing bar stresses exceed their yield stress, the section may then be considered plastic; i.e., increasing rotation will not increase moments or stresses. However, there is no indication of yielding rebars or spalling of concrete which would indicate that a portion of the structure has become plastic. In fact, the formation of plastic sections in a structure mitigates the secondary stress effects of conditions such as differential settlement. To state that "supposed areas of high stress, where cracks are not located, may not exist due to redistribution of loads," is inconsistent with the mechanism of redistribution of stresses.

Part (c) The claim that F. Rinaldi stated, "that the actual settlement values could not be relied upon to determine if the DGB meets the regulatory requirements" is not complete. The additional testimony clearly states that the applicant's analyses using linear settlement data were not fully relied upon in our evaluation. This is stated on pages 11084 - 11087 of the ASLB hearing transcripts, dated December 10, 1982. The staff performed an additional crack evaluation as stated in our written testimony presented on the pages following page 11086 of the above mentioned ASLB hearings. All stress levels were below code allowable. Therefore, we found the concrete cracking levels in the DGB, as reported by the applicant, acceptable. The proposed crack monitoring will provide controls over potential future crack-patterns.

### Third Concern

The evaluation of cracks as performed by the Staff is not a structural analysis, but rather a method of estimating upper bound stresses in the rebars of an existing reinforced concrete structure. These values were used as conservative values for stress due to differential settlement, shrinkage and other secondary effects. These stresses were



conservatively added to total stresses developed by the applicant.

The structural analyses of the DGB were performed by the applicant considering all load combinations as documented in their report, "Structural Stresses Induced by Differential Settlement of the DGB."

The results are documented in the additional written testimony. See transcripts for the ASLB hearing of December 10, 1982.

The DGB is not a complex structure, instead, it is a simple box-like structure. Also, all reinforced concrete structures have cracks and we disagree with the statement that "there is no practical method available today to analyze a complex structure with cracks in it." Note that the applicant's structural consultants and our structural staff and their consultants have performed several evaluations of the DGB without finding any unresolved concerns.

#### Fourth Concern

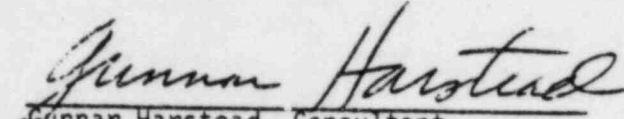
The DGB was not accepted by the staff solely by relying on a crack monitoring program. On the contrary, the acceptance was based upon reviews of the analyses and designs prepared by the applicant as well as independent calculations. Furthermore, the stresses caused by settlements are secondary stresses. Secondary stresses are defined as those stresses which can exist in a structural material which do not impair that capability of the structural material to carry primary stresses, provided the secondary stresses do not cause rupture or gross distortions of the structural material. From a variety of evaluations, the indications are that the stresses in the reinforcing bars are well below yield and far from rupture. The compressive stresses in the concrete are very low. There are no indications of gross distortions of the structure. Therefore, the cracks that have occurred merely indicate that the reinforcing bars will carry imposed tensile forces while imposed compressive forces will cause the cracks to close. While there are no expectations of rupture or gross distortions in the future, a crack monitoring program has been established to provide engineers with information to assess the condition of the structure, as a prudent measure.

The criteria for the monitoring program is identified as ASLB exhibit #29. It contains specific requirements for Alert and Action levels for the monitoring of single and collective crack widths.

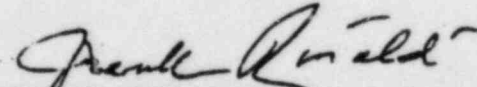
Reply to Summary:

It is surprising that, with all of the data and information available on the subject of DGB there still exists such a misunderstanding. Beyond this response we would respectfully direct R. Landsman to evaluate all of the information currently available in the field of structural analysis and specifically to that available in the docket of the Midland project.

It is our conclusion that all analyses, designs, crack mapping and evaluations and the monitoring program are adequate to establish the structural integrity of the DGB. Only unexpected results during the monitoring program would necessitate a reassessment of the DGB.

  
Gunnar Harstead, Consultant  
Structural & Geotechnical  
Engineering Branch

  
John Matra, Consultant  
Structural & Geotechnical  
Engineering Branch

  
Frank Rinaldi, Structural Engineer  
Midland Project,  
Structural & Geotechnical  
Engineering Branch



**Consumers  
Power  
Company**

Dean L Quamme  
Site Manager  
Midland Project

Midland Project: PO Box 1963, Midland, MI 48640 • (517) 831-8650

December 30, 1983

Mr S W Baranow  
Stone & Webster  
P O Box 1963  
Midland, MI 48640

PRINCIPAL STAFF		
RA	<i>DLQ</i>	DPRP
D/RA		DE
A/RA		DRMSP
RC	<i>DLQ</i>	DRMA
PAO		SCS ✓
SGA		ML
ENF		File <i>DLQ</i>

*orig + 3*

MIDLAND ENERGY CENTER GWO 7020  
PCR/PCN STOP WORK ORDERS  
File: B1.1.7, 0460.3 UFI: 99\*08, 73\* Serial: GSM-0718

Per my staff's discussions on December 29, 1983, all of the Civil Stations are ready to be audited by Stone & Webster Michigan, Inc. for vendor drawings, design drawings, specifications and P&ID's.

December 29, 1983 is the frozen date for the issued and published civil registers to be audited.

If you have any questions regarding the contents of the above, please don't hesitate to contact me directly.

*DLQ/Work for DL Quamme.*

DLQ/DIV/klw

- CC: J J Harrison, NRC Region III
- R J Cook, NRC Site
- J G Keppler, NRC Region III
- N I Reichel, MEC
- B H Beck, MEC
- D D Jonsson, MEC
- T A Spelman, MEC

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JAN 6 1984



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION III  
799 ROOSEVELT ROAD  
GLEN ELLYN, ILLINOIS 60137

*Warnick*

SEP 30 1983

Docket No. 50-329  
Docket No. 50-330

Consumers Power Company  
ATTN: Mr. James W. Cook  
Vice President  
Midland Project  
1945 West Parnall Road  
Jackson, MI 49201

Gentlemen:

This refers to the meeting conducted on August 25, 1983, by Messrs. R. Warnick, S. Lewis, members of the Region III Midland Section, Mr. T. Novak, of NRR, Mr. J. Stone of IE, and Mr. D. Kelly and other members of the Stone and Webster (S&W) Engineering Company to discuss the independent third party overview program, Construction Implementation Overview (CIO), for the Midland Nuclear Plant.

The purpose of this meeting was to better understand the methodology being utilized by S&W to implement the CIO. The enclosed copy of our report identifies topics discussed during this meeting. This meeting was open to members of the public.

In accordance with 10 CFR 2.790(a), a copy of this letter and the enclosure(s) will be placed in the NRC Public Document Room unless you notify this office, by telephone, within ten days of the date of this letter and submit written application to withhold information contained therein within thirty days of the date of this letter. Such application must be consistent with the re-

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SEP 30 1983

quirements of 2.790(b)(1). If we do not hear from you in this regard within the specified periods noted above, a copy of this letter and the enclosed inspection report will be placed in the Public Document Room.

