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MEMORANDUM FOR: Document Control Desk

FROM: R. W. Borchardt, Chief
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Office of Nuclear Reactor Regulation

SUBJECT: PLACEMENT OF DOCUMENT IN THE NRC PUBLIC DOCUMENT ROOM

Please place the attached draft report on the Revised Construction Inspection Program, October 1996, in the NRC Public Document Room. An unbound copy of the report is also attached for your use.

Attachments: As stated

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DRAFT REPORT ON

THE REVISED

CONSTRUCTION INSPECTION PROGRAM

OCTOBER 1996

OFFICE OF NUCLEAR REACTOR REGULATION
DIVISION OF INSPECTION AND SUPPORT PROGRAMS
INSPECTION PROGRAM BRANCH

DRAFT REPORT ON THE REVISED CONSTRUCTION INSPECTION PROGRAM

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DRAFT REPORT ON THE REVISED
CONSTRUCTION INSPECTION PROGRAM

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ATTACHMENTS: Program Documentation

1. Draft Inspection Manual Chapter 2512

2. Tables of Inspection Procedures Assigned to Future Preoperation Phase Inspection Manual Chapters

3. Inspection Procedure Form and Content Guidance
   - Sample Inspection Procedures

4. CIP Information Management System (CIPIMS) Description

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CONSTRUCTION INSPECTION PROGRAM FOR EVOLUTIONARY AND ADVANCED REACTORS

I. EXECUTIVE SUMMARY

In 1991, the Office of Nuclear Reactor Regulation (NRR) started a revision to the Construction Inspection Program (CIP) governed by Inspection Manual Chapter (IMC) 2512, "Light Water Reactor Inspection Program - Construction Phase." The purposes of this project were to address programmatic weaknesses in the NRC construction inspections that had been identified during the licensing of several plants, and to develop an inspection program to meet the needs of evolutionary and advanced reactors. Program development continued into the mid-1990's, when, because of NRC staff resource constraints and a lack of nuclear power plant construction, the project was suspended upon completion of the program's generic features. The program described in this draft report presents a framework from which the CIP can be reactivated to support NRC inspections at a future nuclear power plant. At that time, many of the issues and assumptions described in this report will have been clarified, which will allow the CIP to be finalized. The revised CIP can be applied to plants licensed under either 10 CFR Part 50 or 52.

The CIP described in this document assumes that the program will be reactivated to support the first new construction project, and that the experience gained from the implementation of the CIP at this plant will be incorporated into further refinements to the program. This report describes the process and assumptions used in developing the new program, and forwards a draft revision to IMC 2512. New features of this inspection program include a continuous NRC onsite inspection presence that matches inspector expertise to inspection needs, an inspection procedure format that more clearly defines the attributes (and associated acceptance criteria) that must be inspected, and a dedicated CIP Information Management System (CIPIMS) that is to be used to implement the CIP in concert with the inspection manual. Many of the features described in the report, such as Sign-As-You-Go (SAYGO) and construction project sequencing, are the result of interactions between the NRC and the nuclear power industry, including the Nuclear Energy Institute.

Attachment 1 to this report is the draft revision to IMC 2512; attachment 2 contains tables of preoperation phase inspection procedures; attachment 3 provides inspection procedure format and content guidance; and attachment 4 provides a description of the CIPIMS.

II. BACKGROUND

A. HISTORY OF THE REVISED CONSTRUCTION INSPECTION PROGRAM

In 1991, the Office of Nuclear Reactor Regulation (NRR) began to revise the Construction Inspection Program (CIP) to incorporate lessons learned from previous construction experience and to accommodate requirements for future reactors that would be licensed under 10 CFR Part 52. The initial objectives for revising the CIP were established in references 12 and 13, and the staff's overall plan of action to develop the CIP were transmitted to the Commission in SECYs 92-436 and 92-134 (references 2 and 3, respectively). The revised CIP that resulted from this effort provides enhanced guidance and capabilities for the gathering, recording, and reporting of construction inspection information. The program improvements have centered on the use of a systems-based inspection planning methodology, computerization of the inspection program, and a continuous onsite inspection presence throughout plant construction.

At the start of program development, a working group was established to collate the construction inspection experience from throughout the NRC. This group pursued several avenues of inquiry, and the concepts that best suited the needs of the NRC were incorporated into the CIP revision. The more significant issues are discussed in various places within this report, and in the SECY papers pertaining to this topic (see references). The working group completed its activities in late 1992.

Two parallel, interdependent paths were taken in revising the CIP. One path, which revised the program's policies and structure, resulted in the draft documentation contained in this report. The other path was the development of a personal computer-based system that would assist future NRC staff in implementing the CIP.

Data Base Management System Development

As discussed in SECY 92-134, a data base development program was embarked upon to provide the capability to record inspection information in a retrievable and repeatable format. A contract was established with the US Department of Energy's Pacific Northwest Laboratory (PNL). Under this contract (JCN L-2502), PNL was to develop a series of relational data base management systems that would be integral to the revised CIP. The prototype system was developed for application by the NRC resident inspector office at the Bellefonte Nuclear Plant construction site, and could have been adapted to construction inspections at other sites at which construction might have resumed. The eventual objective of the JCN L-2502 project was to develop a more capable management system based on the lessons learned from developing the Bellefonte Data Base Management System (DBMS). This final system was intended for deployment at future nuclear power plant construction sites.

Data from the 268 Bellefonte construction inspection reports, which dated from the mid-1970's, was manually transcribed and categorized into a format that was compatible with entry into a data base. Late in the development of the Bellefonte DBMS, an electronic text search and retrieval capability, using ZYIndex software, was incorporated. In support of this, all of the Bellefonte inspection reports were scanned into electronic format. However, in late 1994, as part of a restructuring of its nuclear power program, the Tennessee Valley Authority (TVA) cancelled the Bellefonte project. Also, because there were no other deferred plants at which construction was resumed, the prototype DBMS was never deployed, and was therefore never field tested to see how well it assisted in the recording and display of inspection information during a construction project.

The main lessons learned from the Bellefonte DBMS were that, for such a system to be useful, it would need to be user-friendly (fairly simple to operate and easy to understand), and the inspection data would need to be collected and recorded in a structure that was compatible with a DBMS. Based on in-office testing, the staff found that, for computerizing the records of a **previously existing** body of construction inspection reports, the text search and retrieval capability was more useful than a data base in reconstructing the status of a construction inspection program. This characteristic was primarily due to the limited functionality of the DBMS, which resulted from the attempt to "force-fit" data that was never intended to go into a data base.

Experience at the Watts Bar Nuclear Power Plant

In 1994, during the final phases of construction inspection at Watts Bar, all the Watts Bar inspection reports were scanned into electronic format so that they could be searched with ZYIndex software. The objective of doing this was to allow NRC staff to assess the completeness of the construction inspections, which had been ongoing since the 1970's, at that site in preparation for the issuance of its operating license. Although this system did not precisely mimic the direction taken in the development of the data base system, the construction inspection program reconstitution effort at Watts Bar proved the viability of using computerized methods to store and retrieve inspection information, and to use that information to develop conclusions on the safety of a plant's construction and conformance to construction permit conditions in support of plant licensing.

Future Reactors

At the same time the revised CIP was being developed, NRR was developing policy for implementing 10 CFR Part 52. As part of this effort, NRR reviewed the designs for two evolutionary nuclear power plants, the General Electric (GE) Advanced Boiling Water Reactor (ABWR) and the Combustion Engineering (CE) System 80+. The staff intended to revise

the Bellefonte DBMS into a generic system that could conform to both the 10 CFR Parts 50 and 52 licensing processes. This generic system, called the CIP Information Management System (CIPIMS), is described in attachment 4 to this report. The CIPIMS and revised inspection program documentation were modeled on the GE ABWR, since this design was the farthest along in the 10 CFR Part 52 licensing process when CIPIMS development began.

For the future, NRR staff had intended to update the CIP and CIPIMS to design-specific versions as design certification was completed for different evolutionary and advanced nuclear power plant designs. These design-specific systems would then be modified into plant-specific versions as applications for construction permits or combined licenses were submitted by applicants and reviewed by the staff. Although the ABWR was used as the model on which to base the program's structure, very little effort would be required to adapt the program to a different design.

Suspension of CIP Development

In late 1994, because of a reevaluation of NRC priorities, and the lack of a final design certification for any plant, NRR decided to suspend the project to revise the CIP upon completion of the generic CIPIMS. The program was to be put in a condition from which development could be resumed at some time in the future upon receipt of a license application. This report is intended to achieve this objective.

B. LESSONS LEARNED FROM PREVIOUS NRC CONSTRUCTION INSPECTION EXPERIENCES, OBSERVATIONS FROM OTHER PROGRAMS AND ATTRIBUTES OF THE REVISED CIP

A variety of programs, activities, and experiences were researched in developing the revised CIP. Among these were the most recent NRC construction inspection programs that were implemented at US sites, including Seabrook, Comanche Peak, South Texas, Watts Bar, and Bellefonte. Also reviewed were nuclear power plant construction and inspection practices overseas and the use of modular construction techniques in the US shipbuilding industry.

The lessons learned and the associated attributes of the new CIP that are discussed in this section represent an amalgamation of the insights gained during the above reviews. The purposes of this section are to summarize experience that has been used in developing the CIP and to provide a list of issues that should be considered by the NRC staff when reactivating the CIP. Individual insights are not discussed in detail, nor are they mapped to their sources.

Inspection Program Management

- For future construction projects, the objectives of the inspection program should be derived from the conclusions that will be needed to support the NRC licensing decisions that will be made when construction is complete. This approach will enhance the likelihood that enough inspection data will exist to assess the adequacy of plant construction and readiness to commence operations. These objectives should be considered in establishing the inspection methodologies to be employed (e.g., inspection sample selection, inspection type, etc.) and the format and content of inspection documentation.

- In the past, construction inspections were often scheduled on the basis of inspector availability. Inspections were therefore performed on activities that happened to be in progress at the time of the inspection, resulting in a less-than-optimum sample selection. Because the revised CIP plans for a continuous onsite presence of inspectors, future construction inspections should be scheduled on the basis of construction progress. All aspects of the construction inspection program, including inspection planning, scheduling, preparations, and implementation, should be conducted in a way that will ensure all necessary attributes are properly inspected.

- The proper mix of skills and experience among inspectors, particularly during the NTOL phase at a plant, is necessary to ensure effective implementation of the inspection program.

- For future plants, the CIP must be able to support NRC action on a licensee's certification of readiness to load fuel, or that all ITAACs have been completed satisfactorily. The inspection staff should be fully aware, in advance, of all issues the licensee will address in its certification.

- To ensure expeditious closure of NRC activities at the end of construction, NRR and regional management must work together to ensure that the status of all inspection and licensing issues are tracked and raised to the appropriate level of management.

- Inspection results must be assessed to verify that inspection requirements are met, and that they support the objectives of individual inspection procedures and of the construction inspection program.

- In some past cases, the CIP did not consistently guide NRC inspectors and managers toward effectively integrating inspection findings. These failures to integrate findings generally resulted from both programmatic and implementation weaknesses.

To address this problem, the revised CIP incorporates the concept of significant findings, and the ability to group several findings to support one conclusion (like an ITAAC or a SAYGO point), in the CIP Information Management System (CIPIMS). This formalized structure for integrating findings will assist NRC managers in developing an accurate characterization of the adequacy of plant construction.

- A plan for the transition from the construction phase to the operations phase should be made well in advance of the completion of plant construction. This transition plan, which can be viewed as an exit strategy from the CIP, should be based on projected inspection workload, and must account for necessary turnover of issues.

- It is necessary to ensure that each phase of the preoperational inspection program is properly completed. To the maximum extent possible, all issues (such as licensee test exceptions or construction deficiencies) must be closed out before the programs are officially considered complete. Items that are carried over into the operating phase must be extensively documented, and, in particular, their closure requirements must be identified.

- The reduction of the number of resident inspectors assigned to a plant should be delayed until after the completion of construction and preoperational testing. This delay will limit the distractions on the operations resident inspectors by providing construction inspectors who can close out remaining open items and respond to any construction-related issues that emerge. This practice would also enhance the quality of the turnover of inspection responsibility from the construction phase to the operations phase. Resident inspection staffing should remain enhanced until acceptable operational performance has been demonstrated.

- There have been several cases in which allegations were filed very late in plant construction, and the NRC was not always ready to respond to the late filed allegations. NRC management should ensure that the agency's program for addressing allegations will allow the timely evaluation of the safety impacts, technical merit, and the impact on a plant's readiness to operate, of any contentions that surface late in the construction process. The improved inspection documentation required by the revised CIP will assist NRC management to appropriately and expeditiously review and evaluate any allegations before the authorization to operate is scheduled to be issued.

Inspection Program Structure and Implementation

The program must be structured to guide inspectors to inspect needed items, and to provide a coherent and simple method for them to record necessary information.

- o Onsite inspections should begin during site preparation before the COL or CP is issued. A continuous onsite inspection staff must be established and maintained throughout construction. To ensure that the wide variety of construction activities are covered by appropriately qualified inspectors, and because of the phased nature of many of those activities, the mix of expertise among the resident inspection staff should be rotated.

- o Inspection requirements should be made as objective as possible, lending themselves to clear determinations that critical attributes either have or have not been met. Establishing discrete, objective inspection requirements would limit the need for subjective interpretations of acceptability, and major inspection program conclusions can be based on a sizable body of accumulated objective information.

- o Objective inspection requirements should be established, to the maximum possible extent, for systems, structures, and components, as well as for plant programs. Each inspection procedure should clearly state how much inspection should be performed in crder to consider the procedure complete.

