

41-423

JUN 19 1985

MEMORANDUM FOR: R. W. Starostecki, Director  
 Division of Reactor Projects, Region I

FROM: J. G. Partlow, Director  
 Division of Inspection Programs  
 Office of Inspection and Enforcement

SUBJECT: ASSESSMENT OF IMPLEMENTATION OF THE NRC INSPECTION  
 PROGRAM BY REGION I AT MILLSTONE NUCLEAR POWER  
 STATION UNIT 3

The Office of Inspection and Enforcement described to the Commission in SECY-82-150A the assessment of the implementation of the NRC inspection program in conjunction with Construction Appraisal Team (CAT) inspections. Accordingly, we have examined Region I's implementation of the construction inspection program based on the February-March 1985 CAT inspection at Millstone Unit 3. The results of the inspection were documented in Inspection Report 50-423/85-04 dated May 21, 1985. The enclosure to this memorandum documents the results of our assessment of the construction inspection program implementation.

In addition, we have reviewed the region's followup to the CAT inspection performed at Seabrook Station. We noted that the region has been thorough, conscientious, and timely in the closure and documentation of the CAT findings. The resident inspectors were knowledgeable of the current status of the corrective actions.

J. G. Partlow, Director  
 Division of Inspection Programs  
 Office of Inspection and Enforcement

Enclosure: Assessment

cc: J. Taylor, IE

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REGIONAL CONSTRUCTION INSPECTION  
PROGRAM ASSESSMENT - OUTLINE  
FOR MILLSTONE UNIT 3

- I. Objective
- II. Assessment Activities
- III. Assessment Findings
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    1. CAT Findings
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    3. Recommendations
- IV. Review of Inspection Reports
  - A. Scope
  - B. Assessment
  - C. Recommendations
- V. SALP Reports
- VI. Overall Assessment Conclusions

## REGIONAL CONSTRUCTION INSPECTION PROGRAM

### ASSESSMENT - MILLSTONE UNIT 3 (R-1)

#### I. OBJECTIVE

The objective of this assessment is to evaluate Region I's implementation of the Construction Inspection Program and to make an overall assessment of the adequacy of Region I's oversight of construction activities at the Millstone Unit 3 site.

The Construction Appraisal Team (CAT) of the Division of Inspection Programs conducted an announced construction inspection at the Millstone Nuclear Power Station Unit 3 of the Northeast Nuclear Energy Company during the period of February 19- March 1 and March 11-22, 1985. While the predominant effort of the inspection team was devoted to hardware inspection, the team also evaluated the control of design changes and corrective actions.

#### II. Assessment Activities

A review was made of Region I inspection reports of Millstone Unit 3, SALP reports and construction deficiency reports to identify those deficiencies that were previously identified by Region I inspectors or the licensee. The inspection reports of 1979-1984, SALP reports for the period ending 1982, 1983, and 1984, open items and violations were reviewed.

To determine the inspection effort at Millstone Unit 3, the inspection reports for 1979-1984 and the 766 system inspection data were analyzed. It was determined that Region I performed approximately 1870 manhours in 1983 and 2730 manhours in 1984 of direct inspection effort at the Millstone Unit 3 site. The inspection hours for 1983 and 1984 were compared to single unit sites in a similar state of construction and the manhours were found comparable thus indicating a satisfactory level of inspection effort at the site. The analysis of the inspection reports and 766 computer data indicated that the construction inspection program was approximately 90 percent complete at the start of the CAT inspection.

The Executive Summary and Potential Enforcement Actions of the Millstone Unit 3 CAT inspection report (50-423/85-04) are provided as Appendix A and Appendix B, respectively.

#### III. Assessment Findings

##### A. Electrical and Instrumentation Construction

##### 1. CAT Findings

- ° The CAT inspectors identified terminations that were not in accordance with current design drawings. These discrepancies were caused by incomplete implementation of design changes and inadequate documentation of post-turnover wiring changes.
- ° Separation deficiencies were identified in the Main Control Board wiring installed by the vendor or as modified by design and construction activities.

- Although electrical separation criteria of the FSAR had not been met in raceway and cable installations, recent tests were conducted to determine whether the lesser separation criteria could be used.

2. Assessment

It appears that regional inspections in the area of electrical terminations in the construction and testing phases had not identified the deficiencies found by the CAT inspectors.

Based on discussions with Region I and NRR personnel it was evident that the parties involved were aware of the difference between the FSAR and installation criteria for electrical separation. In fact, measures were taken to ensure that the reduced separation criteria were properly justified by testing and that the test report would be reviewed by NRC personnel.

3. Recommendation

The Construction Inspection Procedures in the area of electrical terminations are adequate if properly implemented. Since the licensee is now progressing into the startup and testing phases, the regional office should place more attention in the area of the control of work on components and systems subsequent to turnover from construction.

B. Mechanical Construction

1. CAT Findings

- The CAT inspectors identified several areas which showed a lack of attention to detail by QC inspectors. These were in the areas of installation of pipe supports/restraints, equipment foundation anchorages, and as-built drawings.
- The CAT inspectors determined that complete engineering had not always been performed in that deficiencies were identified in the inspection criteria and engineering interface for pipe support/restraint attachment locations, the review of attachment lug contact criteria, and a number of drafting errors.
- The CAT inspectors determined that corrective actions for deficiencies in the NNECO maintenance program were not effective or timely.

2. Assessment

- The Region I SALP report number 50-423/84-19 identified a declining trend in the area of piping systems and supports. The CAT findings regarding lack of attention to details, though individually not significant, also reflect the declining trend.

- The lack of engineering thoroughness was highlighted to a degree in SALP report number 50-423/84-19. Although the SALP rating in the newly addressed area of Engineering-Construction Interfaces was Category 1 (consistent), the SALP Board did recommend increased NRC attention to address the increasing engineering work during the closeout of the construction phase. It does not appear that the regional office has focused upon communications between engineering and construction in the form of procedures or criteria. Based on the CAT findings it seems that engineering activities should receive additional attention.
- The deficiencies in the NNECO maintenance program was identified in a December 1984 audit by the licensee. There had not been sufficient time prior to the CAT inspection for the regional office to assess the effectiveness of the corrective actions. The CAT inspectors reviewed this area as a normal part of their inspection scope.

### 3. Recommendations

The Region I office has shown an awareness of the programmatic weaknesses in the areas of pipe supports and engineering activities. Continuation of increased attention in these areas is warranted.

## C. Welding-NDE

### 1. CAT Findings

- The CAT inspectors identified deficiencies in completed structural welds in pipe supports for skewed connections and pipe straps.
- Undersized welds were identified by the CAT inspectors in the area of vendor supplied tanks and heat exchangers in nozzles, manways, and supports.

### 2. Assessment

- Previous Region I inspections had not identified the deficiencies in the skewed connections and pipe straps. The Construction Inspection Procedures are adequate in this area if properly implemented.
- The vendor deficiencies in tanks and heat exchangers are recurring on at nuclear construction sites.

### 3. Recommendations

- The welding deficiencies in pipe supports/straps seem to be related to the declining trend in pipe and pipe supports in general. This area warrants additional attention.

- The Construction Inspection Procedures for this area are adequate. An IE Information Notice has been issued and discusses the vendor tank and heat exchanger problems.

D. Civil and Structural Construction

1. CAT Findings

- The CAT inspectors identified deficiencies in a number of structural steel connections in the Main Steam Valve Building. The deficiencies were in welded connections and bolts too tight to allow for thermal expansion.
- Unauthorized material was found by the CAT inspectors in the seismic isolation joints between buildings.

2. Assessment

- The structural steel deficiencies in the Main Steam Valve Building (MSVB) had not been previously identified by the regional office. The Region I team inspection conducted in March 1984 (Inspection Report 50-423/84-04) reviewed the connections in the MSVB and had found incomplete bearing on beam seats, but had not identified the welding or bolting discrepancies.
- Cleanliness of building isolation joints has not been emphasized in the Construction Inspection Procedures.