Sincerely,

"Original signed by R. F. Warnick"

R. F. Warnick, Director  
Office of Special Cases

Enclosure: Inspection Report  
No. 50-329/83-16(OSC), and  
No. 50-330/83-17(OSC)

cc w/encl:

- DMB/Document Control Desk (RIDS)
- Resident Inspector, RIII
- The Honorable Charles Bechhoefer, ASLB
- The Honorable Jerry Harbour, ASLB
- The Honorable Frederick P. Cowan, ASLB
- The Honorable Ralph S. Decker, ASLB
- William Paton, ELD
- Michael Miller
- Ronald Callen, Michigan  
Public Service Commission
- Myron M. Cherry
- Barbara Stamiris
- Mary Sinclair
- Wendell Marshall
- Colonel Steve J. Gadler (P.E.)
- Howard Levin (TERA)
- Billie P. Garde, Government  
Accountability Project
- Lynne Bernabei, Government  
Accountability Project

RIII  
Gardner/lr  
09/16/83

RIII  
Harrison  
9/29/83

RIII  
R. F. W.  
Warnick  
9/29/83

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-329/83-16(OSC); 50-330/83-17(OSC)

Docket No. 50-329; 50-330

License No. CPPR-81; CPPR-82

Licensee: Consumers Power Company  
1945 West Parnall Road  
Jackson, MI 49201

Facility Name: Midland Plant, Units 1 and 2

Meeting At: Quality Inn, Midland, MI;

Meeting Conducted: August 25, 1983

Report Prepared By: *R.N. Gardner*  
R. N. Gardner, Project  
Inspector, Midland

9/28/83  
(Date)

Approved By: *J.J. Harrison*  
J. J. Harrison, Chief  
Section 2, Midland

9/29/83  
(Date)

Meeting Summary

Meeting held on August 25, 1983 (Report No. 50-329/83-16(OSC);  
50-330/83-17(OSC))

Subject: Consumers Power Company proposed third party overview; Stone and Webster's Construction Implementation Overview Program .

Results: During the meeting between the NRC and S&W, the S&W staff presented the methodology of the Construction Implementation Overview (CIO) Program. Following the presentation, the NRC staff asked questions and made comments with S&W providing responses. At the conclusion of the meeting, members of the public were given the opportunity to also ask questions and make comments.

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## DETAILS

### 1. Persons in Attendance

#### Stone and Webster

D. Kelly, Corporate Manager, Quality Assurance  
R. Burns, Assistant Corporate Manager, Quality Assurance  
P. Amaruso, Project Manager  
S. Baranow, Program Manager  
F. Bearham, Program Evaluation Supervisor  
J. Thompson, Physical Verification Supervisor

#### U.S. Nuclear Regulatory Commission

R. Warnick, Director, Office of Special Cases  
R. Novak, Assistant Director for Licensing, Division of Licensing, NRR  
S. Lewis, Region III Counsel  
R. Cook, Senior Resident Inspector  
R. Gardner, Project Inspector  
J. Harrison, Chief, Section 2, Midland  
J. Stone, Chief, Construction Program/Construction Appraisal Team Section  
R. Landsman, Reactor Inspector

### 2. Meeting

The meeting between the NRC and Stone and Webster (S&W) included a presentation by the S&W staff on the Construction Implementation Overview (CIO). Subjects covered by the presentation included:

- . Team Experience
- . Scope
- . Organization
- . Document Tree
- . Physical Verification
- . Program Evaluation
- . Team Monitoring
- . Typical Areas to be Closely Monitored
- . Nonconformances
- . Sampling Plans
- . Staffing Plans

During and following the presentation, the NRC staff presented questions and comments to the S&W staff. Since a representative of the Government Accountability Project (GAP) was unable to attend the meeting, GAP telephoned their questions to Region III and Region III included them with the NRC questions. A copy of the questions is attached. At the conclusion of this meeting, members of the public were given the opportunity to provide comments and ask questions.

Subsequent to this meeting on August 30, 1983, S&W submitted copies of the presentation materials to the NRC, and on September 9, 1983, S&W forwarded a summary of the presentation to the NRC (copies attached).

Attachments:

1. NRC questions for the August 25, 1983 Meeting with S&W
2. S&W letter to NRC dated August 30, 1983
3. S&W letter to NRC dated September 9, 1983



ATTACHMENT 1

NRC, REGION III QUESTIONS  
FOR AUGUST 25, 1983, MEETING WITH S&W

Questions:

1. Methodology of verification (experience, problem, history, etc.)
  - a. Define
  - b. Verification checklist, will any independent inspection or hardware testing be performed (actual dimensions, etc.)?
  - c. Verification - a paper review or observation, or both?
  - d. Should a problem be discovered on items being verified, how will this be identified - QCI 15.01 NIR?
  - e. Should a problem be discovered on a PQCI that is or has been utilized, how will this be identified - NIR?
  - f. How would a problem with an S&W checklist be handled for after the fact usage - NIR?
  - g. Will all problems found by S&W be identified on QCIR's, NIR's?
  - h. Will these problems be identified immediately or following consultation with CPCo/Bechtel?
  - i. Documentation to support? How?
  - j. How will attribute checklist revision controls be assured to be consonant with PQCI revision control?
2. Percentage of Work to be Reviewed
  - a. What will the control for percentage of review basis be?
    - 100%
    - Sampling Plan
    - Provisions for tightening
    - Reduction
    - Confidence levels

b. Overview control will be by system or areas (module)

- Phase I

- Phase II

c. Note:

- Be able to justify what was done and why - confidence level

- Be able to discuss at monthly meetings

3. Project Quality Control Instructions

a. Is an attribute checklist being prepared for each PQCI?

b. If not, and a combination of disciplines are being utilized, what will be the basis for control?

c. A PQCI covers the inspection aspect only, what about ongoing work activities? What will be used for control (e.g., audits and surveillances)?

4. Interaction with CPCo/Bechtel

a. Contact points/protocol, who? Any problems?

b. Information access, problems?

c. Accessibility of S&W generated data - (PDR vs. files)  
Accessible to NRC?

For example:

CIO reports are in the PDR files, what about checklist, audit reports, QCIR's, NIR's?

5. Management Reviews

a. Details of findings/reports, very brief - more detail?

b. Closeout items; how is this controlled?

c. Will a tracking system be utilized?

d. Scope change of program for management review, will re-reviews occur? Should a system problem warrant such?

6. Independent Inspections

a. Will S&W perform any independent inspections?

7. Will S&W QA (Boston) audit the CIO effort?  
Will audit findings be available at the site for the NRC?
8. Explain difference between -
  - . Evaluation
  - . Verification
9. S&W QA Plan excludes audits from scope, why?
10. Procedures for Sampling
  - . What is the reliability/confidence level?
  - . Will bias sampling be utilized?
11. Does S&W plan utilize a procedure for trending for both positive and negative program effects as a guide for overview effort?
12. Comment - It is key that a proper presentation with supporting data and decision basis be presented at each monthly meeting and in the weekly reports.
13. The numbers of personnel involved in the S&W CIO are of concern to the staff and to the public. Please explain your staffing plan.
14. Should you choose to sample, how will the population be defined that the sample is to be drawn from? (That is, by team, by system, by area, by PQCI, or by IR, or by a combination of all?)



**STONE & WEBSTER MICHIGAN, INC.**

P.O. BOX 2325, BOSTON, MASSACHUSETTS 02107

Mr. J. G. Keppler  
Administrator, Region III  
U. S. Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, IL 60137

August 30, 1983

THIRD PARTY CONSTRUCTION IMPLEMENTATION OVERVIEW PROGRAM  
MIDLAND NUCLEAR COGENERATION PLANT

This letter confirms commitments made by Stone & Webster Michigan, Inc. (Stone & Webster) to NRC at the Public Meeting on August 25, 1983, at Midland, Michigan in reference to the Construction Implementation Overview Program (CIO). As stated in the meeting, Stone & Webster will:

1. Implement the CIO Program in a manner consistent with NRC regulations. Program details are described in program documents previously provided to NRC and the attached copies of graphics used in the Stone & Webster presentation on August 25, 1983.
2. Revise the Project Quality Assurance Plan to address Stone & Webster audits of the CIO Program. An initial audit will be conducted within 90 days of NRC approval of the CIO Program followed by audits on a twice a year basis. This audit schedule will be increased if activities warrant.
3. Revise the Project Quality Assurance Plan to address Stone & Webster trend analysis. This trending will be conducted to ensure that sampling levels and changes thereto are consistent with the performance of Consumers Power Company.

We trust that these commitments are in agreement with your understanding of what was stated at the Public Meeting, and meet with your approval.