- o Constructing a plant in a short period of time means that activities will happen rapidly and in parallel with each other, which will place significant demands on inspection resources. Planning and scheduling therefore need to be closely coordinated with plant construction plans.

Inspection Documentation

At the end of the construction process, it will be imperative that the NRC possesses a fully documented body of inspection data to support the findings that need to be made to allow plant operation.

- o In some past construction projects, inspection reports did not fully document all areas that had been evaluated during plant construction. The resulting incomplete inspection documentation resulted in a lack of auditable trails that could be used to respond to questions raised during the process leading up to issuance of an operating license. Also, inspection reports did not always clearly identify the items that had been inspected in the plant.

The revised CIP requires that individual samples (such as identification numbers for welds, pipe supports, and cable terminations) be recorded in the CIPIMS. In addition, each construction inspection in the future should be considered satisfactorily complete only after supervisory or management personnel determine that the inspection is fully documented.

- In the past, NRC inspection reports generally focused on the deficiencies identified during the inspections, without providing much detail on positive inspection findings. Such unbalanced inspection reporting resulted, in some cases, in the NRC staff having to perform extensive reviews during the final stages of plant licensing to provide additional information to support licensing decisions. In some cases, the staff reperformed inspections that had already been done but had not been properly recorded. To reduce the necessity for performing such followup reviews, future construction inspections should document both satisfactory and unsatisfactory findings.

Quality Processes

- Because NRC inspections are done on a sampling basis, the CIP must guide inspections toward assessing the effectiveness of the licensee's quality programs. To the extent possible, all construction inspections should assess QA/QC effectiveness, and the results must be thoroughly documented and integrated. Ideally, the breadth and depth of the NRC's verification that a plant's QA/QC is effective will be such that any demonstrated or alleged lapses in quality can be shown to be isolated in nature, as opposed to being generic.

- The assessment process must begin with inspections of the design engineering process, including engineering quality assurance, to ensure that the licensee can accurately translate high level design requirements into detailed engineering and fabrication drawings.

- The licensee's management of quality control records is an integral part of the quality process. In order to verify the overall adequacy of licensee QA records management process, the CIP must inspect all aspects of QA/QC records, from creation through storage.

- o The identification of construction problems, and the timeliness and extent to which they are corrected, are effective measures of licensee management's control over onsite activities. NRC experience shows that, if the licensee deals thoroughly with corrective action, including the identification and correction of root causes, there is a good chance that the overall quality of the construction is good. If these areas are weak, it is likely that there are lapses in quality; such a case would be evident if repetitive problems occur.

Future Construction Techniques

Throughout the development of the revised CIP, it was assumed that future plants will be built with extensive use of modular construction techniques in order to meet the rapid construction goals that have been established by the nuclear industry.

- o Because of the expected rapid pace of future nuclear power plant construction, the NRC will need to exert more effort than in the past to ensure that construction inspection does not become a critical path activity. A scheduling program has been included in the CIPIMS to assist in inspection planning.

- o To assist in more effective inspection scheduling, the licensee's construction plan should be incorporated, if possible, into the construction inspection schedule. This schedule should be updated as the construction plan is modified.

- o Technical reviews and design engineering inspections should begin in conjunction with application review, since initial design engineering will be done during this phase.

- o Depending on the extent of modular construction employed, the inspection staff should consider the locations at which inspections need to be performed. In general, however, critical attributes should be inspected onsite to the maximum feasible extent.

- o Scheduling modular construction inspections may be difficult, since the fabrication of modules and major plant components could begin many months before the COL is issued and the first structural concrete is poured.

- o The development of new engineering design technologies will need to be accounted for as the inspection procedures for the revised 2511 and 2512 inspection programs are developed. For example, it is likely that computer aided engineering (CAE) will be used to perform detailed plant design. The NRC currently has no guidance for inspecting CAE.

- o A licensee's plans to transport and install modules in a plant need to be assessed to identify potential modes of degradation. Modules will require inspection to verify that they have not degraded during transit or installation. Examples include: verifying that a licensee applies enough additional stiffening to a module's structure to allow it to be lifted, and; ensuring that modules are able to be lifted from the top, as well as being supported from beneath.

- o Depending on the extent and location of automated welding, there may be opportunities to economize NRC inspection resources if repeatable, high quality processes are verified to be in use.

C. EXPECTED LICENSING AND CONSTRUCTION ENVIRONMENT

The purpose of this section is to outline aspects of the expected licensing and construction environment that will impact the structure and implementation of the CIP.

The assumptions used in this section were derived from a variety of sources that were reviewed throughout CIP development, including the projected use of advanced/modular construction techniques and resulting construction inspection requirements for evolutionary LWRs. When the CIP is reactivated, the staff should review the actual licensing and construction environment, identify conditions that differ from those discussed here, and modify the CIP as necessary.

Licensing

Future US nuclear power plants may be licensed under either 10 CFR Parts 50 or 52, as discussed in references 1, 2, 3 and 5. The CIP, including IMC 2512 and the CIPIMS, has been structured to accommodate either licensing method. Because 10 CFR Part 52 includes ITAACs, it is the more limiting process in terms of constraints on the CIP. The CIP has therefore been modeled around 10 CFR Part 52. In terms of the CIP, the only substantial programmatic difference between the two licensing methods is that, for plants licensed under 10 CFR Part 50, matters pertaining to ITAACs can be truncated from the CIP without any adverse impact on the remainder of the inspection program.

POSTULATED COMPOSITE CONTRUCTION AND LICENSING SCHEDULE

QUARTER: -8 -7 -6 -5 -4 -3 -2 -1 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Activity ID	
MLSTN00001	Application for Combine License Submitted
MLSTN00002	Begin Site Preparation
MLSTN00003	Start Excavation
MLSTN00004	Begin RPV Fabrication
MLSTN00005	Start Offsite Fabrication of Systems/Modules
MLSTN00006	Start Turbine Building Construction
MLSTN00007	Issue Combined License
MLSTN00008	Inspect Bedrock
MLSTN00009	Start Basemat/First Concrete
MLSTN00010	Start Onsite Electrical Work
MLSTN00011	Start RCCV Fabrication
MLSTN00012	Start Onsite Mechanical Work
MLSTN00013	Complete Turbine-Generator Pedestal
MLSTN00014	Install RPV
MLSTN00015	Issue Notice of Intent to Operate
MLSTN00016	Receive Petitions
MLSTN00017	Complete ITAAC Verification - Licensee
MLSTN00018	Commission Issues ITAAC Completion Finding
MLSTN00019	Fuel Loading
MLSTN00020	Startup Testing Begins
MLSTN00021	Facility Turnover to Operations
MLSTN00022	Start of Commercial Operation

ASSUMPTIONS

a. 18 months of site preparation are needed before the first concrete pour.

b. The first concrete pour for the basemat starts immediately after the combined license is issued.

c. Fuel load occurs 48 months after the first concrete pour.

d. Commercial operation starts 54 months after the first concrete pour.

e. Startup testing begins immediately after the NRC makes its ITAAC completion finding.

ACRONYMS

RPV - Reactor Pressure Vessel

RCCV - Reinforced Concrete Containment Vessel

ITAAC - Inspections, Tests, Analyses, and Acceptance Criteria

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Figure W

The new CIP was developed in parallel with the design certification processes of two evolutionary LWR designs, the General Electric Advanced Boiling Water Reactor (GE ABWR) and the Combustion Engineering System 80+. The ABWR was used as a generic model for the CIP, since its draft certified design material was the more fully developed of the two at the time CIP development began. The use of the ABWR example to provide a structure for the program and its information management system will have no substantive impact on CIP reactivation because the CIP will need to be customized for each future plant, regardless of its design. The CIP will also apply equally well to any advanced LWR designs.

Construction

Future US nuclear power plants are likely to be built more rapidly than their predecessors. The basic goals assumed in developing the CIP were: the first evolutionary LWR will be built in 54 months from the first concrete pour to commercial operation; and, there will be 18 months of site preparation work before the first concrete pour, followed by 48 months until fuel load.

This shorter time compared to previous US nuclear power plant construction projects will be achieved by the following actions:

- The detailed engineering design will be essentially complete by the start of construction;
- Advanced construction techniques will be used to improve efficiency and shorten construction time --
  - modular construction techniques will allow several different fabrication activities to be done in parallel, rather than sequentially.
  - modularization will permit craft work to be done away from the immediate construction site, reducing the number of people who need access to a given plant area at the same time.
  - extensive use of multiplexing will reduce the overall number of cable raceways and cable pulls, thus simplifying plant design, cutting overall construction effort, and reducing cost.
- Fabrication of plant modules and major components are expected to begin well before COL issuance. For example, the generic CIP assumes that a reactor pressure vessel (RPV) will require just under three years from start of manufacture to installation in the plant. The CIP also assumes that RPV installation will occur about two years after COL issuance; this will result in RPV fabrication

beginning about nine months before COL issuance. Similar scenarios could occur for other major plant components and modules. The net result of these early starts of fabrication will be that hardware inspections will need to begin before the start of onsite construction.

- Plant construction will rely heavily on detailed planning and scheduling to integrate design, procurement and fabrication requirements. The CIP assumes that this planning will occur in advance of the start of site preparation work.

To effectively inspect such a construction project under these assumptions, the CIP should allow for the following:

- The NRC will need a group of several inspectors dedicated to the project to perform the required inspections of construction activities occurring in parallel both on- and off-site, and;

- The core of the project inspection team will need to be established well before ground breaking to allow them to gain a detailed familiarity with the construction master plan and plant engineering design, and to develop the NRC's inspection plan for the project.

The Postulated Composite Construction and Licensing Schedule (Figure W), which depicts major milestones in the licensing and construction of a new nuclear power plant, is based on the above assumptions. Some of the milestones represent the most limiting cases in terms of available planning time for the NRC. These milestones are intended to provide a conceptual planning framework for future NRC construction inspections, and should not be construed as regulatory expectations that the staff intends to impose on future applicants and licensees.

Sign-As-You-Go (SAYGO)

Because of the expected rapid pace of plant construction, and the need for the NRC to systematically inspect a wide range and depth of construction activities, the staff anticipates that extensive coordination between the licensee and the NRC will be required. This coordination could be done by instituting a Sign-As-You-Go (SAYGO) process. The possibility of including SAYGO in the CIP was first discussed in SECY 92-134, "NRC Construction Inspection Program for Evolutionary and Advanced Reactors Under 10 CFR Part 52" (reference 3). For each future construction project, the mechanics of the SAYGO program will need to be negotiated between the licensee and the NRC staff. The use of a SAYGO process would be voluntary on the part of a licensee.

As discussed in SECY 92-134, SAYGO is a structured method to establish that regulatory commitments have been met, to enhance the stability and predictability of the licensing process, and to identify and resolve construction problems early in the project so as not to adversely affect the licensing process. At a nuclear power plant construction site, SAYGO would be a phased verification program in which the licensee certifies to the NRC that certain aspects of construction have been completed adequately, and the NRC staff would perform direct inspection to verify that the certification is accurate. These licensee certifications and NRC verifications would occur at review points, known as SAYGO points, that the NRC would identify in conjunction with the licensee in the early phases of the construction project. The SAYGO points to be met throughout construction should be established before the first structural concrete pour occurs, and should include milestones for ITAAC verifications and significant inspection findings. It should be noted that a SAYGO concept does not include the use of "hold points" at various stages of construction.

SAYGO could be implemented for plants licensed under either 10 CFR Parts 50 or 52. For plants licensed under 10 CFR Part 52, the NRC and licensee could establish links between SAYGO points and ITAACs. A comprehensive SAYGO program could connect various construction and verification activities and provide inspection continuity from site preparation through start-up testing and commencement of full-power operation. The NRC's construction inspection procedures would provide the inspection requirements for determining if the sign-as-you-go activities are acceptable.

For a SAYGO process to work, the licensee and the NRC must agree on the following before plant construction begins:

- o the mechanics of the SAYGO implementation process;
- o content and timing of SAYGO points;
- o acceptance criteria for each SAYGO point.

The staff's verifications that SAYGO points are complete would have the stature of inspection findings, and would not be licensing decisions. Also, there is no assurance that satisfaction of SAYGO criteria will preclude those criteria from coming under scrutiny during a licensing hearing or during the Commission's deliberations regarding the authorization to load fuel.

The CIP Information Management System (CIPIMS) structure can accommodate SAYGO in a variety of ways:

- The NRC and the licensee could identify systems-based milestones, along with critical attributes and acceptance criteria. These could then be tied either to specific inspection procedures (IPs); or, temporary instructions (TIs) could be developed, one for each SAYGO point. The TIs could be self-contained, their critical attributes could be linked to attributes in specific IPs, and credit could be given to both the IMC 2512 inspection and the SAYGO process.

- Instead of a systems-based SAYGO structure, the NRC and licensee could adopt a time-phased approach consisting of SAYGO points at regular intervals, in which the progress made on individual systems and structures would be assessed up to that time in construction.

In the future, when the CIP is reactivated for inspecting a new construction project, the NRC staff should review SECY 92-134 (reference 3) for additional background on how SAYGO would be applied for plants licensed under 10 CFR Part 52. NUREG-1278, "Vogtle Readiness Review," (reference 4) should also be reviewed for lessons learned from the implementation of SAYGO at the Vogtle nuclear power plant in the 1980's.