3. Recommendations

- In the area of structural steel, the Construction Inspection Procedures are adequate if properly implemented.
- An evaluation will be made to determine whether isolation joint cleanliness should be made a part of the Construction Inspection Procedures.

E. Material Traceability and Control

1. CAT Findings

Three areas were identified in which there was a lack of traceability for vendor supplied fasteners - mounting bolts for large pump motors, battery rack bolts, and interconnecting bolts for adjacent motor control center cabinets.

2. Assessment

It does not appear that either the regional office or the licensee has previously identified this problem.



3. Recommendations

Problems in the traceability of fasteners has been identified by the NRC CAT program at several sites. At the present time, IE Inspection procedures address material traceability only in each technical discipline. Current procedures do not exist to cover the programmatic control for material traceability. IE will evaluate the need for additional inspection guidance in this area.

F. Design Change Control

1. CAT Findings

- ° In the area of design change control, an increasing number of drawings were found which were overdue for updating to include the latest design changes.
- ° In the area of design document control, a significant number of document control errors were identified by the CAT inspectors at drawing stations used by construction and inspection personnel.
- ° Weaknesses were identified in the use of yellow (uncontrolled) drawings and in document control audits.

2. Assessment

- ° Region I had previously identified a lack of timely incorporation of design changes in Inspection Report 50-423/84-04. This item was identified as a weakness in the licensee's program.
- ° Region I had also reviewed the area of document control in Inspection Report 50-423/84-04. Only one deficiency was identified in a drawing out-of-date for revision number. Similar parameters were reviewed by both the Region I and CAT inspections. A possible explanation of the difference in findings is that a change had occurred in the licensee's programs in the approximately one year interval between the Region I and CAT inspections.

3. Recommendations

- ° The Construction Inspection Procedures are adequate in the design change control area.

G. Corrective Action Systems

1. CAT Findings

The CAT inspectors identified weaknesses in the corrective actions programs in the following areas:

- preventive maintenance after turnover from construction
- design change control and document control
- unresolved nonconformances after turnover from construction.

2. Assessment

The areas of design change control and document control, and unresolved nonconformances after turnover had been previously identified by Region I. However, improved performance by the licensee in these areas is still warranted. The preventative maintenance issue is too recent to have gotten much regional attention. Generally, the area of corrective action systems is programmatically reviewed from the quality assurance standpoint and reviewed in detail in the technical disciplines.

3. Recommendations

Additional regional attention is warranted to ensure that the licensee's corrective actions are effective and timely. The Construction Inspection Procedures are adequate in this area. For additional details see the previous discussion in the discipline areas.

IV. REVIEW OF MILLSTONE UNIT 3 CONSTRUCTION INSPECTION REPORTS

A. Scope

The inspection procedures itemized in IE Manual Chapter (MC) 2512 were reviewed as to which were applicable to the Millstone Unit 3 construction site. A 766 system computer printout was obtained for the entire construction period which identified report numbers, inspection procedures, inspection dates, staff hours, percent complete and completion status. The inspection history for Millstone Unit 3 was tabulated as indicated in Attachment I. A review was conducted for which procedures were implemented against the inspection procedure requirements. In addition, Attachments II-IV present a summary of inspection man-hours in each functional area, as defined by the inspection procedures shown below.

<u>Functional Area</u>	<u>Inspection Procedures</u>
Management (MGMT)	30XXX
Quality Assurance Program (QA)	35XXX
As-Built/Design (AS-BUILT)	37XXX
Site Preparation/Foundation (SITE PREP)	45XXX/46XXX
Concrete (CONC)	47XXX
Structural Steel (STR STL)	48XXX
Piping (PIPING)	49XXX
Mechanical (MECH)	50XXX
Electrical (ELECT)	51XXX
I&C	52XXX
Penetrations (PENETR)	53XXX



Welding/NDE (WELDING)  
In-service Inspection (ISI)  
Miscellaneous (MISC)  
Independent Inspections  
(IND INSP)

55XXX/56XXX/57XXX/58XXX  
73XXX  
92XXX  
92706

Inspection data for 1984 is presented in Attachment V. The 1984 data represents information in the 766 system as of January 22, 1985. The inspection reports prepared by the regional inspectors were evaluated to determine whether they: included the required information, were sufficiently comprehensive, were issued in a timely fashion and were prepared in accordance with MC 0610.

B. Assessment

The review of the MC 2512 inspection procedures required to be implemented as Priority I as compared to those actually implemented indicated basically full implementation except for a few where plant construction was still in progress. It appears that in two areas inspection procedures have not been implemented based on the data available as of January 1985 (not all 1984 inspection procedure completion information was available). The two areas are instrumentation and welding of steel structures and supports. Those inspection procedures without inspection time assigned to them are categorized as Priority I in MC 2512 (dated 9/15/81) and are listed below.

<u>Instrumentation</u>	<u>Welding (Steel Structures and Supports)</u>
52054B	55151B
52056B	55152B
52061B	55153B
52063B	55154B
52064B	55156B
52065B	55157B
52066B	55158B

It is noted that some regional inspections were performed in late 1984 in the area of electrical and instrumentation construction which may not be reflected in the data base. In the area of welding steel structures and supports, seven inspection procedures appear not to have been implemented. The only previous inspection performed in this area was performed as part of the NDE van inspection in 1983 (discussed in Inspection Report 83-14). In light of the deficiencies identified in the welded connections of the Main Steam Valve Building, implementation of these inspection procedures should have identified these deficiencies. Recent changes in the Construction Inspection Procedures in this area should clarify and simplify the inspection requirements.

In addition to the two areas highlighted above, it was also noted that the inspection procedures in the area of preservice/in-service inspections have not been reviewed by the regional office in much detail. The latest inspection was performed in late 1983 and only a total of 12 inspection man-hours have been spent in this area. The latest regional procedure status is noted to be 10% complete.

A random sample of 10 inspections reports (indicated below) shows that they were essentially being prepared in conformance with IE Manual Chapter 0610. The reports included pertinent information such as report number, docket no., inspectors, inspection summary, results, details of inspection, persons interviewed, and individuals present at entrance and exit meetings. The inspection reports provided sufficient detail to understand the issues and showed evidence of adequate technical content and review.

One area for improvement involves the issuance of inspection reports. MC 0610 suggests that inspection reports be issued 20 days after the last day of inspection or 20 days after the inspection period ends as in the case of monthly resident's reports. The following lists the reports reviewed and the total time elapsed from the end inspection to issuance of report.

<u>Inspection Report Number</u>	<u>Performed By</u>	<u>Inspection Ending Date</u>	<u>Report Issue Date</u>	<u>Days To Issue</u>
83-07	Sr. Res. Insp.	6/12	9/9	89
83-08	Region I	6/9	7/5	26
83-12	Region I	6/24	8/3	40
83-13	Region I	7/22	8/18	27
83-20	Sr. Res. Insp.	12/10	1/27	58
83-21	Region I	12/2	2/1	61
84-02	Sr. Res. Insp.	3/4	4/10	37
84-03	Sr. Res. Insp. and Region I	4/14	5/29	45
84-06	Sr. Res. Insp.	5/19	6/26	38
84-11	Region I	5/18	6/20	33

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[Note - Inspection Report 84-23 issued on March 20, 1985 pertains to an inspection which ended on October 26, 1984. A total of 157 days were required to issue the inspection report.]

The average time required to issue reports is much longer than recommended in MC 0610 and a recent inspection report (84-23) shows an inordinate delay in issuing the report.