P. A. Wild  
Vice President

Enclosure

cc: JWCook-CPCo

SEP 2 1983

8310170466



## **TEAM EXPERIENCE**

### **S. BARANOW**

#### **PROGRAM MANAGER**

**15 YEARS NUCLEAR EXPERIENCE**

**10 YEARS NUCLEAR SITE EXPERIENCE**

**5 DIFFERENT SITES**

### **F. BEARHAM**

#### **SUPERVISOR OF PROGRAM EVALUATION**

**25 YEARS OF NUCLEAR EXPERIENCE**

**13 YEARS NUCLEAR SITE EXPERIENCE**

**8 DIFFERENT SITES**

### **J. THOMPSON**

#### **SUPERINTENDENT OF PHYSICAL VERIFICATION**

**14 YEARS NUCLEAR EXPERIENCE**

**12 YEARS NUCLEAR SITE EXPERIENCE**

**4 DIFFERENT SITES**

11-010

11-010

# **CONSTRUCTION IMPLEMENTATION OVERVIEW**

**PROGRAM - CIO**

11-010

# **BACKGROUND**

**CONSTRUCTION COMPLETION  
PROGRAM-CCP**

**STONE & WEBSTER PROPOSED AS  
INDEPENDENT THIRD PARTY**

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# SCOPE

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## INDEPENDENTLY ASSESS IMPLEMENTATION OF CCP

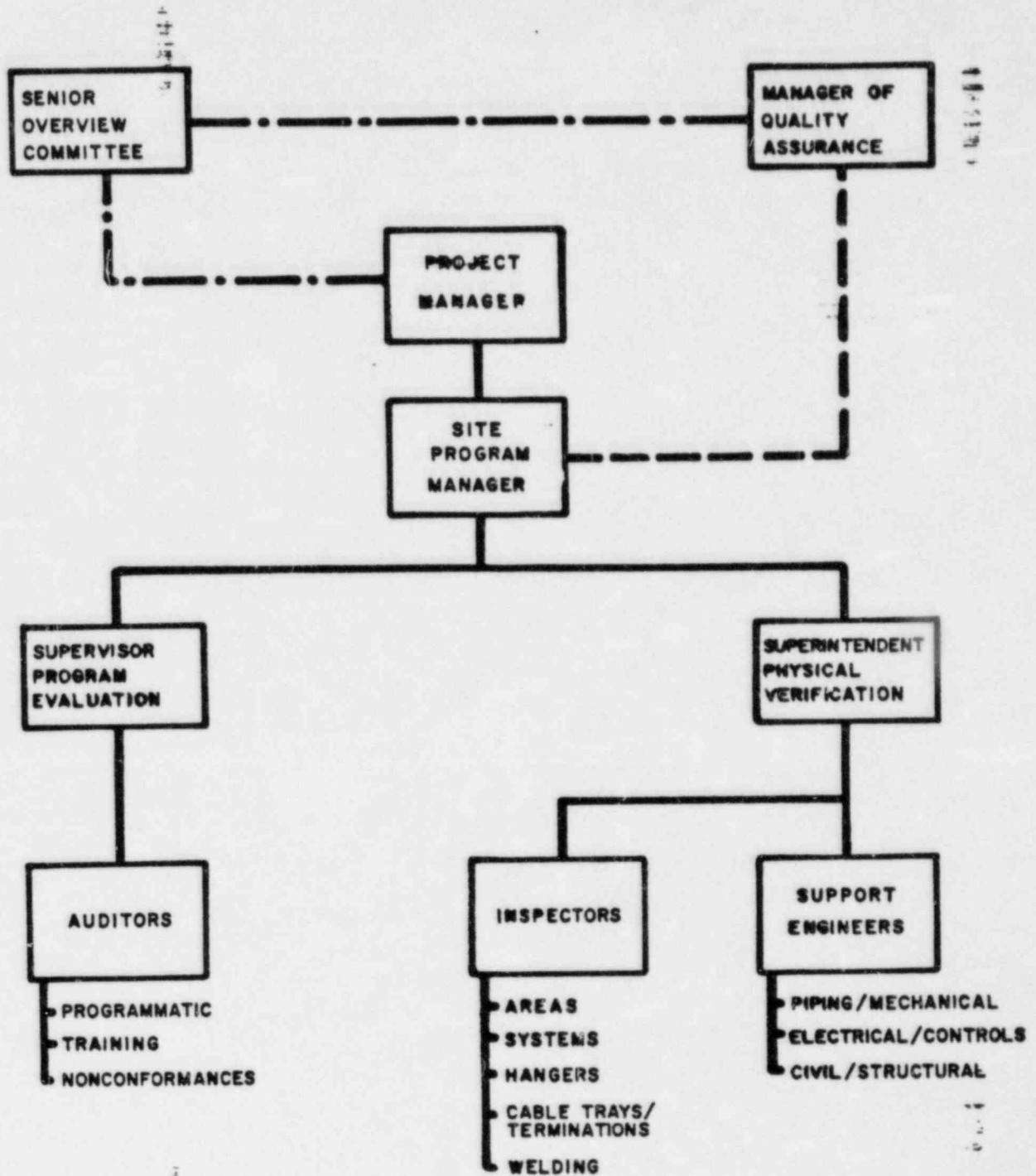
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### ACTIVITIES:

- ✓ PHASE I PLANNING
- ✓ MANAGEMENT REVIEWS
- ✓ INSTALLATION AND INSPECTION STATUS
- ✓ VERIFICATION OF COMPLETED  
INSPECTIONS (QVP)
- ✓ HVAC/ZACK
- ✓ NSSS
- ✓ SPATIAL SYSTEM INTERACTION  
PROGRAM (SSIP)
- ✓ PHASE II

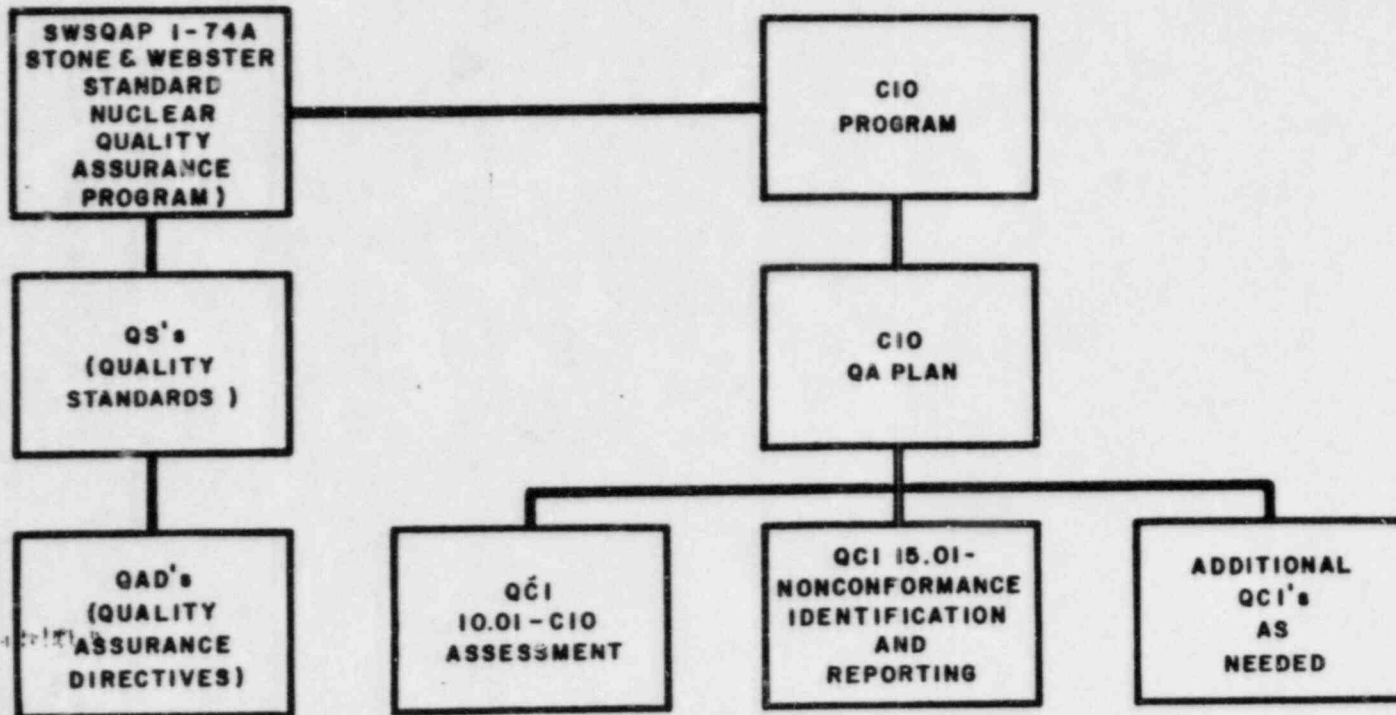


# CIO ORGANIZATION



- - - - - TECHNICAL DIRECTION  
 - . - . - OVERVIEW

# DOCUMENT TREE



# **SWEC CIO PROGRAM**

- **OBJECTIVE IS TO ASSESS QVP AND CCP RESULTS TO ESTABLISH THE PROGRAM'S EFFECTIVENESS.**
- **KNOWN STATISTICAL METHODS WILL BE USED TO ESTABLISH THE NUMBER OF INSPECTIONS/ASSESSMENTS.**
- **TECHNICAL EVALUATIONS WILL BE MADE TO ESTABLISH THE SIGNIFICANCE OF NONCOMPLYING CONDITIONS.**
- **CORRECTIVE MEASURES WILL BE REQUIRED IF CPCo PROGRAMS PERSONNEL OR IMPLEMENTATION ARE TURNING OVER LOTS WHICH CONTAIN SIGNIFICANT DEFICIENCIES.**