III. CIP IMPLEMENTATION

A. OVERVIEW OF PREOPERATION INSPECTION PROGRAMS

The revision of the Inspection Manual Chapter (IMC) 2512 Construction Inspection Program will necessitate some redistribution of inspections among the four NRC inspection programs for preoperational nuclear power plants. This section outlines the projected scope, for future nuclear power plants, of the following Inspection Manual Chapters (IMCs) of the Light Water Reactor Inspection Program:

IMC 2511	Pre-CP Phase
IMC 2512	Construction Phase
IMC 2513	Preoperational Testing and Operational Preparedness Phase
IMC 2514	Startup Testing Phase

The tables that follow this overview list the existing inspection procedures that currently apply to each program, along with their proposed distribution among the various programs following CIP revision. Also listed in the table are inspection procedures that should be developed to support CIP implementation.

2511 - Pre-Construction Permit (Pre-CP) Phase

For future plants, this program is expected to be similar in scope and applicability to the existing IMC 2511 program for site characterization and preparation activities. The Pre-CP inspection program's focus will be on QA programs and implementation; site preparations including installation of services, support facilities, and non safety-related systems, structures, and components; and environmental protection considerations. Inspections of activities authorized by an Early Site Permit (ESP), if applicable, should be conducted under this inspection program. The Pre-CP program should be completed at about the same time as a plant's combined license (COL) or CP is issued. The IMC 2511 program is expected to run concurrently with the CIP for several months because, as discussed earlier in this report, construction inspections will probably start before COL or CP issuance. The results of the Pre-CP inspections will provide the initial baselines of several construction phase inspections, particularly in the quality assurance area.

IMC 2511 will need to be reviewed and revised, regardless of the method used to license a future plant, to ensure that it is compatible with the revised CIP. One item requiring significant attention will be the ESP process, especially identifying the scope of, and demarcations between, licensing reviews and inspections. Beyond identifying IMC 2511

inspection procedures that could apply to the CIP, no substantial activity has been performed to update the Pre-CP inspection program under the CIP revision project. Therefore, when the NRC staff reactivates the preoperational inspection programs for a future plant, a "zero-based" review of the IMC 2511 inspection program should be performed.

2512 - Construction Inspection Phase

This program applies to the construction phase and will be implemented as discussed in this report. The scope of the revised CIP has been established to encompass all activities that might impact ITAAC verification. The revised CIP therefore includes activities that are currently addressed in IMCs 2511 and 2513, in addition to the current IMC 2512. The revised CIP focuses on design work, ITAAC verification, QA programs and implementation, construction processes, and preoperational testing. Many inspections similar to those previously performed for preoperational testing under IMC 2513 have been included in the revised CIP to maintain continuity with plant systems inspections and ITAAC verification. The CIP will end when fuel load is authorized or an operating license (OL) is issued, as applicable.

2513 - Preoperational Testing Phase

This program will start during the last part of the construction phase and will continue through low power testing. Inspections will remain similar to those included in the current version of IMC 2513, with the major exception of those inspections that would verify ITAAC completion. The operational readiness team inspections performed under this program will focus on management oversight, QA program and implementation for operations, plant procedures, operations, maintenance, plant support (radiological controls, security, EP, chemistry, training, and fire protection) and operator licensing. Aside from identifying IMC 2513 inspections that would apply to the revised CIP, the Preoperational Testing inspection program was not revised as part of the CIP revision project.

2514 - Startup Test Phase

This program will start at fuel load authorization or OL issuance, as applicable, and end when the plant enters the operational phase, at which point the operations inspection program will be implemented at the plant. The startup testing inspection program is expected to be similar in scope and content to the existing 2514 program, although some revisions will likely be needed to accommodate evolutionary and/or advanced reactor designs.

B. CIP DESCRIPTION

The revised CIP consists of two major components, draft IMC 2512 and the CIPIMS. These components are closely integrated, and must be used together.

The draft IMC 2512 included in this report details the CIP's structure, inspection planning and scheduling requirements, and interfaces with other programs. It is designed to provide a generic framework on which the NRC inspection program can be implemented at a future nuclear power plant construction site. When CIP development is resumed, the draft IMC 2512 must be finalized. The CIPIMS is described in attachment 4 to this report. The staffing and organizational requirements of the CIP are discussed in the CIP Reactivation section of this report.

Inspection Sampling

The draft IMC 2512 does not contain detailed guidance for selecting inspection samples. As part of CIP reactivation, policies for inspection sampling must be developed and included in the final IMC 2512, and corresponding guidance should be incorporated into construction inspection procedures. Sampling policies and guidance should be approved for use by cognizant NRC managers.

During CIP revision, NRR staff investigated the use of statistical methods and probabilistic safety assessments in identifying areas that should be inspected. These two topics are briefly discussed in the following paragraphs.

Statistical Methods

Several approaches to inspection sampling were considered during the development of the CIP revision. One approach that was discussed in references 1 and 2 was the development and implementation of statistical sampling methods with the goal of obtaining, at the end of a plant's construction phase, a confidence statement about the quality of plant construction. This statement could potentially be applied to either the plant as a whole, or it could consist of a series of statements about various aspects of plant construction (e.g., concrete pouring, pipe welding, etc.). Because of staff resource limitations and time constraints, no detailed research along these lines was performed beyond identifying the scope of the issue, as discussed here.

The major difficulty with applying statistical sampling to a nuclear power plant construction inspection program would arise from the attempt to make confidence statements about the many non-homogeneous processes that occur in phases at a construction site. This characteristic

contrasts with continuous processes, such as factory assembly lines, in which activities occur in a standardized, repetitive manner under controlled conditions, and which result in large populations of inspectable items. A confidence statement comprised of non-homogeneous items (for example, cable routing and snubber installation) may not be statistically valid.

During development of the revised CIP, the staff did, however, identify past examples in which statistically based inspection sampling was used with success. These examples included assessing the adequacy of a large population of completed welds in safety related piping systems at one nuclear power plant, and assessing the adequacy of containment coatings at another plant.

In the mid-1970's, the NRC performed a series of statistically based operating phase inspections at Three Mile Island Unit 1. The evaluation of this trial inspection program was forwarded to the Commission on February 11, 1977 by reference 14. These inspections were done independently of, and in parallel with, the traditional NRC inspection process. This trial program showed that strictly statistically based sampling was, on balance, not an optimal method of inspection planning because: the statistical method identified no significant safety concerns that the traditional method failed to identify; the traditional method successfully identified significant safety concerns that the statistical method did not identify, and; the statistically based method was comparatively more resource-intensive.

In summary, except in unique applications with fairly narrow scopes and homogeneous sample populations, NRR managers concluded that the use of statistical sampling methods in construction inspections was of limited utility. When the CIP is reactivated, the application of statistically based sampling methods to specific sample populations should be reevaluated.

Probabilistic Risk Assessment (PRA) Insights

In developing the revised CIP, the staff identified some methods for incorporating PRA insights into construction inspections. These methods should be developed further when the CIP is reactivated, and should be based on the PRAs that would be included in the material supporting a plant's license application. The NRC should perform sensitivity, uncertainty, and importance analyses to identify those plant SSCs whose passive failure (due to inadequate construction) would most greatly impact the plant's risk profile. In this way, the more risk significant SSCs would be identified, and construction inspection samples could be skewed toward those SSCs.

C. INSPECTION FINDINGS AND INSPECTION FOLLOWUP

The majority of the following discussion will focus on CIP inspection findings of various types. As used here, the term "finding" applies to a statement by NRC management regarding some aspect of plant construction; these findings will be based on the results of construction inspections. The final portion of this discussion will briefly address the identification, tracking, and closure of inspection results that require inspector followup.

The Need To Make Findings

As has been stated elsewhere, the fundamental purpose of the CIP will be to verify that plants are built according to their designs. CIP findings will:

- provide bases for NRC management conclusions, such as those required by:
  - 10 CFR 50.57
  - Inspection Procedure (IP) 94300, "Status of Plant Readiness for an Operating License"
  - construction permits, or
  - combined licenses (including inspections, tests, analyses, and acceptance criteria (ITAACs));
- support agency conclusions on the adequacy of generic construction activities/processes, and;
- inform the licensee and the public of the progress of the inspection program.

Types of Findings

Although there are significant differences in the findings that must be made under 10 CFR Parts 50 and 52, respectively, the inspection activities that support these methods are essentially the same.

10 CFR Part 50 plants: Under 10 CFR Part 50, issuance of the construction permit resolves only questions regarding the general aspects of design and construction of the proposed facility. The details of the plant design, the nature of the tests and inspections to be performed to verify that the design and construction are completed in an acceptable fashion, and the criteria for evaluating the adequacy of the design and construction, are generally not available at the time of issuance of the construction permit. As a result, issues remain to be resolved prior to issuance of the operating license. Section 50.57 contains a range of findings that must be made with respect to these

issues, and the CIP is generally structured to support management's ability to make the findings. In some cases, as specified in Section 50.57, the Director of Nuclear Reactor Regulation can make these pre-licensing findings.

For plants licensed under 10 CFR Part 50, CIP inspection results will be used to assess a plant's readiness to be granted an operating license. This assessment is currently made by the cognizant regional administrator under IP 94300, who would provide a recommendation to the Director of Nuclear Reactor Regulation for issuing an operating license.

10 CFR Part 52 plants: For plants licensed under 10 CFR Part 52, the output of the CIP will be used to support a staff recommendation to the Commission regarding a licensee's readiness to load fuel. As part of issuance of a combined license (COL), the NRC will approve details of the plant design, the nature of the tests and inspections to be performed to verify construction, and the acceptance criteria for construction. Section 52.103 provides that, once construction has been completed, the finding that must be made is limited in scope to a determination that the pre-approved inspections, tests and analyses have been performed and the associated pre-approved acceptance criteria have been met. It is the licensee's responsibility to perform all required ITAACs, while the NRC staff's role is to verify satisfactory licensee completion of ITAACs. One of the functions of the CIP for plants licensed under 10 CFR Part 52 is to guide NRC verification of the licensee's completion of ITAACs so that the findings specified in Sections 52.99 and 52.103 can be made.

Several policy issues related to the impact of inspection results on ITAAC verification remain under consideration. These issues, which must be resolved before the reactivated CIP is implemented, are summarized in the policy issues section of this report.

a. <u>10 CFR Part 52.99</u>: 10 CFR Part 52.99 states, in part, that at "appropriate intervals during construction, the NRC staff shall publish in the Federal Register notices of the successful completion of inspections, tests and analyses." These notices will document that the licensee has informed the NRC of ITAAC completion, and that the NRC staff has verified this completion. The exact protocol of licensee notification to NRC of ITAAC completions, NRC staff verification of the same, and the subsequent publication of the Federal Register notice, remains to be established. The following discussion presents some concepts on this topic that should be considered in establishing these protocols.

   As discussed previously in this report, some ITAAC verifications will be relatively simple, in that they will involve comparisons of system performance measurements and observations against established

criteria. ITAACs of this type will normally be accomplished within a well-defined period during construction and will have well-defined documentation of satisfactory completion. Examples of such ITAACs from the GE ABWR design certification ITAACs (reference 11) include: verification that alarms exist or can be retrieved in the main control room for a particular system, verification that water is pumped by a system at greater than a prescribed minimum flow rate, and verification that prescribed system valve interlocks function. Because these ITAACs are limited in scope and will be completed over a short time span (mostly as part of preoperational testing), they will require comparatively little effort for verification and subsequent notification in the Federal Register in accordance with 10 CFR Part 52.99.

In contrast, other ITAACs will be accomplished over long periods of time. For these ITAACs, many separate inspections will be performed over a long period of time to verify their different attributes. When the final construction activity associated with a particular ITAAC is completed, the sum of the results of these inspections will support the conclusion that the ITAAC has been met. It is envisioned that NRC verification that these ITAACs are met will rely on a combination of inspections performed on respective systems, structures, and components (SSCs) and of significant inspection findings, which are discussed in detail below.

For example, one of the 13 ITAAC acceptance criteria for the ABWR control building (C/B) reads as follows: "The as-built C/B has a main control area envelope separated from the rest of the C/B by walls, floors, doors and penetrations which have a three-hour fire rating."

The construction activity associated with this ITAAC could span an estimated three and a half years. The staff's activities to verify that this ITAAC is met will not wait for field activity to start; rather, part of the staff's assurance that this ITAAC is met will involve verification that engineering details will properly implement the high-level design commitments pertaining to the control building. This could involve inspections that verify that the prescribed thickness of the control building wall or floor will result in a three-hour fire rating, or could verify that the purchase specifications for the control building have properly prescribed the attributes of a door that will possess a three-hour fire rating. When the results of these inspections are coupled with inspector verification of proper installation, there would be high confidence that the acceptance criteria of the inspections, tests and analyses have been met.

NRC verification that this control building ITAAC has been satisfied will also depend on observations of licensee activities for similar

attributes elsewhere in the plant. Assuming these activities are satisfactory in terms of the processes and materials used, as well as the effectiveness of the quality assurance oversight, these observations can contribute to the conclusions regarding the fire protection envelope in the control building. The character of these other observations, and the extent to which they would apply to this ITAAC, will need to be determined in accordance with the resolutions of policy issues during the reactivation of the CIP.

The concepts discussed above are very similar to the notion of significant inspection findings, which are discussed later in this section.

b. 10 CFR Part 52.103(g): This section states: "Prior to operation of the facility, the Commission shall find that the acceptance criteria in the combined license are met." Since IP 94300 will also apply to plants licensed under 10 CFR Part 52, the content of this inspection procedure will need to be revised to accommodate the finding on the status of ITAAC completion.

Sign-As-You-Go (SAYGO): As discussed earlier in this report, a SAYGO program of inspection milestones, known as SAYGO points, jointly agreed on between the NRC and a licensee could be implemented at a future nuclear power plant construction project. As the criteria for each SAYGO point are successfully met by the licensee and verified by NRC, their completion would be documented in inspection reports (IRs). At the option of NRC management, these SAYGO completions could be noticed in the Federal Register; however, the agency has not yet established a policy for this matter. SAYGO could be applied to any future plant, regardless of its licensing method.