C. Recommendation

Overall, the Region I office has performed satisfactorily in the implementation of the construction procedures, except in the area of welding steel structures and supports. An assessment of the implementation of the instrumentation and in-service/pre-service inspection procedures should be done to ensure that this area has been or will be adequately inspected. Regional management should address the timely issuance of inspection reports.

## V. SALP Reports

An analysis was made of the two most recent SALP reports 1982-1983 and 1983-1984 for those areas that were common to both SALP and the CAT inspection. Generally the SALP reports reflect a high level of licensee performance with mostly Category 1 ratings and only a few Category 2 ratings (in the last SALP period - piping systems and supports, and licensing activities were Category 2).

The CAT inspection identified weaknesses in the licensee's programs in the areas of: post-turnover work control; communications between the engineering, construction, and inspection groups; document control errors; and Quality Control inspection effectiveness. The SALP reports deal directly with three of the four program weakness areas. In two areas (pre-operational testing and engineering-construction interfaces) the CAT and regional findings are in general agreement. The regional assessment in preoperational testing shows the increasing need to aggressively review the implementation of the testing program. The regional findings in the area of engineering-construction interfaces also recognized the need to increase NRC inspection efforts.

In the area of document control, the regional office had eliminated this as a functional area as it was no longer considered to be a significant programmatic concern. As the CAT findings indicate, this elimination may have been done too soon. Continued attention in this area is warranted.

In the area of containment and other safety-related structures, the CAT and regional findings were similar for concrete and reinforcing steel activities. However, in structural steel connections, the deficiencies in welding and bolting were not identified in regional inspections for the same building structures as reviewed by the CAT inspectors.

The 1983-1984 SALP report described a potential trend of "less foresight, thoroughness, and aggressive resolution of items" in the area of piping systems and supports. This trend is similar to that found by the CAT inspection in the area of engineering thoroughness, particularly regarding pipe supports.

In the other areas assessed in the SALP reports (safety-related components, support systems, and electrical power, instrumentation, and controls), the regional findings were generally in agreement with the CAT findings.

## VI Overall Assessment Conclusions

A review of the Millstone Unit 3 inspections reports, SALP reports, and 766 system data indicates that generally the construction inspection modules had been adequately implemented. The inspection reports were written with the necessary scope, depth, and technical content. However, a few inspection modules require additional attention. An assessment by regional management should be made to ensure that inspection modules in the areas of instrumentation, welding of steel structures and supports, and in-service/pre-service inspection are implemented. An effort by regional management should be made to ensure more timely issuance of inspection reports.

A review of the CAT and regional findings shows general agreement and the CAT findings particularly reinforce the region's impression of potentially declining trends in the areas of pipe supports, engineering-construction interfaces, post-turnover work control including maintenance activities, and design change control. The significant area which requires additional regional attention (previously judged to be no longer a concern) is the area of document control, particularly drawings and associated design changes.

A review of the latest SALP reports indicates that the licensee's performance has apparently declined in several areas from the high levels previously achieved, based on the CAT findings. This is significant in that regional attention will be necessary in order to assure that the declining trends do not progress into unsatisfactory program performance.

Overall, the regional efforts to oversee the construction activities at Millstone Unit 3 appear to be satisfactory. The implementation of the Construction Inspection Procedures was adequate. Regional management attention will be necessary to ensure completion of the construction inspection program in a few remaining areas and as the project moves into the testing phase. The declining trends in several areas should also be given additional attention. The regional office has demonstrated perceptiveness in identifying these trends at an early stage.



## APPENDIX A

### EXECUTIVE SUMMARY

An announced NRC Construction Appraisal Team (CAT) inspection was conducted at North American Nuclear Energy Company's Millstone Unit 3 during the period February 11-March 1 and March 11-22, 1985.

#### Overall Conclusions

Hardware and documentation for construction activities were generally in accordance with requirements and licensee commitments. However, the NRC CAT did identify a number of construction program weaknesses that require additional management attention. These include:

1. Control of work on systems and components subsequent to turnover from Construction to the testing organization requires improvement. This is indicated by the deficiencies found in the control of wiring changes, and preventive maintenance deficiencies found in the mechanical and electrical areas subsequent to turnover to the startup organization. Additional attention is needed to ensure that missed maintenance activities are evaluated as to the potential damaging effects on the components. These findings indicate the need to reevaluate the controls applied to activities subsequent to system turnover from Construction to Operations.
2. A number of hardware deficiencies were identified which appear to have been caused by a lack of effective communications between the design, construction, and inspection groups. Design parameters were in some cases not properly translated into inspection criteria. For example, pipe supports had been installed and accepted by QC with dimensional tolerances not in accordance with the design calculations. In addition, a lack of thoroughness on the part of the design organization was identified. Examples identified include: omission of the Residual Heat Removal System from the pipe support "lugs-in-contact" review; wiring termination changes made to drawings without the issuance of the necessary documents to control the actual construction work; inadequate technical justification for the acceptance of unmarked fasteners in certain motor control centers; and conflicting details for a structural steel end connection.
3. A significant number of document control errors were found at both the Quality Control and Construction drawings stations. This is of particular concern in that the deficiencies in document control had been identified previously, and the number of audits increased to monitor the situation. In fact, a 100% audit of all drawing stations had been performed just prior to the start of the NRC CAT inspection. The corrective actions taken had not been effective, however.



- d. A number of findings indicate that the effectiveness of Quality Control inspection activities needs to be improved. These findings include the area of piping as-built drawings, mechanical equipment foundation anchorage, structural steel connections (welded and bolted), piping support welding (pipe straps and skewed fillet welds), and pipe support miscellaneous hardware (lock nut tightness, cotter pin installations, etc.). Also, vendor deficiencies were identified in the areas of tank and heat exchanger fillet welds (pressure boundary and supports), performance of load indicating washers, and marking of fasteners.

The foregoing identified weaknesses require additional management attention to assure that completed installations meet design requirements.

#### AREAS INSPECTED AND RESULTS

##### Electrical and Instrumentation Construction

The electrical and instrumentation samples inspected generally met the applicable design requirements and installation specifications. Several discrepancies were identified including some that will require additional management attention.

Numerous electrical separation discrepancies were identified in the Main Control Board wiring installed by the vendor and as modified by design and construction activities. Several areas were noted in which redundant electrical division wires were in contact with each other.

Electrical separation criteria detailed in the Millstone Unit 3 FSAR had not been met in many raceway and cable installations. However, lesser separation may be acceptable based on recent tests. This matter is considered open pending NRR review and evaluation.

During examination of Class 1E cable ends, a number of terminations were identified that were not in accordance with current design drawings. One group of discrepancies pertains to incomplete implementation of design changes. The second group relates to inadequate documentation of post-turnover wiring changes.

##### Mechanical Construction

HVAC restraints, concrete expansion anchor installations, pipe wall thickness and piping hydrostatic test records were found to be in general conformance to design and procedural requirements.

Numerous discrepancies were identified in pipe support/restraints and mechanical equipment foundation installations. A number of discrepancies were observed between as-built drawings and piping configurations. Greater attention to detail during QC inspections appears necessary.

A need for more thorough engineering review activities, and additional reinspection and/or reanalysis was observed. This need was indicated by: unclear inspection criteria and inadequate engineering interface for pipe support/restraint attachment locations; inadequate review of attachment lug contact criteria; and a number of drafting errors.

The NNECO maintenance program and maintenance activities performed after equipment turnover from Construction were considered to be inadequate. This item had been previously identified, but corrective actions taken had not been effective or timely.

#### Welding and Nondestructive Examination

Welding and nondestructive examination activities were generally found to be conducted in accordance with the governing codes and specifications. However, a number of examples were identified where completed structural welds in pipe supports involving skewed welded connections did not have the weld sizes specified by the Architect-Engineer. These undersized welds in skewed connections should have been identified during the weld inspection process, and their existence indicates a program weakness. The licensee has performed an engineering evaluation concerning this problem and concluded that most of these welds are adequate for the intended application. In the area of vendor supplied tanks and heat exchangers a number of tanks were found to have undersized weld reinforcements in nozzle and manway welded joints. In addition, some tank supports were found to have deficient welds.