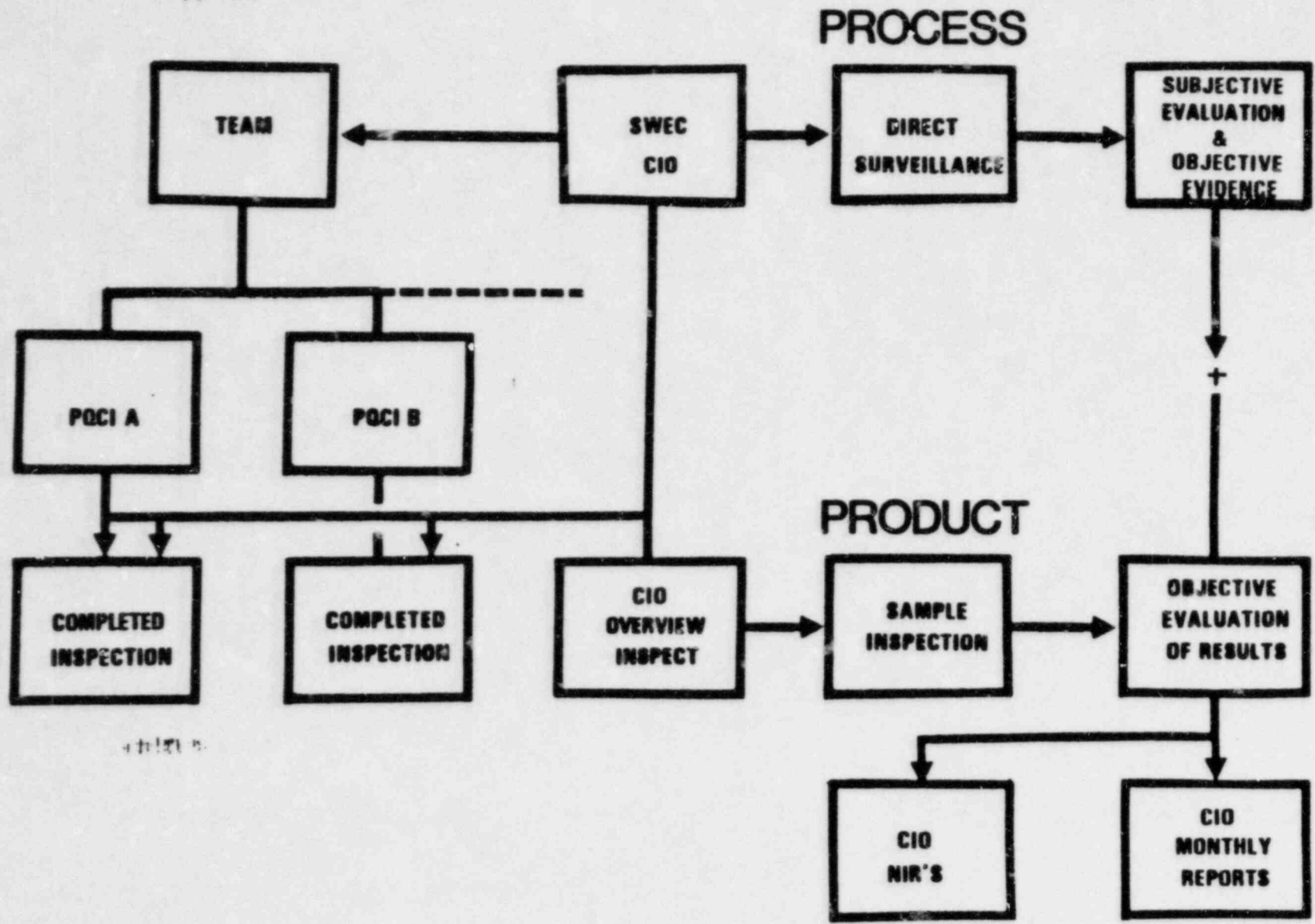
**ASSESSMENT MATRIX  
FOR  
PHYSICAL VERIFICATION GROUP**

<b>ASSESSMENT ELEMENTS</b>	<b>REVIEW OF PQC's</b>	<b>REVIEW OF SUPPORTING DOCUMENTS</b>	<b>CHECKLIST DEVELOPMENT</b>	<b>EVALUATION</b>	<b>VERIFICATION</b>
<b>1. STATUS</b>					
<b>INSTALLATION</b>		★	★	★	★
<b>INSPECTION</b>	★	★	★	★	★
<b>2. QUALITY VERIFICATION PROGRAM</b>					
<b>ACCESSIBLE</b>	★	★	★		★
<b>INACCESSIBLE</b>	★	★	★	★	
<b>3. PHASE II</b>	★	★	★	★	★



# ASSESSMENT MATRIX FOR PROGRAM EVALUATION GROUP

<b>ASSESSMENT ELEMENTS</b>	<b>REVIEW OF IMPLEMENTING DOCUMENTS PROCEDURES</b>	<b>CHECKLIST DEVELOPMENT</b>	<b>EVALUATION</b>	<b>VERIFICATION</b>
<b>1. PROGRAMMATIC</b>				
MANAGEMENT REVIEW MEETINGS	★	★	★	
CCP ORGANIZATION	★	★	★	
MPOAD ORGANIZATION	★	★	★	
INSPECTION PLANS	★	★	★	
NRC AND CIO HOLD POINTS		★		★
COMMITMENTS TO NRC		★		★
<b>2. PROCEDURES</b>				
CONSTRUCTION PROCEDURES	★	★	★	★
MPOAD PROCEDURES	★	★	★	★
<b>3. TRAINING</b>				
CCP TEAMS	★	★	★	
MPOAD INSPECTORS	★	★	★	
CONSTRUCTION CRAFT	★	★	★	
<b>4. RESOLUTION OF NONCONFORMANCES</b>				
	★		★	★



## **TEAM MONITORING**

### **INITIAL**

- ▶ FULL TIME CIO MONITOR ASSIGNED TO OVERVIEW EACH TEAM'S ACTIVITIES AND ALL INSPECTIONS WITHIN THE PERVIEW OF THE TEAM.
- ▶ A STATISTICAL SAMPLE OF MPQAD INSPECTIONS WILL BE TAKEN AND EVALUATED BY INDEPENDENT CIO INSPECTION.

### **SUBSEQUENT**

- ▶ IF TEAM PERFORMANCE AND INSPECTION RESULTS ARE DEEMED SATISFACTORY - FULL TIME CIO MONITORING WILL BE ADJUSTED DOWNWARD. INDEPENDENT SAMPLING INSPECTIONS WILL BE MAINTAINED.
- ▶ IF TEAM PERFORMANCE OR INDEPENDENT INSPECTION RESULTS REVEAL UNSATISFACTORY, CPCO CCP/QVP FULL TIME CIO MONITORING WILL BE MAINTAINED.