SAYGO points can be viewed functionally as analogous to ITAACs, except that they are not specifically provided for in 10 CFR Part 52. Although some SAYGO points could be tied to ITAACs, the SAYGO process is separate from ITAAC verifications.

Significant inspection findings: The concept of significant inspection findings was introduced in SECY 94-294, "Construction Inspection and ITAAC Verification" (reference 1), as a mechanism to announce broad staff conclusions regarding significant construction activities or processes. These findings are intended to be NRC staff actions to assist in managing the inspection program, and they should be based on aggregated inspection results documented in the CIPIMS. At its option, the staff may coordinate significant inspection findings with applicable ITAACs and SAYGO points. Significant inspection findings are not required by regulations, and they should be used strictly as an NRC program management tool and as a vehicle for public notice. The following discussion contains many similarities to the outlines discussed above for ITAAC verification and SAYGO.

In the past, the staff's judgments about construction acceptability have been based largely on the determinations of the acceptability of generic aspects of plant construction, be they processes or the as-built acceptability of hardware items found throughout the plant. The revised CIP will incorporate, and enhance, this philosophy by formalizing and publicizing these judgments through the use of significant inspection findings. The following items have been identified as possible candidates for significant inspection findings:

- site preparation
- structures
- equipment fabrication
- equipment placement
- equipment operation
- geotech/foundations
- structural concrete
- masonry
- concrete expansion anchors
- structural steel and supports
- safety related piping
- pipe supports and restraints
- mechanical components/equipment
- heating, ventilation and air conditioning
- electrical components
- electrical cable and terminations
- instrumentation and controls (I&C) components
- I&C tubing and supports
- penetrations
- welding
- non-destructive examination
- reinforcing bar (including couplings)
- quality assurance/quality control programs
- training
- personnel qualifications
- equipment and material qualifications
- records
- measuring and test equipment

Most of these elements apply, in one way or another, across a variety of SSCs throughout a nuclear power plant. Because of the sampling nature of NRC construction inspections, it is not feasible to inspect each of these elements for each system or structure in the plant. Rather, a broad sample of each element should be inspected, and an inspection finding pertaining to each element should be made. Each of these findings could then be applied throughout the plant. The above list is not intended to be all-inclusive, and items can be added, combined, or deleted as necessary during CIP reactivation.

When to Make Findings

When the NRC project team is formed, one of its major activities will be to develop the site specific inspection plan. During this planning stage, the staff must determine the significant inspection findings that will need to be made during plant construction, what body of inspections will be used to make the significant findings, and when the findings will be made. These significant findings will also need to be tied, as necessary, to specific ITAACs. If a SAYGO process is used, the interface of the findings with SAYGO points must be clearly identified.

These planning activities should be completed before the COL or CP is issued to ensure that the regulatory plan of action is as clear as possible by the time construction begins.

Significant inspection findings: Significant inspection findings should be made early in the chronological process of installing a particular type of component or commodity. For example, a finding on reinforcing bar installation could be made when 25% of all reinforcing bars have been installed. This finding would remain effective for the construction period, and its validity would be periodically verified by NRC inspections.

The initial inspections that support significant inspection findings will need to use fairly comprehensive and extensive IPs that are structured to validate given activities or processes. Once the significant findings are made, subsequent inspections to periodically revalidate the findings will use the same IPs, but with their scope reduced. It must be emphasized that a finding made at the 25% point could not be considered the NRC's final conclusion on a particular activity, since the inspected activity will continue.

Management of Findings: Inspection activities that impact a significant inspection finding will be tracked using the CIPIMS. This can be done by determining which IP occurrences will apply to a given significant finding, ITAAC verification, or SAYGO point.

a. Significant Inspection Findings: Consider the installation of structural concrete at an ABWR as an example of how to set up the inspection plan to make a significant finding. As can be seen in the hypothetical extract of a plant construction and inspection schedule shown in Figure X, there are three inspection procedures pertaining to this activity: IP 46051, "Structural Concrete Procedure Review;" IP 46053, "Structural Concrete Work Observation;" and IP 46055, "Structural Concrete Record Review." To allow for early inspection of concrete installation activities (if needed), the first occurrence of each procedure is shown on the schedule as occurring before COL issuance. For the purposes of this example, the first opportunity for performance of all three inspection

STRUCTURAL CONCRETE SIGNIFICANT FINDING

Act ID	Description
01 - MAJOR MILESTONES	
1010	Concrete Installation
1020	Issue Combined License
1030	Start Reactor Bldg Basemat
1040	Start RCCV Fabrication
1050	Install Reactor Pressure Vessel
02 - SYSTEM MILESTONES	
2010	Control Bldg Concrete Complete
2020	RadWaste Bldg Concrete Complete
2030	Turbine Bldg Concrete Complete
2040	Service Bldg Concrete Complete
2050	Reactor Bldg Concrete Complete
03 - INSPECTION ACTIVITIES	
03.01 - Concrete Procedures Review (IP 46501)	
3011	1st Inspection (4 hours)
3012	2nd Inspection (40 hours)
3013	3rd Inspection (4 hours)
3014	4th Inspection (4 hours)
3015	5th Inspection (4 hours)
03.02 - Concrete Work Observation (IP 46503)	
3021	1st Inspection (8 hours)
3022	2nd Inspection (80 hours)
3023	3rd Inspection (8 hours)
3024	4th Inspection (8 hours)
3025	5th Inspection (8 hours)
03.03 - Concrete Record Review (IP 46055)	
3031	1st Inspection (8 hours)
3032	2nd Inspection (40 hours)
3033	3rd Inspection (8 hours)
3034	4th Inspection (8 hours)
3035	5th Inspection (8 hours)
04 - SIGNIFICANT FINDINGS	
4010	Structural Concrete Significant Finding

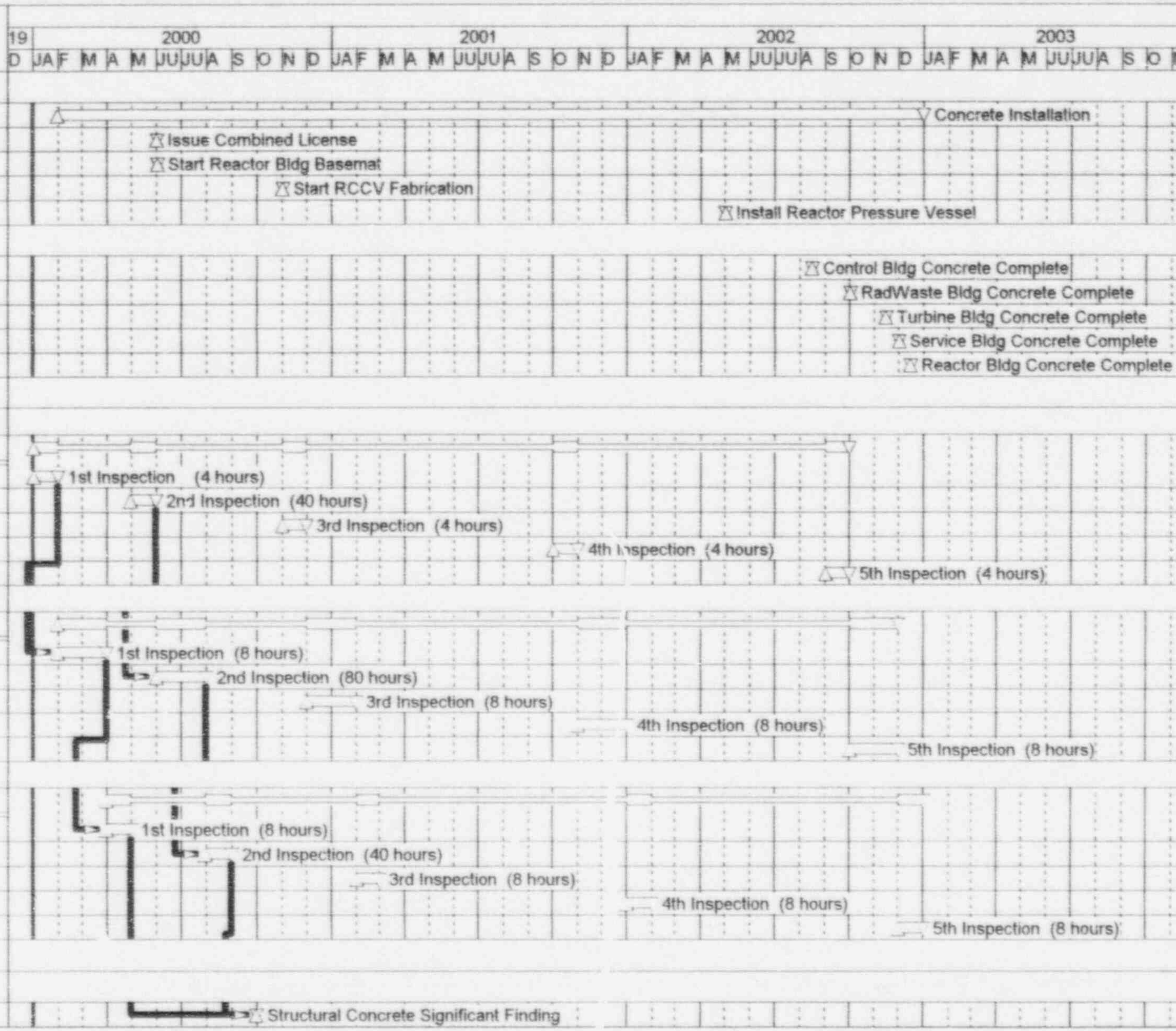

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FIGURE X

procedures is assumed to occur immediately before and after the COL is issued, which would equate to the second occurrence of each IP. The second occurrences of IPs 46051, 46053, and 46055 are planned to require 40, 80, and 40 hours of inspection, respectively, and will be completed about three months after COL issuance.

Cognizant NRC management will review the inspection results to determine if a significant finding can be made. Assuming the inspection results demonstrate that the licensee's process for installing structural concrete is acceptable, a significant inspection finding to this effect will be made by the end of the fourth month after COL issuance, as shown in Figure X.

The remaining occurrences of these inspection procedures would be used to monitor licensee performance in this area to verify the continued validity of the conclusions stated in the significant inspection finding. Note that the subsequent inspections are planned to require much less effort than the inspections performed before the significant finding is made. The lead inspectors for each discipline will select which portions of each procedure to perform during the monitoring phase, as opposed to fully performing the procedures as in the period preceding the significant finding. The staff hours shown for each of these inspections is a baseline estimate; the actual staff hours should be based on the amount of inspection effort required to verify the continued adequacy of structural concrete activities.

This significant inspection finding could contribute to the basis of verification that the following ABWR design certification ITAACs have been met:

2.14.1.1 Primary Containment System

Basic Configuration (including basemat, vertical portions of the reinforced concrete containment vessel (RCCV), RPV pedestal, RCCV diaphragm floor, and top of RCCV)

2.15.10.1 Reactor Building

Basic Configuration (including exterior walls, basemat, inter-divisional walls and floors, and R/B roof)

2.15.12.1 Control Building

Basic Configuration (including exterior walls, basemat, interdivisional and steam tunnel walls and floors, and the main control area envelope)

2.15.13.1 Radwaste Building

Basic Configuration (including basemat and below grade external walls)

Additionally, this finding could apply to any applicable COL ITAACs, SAYGO points, or other regulatory requirements or license conditions.

In the CIPIMS, the significant finding milestone should be scheduled, the inspection procedure cycles that will support the significant finding should be linked in the data base module, then the significant finding should be linked with the appropriate ITAACs and SAYGO points to which it pertains.

In practice, the process outlined above will be structured by the NRC project team, who will judge when inspections will be performed and findings made on the basis of a plant's design and construction schedule.

Experience has shown that NRC inspections often have items requiring followup, and such may be the case with significant inspection findings. The existence of inspection followup items may not necessarily prevent the issuance of a significant inspection finding, if those items are limited in scope and are not of a nature that they would invalidate the overall conclusion being made. In such a case, the outstanding items would be treated like any other followup issue arising from an inspection, as discussed later in this chapter.

b. ITAAC Verification and SAYGO Points: Planning for ITAAC verifications and for SAYGO points will require more detailed input from the licensee's construction schedule than will be the case for significant findings. Beyond this difference, however, the inspection schedule and data base can be set up to accommodate these findings using a similar process as used for significant findings.

Public Notice

To help maintain the openness of the construction inspections at a future nuclear power plant, the following methods of providing public notice of inspection activities could be considered for implementation when the CIP is reactivated.

Significant Findings: Significant findings will be issued by the resident inspection staff either as part of routine inspection reports or by special inspection reports. The NRR staff should periodically

publish Federal Register notices that identify recently issued inspection reports containing significant findings. One advantage to publicizing the issuance of significant findings in the Federal Register would be to provide the public and industry with an early opportunity to review and comment on the progress of construction inspection.

SAYGO Points and ITAAC Verifications: For SAYGO points and ITAAC verifications, the resident inspection staff will make recommendations to the cognizant NRR project director, who will ensure that each finding satisfies appropriate license conditions and regulatory requirements. SAYGO notifications and 10 CFR 52.99 Federal Register notices will be issued by the cognizant NRR division director.

10 CFR Part 50.57 and Part 52.103(g): The issuance of these findings will be done in accordance with the regulations and NRC policies existing at the time the findings need to be made. In general, the cognizant division director, with inputs from the resident inspection staff and the project director, will make the recommendations for these findings to the Director of Nuclear Reactor Regulation.

Start of Construction Inspection: The staff is considering publishing Federal Register notices to state when inspection activities at a construction site begin. Although these notices are not required by Part 52 or the Atomic Energy Act, they will improve public knowledge and allow for timely public participation.