#### Civil and Structural Construction

In general, concrete quality, cadwelding and concrete material certification were found to be acceptable. Rebar appeared to be placed in accordance with the design drawings. However, the NRC CAT inspectors identified unauthorized material in the building isolation joints (rattle spaces).

Structural steel member size and configuration were generally found to be acceptable. A number of steel connections in the Main Steam Valve Building were found to be not in accordance with the design drawings. Based on testing by the NRC CAT, problems were identified in the performance of load indicating washers.

#### Material Traceability and Control

- The licensee's material traceability and control program was found to be acceptable, except for certain fastener hardware. Significant lack of traceability was found for vendor fastener materials, including bolts for mounting large pump motors, bolts for battery racks and bolts for inter-connecting adjacent motor control center cabinets.

#### Design Change Control

Design change control was determined to be in accordance with site procedures with the exception of timely updating of design documents with the latest change information. A number of drawings were found to be overdue for updating to include the latest design change requirements. In the area of design document control, a significant number of document control errors were found at site drawing stations used for construction work and QC acceptance. Weaknesses were also identified in the use of yellow drawings and document control audits. In addition, four cases of apparent inadequate corrective actions were noted in both the document control and design change control areas.

### Corrective Action Systems

A weakness was found in the corrective actions taken to control preventive maintenance after components had been turned over for testing/operation. In addition, corrective actions applied to design change controls and document control deficiencies had not been effective. Also, an increasing number of unresolved nonconformances was found after turnover of system packages for testing/operation. These matters require additional management attention.

## APPENDIX B

### POTENTIAL ENFORCEMENT ACTIONS

As a result of the NRC CAT inspection of February 19 - March 1 and March 11-22, 1985 at the Millstone Unit 3 site, the following items are being referred to Region I as Potential Enforcement Actions. Section references are to the detailed portion of the inspection report.

1. 10 CFR 50, Appendix B, Criterion III, as implemented by Northeast Utilities Quality Assurance Program (NUQAP), QAP 3.0, requires that measures shall be established to assure that applicable regulatory requirements are correctly translated into specifications, drawings, procedures and instructions.

Contrary to the above, at the time of this inspection, the licensee's program for design control has not been adequate to assure that Class 1E wiring configurations are in accordance with applicable design. As a result of incomplete control of electrical termination changes, a number of existing installations may not perform their intended function (Section II.B.2.b.(6)).

2. 10 CFR 50, Appendix B, Criterion V, as implemented by NUQAP, QAP 5.0, requires that activities affecting quality shall be prescribed by documented instructions, procedures or drawings which include appropriate quantitative or qualitative acceptance criteria.

Contrary to the above, the NRC CAT inspectors found, at the time of this inspection, that the licensee's programs were not effectively implemented in that they:

- a. Failed to adequately implement their post-turnover test and inspection program to assure that wiring changes were documented in accordance with applicable procedures. (Section II.B.2.b.(6)).
  - b. Failed to identify conflicting allowable acceptance criteria between the design organization and the inspection organization for pipe supports/restraints (Section III.B.2).
3. 10 CFR 50, Appendix B, Criterion VI, as implemented by NUQAP, QAP 6.0, requires in part that measures be established to control issue and distribution of document changes to the prescribed locations.

Contrary to the above, during this inspection, the SWEC design document control procedures were not adequately implemented in that numerous errors in distribution, filing and updating of document record cards, design change documents, drawings and specifications were found to exist in site drawing stations used for plant construction and Quality Control inspection (Section VII.B.1).

4. 10 CFR 50, Appendix B, Criterion VII, as implemented by NUQAP, QAP 7.0, requires that measures be established to assure that purchased material, equipment and services conform to the procurement documents.



Contrary to the above, at the time of this inspection, the implementation of SWEC's procedures were found to be ineffective in that vendor procured tanks and heat exchangers were accepted and installed with deficient welds (Section IV.B.1).

5. 10 CFR 50, Appendix B, Criterion VIII, as implemented by NUQAP, QAP 8.0, requires that measures be established for the control of materials, parts and components to prevent the use of incorrect or defective items.

Contrary to the above, at the time of this inspection the material traceability and control of some fasteners, including bolts for mounting large pump motors, have not been adequate to assure the use of correct materials.

6. 10 CFR 50, Appendix B, Criterion X, as implemented by NUQAP, QAP 10.0, requires that a program for inspection of activities affecting quality be established and executed to verify conformance with design documents.

Contrary to the above, at the time of this inspection, it was found that the licensee's programs were not effectively implemented in that they:

- a. Failed to ensure that safety-related pipe supports/restraints were constructed in accordance with design requirements in that support attachment locations were not installed as shown on design drawings (Section III.B.2).
  - b. Did not assure that equipment foundation bolting connections were installed in accordance with specified acceptance criteria and requirements (Section III.B.5).
  - c. Have not assured that the specified weld sizes in skewed structural pipe support connections have the required weld sizes (Section IV.B.1).
7. 10 CFR 50, Appendix B, Criterion XVI, as implemented by NUQAP, QAP 16.0, requires that measures be established to assure that conditions adverse to quality are promptly identified and corrected, including action to avoid repetition.

Contrary to the above, at the time of this inspection, the licensee's program of Quality Control Inspection had not provided adequate procedural controls in that there was:

- a. Failure to promptly identify and correct numerous separation deficiencies in vendor or modified vendor wiring installations within the main control boards (Section II.B.2.b(2)).
- b. Failure to promptly perform effective corrective action to prevent recurrence of nonconformances (Section VIII.B.1.b(1)).
- c. Inadequate control of preventive maintenance after turnover for testing/operating (Section VIII.B.1.b.(2)).
- d. Failure to apply effective corrective actions for document control deficiencies (Section VIII.B.1.b.(4)).



ATTACHMENT I

INSPECTION PROGRAM HISTORY FOR MILLSTONE UNIT 3

A. Civil and Structural Procedures

1. Program Requirements

- a. IP-45051B, 45053B, 45055B - Site Preparation - Procedures review to be completed before site work started and records reviewed during site work.
- b. IP-46051B, 46055B - Foundations - Procedures to be done before work is 10% complete and review of quality records before work is 60% complete.
- c. IP-46153B - Site Preparation and Foundations - To be done before work is 60% complete.
- d. IP-47051B, 47053B, 47054B, 47055B, 47056B - Containment (Structural Concrete) - Procedure review before start of work, observation of work after 10% and 50% and review of records after 10% and 50%.
- e. IP-48051B, 48053B, 48055B - Containment (Steel Structures and Supports) - Procedure review before start of work, observation of work and record review before work is 50% complete.
- f. IP-48061B, 48063B, 48064B, 48065B, 48066B, - Safety-Related Structures (Structural Steel and Supports) - Procedure review before start of work, observation of work at 10% and 50%, and record review at 20% and 50%.