11-11-11

1 1 11

## **AREAS TO BE CLOSELY MONITORED**

**TRAINING**

**WELDER QUALIFICATION**

**PRODUCTION WELDING**

**DOCUMENT CHANGE CONTROL**

**CABLE PULLING**

**CONTROL OF PURCHASE MATERIAL**

**QA RECORDS**

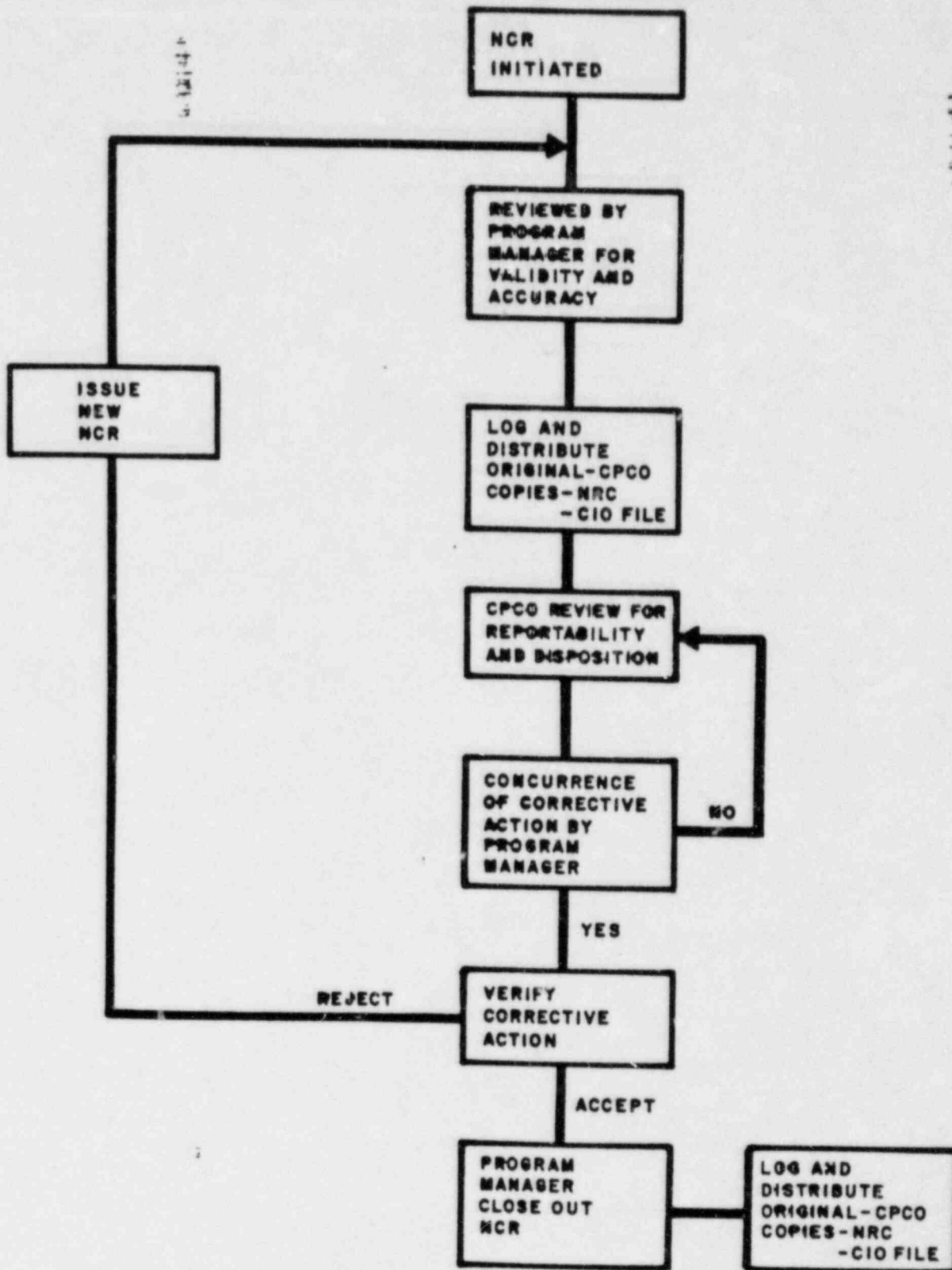
**STORAGE / PREVENTIVE MAINTENANCE**

**CORRECTIVE ACTION FOR NONCONFORMANCE**

**TRENDING & ROOT CAUSES**

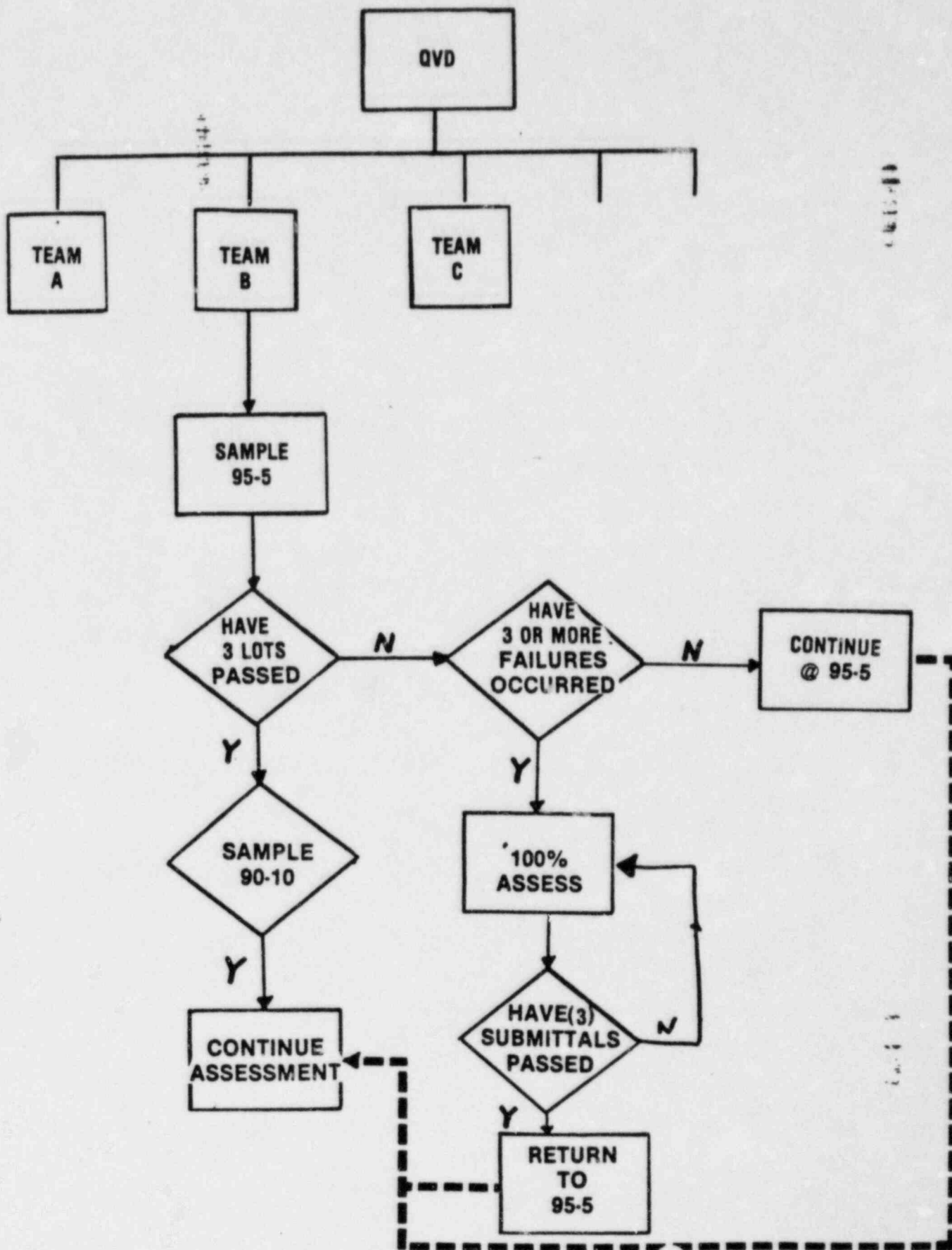


# FLOW CHART FOR NONCONFORMANCE REPORTS



# **SAMPLING OVERVIEW**

- **SWEC WILL USE MIL-STD-105D AS THE BASIC STATISTICAL METHOD.**
- **COMPLIANCE BASELINE WILL BE ESTABLISHED AS FOLLOWS:**
  - **EACH QVP TEAM'S WORK WILL BE SAMPLED USING 95-5 CONFIDENCE FOR 1ST (3) SUBMITTALS**
  - **IF ALL PASS THEN SAMPLING WILL BE REDUCED TO 90-10 CONFIDENCE**
  - **IF A TEAM HAS SINGLE FAILURE BASED ON SIGNIFICANT ATTRIBUTE THEN RETURN TO 95-5. THIS WILL CONTINUE UNTIL (3) CONSECUTIVE PASSES ARE ACHIEVED.**
- **ANY TEAM SUBMITTING (3) CONSECUTIVE FAILED LOTS WILL BE SUBJECT TO RETRAINING AND 100% INSPECTION UNTIL IT IS JUDGED SAFE TO RETURN TO SAMPLING - NORMALLY THIS WILL BE (3) CONSECUTIVE PASSED LOTS WITH NO SIGNIFICANT CONDITIONS OBSERVED.**