Inspection Followup

Outstanding items arising from construction inspections, including enforcement items, will be recorded in the CIPIMS in accordance with the instructions contained in draft IMC 2512 (reference 10). They will be disposed of as directed by the NRC policies that exist when the plant is under construction. Inspection results requiring further inspector action are currently managed through the Inspection Followup System (IFS), which tracks violations (VIOs), unresolved items (URIs), and inspection followup items (IFIs). When identified, these items are entered into the IFS data base, and their entries could be periodically updated until they were closed in an inspection report. The CIPIMS is structured to perform this inspection followup function, and it therefore is intended to replace IFS (or its successor) for new construction plants.

Followup: The CIPIMS should be used to schedule the followup and closure of each violation, unresolved item, or inspection followup item. Each item can be assigned to an already scheduled inspection cycle, or, if there is no planned inspection available, an additional cycle of the procedure that was used to identify the item (or another procedure cycle, as appropriate) should be scheduled. When planning and scheduling inspection followup and closeout, it is essential to review

each item, identify the critical attributes that require reinspection, and clearly indicate these in the inspection planning section of the CIPIMS.

Linkage to ITAACs: The CIPIMS allows inspection staff to tie individual violations, unresolved items, and inspection followup items to specific ITAACs. Each one of these must be assessed to determine if it materially applies to an ITAAC, and, if so, the extent to which it impacts the NRC's ability to verify that the licensee has successfully completed the requirements pertaining to the ITAAC. This determination is additional to the requirements of the IFS, and the ultimate closure of the item must also account for the ITAAC impact. The general definition of what types of things pertain to ITAAC are still being explored as a policy issue. Therefore, it is not possible to go into further detail on this matter, and instead leave it as a process whose mechanics will need to be defined when the CIP is reactivated.

D. NRC ORGANIZATION

The "Postulated Licensing and Construction Schedule" depicted as Figure W in the "Expected Licensing and Construction Environment" section of this report is intended to present a scenario that would be very demanding on the NRC so that it can be used as a planning tool for future personnel, resource, and program needs. **The NRC does not expect that a utility must meet this schedule as a condition for licensing.** Under this scenario, a utility would have begun material procurement and fabrication of major components and modules by the time it applies for a COL or a construction permit.

It follows, then, that early establishment of the NRC project team will be necessary for the agency to gain a detailed understanding of an applicant's design, plans, and schedule for constructing a plant, which will be used to develop and implement NRC inspection plans. Further, to carry out the construction inspection program for a future nuclear power plant, the NRC will need to establish its inspection teams well before onsite construction actually begins (this need was identified on the basis of past and present nuclear power plant construction experiences).

Organization: The project team will consist of three groups: a resident inspection office; the cognizant regional office, and; a project directorate in headquarters. The following organizational descriptions are based on projections of the necessary functions and personnel to reactivate and implement the CIP. When the CIP is reactivated, these functions, and the inter-organizational relationships and reporting structures, should be evaluated in the context of the contemporary NRC organization to ensure that the CIP will be efficiently implemented.

- A resident inspection office established at the start of construction will implement the CIP for the plant. For the purposes of this discussion, start of construction is defined as the time when plant component fabrication (for example, a reactor pressure vessel or a prefabricated module) begins in a factory, or at the commencement of any other licensee activities that require inspection. In the earliest phases of plant construction (e.g., site preparation), the resident inspection office would operate from either the cognizant regional office or NRC headquarters, and would shift to the site when the pace of activities requires significant inspection coverage. The office will consist of 6 to 12 technical staff, plus administrative support, who would rotate on and off site according to the needs for different types of expertise to verify satisfactory completion of various phases of plant construction. The following personnel, whose duties and responsibilities are defined in draft IMC 2512, would provide the core of the resident inspection office staff, and would be augmented by specialist inspectors.

  - Senior Construction Site Representative
  - Site Chief Structural Inspector
  - Site Chief Mechanical Inspector
  - Site Chief Electrical and Instrumentation Inspector
  - Construction Site Scheduler

- The cognizant regional office would oversee the implementation of the onsite inspection program and would provide inspection resources and other technical support as necessary. The regional office organization for construction could, for example, be a task force made up of a manager supported by a technical staff of project engineers, reactor engineers, and inspectors of varying disciplines.

- A group in NRC headquarters would oversee licensing aspects of plant construction. The staff would consist of a Senior Executive Service manager and an appropriate combination of project managers, project engineers, and support staff. This staff would also be responsible for issuing Federal Register notifications of successful ITAAC completion for plants licensed under 10 CFR Part 52. The headquarters organization envisioned for the next nuclear power plant built in the US would consist of:

  - project director
  - project managers for licensing and policy issues
  - project engineers for technical issues
  - prospective resident inspection staff for developing the site-specific construction inspection program
  - licensing assistant(s) (as needed)
  - clerical support (as needed)

The project directorate's involvement with CIP details will include reactivating the CIP (discussed below), and overseeing the programmatic aspects of CIP implementation. This organization may be streamlined as issues are resolved and the inspection and licensing process enters a routine mode. The organization may also be adjusted as lessons learned from the lead plant are incorporated into planning.

Establishing the Project Team: The headquarters project directorate should be the first organization created, and should be established at the first credible indication that a reactor will be ordered, and license application made. Initially, this staff will coordinate license reviews, and be responsible for making recommendations regarding the approval of a COL or CP, as appropriate, in response to a license application. This staff will also take the lead in reactivating the CIP, and some of its members would be the cadre around which the resident inspection office would be formed.

CIP-related items to be developed during application review will include: defining the inspection program to be implemented at the site; establishing the plant-specific COL ITAAC (if the plant is licensed under 10 CFR Part 52), and; establishing SAYGO points (if so desired by the applicant). Close coordination with other NRC organizations will be necessary for many aspects of CIP reactivation, such as updating the CIPIMS to the current state of the art and developing inspection procedures. The minimum estimated level of effort that will be needed to reactivate the CIP is 8 FTE (4 staff for two years).

Obtaining Expertise: Another area to be addressed in conjunction with CIP reactivation will be the identification of the types of expertise needed to carry out construction inspections. The staff will have to determine if sufficient technical expertise is available within the NRC to perform the inspections. Arrangements must be made for the training and qualification of sufficient staff, and these arrangements will need to be made early enough to avoid impacting the inspection schedule. Similarly, if it is determined that obtaining contract expertise is required, NRC management will need to consider the long lead times associated with establishing technical assistance contracts.

E. ACTIONS ASSOCIATED WITH FUTURE CIP REACTIVATION

The following list is a general series of NRC actions that should be taken to reactivate the CIP when it becomes apparent that a nuclear power plant will be ordered. This list is only intended to be a starting point for reactivating the program, and it should be reviewed and understood within the context of this draft report.

1. Form NRC Project Team.

2. Review draft CIP report and other program documentation:

   - o develop plan to resolve policy issues;
   - o information and computer software related to Construction Inspection Program Information Management System (CIPIMS);
   - o update CIPIMS software to contemporary standards --
     - \- to the degree possible, the CIPIMS has used commercial off- the-shelf-software, so the basic system architecture should be easily transferred and updated;
   - o determine exactly how the CIPIMS data base needs to be structured to allow the public to have electronic access to inspection information;
   - o identify computer hardware needs;
   - o identify NRC staff computer training needs.

3. Obtain information from applicant and from other NRC organizations:

   - o contents of combined license (COL);
   - o ITAACs;
   - o detailed engineering design;
   - o construction schedule;
   - o SAYGO proposal.

4. Investigate construction methods to be used; identify locations at which fabrication, and therefore construction inspections, will occur. Pertinent issues include:

   - o engineering design for modular construction;
   - o transportation arrangements for modules;
   - o engineering design details;
   - o equipment procurement schedules.

5. Identify the endpoint of the construction inspection program to be implemented at the construction site:

   o establish program goals and assumptions --

      - if the plant is to be licensed under 10 CFR Part 52, identify contents of the section 52.103g finding
      - if plant is licensed under Part 50, identify contents of the section 50.57 findings;

   o establish program timing and content --

      - finalize IMC 2511 -- determine scope and endpoint of the early site permit/site preparation inspections to be done under this pre-construction inspection program
      - finalize IMC 2512 -- will include IMC 2513 Appendix A inspection procedures (IPs), and all 2513 Appendix B IPs that are covered by ITAACs
      - review and revise IP 94300, "Status of Plant Readiness for an Operating License," to support program objectives
      - begin revising IMCs 2513 and 2514.

6. Identify significant findings to be made during plant construction:

   o using the list of possible significant inspection findings provided in this report, develop a final list of findings, and determine for each one --

      - contents/basis
      - timing for making the finding
      - cross reference which inspections will be used to support the issuance of significant inspection findings;

   o integrate findings with ITAAC verifications and SAYGO points (significant findings, ITAACs, and SAYGO points should be determined in conjunction with each other);

   o superimpose the significant inspection finding milestones on the NRC construction inspection schedule.

7. Outline the inspection procedures needed to support significant findings, ITAACs, and SAYGO points:

   o define scope of each inspection;

   o develop inspection sampling criteria.

8. Staffing:

- o identify staffing needs;
- o identify knowledge and expertise requirements for inspectors;
- o identify inspector training needs;
- o procure training for inspectors.

9. Generate resource estimates of inspectors for entire CIP:

- o resident inspectors;
- o specialist inspectors;
- o contractors;
- o inspection teams.

10. Develop new inspection procedures (IPs):

- o prioritize procedure development based on need date --
  - it will not be necessary to have all of them done right away (therefore, IP development can be "level loaded" in conformance with available resources; this will also allow for improvement of later IPs based on experience gained from in-office and field use of the IPs that are developed first).
- o ensure that improved procedures are developed for inspecting welding and non-destructive examination activities (commitment made in SECY 92-436)

11. Interfaces with Other NRC Activities:

- o update Management Directive 8.6 to include guidance on performing Systematic Assessments of Licensee Performance (SALP) for nuclear power plants under construction;
- o update the Vendor Inspection Program as necessary to conform to construction inspection requirements, and identify interfaces with the CIP.

12. Begin inspections:

    o early inspections to be performed in conjunction with application reviews.

13. Fully staff resident inspector office:

    o consider permanently relocating the office to the construction site during the later phases of site preparation.

14. NRC issues COL or construction permit.

15. Implement CIP in accordance with revised IMC 2512.

16. Finalize IMCs 2513 and 2514; begin preoperational testing inspections under IMC 2513 late in plant construction:

    o make a plan to transition from construction phase to operations phase inspections under IMCs 2514 and 2515.

17. Issue findings as needed to support NRC licensing decisions, as appropriate for the method used to license the plant.

18. Complete IMC 2512 for the construction project.

F. OUTSTANDING POLICY ISSUES

Several policy issues relevant to construction inspection and ITAAC verification remain under consideration. Many of these issues were discussed in the following references:

- SECY 94-294, "Construction Inspection and ITAAC Verification" (reference 1)
- SECY 92-436, "Status of Development of the NRC's New Construction Inspection Program" (reference 2)
- SECY 92-134, "NRC Construction Inspection Program for Evolutionary and Advanced Reactors under 10 CFR Part 52" (reference 3)

- Memorandum to the Commission from J. M. Taylor, EDO, forwarding the draft Commission Paper, "10 CFR Part 52 Combined License (COL) Review Process and COL Form and Content" (reference 5)

- Memorandum to the Commission from J. M. Taylor, EDO, forwarding the draft Commission Paper, "ITAAC Verification and Construction Inspection Under 10 CFR Part 52" (reference 15)

The following list briefly summarizes unresolved policy questions pertaining to construction inspection at future nuclear power plants. In addition to issues discussed in the above references, the list includes several items that were identified during the writing of this draft report. As mentioned earlier, in the report section discussing the required actions associated with CIP reactivation, a plan to review and resolve these issues should be prepared developed soon after the resumption of CIP development. The policy questions are presented without elaboration, since background information on them can be found elsewhere in either this draft report or its references. The structure of the revised CIP is flexible enough to accommodate the resolutions of these issues when the CIP is reactivated in the future.

Agency Level Policy Issues

The following issues pertain to the nature of the findings to be made under 10 CFR Part 52.

1. What will be the Commission's expectations of staff information to support the section 52.103(g) findings?

2. Is it possible for the Commission to delegate the section 52.103(g) finding authority to the EDO? If so, would the Commission delegate it?

3. Once an ITAAC has been announced in the Federal Register as being complete (per the requirements of section 52.99), what would be its legal standing? Would it have the same weight as a finding made under 10 CFR Part 52.103(g)?

4. What would constitute prima facie evidence that a particular ITAAC might not have been met?

5. What types of activities could impact an ITAAC? What specific attributes would be included as part of an ITAAC? What activities, although closely related to an ITAAC, would be treated as a 10 CFR Part 50 problem that would not necessarily preclude NRC verification that an ITAAC has been met?

6. How would deficiencies in a quality assurance process impact ITAAC findings?

Programmatic Policy Issues

1. Determine the best method of publicizing significant findings, including whether to publish them in the Federal Register.

2. Determine if significant findings should be issued by routine or special inspection reports.

3. Refine the guidance on how the different types of inspection findings shall be made and who should make them.

4. Clarify the organizational structure and responsibilities for developing and implementing the CIP, including the roles of regional offices.

5. Define the extent of design engineering evaluations to be done as part of license application review, and the extent to which design engineering will be inspected under the CIP. It will be necessary to validate "first-of-a-kind engineering," and the design engineering and design change processes, to ensure fidelity of construction drawings to approved design.

6. Define the protocol of licensee notification to NRC of ITAAC completions, NRC staff verification of the same, and the subsequent publication of Federal Register notices.