2. Inspections Conducted at Millstone Unit 3

<u>Proc. No.</u> (*Priority I)	<u>Report Number</u>	<u>Total Staff Hours</u>	<u>Latest Percent Complete</u>	<u>Latest Status</u>
a. IP-45051B, 45053B, 45044B - Site Preparation				
45051B	75-05		100	C
45053B	75-05	2	100	C
	79-10			
45055B	75-05	2	100	C
	79-10			
b. IP-46051B, 46055B - Foundation				
46051B	75-05		100	C
46053B	75-05	8	100	C

	84-06			
46053*				
46055B	75-05		100	C

c. IP-46153B - Site Preparation and Foundations - Module not in effect of time of activity. Earlier site preparation and foundations modules completed.

d. IP-47051B, 47053B, 47054B, 47055B, 47056B - Containment (Structural Concrete)

47051B*	75-05			100	C
47053B*	75-09	22		100	C
	77-03				
	82-09				
47053C	81-04	26			
	81-06				
	81-12				
47054B*	76-05	81-02	123	100	C
	78-03	81-09			
	78-04	83-12			
	79-06	83-20			
	79-10	83-21			
	80-	83-22			
47055B*	76-01		27	100	C
	77-03				
47056B	78-03	81-02	52	90	
	78-06	81-09			
	79-06	82-09			
	79-10				

e. IP-48051B, 48053B, 48055B, - Containment (Steel Structures and Supports)

48051B*	75-07		33	100	C
	76-04				
	84-04				
48053B*	76-04	77-06	99	100	C
	76-06	77-08			
	76-07	77-11			
	77-01	80-05			
	77-02	80-05			
	77-04	81-02			
	77-05	84-04			
48053C	81-08		6		
48055B*	76-04	77-04	34	70	
	76-06	77-05			
	76-07	77-06			
	77-01	77-08			
	77-02				

f. IP-48061B, 48063B, 48064B, 48066B - Safety-Related Structures (Structural Steel and Supports)

48061B*	75-07	77-09	36	50	
	77-02	79-09			
48063B*	79-09		32	100	C
	81-02				
	84-04				
48063C	81-12	82-11	26		
	82-04	83-02			
48064B	83-16		23	100	C
	82-21				
48065B*	83-21		14	100	C
48066B	83-21		14	100	C

B. Mechanical Construction Procedures

1. Program Requirements

- a. IP-49051B, 49053B, 49054B, 49055B, 49056B - Reactor Coolant Pressure Boundary Piping - Procedure review before start of work, observation of work at 20% and 60% and record review after 20% and 60%.
- b. IP-49061B, 49063B, 49065B - Safety-Related Piping - Procedure review before start of work, observation of work at 40% and record review at 50%.
- c. IP-50051B, 50053B, 50055B - Reactor Vessel Installation - Procedure review before start of work, observation of work at *installation and record review at completion.*
- d. IP-50061B, 50063B, 50065 - Reactor Vessel Internals - Procedure review before start of work, observation of work during installation and record review after installation.
- e. IP-50071B, 50073B, 50074B, 50075B, 50076B - Safety-Related Components - Procedure review before start of work, observation of work at 10% and 50% and record review after 20% and 50% work completion.
- f. IP-50090B - Safety-Related Pipe Support and Restraint Systems - To be implemented before work is 20% complete.
- g. IP-50095B, Spent Fuel Storage Racks - Observation of work before work is 50% complete.
- h. IP-500100 - Safety-Related Heating, Ventilating, and Air Conditioning (HVAC) Systems (new procedure initiated 10/83)

2. Inspections Conducted at Millstone Unit 3

<u>Proc. No.</u> (*Priority I)	<u>Report Number</u>	<u>Total Staff Hours</u>	<u>Latest Percent Complete</u>	<u>Latest Status</u>
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a. IP-49051B, 49053B, 49054B, 49055B, 49056B - Reactor Coolant Pressure Boundary Piping

49051B*	77-04		14	10	
	77-06				
49053B*	82-12				
49053C*	81-04	81-15	34		
	81-11	82-04			
	81-12	82-08			
	81-14				

IP 49054B, 49055B, and 49056B do not appear to have been implemented, however the related IPs (49061B, 49063B, and 49065B) have been performed for safety-related piping.

b. IP-49061B, 49063B, 49065B - Safety-Related Piping

49061B*	77-04		13	10	
	77-06				
49063B*	77-11		51	100	C
	83-21				
	84-04				
49063	83-07	83-22	42	90	
	83-10	84-02			
49063C	81-04	81-14	52		
	81-08	82-04			
49065B*	83-21		21	100	C
	84-04				
49065	83-16		9	10	

c. IP-50051B, 50053B, 50055B - Reactor Vessel Installation

50051B*	77-04	80-05	8	100	C
	77-05				
50053B*	77-03	80-02	18	60	
	77-04	80-05			
	77-05	80-06			
50053C	82-06		18		
	82-08				
50055B*	77-05		8	100	C
	80-06				

d. IP-50061B, 50063B, 50065B - Reactor Vessel Internals

50061B*	77-05		6	15	
	82-12				
50063B*	77-05	80-02	46	40	
	80-02	81-02			
50063C	81-04	82-12	34		
	82-06	83-05			
	82-11				
50065B*	77-05		1	10	

e. IP-50071B, 50073B, 50074B, 50075B, 50076B - Safety-Related Components

50071B*	77-05		10	100	C
	84-04				
50073B*	77-05	81-02	60	100	C
	77-09	83-10			
	80-02	84-04			
50073C	81-04	82-04	129		
	81-06	82-06			
	81-14	82-11			
50074B*	82-15	83-12	39	10	
	83-07				
50075B*	77-05	81-02	5	30	
	77-09				

f. IP-50090B - Pipe Support and Restraint Systems

50090B*	82-10	84-04	67	100	C
	83-10	84-18			
50090	83-10		8	10	
50090C	82-12	82-04	54		
	82-02	82-08			

g. IP-50095B - Spent Fuel Storage Racks

50095B	83-22		18	50	
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h. IP-50100 - HVAC

50100	84-08		40	80	
	84-11				

C. Electrical and Instrumentation Construction Procedures

1. Program Requirements

- a. IP-51051B, 51053B, 51054B, 51055B, 51056B - Electrical Components and Systems - Procedure review before start of work, observation of work at 30% and 60% complete and record review before 70%.
- b. IP-51061B, 51063B, 51064B, 51065B, 51066B - Electrical Cables and Terminations - Procedure review before start of work, work observation at 10% and 50% completion and record review at 20% and 50%.
- c. IP-52051B, 52053B, 52054B, 52055B, 52056B - Instrumentation - Components and Systems - Procedure review before start of work, work observation at 10% and 50% and record review at 20% and 50%.
- d. IP-52061B, 52063B, 52064B, 52065B, 52066B - Instrumentation - Cables and Terminations - Procedure review before start of work, work observation of 10% and 50% and record review at 20% and 50%.



2. Inspection Conducted at Millstone Unit 3

<u>Proc. No.</u> ( <u>*Priority I</u> )	<u>Report Number</u>	<u>Total Staff Hours</u>	<u>Latest Percent Complete</u>	<u>Latest Status</u>
a. IP-51051B, 51053B, 51054B, 51055B, 51056B - Electrical Components and Systems				
51051B <sup>a</sup>	81-02 83-04 82-05 83-09	60	100	C
51053B <sup>a</sup>	82-13 83-15 81-02 83-11 82-13 83-15	28	100	C
51053C	82-06 81-14 83-05	22		
51054B <sup>a</sup>	82-03 83-04 83-18 83-09 84-04	43	100	C
51055B <sup>a</sup>	83-11 83-11 84-04	19	100	C
51056B <sup>a</sup>	83-18 83-18 84-04	29	100	C
b. IP-51061B, 51063B, 51064B, 51065B, 51066B - Electrical Cables and Terminations				
51061B <sup>a</sup>	82-05 83-15 82-12 84-04	45	100	C
51063B <sup>a</sup>	82-13 82-13 83-20 83-06 83-22 83-13 84-04 83-15 84-08 83-19	90	80	
51063C	81-06 82-03 81-08 82-11 81-11 82-15 81-15 83-05	102		
51064B <sup>a</sup>	83-11 83-18 83-17 84-02	43	90	
51065B <sup>a</sup>	83-13 83-15	16	100	C
51066B <sup>a</sup>	83-18	4	100	C
c. IP-52051B, 52053B, 52054B, 52055, 52056B - Instrumentation - Components and Systems				
52051B <sup>a</sup>	83-13 84-11	28	100	C
52053	84-20	10	30	
52053B <sup>a</sup>	83-13	19	50	C
52054B <sup>a</sup>	84-11			