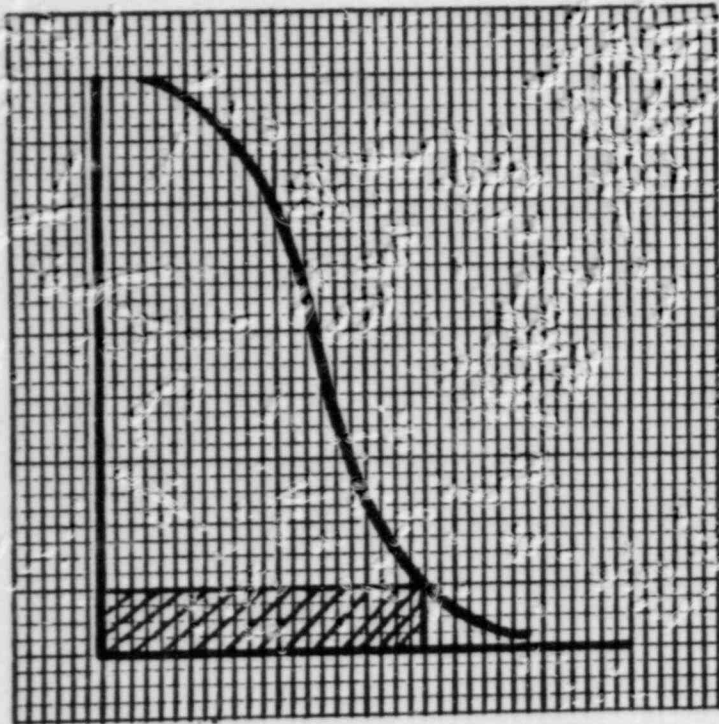
## A COMPARISON BETWEEN SAMPLE SIZES

MS-105D LOT SIZE (N)	SAMPLE SIZE (n)		
	@ 95-5	@ 90-10	@ 20%*
2 to 8	ALL	ALL	1 / 2
9 to 15	ALL	ALL	2 / 3
16 to 25	ALL	All to 20	4 / 5
26 to 50	ALL	20	6 / 10
51 to 90	50	20	11 / 18
91 to 150	50	20	19 / 30
151 to 280	50	32	21 / 56
281 to 500	50	50	57 / 100
501 to 1200	80	80	101 / 240
1201 to 3200	125	125	241 / 640
3201 to 10,000	200	200	641 / 2000

\*Values rounded up to the nearest integer for greater confidence



## LIMITING QUALITY



- Designed for "isolated" lot vs. continuous sampling
- Provides protection by "fixing" risk of accepting "bad products"
- Provides greater discrimination by designating AQL to avoid greater than allowable proportion defective

# **SAMPLING OVERVIEW**

- **SWEC APPROACH WILL ENSURE**
  - **OBJECTIVE ASSESSMENT**
  - **REPORTS TO NRC, CPCo, PUBLIC**
  - **CORRECTIVE ACTION**
- **PERFORMANCE WILL BE REWARDED AND ENCOURAGED BY SAMPLE REDUCTIONS, WHEN JUSTIFIED.**

## **SAMPLING OVERVIEW**

---

- ▶ **UPON COMPLETION OF CIO, SWEC WILL STATE:**
  - ▶ **THAT CPCO's, QVP AND CCP HAVE BEEN ASSESSED AND FOUND ACCEPTABLE.**
  - ▶ **THAT ALL SIGNIFICANT CONDITIONS ADVERSE TO QUALITY HAVE BEEN IDENTIFIED AND RESOLVED.**

**A CONCLUSION THAT MIDLAND STATION MEETS OR EXCEEDS ALL APPLICABLE REGULATIONS, CODES AND STANDARDS.**



STONE & WEBSTER MICHIGAN, INC.

P.O. BOX 2325, BOSTON, MASSACHUSETTS 02107

Mr. J. W. Keppler  
Administrator, Region III  
U. S. Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, IL 60137

September 9, 1983

THIRD PARTY CONSTRUCTION IMPLEMENTATION OVERVIEW PROGRAM  
MIDLAND NUCLEAR COGENERATION PLANT

Stone & Webster Michigan, Inc. (Stone & Webster) letter of August 30, 1983, confirmed commitments made to the NRC at the Public Meeting on August 25, 1983, and forwarded copies of the graphics used in the Stone & Webster presentation. This letter forwards a summary of the presentation as requested by Mr. J. J. Harrison on September 6, 1983.

P. A. Wild  
Vice President

APA:efb

Enclosure

cc: JWCook-CPCo.

~~8309150255~~  
SEP 12 1983



SUMMARY OF PRESENTATION TO NRC ON AUGUST 25, 1983  
CONSTRUCTION IMPLEMENTATION OVERVIEW (CIO) PROGRAM

Background to CIO

The Construction Completion Program (CCP) has been developed by Consumers Power Company to control the construction and quality activities needed to complete the Midland Nuclear Power Station. One feature of the CCP is the use of an independent third party to assess the CCP's effectiveness in evaluating existing systems, structures, and components and efforts to complete unfinished work.

Consumers Power Company has proposed Stone & Webster as the third party. This selection was based on Stone & Webster's independence with respect to the work to be performed, and on Stone & Webster's experience and technical capabilities to do the job.

Scope of CIO Program

The scope of the CIO Program is to independently assess CCP adequacy. CCP activities presently assigned to the CIO team for assessment are:

- Phase I Planning
- Management Reviews
- Installation and Inspection Status
- Quality Verification Program (QVP)
- Phase II

Activities outside of the CCP, but included in the CIO Program for assessment, are:

- HVAC/ZACK
- NSSS/B&W
- Spatial System Interaction Program (SSIP)

CIO Organization

The CIO Team is made up of two functional groups - the Program Evaluation Group and the Physical Verification Group. The Program Evaluation Group is responsible for assessing compliance with programmatic provisions of the CCP, plans, procedures, commitments, personnel qualifications, training programs, organizational practices, and nonconformances. The Physical Verification Group is responsible for assessing compliance of CCP team, MPQAD, construction, and craft personnel with pertinent procedures and instructions.

The Program Manager is responsible for directing the day-to-day activities of these two groups. The Program Manager receives technical direction from the Stone & Webster Manager of Quality Assurance and resource support from the Project Manager.

A Senior Overview Committee is responsible for monitoring the performance of the CIO Program and providing direction when appropriate. Monitoring will be done by reviewing reports, correspondence, and nonconformances and observing site activities during periodic visits.

#### Experience Level of CIO Team

Key members of the CIO Team have significant experience with the construction of nuclear power stations. The Program Manager has 15 years of nuclear experience with 10 of those years spent at 5 new construction sites. The Supervisor of Program Evaluation has 25 years of nuclear experience with 13 of those years spent at 8 new construction sites. The Superintendent of Physical Verification has 14 years of nuclear experience with 12 of those years spent at 4 new construction sites.