7. Review and revise inspection procedure 94300, "Status of Plant Readiness for an Operating License," to be consistent with 10 CFR Part 52 and CIP requirements.

8. Develop a policy to implement a Sign-As-You-Go (SAYGO) process for future nuclear power plant construction projects.

9. Establish policy for publicizing/docketing construction inspection reports (including the particulars of inspection report formats, and the format that should be used to make reports available electronically to the public).

10. Establish the significance of NRC management's certification that a construction inspection procedure has been satisfactorily completed, particularly with respect to ITAAC verifications, significant findings, and SAYGO points.

11. Develop policies for inspection sampling.

IV. ACRONYMS

ABWR	Advanced Boiling Water Reactor
CAD	Computer Aided Design
CAE	Computer Aided Engineering
CDR	Construction Deficiency Report
CE	Combustion Engineering
CIP	Construction Inspection Program
CIPIMS	CIP Information Management System
COL	Combined License
CP	Construction Permit
CSS	Construction Site Scheduler
DBMS	Data Base Management System
ESP	Early Site Permit
FTE	Full Time Equivalent
GE	General Electric
HPCF	High Pressure Core Flooder system
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
ITAAC	Inspections, Tests, Analyses, and Acceptance Criteria
LWR	Light Water Reactor
PRA	Probabilistic Risk Assessment
QA	Quality Assurance
QC	Quality Control
RCCV	Reinforced Concrete Containment Vessel
RPV	Reactor Pressure Vessel
SAYGO	Sign As You Go
SCEI	Site Chief Electrical and Instrumentation Inspector
SCMI	Site Chief Mechanical Inspector
SCSI	Site Chief Structural Inspector
SCSR	Senior Construction Site Representative
SSC	Structure, System or Component
TI	Temporary Instruction
UNR	Unresolved item
VIO	Violation

V. REFERENCES

1. SECY 94-294, "Construction Inspection and ITAAC Verification" (December 5, 1994)

2. SECY 92-436, "Status of Development of the NRC's New Construction Inspection Program" (December 31, 1992)

3. SECY 92-134, "NRC Construction Inspection Program for Evolutionary and Advanced Reactors under 10 CFR Part 52" (April 15, 1992)

4. NUREG-1278, "Vogtle Unit 1 Readiness Review" (September 1987)

5. Memorandum to the Commission from J. M. Taylor, EDO, forwarding the draft Commission Paper, "10 CFR Part 52 Combined License (COL) Review Process and COL Form and Content" (April 1, 1993)

6. Inspection Manual Chapter (IMC) 2511, "Light Water Reactor Inspection Program - Pre-CP Phase" (April 1, 1978)

7. IMC 2512, "Light Water Reactor Inspection Program - Construction Phase" (December 17, 1986)

8. IMC 2513, "Light Water Reactor Inspection Program - Preoperational Testing and Operational Preparedness Phase" (January 1, 1984)

9. IMC 2514, "Light Water Reactor Inspection Program - Startup Testing Phase" (August 21, 1989)

10. Draft IMC 2512 (attachment 1 to this report)

11. General Electric Advanced Boiling Water Reactor ITAACs (versions dated April - June, 1993)

12. SRM COMIS 91-015 (November 21, 1991)

13. Memorandum to the Commission from J. M. Taylor, EDO: "Seabrook - The Staff's Review of the Office of the Inspector General (OIG) Report 90-31H - 'Review of the NRC Staff's Responses to Congressional Inquiries Regarding Joseph Wampler and the Welding Program at Seabrook Nuclear Station'" (February 12, 1992)

14. Memorandum to the Commission from E. Volgenau, Director, Office of Inspection and Enforcement: "Inspection Program Utilizing Statistical Sampling Inspection Techniques" (February 11, 1977)

15. Memorandum to the Commission from J. M. Taylor, EDO, forwarding the draft Commission Paper, "ITAAC Verification and Construction Inspection Under 10 CFR Part 52" (January 28, 1994)

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ATTACHMENT 1

DRAFT INSPECTION MANUAL CHAPTER 2512

LIGHT WATER REACTOR CONSTRUCTION INSPECTION PROGRAM

NRC INSPECTION MANUAL

MANUAL CHAPTER 2512

LIGHT WATER REACTOR CONSTRUCTION INSPECTION PROGRAM CONSTRUCTION PHASE

2512-01 PURPOSE

To provide guidance for implementation of the inspection program during construction of light water nuclear power reactors licensed either under 10 CFR Parts 50 or 52. This program provides guidance for inspection of nuclear power plant construction including: onsite excavation; fabrication of systems, structures, and components both onsite and offsite, and before, during, and after basemat excavation; and ending with the fuel load preparation. Inspection of activities conducted under an early site permit or limited work authorization, or during site characterization, will be performed under inspection manual chapter (IMC) 2511, "Light Water Reactor Construction Inspection Program - Pre-CP Phase."

2512-02 OBJECTIVES

The primary objective of the construction inspection program (CIP) is to ensure public health and safety during future nuclear plant operations through an evaluation of the effectiveness of licensee performance in implementing technical, quality, and administrative requirements and activities during nuclear power plant design, procurement, and construction. This is accomplished through a sampling inspection process where the NRC evaluates the licensee's self-assessment capabilities and their ability to monitor, document, and verify satisfactory completion of construction related activities. The NRC's process involves direct observation of construction activities; physical examination of components, systems, and structures important to safety; review of licensee records; and evaluation of licensee data. A significant portion of the NRC's efforts to evaluate licensee performance during the construction phase will be direct observation of construction related activities. The NRC's evaluation will use the inspection procedures prepared for the inspection of construction activities as outlined in Appendix A to this manual chapter.

NRC's assessments based on performance of the CIP inspection procedures, combined with the licensee's verification of satisfactory completion of license conditions, construction activities, and the NRC's evaluation of the licensee's quality assurance (QA) organization will provide the basis for making findings supporting fuel load and startup testing. For facilities licensed under 10 CFR Part 52, this includes the finding required before the start of operation by 10 CFR 52.103 regarding satisfactory completion of the acceptance criteria contained in the inspections, tests, analysis, and acceptance criteria (ITAAC) provided in the certified design and combined license.

2512-03 BACKGROUND

The NRC staff developed a revised construction inspection program (CIP) for future nuclear power plants to incorporate lessons learned from the implementation of the inspection program at past nuclear power plant construction projects, accommodate features of the 10 CFR Part 52 licensing process, and to take advantage of improvements in computer hardware and software technology. The need for better documentation and retreivability of NRC inspection information, continuity of inspectors, and the to effectively and efficiently transfer NRC institutional knowledge regarding construction activities gained during plant construction were significant lessons learned. Advances in computer hardware and software have made it possible to quickly, inexpensively, and accurately store and retrieve inspection information.

This manual chapter and its appendices contain the requirements for establishing a framework for implementation of the construction inspection program at future nuclear power plant construction sites. Significant changes have been made in the organizational structure necessary to successfully implement this construction inspection program. Greater reliance has been placed on effecient scheduling of inspector resources. A full time NRC inspection scheduler will be assigned at each construction site. The CIP information management system (CIPIMS) has been developed to provide the tools necessary for accurate and timely inspection planning.

Coordination of inspection planning with the licensee is essential to ensure the required inspections are performed with a minimum impact on licensee activities. As in the past, site specific inspection plans will be developed. However, under the guidance in this manual chapter the site specific inspection plan will be developed in parallel with a plant's application review, and will consider the licensee's construction schedule and the impact of changes to the regulatory environment (specifically 10 CFR Part 52). When development is completed, the site specific inspection plan should be made public in order to show how the NRC will verify the facility is constructed to ensure public health and safety, and to provide regulatory predictability and stability.

The CIPIMS was created to improve the availability, retreivability, and documentation of inspection results, and enhancements were made to inspection procedure format. The CIPIMS allows storing inspection related information in a computerized system that provides easy access to and querying of the information. The inspection procedures provide clear requirements with insights on how those requirements can be satisfied. It is incumbent upon all NRC staff involved with the implementation of the construction inspection program to thoroughly document the inspections performed at nuclear power plant construction sites.

2512-04 DEFINITIONS

04-01 Applicant. Any individual, corporation, or association that submits, for NRC review, an application to conduct activities under a license, early site permit, or combined license.

04-02 Attribute Guidance. Guidance provided in inspection procedures related to a specific inspection procedure critical attribute that outlines the types of activities the inspector should review or observe during performance of the critical attribute.

04-03 Audit. Activities to determine through investigation the adequacy of, and adherence to, established procedures, instructions, specifications, codes and other applicable contractual and licensing requirements, and the effectiveness of implementation.

04-04 Certified Design. A reactor design that has been incorporated into NRC regulations as an appendix to 10 CFR Part 52 pursuant to the requirements of 10 CFR Part 52 Subpart B.

04-05 Combined License. A combined construction permit and operating license with conditions for a nuclear power facility issued pursuant to 10 CFR Part 52 subpart C.

04-06 Construction Activities. Any activity associated with the construction, fabrication, or testing of structures, components, subcomponents, subsystems, or systems either at the construction site or at remote fabrication or testing facilities that occurs during the construction phase of the inspection program. Construction activities also include the design and engineering of the structures, systems, and components of the facility.

04-07 Construction Inspection Program Information Management System (CIPIMS). The personal computer based system that provides the ability to schedule, plan, document, and report the results of inspection activities. Appendix E provides detailed guidance on the content and use of the CIPIMS. The CIPIMS will contain a predecisional portion that contains unreviewed inspection information that represents an individual inspector's position or views on an inspection activity and an NRC management reviewed portion that has received NRC management's review and represents the final NRC position on a specific inspection activity.

04-08 Construction Milestones. Preselected construction events that are used to determine construction status and to aid in establishing inspection points in the construction inspection program.

04-09 Construction Permit. Authorization from the NRC to begin construction of a facility pursuant to 10 CFR Part 50.10.

04-10 Construction Verification Tests. Tests performed under the direction of construction management personnel before system or component turnover to the operating group or as part of the ITAAC verification process. They may also include tests such as containment integrity and hydrostatic testing of piping systems necessary to demonstrate component, system, or structure design and construction satisfy license conditions and regulatory requirements. These tests may also include activities such as chemical cleaning, flushing, continuity testing, and initial calibration of instrumentation necessary to prepare a system for operation.

04-11 Contractor. Any organization under contract for furnishing items or services to an organization operating under the requirements of Appendix B of 10 CFR Part 50 or the commitments made in a combined license application under 10 CFR Part 52. The term includes consultant, vendor, supplier, fabricator, constructor, and subtier levels of these, where appropriate.

04-12 Critical Attribute. A characteristic or quality of a material, object, action, or process that is vital to demonstrating that design requirements have been met or that the activity being observed was performed successfully. Critical attributes will be provided in each inspection procedure for the

processes or activities being inspected. Critical attributes provide inspectors with NRC management expectations for what activities they are required to complete during performance of the associated inspection procedure.

04-13 Early Site Permit. NRC approval, issued pursuant to 10 CFR Part 52 Subpart A, for a site or sites on which one or more nuclear power facilities may be constructed and operated.

04-14 Exception. Findings or observations made during inspection that require additional NRC followup. Each exception will be related to a specific inspection sample and a specific critical attribute and occurrence of an inspection procedure. For each inspection report, related exceptions will be combined into a single open item (unresolved item, inspector followup item, or violation as appropriate).

04-15 Inspection Procedure Occurrence. An inspection procedure occurrence is the complete performance of an inspection procedure's critical attributes that are scheduled for performance at a given time. Inspection procedure occurrence is also referred to as an inspection procedure cycle. During the construction period, inspection procedures may be performed a number of times and each time the inspection procedure is performed is another occurrence. To complete an occurrence of an inspection procedure, all of the critical attributes scheduled for performance shall have been inspected, with either satisfactory results or with additional followup required.

04-16 Inspection Sample. An inspection sample is an item that is selected for inspection of one or more critical attributes. For example, an inspection sample may be a single record for review of welding records, while an entire system would comprise the inspection sample during a system walkdown inspection. The composition of an inspection sample will be defined in each inspection procedure under the sampling criteria. When practical, the inspection sample should be identified with the licensee's unique identification number.

04-17 Inspection Schedule. Inspection schedules will be based on the licensee's construction schedule and the site specific inspection plan. Inspection schedules will include an overall construction inspection schedule, and rolling twelve month, quarterly, monthly schedules, and weekly schedules. [Note: the CIPIMS description (attachment 4 to the draft CIP report) provides a detailed discussion on the use of the inspection planning and scheduling application of the CIPIMS.]

04-18 Inspections, Tests, Analysis, and Acceptance Criteria (ITAAC). A body of requirements contained in a combined license (or certified design), which if met will provide reasonable assurance that the plant was built and will be operated in accordance with its certified design and combined license for facilities licensed under 10 CFR Part 52.

04-19 License Condition. Legally binding requirements specified in the license that have the same regulatory standing as NRC requirements and regulations. License conditions are required to be satisfied by the license holder as a condition for use of the license.

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04-20 Licensee. Any individual, corporation, or association that is authorized to conduct activities under a license, construction permit, combined license, or early site permit issued by the NRC.

04-21 Licensee Commitment. Written statements made by the licensee providing information on how NRC requirements or license conditions will be met relative to facility design and construction. Most of the commitments are contained in the safety analysis report (SAR), or the certified design and combined licensee application for facilities licensed pursuant to 10 CFR Part 52, but may be elsewhere, such as in responses to Atomic Safety and Licensing Board (ASLB) proceedings.

04-22 Limited Work Authorization (LWA). Authorization from the NRC to an applicant to conduct certain construction activities pursuant to 10 CFR 50.10(e)(1) or 10 CFR 50.10(e)(3)(i).