52055B*	83-13	10	50	C
52056B*	24-11			

d. IP-52061B, 52063B, 52064B, 52065B, 52066B - Instrumentation - Cables and Terminations

52063C	82-08	18		
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[Note - IP-52061B, 52063B, 52064B, 52065B, 52066B do not appear to have been implemented.]

e. IP-53051B, 53055B, 53055B - Containment Penetrations

53051B*	77-11	7	100	C
53053B*	79-08	60	10	
	81-02			
53053C*	81-04	82-04	40	
	82-02	82-08		
	82-03	82-11		
53055B*	79-08	30	30	

D. Welding and NDE Procedures

1. Program Requirements

- a. IP-55051B, 55053B, 55055B - Containment - Structural Steel Welding - Procedure review before start of work, work observation after 20% and record review after 30%.
- b. IP-55061B, 55063B, 55064B, 55065B, 55066B - Safety-Related Structures - Welding - Procedure review before start of work, work observation at 10% and 50% and record review at 20% and 50%.
- c. IP-55071B, 55073B, 55074B, 55075B, 55076B - Reactor Coolant Pressure Boundary Piping Welding - Procedures review before start of work, work observation at 10% and 40% and record review at 20% and 50%.
- d. IP-55081B, 55083B, 55085B - Safety-Related Piping Welding - Procedure review before start of work, work observation at 20% and record review at 30%.
- e. IP-55093B - Reactor Vessel Internals Welding - Observation of work during installation.
- f. IP-55151B, 55152B, 55153B, 55154B, 55156B, 55157B, 55158B - Steel Structures and Supports - Welding during various stages of construction.
- g. IP-55171B, 55172B, 55173B, 55175B, 55176B, 55177B, 55178B - Reactor Coolant Loop Piping - Welding Activities - To be performed at various stages of construction.

- h. IP-55181B, 55182B, 55183B, 55185B, 55186B, 55187B, 55188B - Other Safety-Related Piping - Welding Activities - To be performed at various stages of construction.
- i. IP-55900B, 55901B, 57094B - Welding/NDE - Procedure review, material control, RT.
- j. IP-73051B, 73052B, 73053B, 73055B - Inservice/Preservice Inspection - Program review, work observations at 30% and data review at 50%.

2. Inspections Conducted at Millstone Unit 3

Proc. No. (*Priority I)	Report Number	Total Staff Hours	Latest Percent Complete	Latest Status
a. IP-55051B, 55053B, 55055B - Containment Structural Steel Welding				
55051B*	75-07 76-04 76-05	76-06 79-08	18	90
55053B*	76-05 76-06 76-07 77-01 77-02	77-04 77-05 77-08 77-12 79-08	75	50
55053C	81-04		2	
55055B*	76-04 76-05 76-06 76-07 77-01	77-02 77-04 77-08 77-12	23	30
b. IP-55061B, 55063B, 55064B, 55065B, 55066B - Safety-Related Structures - Welding				
55061B*	77-02 77-09		6	10
55063B*	77-01 77-08	78-05	5	20
55063C	82-04 82-06		10	
55065B*	77-01 77-08		3	10
55066B*	83-14		95	10
c. IP-55071B, 55073B, 55074B, 55075B, 55076B - Reactor Coolant Pressure Boundary Piping - Welding				

55071B*	77-06	81-02	16	30	
	79-02				
55073B*	79-02				C
55073C	81-11	82-06	97		
	81-14	82-08			
	81-15	82-11			
	82-03	83-02			
	82-04	83-05			
55074B	79-02				C
55075B*	79-02				C
55076B	79-02		95	10	
	83-14				

d. IP-55081B, 55083B, 55085B - Safety-Related Piping - Welding

55081B*	77-06		3	10	C
	79-02				
55083B*	77-09	83-14	36	90	
	79-02	84-02			
	81-02				
55083C	81-04	82-02	112		
	81-12	82-04			
	81-14	82-06			
	81-15	82-11			
55085B*	77-09	83-14	96	10	
	79-02				

e. IP-55093B - Reactor Vessel Internals - Welding

55093B*	82-15		34	10	
	83-01				

f. IP-55151B, 55152B, 55153B, 55154B, 55156B, 55157B, 55158B - Steel Structures and Supports - Welding Activities

55155B*	83-14		95	10	
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[Note - IP 55151B, 55152B, 55153B, 55154B, 55156B, and 55157B do not appear to have been implemented.]

g. IP-55171B, 55172B, 55173B, 55175B, 55176B, 55177B, 55178B - Reactor Coolant Loop Piping - Welding Activities

55171B*	79-05		24	20	
	81-10				
55172B*	79-05		17	10	
	81-02				
55173B*	81-02	82-15	32	20	
	81-10				
55175B*	81-10	83-14			
	82-10		106	10	
55176B*					
55177B*	82-10		4	50	
55178B*	81-10		9	30	

h. IP-55181B, 55182B, 55183B, 55185B, 55186B, 55187B, 55188B -  
Other Safety-Related Piping - Welding Activities

55181B*	81-10		9	40
55182B*	80-05		6	90
	81-10			
55183B*	80-05	83-08	29	90
	82-10	83-21		
	83-01	84-06		
55185B*	80-05	83-01	125	10
	81-10	83-08		
	82-10	83-14		
55186B*				
55187B*	82-10	83-08	15	90
	83-01			
55188B*	81-10		6	50
	82-10			

i. IP-55900B, 55901B, 57094B - Welding/HOE

55900B	84-06		4	90	
55901B*	84-06		2	100	C
57094B	83-14		42	100	C
	84-04				

j. IP-73051B, 73052B, 73053B, 73055B - In-service/Pre-service Inspection

73051B*	83-21		2	10
72051*	83-16		8	10
73053B*	83-21		2	10

[Note - IP-73052B and 73055B do not appear to have been implemented and the last inspection was performed in 1983.]

E. Miscellaneous Inspection Procedures

1. Program Requirements

- a. IP-30702B, 30703C, 35060B, 35061B, 35065B, 35100B, 36100B, 37051B, 37055B, 80220B, 92051B, 92053B, 92055B, 92700, 92700B, 92700C, 92701B, 92702, 92702B, 92702C, 92703, 92703B, 92703C, 92704B, 92705B, 92706, 92706B, 92706C - Various inspections during construction phase.