#### Supporting Documents for CIO Program

The Stone & Webster Corporate Quality Assurance Program is described in the NRC approved topical report, SWSQAP 1-74A, "Stone & Webster Standard Nuclear Quality Assurance Program". This base document is supplemented by volumes of Quality Standards and Quality Assurance Directives. Provisions of these documents that are applicable to a project and special instructions that are needed to accomplish unique work items, are covered by project procedures and instructions. Corporate generic procedures and instructions are available for use or as models for project document development.

For the CIO effort, four project procedures have been approved by the Corporate Manager of Quality Assurance to supplement Corporate documents in carrying out the assessment of the CCP. These procedures are the Third Party Construction Implementation Overview Program, which establishes the CIO Program; the Project Quality Assurance Plan, which describes quality assurance provisions for the project; QCI 10.01, which describes the procedure for conducting the assessment; and QCI 15.01, which describes the procedure for processing Nonconformance Identification Reports. Additional project procedures will be issued as needed to cover unique items that arise during the CIO effort.

#### CIO Methodology

The methodology to be used in assessing the installation and inspection status and Quality Verification Program (QVP) of the CCP consists of (1) surveying the activities of each CCP team and all inspections within the purview of each team to evaluate the process being used to carry out the CCP and then, (2) taking a statistical sample of MPQAD inspections and evaluating the results by conducting independent inspections with CIO team members to assess the final product. A full time monitor from the CIO team will be assigned to each CCP team until team performance and inspection results are deemed satisfactory. Full time monitoring might then be adjusted downward, but independent sampling of QVP inspections would continue to ensure that the overall CCP process is being effectively implemented. If independent inspections indicate that problems are developing, full time monitoring will be restored.

Sampling of QVP inspections will be conducted using MIL-STD-105D as the basic statistical method. MIL-STD-105D was selected because it is nationally recognized. Sample lots will be based on the number of inspection attributes completed during a period of time within a CCP team's area/module. Attributes selected for inspection will be assembled to cover the various commodities and inspectors involved and previously identified weaknesses; such as, QA records, control of purchase material, design change control, production welding, document change control, cable pulling, training, etc. Sample size will be based on a 95-5 confidence level. Inspection results, including non-conformances, will be collected, analyzed, and trended to determine the appropriateness of inspection levels and will be used to evaluate changes in those levels.

One of the objectives of the CIO Program is to assess the ability of MPQAD to identify deficiencies in the plant. Sampling the product from MPQAD inspections will provide a reliable assessment of that effectiveness.

Programmatic and training aspects of the CCP will be assessed by reviewing implementing documents and commitments and then developing checklists for use by CIO team members in verifying compliance by surveillance and document reviews.

Deficiencies identified by CIO team members, and not previously reported by MPQAD, will be documented on Nonconformance Identification Reports. These reports will be sent to Consumers Power Company and the NRC, tracked to ensure that satisfactory corrective action is taken, and summarized on weekly reports and during monthly public meetings.

The methodology to be used by Stone & Webster in carrying out the CIO Program will ensure:

- An objective assessment of the CCP
- Corrective action for problem areas
- Awareness of Consumers Power Company, NRC, and Public about the effectiveness of the CCP through reports and meetings

#### Stone & Webster Corporate Audits

The CIO Program will be audited by the Stone & Webster Quality Assurance Cost & Auditing Division on a regular basis to ensure the adequacy of the CIO Program's procedures, personnel, and implementation.

#### Manning Plan for CIO Team

Nine members of the CIO team are currently on site. These people have been reviewing documents; preparing checklists; and evaluating training, organizational practices, and procedures.

Plans are to have one team member assigned to each CCP team, five auditors to conduct the program evaluation function, one to three support engineers depending on the workload, two group supervisors, and the program manager. Anticipating that some 12 CCP teams will be in operation initially, a team of some 21 people will be required. When the anticipated 23 teams become operational, some 32 people will be required. These are minimum numbers and are based on a single shift work schedule. The situation is a dynamic one. As conditions change and more people are needed to carry out the provisions of the CIO Program, more people will be brought in.

#### Summary

Stone & Webster has designed and constructed a number of nuclear power stations and knows the right way to do the work. The CIO Program will be carried out to ensure that the Midland plant is built in accordance with applicable codes, standards, and regulations.





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION III  
799 ROOSEVELT ROAD  
GLEN ELLYN, ILLINOIS 60137

*Warrick*

SEP 29 1983

Docket No. 50-329  
Docket No. 50-330

Consumers Power Company  
ATTN: Mr. James W. Cook  
Vice President  
Midland Project  
1945 West Parnall Road  
Jackson, MI 49201

Gentlemen:

We have reviewed your proposal to have the Stone and Webster Corporation (S&W) perform the third party independent overview of the Construction Completion Program (CCP). Our evaluation is enclosed.

The staff has considered the qualifications of both the S&W organization and the individuals proposed as team members to conduct the Construction Implementation Overview (CIO) of Consumers Power Company's (CPCo) Construction Completion Program. Inputs to this review included the information supplied by S&W, as set forth in the April 6, 1983, April 11, 1983, and May 19, 1983 submittals, the staff's existing knowledge of S&W performance at other nuclear power plants, and information as to S&W personnel competence.

The CIO program described by S&W in the August 30, 1983, and September 9, 1983, submittals and at the August 25, 1983, meeting has been reviewed by the NRC staff and found to constitute an acceptable third party overview program. The NRC staff has reviewed the CIO activities performed to date and has found this overview to have been adequate.

Based on NRC review of the documentation submitted by CPCo and S&W, followup checks, and consideration of comments by members of the public, we conclude that S&W meets the independence and competence criteria for third party reviewers and that S&W's proposed CIO program is adequate to provide for an assessment of the Construction Completion Program (CCP).

This letter constitutes NRC approval of S&W to perform the CIO.

~~831005034L~~

SEP 29 1983

Should you have any questions regarding this letter please contact Mr. R. F. Warnick of my staff.

Sincerely,

Original signed by  
James G. Keppler

James G. Keppler  
Regional Administrator

Enclosure: As stated

- cc w/encl:
- DMB/Document Control Desk (RIDS)
- Resident Inspector, RIII
- The Honorable Charles Bechhoefer, ASLB
- The Honorable Jerry Harbour, ASLB
- The Honorable Frederick P. Cowan, ASLB
- The Honorable Ralph S. Decker, ASLB
- William Paton, ELD
- Michael Miller
- Ronald Callen, Michigan  
Public Service Commission
- Myron M. Cherry
- Barbara Stamiris
- Mary Sinclair
- Wendell Marshall
- Colonel Steve J. Gadler (P.E.)
- Howard Levin (TERA)
- Billie P. Garde, Government  
Accountability Project
- Lynne Bernabei, Government  
Accountability Project

RIII  
Gardner/lr  
09/27/83

RIII  
Harrison  
9/28/83

RIII  
RFW  
Warnick  
9/27/83

RIII  
Lew  
9/28

RIII  
Davis  
9/29

RIII  
Keppler  
9/29/83

9-28-83  
9/28/83  
9/28/83

STAFF EVALUATION OF CONSUMERS POWER COMPANY  
PROPOSAL TO USE STONE AND WEBSTER MICHIGAN, INC.  
TO CONDUCT THE THIRD PARTY  
CONSTRUCTION IMPLEMENTATION OVERVIEW OF THE  
MIDLAND NUCLEAR PLANT

Purpose and Background

The purpose of this document is to provide an evaluation of the Consumers Power Company's (CPCo) proposal to use Stone and Webster (S&W), Michigan, Inc. to conduct the third party overview of the Construction Completion Program at Midland. Consumers' proposal is documented in their letter of April 6, 1983, in response to the NRC's March 28, 1983, request for additional information. The CPCo commitment to provide for an independent third party Construction Implementation Overview (CIO) has been reviewed and found acceptable. This evaluation provides the basis of the NRC's acceptance of Consumers proposal.

The purpose of the CIO is to provide an independent overview of the Construction Completion Program (CCP) to assure the program is adequate and will be properly implemented. This is to ensure that the construction of the facility can be completed in conformance with the Commission's regulations and the construction permits.

The S&W overview of the CCP will be independent from and supplemental to the normal NRC inspection program. As part of their inspection program, the NRC inspectors will monitor and review the S&W CIO.