04-23 NRC Requirements. NRC requirements include provisions of the Atomic Energy Act, NRC rules and regulations, conditions of a construction permit or combined license, and Commission orders. These include the ITAAC committed to by the applicant in the certified design and/or the combined license application for facilities to be licensed for construction under 10 CFR Part 52 Subpart C.

04-24 Open Item. An open item (or finding) is any inspection finding requiring additional followup by the NRC. This includes unresolved items, inspector followup items, violations, construction deficiency reports, and licensee identified items. Open items will contain the all of the related exceptions found during an inspection period. For example, if during an inspection period multiple exceptions related to procedure adherence were identified during performance of different inspection procedures, all of the exceptions would be combined into a single open item requiring NRC followup of licensee corrective actions on improving procedure adherence.

04-25 Preoperational Tests. Tests performed to demonstrate the proper functioning and conformance to design requirements of plant components, systems, and structures. Preoperational testing will generally provide the final verification that components, systems, and structures have satisfied the acceptance criteria specified in the combined license for facilities licensed under 10 CFR Part 52.

04-26 Quality Assurance (QA). Quality assurance comprises all those planned and systematic actions necessary to provide adequate confidence that a structure, system, or component will perform satisfactorily in service. Quality assurance includes quality control (QC), which comprises those quality assurance actions related to the physical characteristics of a material, structure, component, or system which provides a means to control the quality of material, structure, component, or system to predetermined requirements.

04-27 Quality Assurance Manual (QA Manual). Quality assurance manual refers to the aggregate collection of internal instructions and procedures established by each organization that has been delegated QA program responsibilities and whose objective is to ensure acceptable implementation of the QA program.

04-28 Review. A deliberate, critical examination.

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04-29 Significant Inspection Finding. A compilation of individual inspection findings that provides the NRC staff conclusions regarding the licensee's procedures, controls, and practices associated with a specific construction activity. Significant inspection findings will be made early in the construction of the facility with periodic validation inspections performed throughout construction to verify continued acceptable implementation of the procedures, controls, and practices. The scope of inspections necessary to make a significant inspection finding will be defined in the site specific inspection plan.

04-30 Sign-As-You-Go (SAYGO). A program of inspection milestones known as SAYGO points that can be implemented at a licensees request. Each SAYGO point will provide licensee verification that its associated activities have been completed appropriately and provide NRC confirmation that the activities inspected up to that point have been accomplished in accordance with the applicable industry codes and standards, and regulations and regulatory guidance.

04-31 Site Specific Inspection Plan. The site specific inspection plan is the plan to be developed by the NRC based on the licensee's construction schedule that incorporates the inspection requirements of Appendix A of this manual chapter. The site specific inspection plan will provide references to inspection procedures; temporary instructions; number of occurrences of each inspection procedure and temporary instruction; ITAAC; and SAYGO points. The site specific inspection plan will be developed during application review.

2512-05 ORGANIZATION, RESPONSIBILITIES AND AUTHORITIES

05-01 Responsibilities and Authorities.

A. **Office of Nuclear Reactor Regulation**

(This discussion reflects the NRR organizational structure that was in effect at the time this revision to 2512 was prepared. The NRR organizational structure will have to be re-evaluated when restarting development of the construction inspection program during the first license application review for construction of a power reactor.)

1. Director, Office of Nuclear Reactor Regulation. The Director has the responsibility and authority for:

   a. Overall direction of the program.

2. Director, Division of Inspection and Support Programs. The Director has responsibility and authority for:

   a. Administration and control of inspection program development and revision.

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3. Director, Appropriate Project Directorate. The Director has responsibility and authority for:

   a. Making determinations regarding the acceptability of the quality assurance program as described in the SAR/combined license application.

   b. Overseeing an appeals process to resolve disputes between the licensee and NRC staff over inspection results and their impact on construction permit or combined license requirements.

   c. Making determinations regarding the status of construction, implementation of the quality assurance program, the assessment of licensee performance, and reviewing the site specific inspection plan developed during application review.

   d. Coordination of periodic *Federal Register* notices for the completion of inspections, tests, and analysis (ITA) (10 CFR Part 52.99 notifications), *Federal Register* notices for satisfactory completion of acceptance criteria (10 CFR Part 52.103 notifications) and other periodic notification of significant inspection findings that may be issued in the *Federal Register*.

   e. Obtaining contractor inspector support for their assigned construction site as requested by the Senior Construction Site Representative.

4. Chief, Inspection Program Branch. The Branch Chief has the responsibility and authority for:

   a. Reviewing the recommendations from the inspection staff regarding improvements to inspection procedures related to critical attributes and attribute guidance. Updating the inspection procedures as appropriate based on these recommendations.

   b. Performing the assessment of the implementation of the construction inspection program.

   c. Coordinating and overseeing the revision of existing inspection procedures and the development of new inspection procedures for the construction inspection program.

B. **REGIONAL OFFICE**

(At the time this revision to 2512 was prepared, it was unclear what role the regions should play in implementation of the construction inspection program or what the structure of the regional office would be in the future. The regional organizational structure will have to be re-evaluated when restarting development of the construction inspection program during the first license application review for construction of a power reactor.)

1. Regional Administrator. The Regional Administrator has responsibility and authority for:

   a. Implementing the startup test phase of the inspection program following fuel loading in accordance with the requirements of manual

chapter 2514, "Light-Water Reactor Inspection Program - Startup Testing Phase." This includes taking the lead in transitioning from the construction inspection program implemented by NRR to the startup and operational phases of the inspection program.

b. Providing inspector resources to support and augment NRR inspector resources assigned to inspect construction projects in their region.

c. Providing support for enforcement and allegation activities for construction projects in their region.

2. Construction Branch Chief. The Construction Branch Chief has responsibility and authority for:

a. Assigning regional inspector resources to construction projects in their region in coordination with the regional Division Directors and the SCSR.

b. Interfacing with other Regional Offices to identify inspector resources that are available to support construction projects in their region.

c. Notifying the SCSR or CSS of any changes in the availability of inspector resources that has an impact on construction inspections associated with the facility.

C. **RESIDENT OFFICE**

1. Senior Construction Site Representative (SCSR). Initially the SCSR will be assigned to the NRR office during the early phase of application review. However, when the NRC site office is established the SCSR will be reassigned to the site office. The SCSR has the responsibility and authority for:

a. Administration and control of the implementation of the construction inspection program at the facility. The SCSR will be assigned when an application is submitted and will be involved in the review of the application. The SCSR will request inspector resources from NRR and the Regional Offices as necessary to effectively implement the construction program at their assigned construction site.

b. Determining and ensuring that the applicant/licensee has established and executed the QA program as described in the SAR or combined license application. Making recommendations to the appropriate NRR Director, Reactor Projects if the QA program is considered deficient with respect to 10 CFR 50, Appendix B.

c. After the resident office is established at the construction site, the SCSR will be the licensee's primary NRC contact for inspection program, policy, administrative, and technical issues.

d. The SCSR will be responsible for integrating all of the inspection findings to develop an overall assessment of licensee performance. This assessment will provide one of the bases for development of the systematic assessment of licensee performance (SALP) report for the construction project.

e. Providing NRC management review of the predecisional portion of the CIPIMS and authorizing the transfer of data between the predecisional portion and the NRC management reviewed portion of the CIPIMS.

f. Issuing inspection reports.

g. For facilities licensed under 10 CFR Part 52, the SCSR will make recommendations and provide supporting information to NRR management regarding completion of the inspection, tests, and analysis as required by 10 CFR 52.99 and verification of acceptance criteria to support the findings required by 10 CFR 52.103.

h. Coordinate development of the site specific inspection plan during construction permit or combined license application review.

i. Assisting the cognizant Regional Administrator in transitioning from the construction inspection program to the startup and operating phase inspection programs.

2. <u>Construction Site Scheduler (CSS).</u> Initially the CSS will be assigned to the NRR office during the early phases of application review. After the NRC site office has been established the CSS will be reassigned to the site office. The CSS has the responsibility and authority for:

a. Preparing the site specific inspection plan using the inspection requirements of Appendix A and the licensee's construction schedule.

b. Preparing inspection schedules based on the site specific inspection plan, licensee construction schedules, and as directed by this manual chapter. During development of inspection schedules, the CSS will identify future inspector needs to the SCSR.

c. The CSS will be the CIPIMS system manager for the assigned construction site. This includes coordinating the input of data into the CIPIMS and retrieval of data from the CIPIMS.

d. Assisting the cognizant Regional Administrator in transitioning from the construction inspection program to the startup and operating phase inspection programs.

3. <u>Site Chief Civil/Structural Inspector (SCSI), Site Chief Mechanical Inspector (SCMI), and Site Chief Electrical/I&C Inspector (SCEI).</u> The SCSI, SCMI, and SCEI have responsibility and authority for:

a. The SCSI will coordinate the performance of and participate in inspections related to geotechnical, civil, and structural activities including site preparation, excavation, fabrication, manufacture, installation, and testing of structures. The SCMI will coordinate the performance of and participate in inspections related to the fabrication, manufacture, installation, and testing of mechanical systems and components. The SCEI will coordinate the performance of and participate in inspections related to the fabrication, manufacture, installation, and testing of electrical and instrumentation/control systems and components.

b. Performing all inspections related to the review of QA Program procedures, policies, and practices, and implementation of the QA/QC Programs in their areas of responsibility.

c. Assisting the CSS in scheduling inspections and identifying inspector resources required for future inspections in their areas of responsibility.

d. Assisting the cognizant Regional Administrator in transitioning from the construction inspection program to the startup and operating phase inspection programs.

e. Providing the point of contact and peer review for specialist inspectors assigned to the construction site in their areas of responsibility. This includes review of all specialist inspector generated inspection information before the information is input into the predecisional portion of the CIPIMS.

f. Preparing inspection report input using the inspection generated information provided by the NRC management reviewed portion of the CIPIMS for their areas of responsibility.

g. Updating testing and other inspection procedures as necessary and directed within specific inspection procedures to recognize plant specific design features and testing requirements.

2512-06 PROGRAM POLICY

06-01 Inspection Planning. The licensee is ultimately responsibly for the safety of the nuclear facility. The NRC ensures, through a sampling inspection program, that this responsibility is carried out in an effective manner during plant construction. The construction inspection program described in this chapter provides the basic inspection requirements to be incorporated into the site specific inspection plan developed during application review. Appendix A to this manual chapter references construction inspection procedures, which contain the inspection requirements, for various processes and activities performed during construction.

For plants licensed under 10 CFR Part 52, this manual chapter provides the framework for inspection activities necessary to verify satisfactory completion of the ITAAC specified in the certified design and combined license application. The scope of inspection activities performed for verification of the acceptance criteria will be determined during combined license application review and will be incorporated into the site specific inspection plan. Verification of the acceptance criteria will provide input to NRC management necessary to make a recommendation to the Commission that the acceptance criteria have been met before operation of the facility is authorized as required by 10 CFR 52.103.

06-02 Inspection Performance. It is expected that most inspection activity will involve the direct observation of ongoing construction activities. Inspection performance will be directed by the requirements of the inspection procedures assigned to an individual inspector. Inspection procedures will provide requirements on what the inspector shall inspect (critical attributes), and will provide the inspector with guidance on how to perform the inspection and what acceptance criteria to use in assessing licensee performance (attribute

guidance). Inspection procedures should generally be narrowly focused and of short duration. By using a narrowly focused, regimented approach in directing inspection performance, accurate and highly detailed information should be obtained by the inspector. After the inspection generated information is recorded in the construction inspection program data base, it provides discrete, manageable blocks of information that can be readily sorted and grouped using the CIPIMS for assessment by NRC management.

06-03 Use of Significant Inspection Findings. Significant findings will be used to announce NRC staff conclusions regarding significant construction activities or processes. These findings are intended to be NRC staff actions to assist in managing the construction inspection program, and will be based on aggregated inspection results contained in the CIPIMS. Notification of significant inspection findings will generally be in the monthly resident inspection reports, and the NRR staff may issue *Federal Register* notices documenting in which inspection reports significant inspection findings were made.

The specific inspection procedure occurrences associated with significant inspection findings will be identified during application review and will be incorporated into the site specific inspection plan. The significant inspection findings may be coordinated with or related to ITAAC and SAYGO points as appropriate. The issuance of these findings are not required by regulations and will not be coordinated with the licensee. Significant inspection findings will provide formalized publication of NRC staff judgements on construction acceptability for a broad range of licensee processes and/or as-built systems, structures, and components. For example, the following list contains typical areas for notification of NRC significant inspection findings:

- Site Preparation
- Structure Construction
- Equipment Fabrication
- Equipment Placement
- Equipment Operation (testing)
- Geotechnical/Foundation Activities
- Structural Concrete/Rebar
- Masonry Construction
- Concrete Expansion Anchors
- Structural Steel & Supports
- Safety Related Piping
- Pipe Supports & Restraints
- Records
- Mechanical Components/Equipment
- HVAC Systems
- Electrical Components
- Electrical Cables and Terminations
- I&C Components
- I&C Tubing and Supports
- Containment Penetrations
- Welding
- Non-Destructive Examination
- QA/QC Programs
- Training/Personnel Qualifications
- Equipment/Material Qualification
- Measuring and Testing Equipment

This list is not necessarily all inclusive, however, it does provide typical areas where NRC inspections are performed that cover a wide variety of systems, structures, and components throughout a nuclear power plant. Because NRC's construction inspections are performed on a sampling basis, it is not feasible to inspect each of the systems, structures, and/or components to the same level of detail. Therefore, significant inspection findings will be based on the inspection of a sample of systems, structures, and components that will subsequently be applied across other systems, structures, and components (as applicable) throughout the plant.