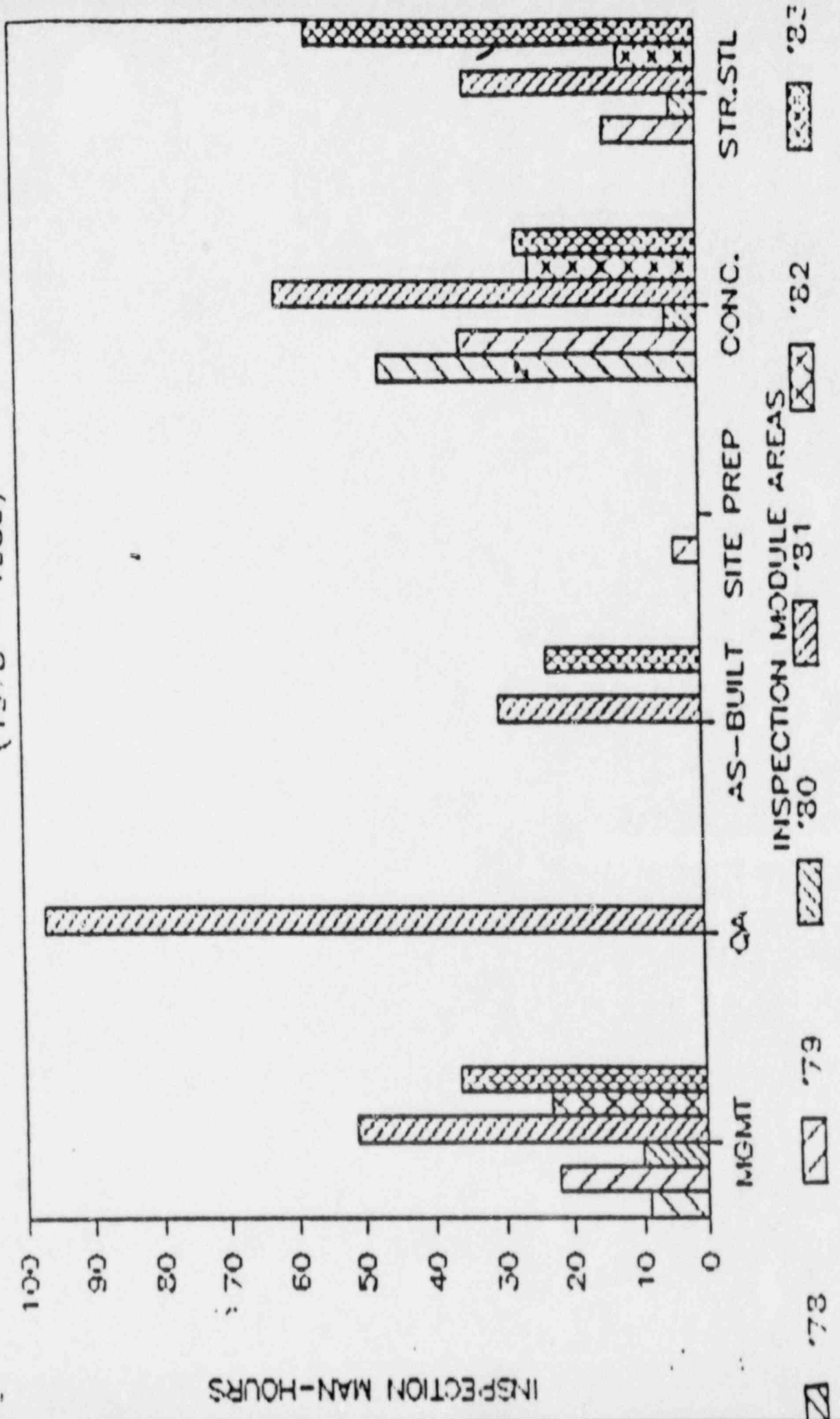
2. Inspection Conducted at Millstone Unit 3

<u>Proc. No.</u> (*Priority I)	<u>Report Number</u>	<u>Total Staff Hours</u>	<u>Latest Percent Complete</u>	<u>Latest Status</u>
30702B*	77-07 81-07	11		
30703B*	Performed as Required			



30703C*	Performed as Required				
35060B	81-02	84-04	53		
	81-11				
35061B	81-02		92	50	
	84-04				
35065B	81-02		24	60	
35100B	84-04		24	100	C
36100B	78-01		1	30	
37055B	81-02	83-16	115	50	
	83-12	84-04			
80220B	75-01	81-03	98	100	
	76-08	83-03			
	77-10	83-17			
	79-01				
92051B	76-01	77-11	30	100	C
	76-02	77-12			
	76-04	78-01			
92053B	76-01	76-05	16		
	76-02	76-07			
	76-04	78-02			
92055B	76-04		10		
	76-05				
92700	Performed as Required				
92700B	Performed as Required				
92700C	Performed as Required				
92701B*	Performed as Required				
92702*	Performed as Required				
92702B*	Performed as Required				
92702C*	Performed as Required				
92703*	Performed as Required				
92703B*	Performed as Required				
92703C*	Performed as Required				
92704B*	Performed as Required				
92705B*	Performed as Required				
92706*	Performed as Required				
92706B*	Performed as Required				
92706C*	Performed as Required				

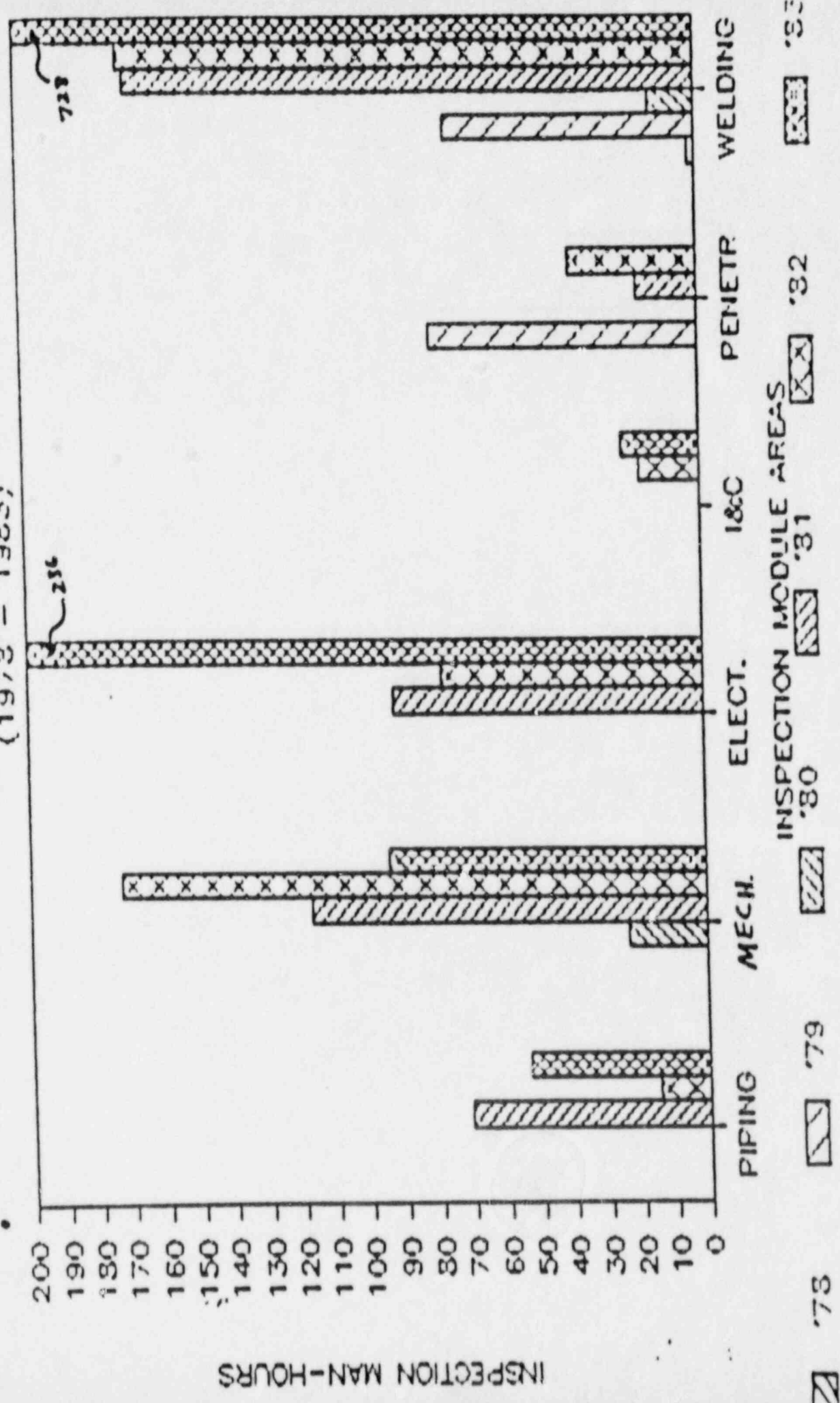
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INSPECTION MAN-HOURS