The use of S&W as the third party overviewer will provide additional assurance of proper implementation of the quality program. In addition, it will function as a mechanism to allow members of the public and the NRC to regain confidence in the program.

The results of the overview program will be submitted to the Regional Administrator in a weekly report of CCP activities overviewed and any problems identified.

The NRC has required communications between CPCo and S&W to follow a protocol to assure S&W's independence is being maintained and to assure public and NRC knowledge of S&W activities and correspondence. It should be noted that the protocol provides for a monthly meeting, open to the public for observation, to review S&W activities for the month and to discuss problems identified by the overview.

CPCo's Proposed Third Party Reviewer

CPCo has proposed that Stone and Webster perform an independent overview of the Midland project CCP. The NRC staff has considered CPCo's submittal of April 6, 1983, and responses to Region III questions, public comments, and the clarification of submitted comments and additional comments received at

public meetings held in Midland, Michigan on February 8, 1983, and August 11, 1983. In addition, the staff conducted numerous meetings and telephone conversations with representatives of the Government Accountability Project (GAP) and the intervenors. In considering CPCo's proposal, the staff has used as guidance the letter of February 1, 1982, from Chairman Palladino to Congressmen Ottinger and Dingell, (attached) which sets forth the "competence and independence" standards that have been applied by the Commission in determining the acceptability of proposed third-party reviewers.

#### S&W Competence

The staff has considered the qualifications of both the S&W organization and the individuals proposed as team members to conduct the independent overview of the Midland project. Input to the staff's review included the information supplied in CPCo's submittal, the responses to the staff's inquiries, the S&W submittals, and the staff's existing knowledge of S&W performance at other nuclear power plants.

The staff has reviewed S&W's experience in assessing nuclear construction projects, particularly its performance in independent reviews of design, construction, and quality assurance undertaken for utilities as input to the NRC's operating license reviews.<sup>1</sup>

The staff has also reviewed the qualifications of the key persons proposed for the project, as set forth in the April 6, 1983, April 11, 1983, and May 19, 1983, submittals, and has concluded that the team has significant stated experience in QA/QC matters, nuclear plant construction, and management systems. These are the skills which we find necessary to carry out the third party overview. Through reference checks and/or discussions with NRC staff members familiar with the key personnel, we have verified their experience and competence in these areas.

Based upon its review, the staff concludes that the S&W organization and the individual overview team members are competent to conduct the Construction Implementation Overview and meet the technical competence standards set forth in the Ottinger/Dingell letter.

#### S&W Independence

The staff believes that for an organization to be acceptable to conduct this program the organization must be independent of the utility which owns Midland and independent of contractors whose work will be subject to the third party overview. Independence has been defined by the Commission as being the ability "... to provide an objective, dispassionate technical judgement, provided solely on the basis of technical merit..." (Page 1 of Response to Questions, attached to Ottinger/Dingell letter.) The Commission further defined the term by stating that the company approved to conduct an independent review must be one "...not previously involved with the activities...that they will now be reviewing..." Id.

<sup>1</sup>Reference Secy 82-414, "Diablo Canyon Design Verification Program Phase II Recommendations"



The staff has reviewed the information provided by CPCo and S&W regarding previous work performed by S&W for the Midland site and the principal contractors for the Midland project. Previous work at Midland consisted of limited activities (one person) in the planning phase of providing interface controls going from construction/preoperation testing into operations and is not considered to violate the independence criteria.

To the best of our knowledge, all the professional personnel assigned to work on the Midland Construction Implementation Overview have provided the NRC with sworn statements regarding their independence. S&W has stated that none of the staff expected to be assigned to the Midland review has any prior work experience with CPCo or on Midland.

Based on this information and the assessment of S&W to perform work as defined in Secy 82-414, the staff has no basis to believe that S&W is not sufficiently independent of CPCo.

The staff concludes that S&W and the key personnel who have been identified for the conduct of the review meet the standards of independence outlined in the Ottinger/Dingell letter.

#### S&W's Overview Program

The purpose of the independent third party overview is to provide additional assurance that the CCP is adequate and will be properly implemented. This overview requirement was necessitated by the loss of NRC staff confidence in CPCo to implement successfully the Quality Assurance Program. The CIO will remain in place at the Midland site until the necessary confidence level has been restored to the satisfaction of the NRC staff. CPCo also has the option to continue the CIO as an additional system of checks and balances, beyond any period of time required by the staff.

The written CIO program is controlled by site originated program documents and by S&W corporate program documents as follows:

- A. The documents written expressly for the CIO include:
- . CIO Program Document dated April 1, 1983
  - . CIO Quality Assurance Plan
  - . Third Party CIO Plan
  - . CIO Assessment Procedure, 10.01
  - . Nonconformance Identification and Reporting Procedure, 15.01
  - . A detailed attribute checklist for each CPCo Project Quality Control Instruction (PQCI)



- . A detailed checklist to review generic types of requirements (for non-PQCI activities); e.g., QA Audits and Surveillances
  - . Additional Quality Control Instructions as needed to provide adequate overview control
- B. The following S&W corporate master program documents will also be utilized for the CIO, as required:
- . QA Topical Report SWSQAP 1-74A, S&W Standard Nuclear Quality Assurance Program
  - . S&W Quality Standards; e.g., for quality sampling
  - . S&W Quality Assurance Directives

The NRC met with S&W on August 25, 1983, to gain additional insight into the total S&W program. This meeting was held in Midland, Michigan and was open to the public. Questioning by the public on the CIO was permitted at the end of the meeting. Subsequent to this meeting, S&W submitted on August 30, 1983, to the NRC copies of the material presented at the August 25, 1983, public meeting and on September 9, 1983, submitted a summary of the program presented at that same meeting.

The program described by S&W in the above documents and at the August 25, 1983, meeting has been reviewed by the NRC staff and found to constitute an acceptable third party overview program. The CIO program will be audited independently by the S&W corporate QA staff from Boston and on a routine inspection effort by the NRC.

S&W personnel onsite for the CIO will vary with the demand of the work activities to be overviewed. S&W's CIO staffing plan currently has nine people assigned at the Midland site and there are currently planned increases to 32 people as work activities dictate. These numbers, however, are only estimates and S&W will commit whatever personnel is necessary to conduct the CIO. The number of personnel used is not subject to limitation by CPCO.

The S&W overview activities of the CCP to date have been somewhat limited, since the CCP has not yet been approved and work in progress is therefore limited. Activities being overviewed were pre-Phase I. The activities being overviewed have included the following CCP and non-CCP activities:

- . Program and procedure review
- . Review of MPQAD QA/QC personnel training and certification
- . Review of general training of CPCo and Bechtel personnel, including construction craftspersons
- . Review of CCP Management Reviews

- . Review of System Interaction Walkdowns
- . Review of Design Documents

The above reviews have identified various concerns and one nonconformance that required CPCo actions to resolve. The NRC staff has reviewed the CIO activities performed to date and has found this overview, including actions taken by CPCo, to have been adequate.

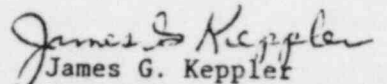
#### Summary and Conclusion

Based on NRC review of the documentation submitted by CPCo and S&W, followup checks, and consideration of comments by members of the public, we conclude that S&W meets the independence and competence criteria for third party reviewers and that S&W's proposed CIO program is adequate to provide for an assessment of the Construction Completion Program (CCP).

SEP 29 1983

Should you have any questions regarding this letter please contact  
Mr. R. F. Warnick of my staff.

Sincerely,

  
James G. Keppeler  
Regional Administrator

Enclosure: As stated

cc w/encl:

DMB/Document Control Desk (RIDS)  
Resident Inspector, RIII  
The Honorable Charles Bechhoefer, ASLB  
The Honorable Jerry Harbour, ASLB  
The Honorable Frederick P. Cowan, ASLB  
The Honorable Ralph S. Decker, ASLB  
William Paton, ELD  
Michael Miller  
Ronald Callen, Michigan  
Public Service Commission  
Myron M. Cherry  
Barbara Stamiris  
Mary Sinclair  
Wendell Marshall  
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