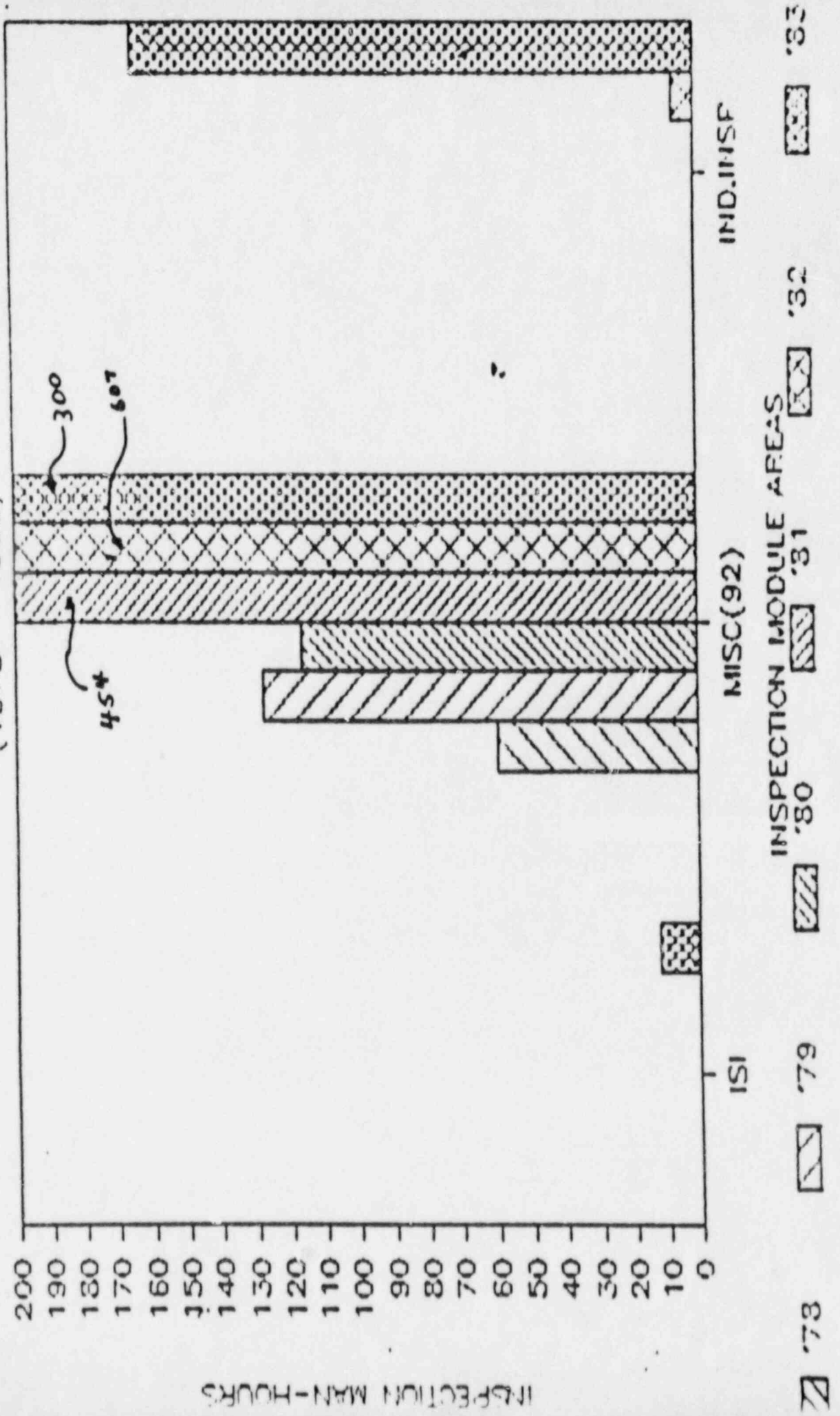
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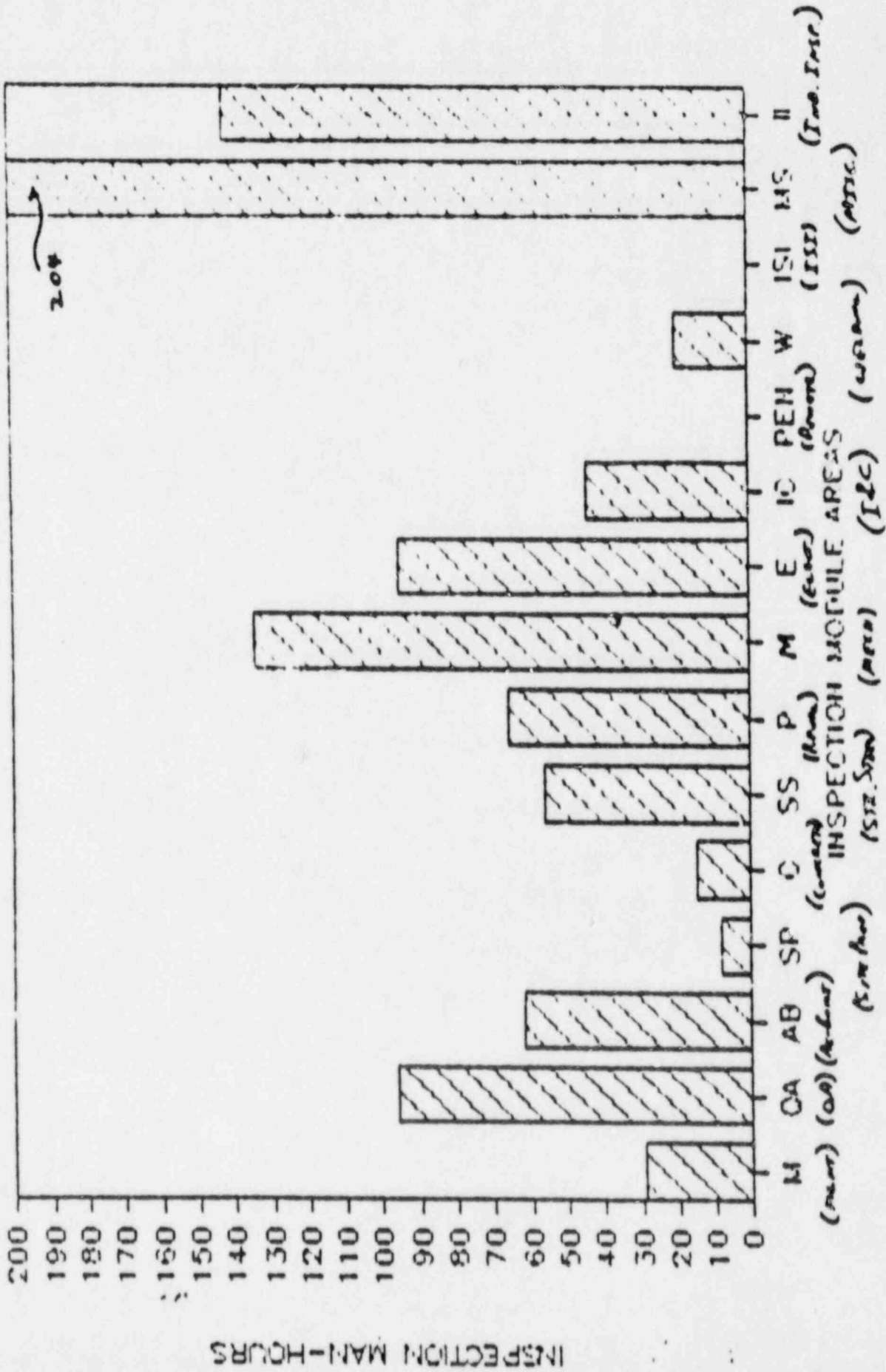
INSPECTION MAN-HOURS

# MILLSTONE UNIT 3 (1978 - 1983)



# MILLSTONE UNIT 3

1984



INSPECTION MAN-HOURS