Significant inspection findings should be made early in performance of the related construction process or activity. For example, a finding regarding the structural concrete and rebar could be made when about 25% of the concrete and rebar have been placed. This finding would then remain effective for the

construction period with its validity periodically checked by NRC inspections. For this practice to be effective, the inspections performed to support the significant inspection finding need to be structured to comprehensively evaluate the specific activity or process being reviewed. Subsequent inspections in these areas will use the same inspection procedures as the initial inspections; however, the inspection scope should be reduced. While the significant inspection finding indicates that the methods and controls employed by the licensee for implementation of a specific process or activity are acceptable, the significant finding does not represent the NRC's final conclusion regarding the successful implementation of the process or activity since the activity or process will continue after the finding is made.

In the event open items are identified during performance of the inspection procedures associated with a significant inspection finding, the SCSR will evaluate the impact of the open item on issuing the significant inspection finding. All open items identified during performance of inspection procedures related to significant inspection findings will be followed up as described in Section 07.03 of this manual chapter. However, if the open item impacts the issuance of the significant inspection finding, the SCSR will inform the licensee that prompt action is required to address the open item to prevent delays in the issuance of the significant inspection finding. After the license indicates that an open item is ready for closure, the SCSR will direct that open item followup be performed.

It is important to recognize that significant inspection findings will provide the cornerstone for future NRC inspection efforts at the construction site. Inspection effort will decrease in those areas for which significant inspection findings have been made consistent with the need to periodically assess the validity of the finding.

If during inspection of an activity for which a significant inspection finding has been made, the NRC determines that the finding is no longer valid, the level of inspection effort will increase in that area to a level similar to that used to make the original significant inspection finding. The SCSR, in consultation with NRR and Regional Management, will determine when there is adequate justification to warrant retraction of a significant inspection finding and what the increase in inspection effort will be. The retraction will be made in the same forum as the original issuance of the significant finding (i.e., inspection report or *Federal Register* notice) and will reference the original notice and the basis for the retraction. The licensee should be given approximately 30 days to address the retraction before it is issued. Should the licensee identify new information that demonstrates that the significant finding remains valid, the SCSR, in consultation with NRR and Regional Management, may delay issuance of the retraction to allow NRC followup and confirmation of the information or may terminate issuance of the retraction at the SCSR's discretion.

06-04 <u>Periodic Notifications of Inspection Results.</u> Routine inspection results will be included in periodic resident inspection reports issued by the SCSR. These inspection reports will describe all of the completed inspection activities performed during the period based on the completion of inspection procedure critical attributes. Inspection activities (critical attributes) ongoing at the end of the period shall not be documented in the subject periodic inspection report. Inspection reports shall only document completed inspection activities. Completed inspection activities include those critical attributes that require additional NRC followup for which an open item was identified, but adequate information was available to complete the critical attribute. For example,

during review of a critical attribute the inspector may identify that workers failed to follow the specific steps in a procedure, however the inspector determined that this action had no direct adverse impact on the quality of the work being performed. The inspector would identify an exception indicating the failure to follow procedure, but would complete the critical attribute noting that the activity being observed was performed satisfactorily with a minor exception. The exception would then be followed up as described in Section 07.03 of this manual chapter.

In addition to routine inspection reports, special inspection reports may be issued when required or as directed by NRC management or other inspection manual chapter requirements. Resident inspection reports will be issued in accordance with the directions provided in Appendix C of this manual chapter using the inspection information contained in the NRC management reviewed CIPIMS.

Other periodic notifications of inspection results include the Notification of Significant Inspection Findings as discussed in Section 06.03 above and the Systematic Assessment of Licensee Performance (SALP) reports as discussed in NRC Management Directive 8.6.

06-05 <u>Sign-As-You-Go Processes (SAYGO).</u> The term SAYGO refers to a program of inspection milestones, known as SAYGO points, jointly agreed on between the NRC and a licensee. As the criteria for each SAYGO point are successfully met by the licensee and verified by the NRC, their completion should be documented in inspection reports (IRs), including the appropriate supporting data from the CIPIMS. At the option of NRC management, these SAYGO completions could be noticed in the *Federal Register*(at the time of this revision to MC 2512, the NRC staff had not taken a position on this issue).

At the licensee's request, a SAYGO process could be incorporated into the construction inspection program. During the development of the site specific inspection plan, the NRC and the licensee would reach consensus regarding when each SAYGO point should occur, what the licensee requirements are for satisfying the SAYGO point, what NRC actions would be required to verify satisfactory completion of the SAYGO point, and how completion of the SAYGO point should be related to future licensee and NRC activities. For facilities licensed under 10 CFR Part 52, SAYGO points may be used in the verification of satisfactory ITAAC completion.

06-06 <u>Periodic Notification of Inspection, Test, and Analysis, and Acceptance Criteria (ITAAC) Completion.</u> Periodic notifications of ITAAC completion are required of the NRC staff by 10 CFR Part 52.99. The SCSR will make recommendations to the cognizant NRR management regarding the issuance of notifications of ITAAC Completion. The SCSR's recommendation will certify that the NRC's inspection activities related to the specified ITAAC have been completed. The Notification of ITAAC Completion will be published in the *Federal Register*.

06-07 <u>QA Program Implementation.</u> The NRC policy for inspection of QA manual and QA program implementation and documentation of findings is as follows:

a. Before conducting the program implementation inspection at the office of the applicable organization, inspection of the QA manual shall be performed by the SCSR. The QA manual inspection should occur as early as possible during the license application review process. Findings regarding the QA manual inspection shall not be formally documented in an

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inspection report until the QA program implementation inspection at the applicant's or contractor's office, and the site, as appropriate, have been completed. The initial inspection of the applicant's QA program implementation shall be completed shortly after the start of significant activities related to the construction or fabrication of systems, structures, or components covered or to be covered by the requirements of the QA manual.

b. Significant inspection findings related to the QA manual inspection shall be forwarded to the cognizant NRR manager for review and resolution at any time during the performance of the inspection.

06-08 Other Program Interfaces. The construction inspection program may be supplemented by other related programs such as the Vendor Inspection Program (MC 2700), the Construction Appraisal Team Inspection Program (MC 2920), the Light Water Reactor Construction Inspection Program - Pre-CP Phase (MC 2511), and the Operator Licensing program. These programs can be used to meet the construction inspection program objectives.

2512-07 PROGRAM REQUIREMENTS

07.01 Inspection Requirements. The inspection procedures (IP) applicable during construction are provided in Appendix A to this chapter [All of the current construction inspection procedures and temporary instructions will require revision to incorporate the content and format changes to make them compatible with this program]. Each of the IPs will contain critical attributes that inspectors shall verify (in accordance with the inspection schedules) during performance of each inspection procedure occurrence.

Within each critical attribute is guidance intended to provide NRC management insights to the inspector regarding the types of items to inspect to satisfactorily complete verification of the critical attribute. This attribute guidance is based on the expected significant aspects of each critical attribute. However, they do not represent every significant aspect that could be inspected and, therefore, the inspector may inspect other aspects of the critical attribute provided the following criteria are met:

1) The inspector determines that the aspect is safety significant, based on sound technical judgement.

2) The inspector obtains approval from the Senior Construction Site Representative regarding the change as soon as possible and at least before departing the inspection site (onsite or offsite).

3) The activities performed to inspect the critical attribute and the results of the inspection are clearly recorded in the inspector's input to the CIPIMS and the inspection report.

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In having detailed requirements in the inspection procedures by using critical attributes, and the guidance inspectors should follow to verify completion of the critical attributes, NRC management has provided the inspection staff with clear expectations regarding their performance during inspection of construction related activities.

07.02 Level of Effort. The level of inspection effort required to ensure the same degree of confidence that construction is adequate will vary from site to site. Similarly, different types of construction activities at the same site or at locations away from the construction site may require various levels of effort to provide the same degree of assurance of quality work. As a minimum, inspection effort will be driven by the requirements of the site specific inspection plan and associated inspection procedures, and shall be sufficient to avoid unnecessary delays in the construction of the facility related to NRC inspection activities. Significantly increasing the scope of inspection effort beyond those stated by the site specific inspection plan will generally be the result of declining licensee performance as noted during periodic assessment of licensee performance. Increases in inspection effort following the issuance of a significant inspection finding will be made in the event the significant inspection finding is retracted for cause and as directed by the SCSR and the site specific inspection plan will be adjusted accordingly.

For multi-unit facilities, the construction inspection effort applied to the QA/QC Program may be reduced for subsequent units when no substantive changes have been made to the QA/QC Program for the subsequent units. Significant QA/QC procedure revisions should be examined for all units. However, completion of construction inspection requirements related to the implementation of the QA/QC Program (i.e., work observation and review of quality records) is required for each unit under construction. The Construction Site Scheduler (CSS) should consider this reduction in inspection effort when developing the site specific inspection plan and inspection schedules.

Additional inspection effort may be required to perform followup inspections of NRC findings or allegations. This additional inspection effort will be coordinated as described in Section 07.03 for both NRC findings followup and allegation review.

07.03 Inspection Finding Followup. Inspection findings consist of compilations of related exceptions identified during an inspection report period, and are documented and tracked as an open item. Open items shall be followed up by scheduling an inspection procedure(s) related to the open item. The inspection procedure(s) scheduled can be of limited scope by specifying only those critical attributes required to be performed as followup. The CSS shall review each open item and assign followup responsibility to the associated chief construction inspector (SCSI, SCEI, SCMI). The assigned chief construction inspector shall review the open item, identify which inspection procedure(s) and associated critical attributes are applicable for followup, and determine the timeframe in which the licensee should have completed actions to resolve the open item.

The CSS will use this information to schedule performance of the followup inspection based on currently scheduled inspection effort, and if necessary will schedule additional inspection effort. The CSS will electronically attach a note in the schedules documenting which open items and associated exceptions will be followed up during specific future inspections.

The inspector(s) assigned to perform the followup inspection shall review the open item (including the inspection information for each of the exceptions related to the open item), review the inspection procedure(s) and critical attributes selected by the senior construction inspector, and perform inspections as outlined in the inspection procedure(s) and critical attributes. Followup inspection results will be documented in the same manner as routine inspection results.

07.04 Use of Inspectors. In accordance with the objectives of this program, the majority of the assigned inspectors' time should be focused on assessing the results of licensee construction activities. Inspection assignments should emphasize the early identification of problem areas.

Successful completion of the site specific inspection plan may require significant inspection effort outside of normal working hours, on backshifts and weekends. Backshift and weekend work will be scheduled based on the licensee's construction schedule. The amount of backshift and weekend work scheduled should be consistent with the amount and types of construction activities the licensee performs during these periods. The SCSR will determine when backshift coverage is required and the scope of the backshift coverage.

The permanent resident inspection staff will be headed by the SCSR, with the SCMI, SCEI, SCSI, and CSS coordinating inspection activities. The SCSR and Regional management will coordinate the assignment of inspection requirements to the resident, regional, or NRR inspectors consistent with the qualifications and availability of individual inspectors.

Inspection of routine construction activities will generally be performed by the resident staff. The SCMI's, SCSI's, and SCEI's primary focus will be on the performance of all QA Program and QA/QC procedure review and implementation inspections. This is to be accomplished through program and procedure reviews, and direct observation of the implementation and use of QA/QC controls during construction activities. Detailed technical reviews and inspections, and much of the direct observation of construction activities, for technical aspects of construction, will be performed by specialist inspectors assigned to the site. The purpose of dividing responsibilities in this manner is to provide two methods of inspection that can be used to cross-check NRC inspection results and activities to give a more comprehensive picture of licensee performance. Issues identified during review of the QA Program and procedures can identify technical areas for specialist inspectors to follow, and can be used to check the effectiveness of NRC specialist inspector efforts in reviewing licensee activities. Specialist inspector findings can be used to check the effectiveness of the licensee's QA organization and identify directions for future NRC inspection of the licensee's QA Program, procedures, and implementation.

Transition to the startup phase of the inspection program will be coordinated with the Regional Office. It is expected that the Regional Offices will assign operations resident staff during pre-operational testing. The SCSR, SCMI, SCSI, SCEI, and CSS will support transition to the startup phase of the inspection program and will remain onsite for at least 6 months after start of commercial operation of the facility. Some construction inspection staff may stay onsite longer to ensure that all issues that arose during construction, especially open items, are resolved. This practice will ensure that the operations resident

inspectors can focus on plant operations during the early phase of commercial operation. The resident office composition during the startup and early operation phases of the inspection program will be determined by the cognizant Regional Administrator and SCSR.

2512-08 PROGRAM MANAGEMENT

08.01 Implementation. The Office of Nuclear Reactor Regulation (NRR) is responsible for the implementation of the inspection program described in this chapter and related appendices with the exceptions noted within. The Regional Offices are responsible for providing inspection resources and to support and supplement the inspection resources provided by NRR.

The inspection program is intended to provide the framework for managing the inspection effort. The number of inspection samples to obtain for completion of each inspection procedure will be provided in the inspection procedures (not yet developed), however, the number of samples to obtain during each occurrence of the inspection procedure can be adjusted when the site specific inspection plan is developed or as inspection schedules are prepared. How often each inspection procedure should be performed during the construction period, and when each inspection procedure occurrence should be performed, will be determined during development of the site specific inspection plan and inspection schedules.

Inspectors are encouraged to independently pursue any safety significant concern. However, inspector must identify which inspection procedure(s) and/or specific critical attributes are to be used to perform independent inspection activities and to accurately record this information and the inspection results so they can be incorporated into the CIPIMS. Individual inspectors are expected to apply professional judgement regarding the need to complete all of the attribute guidance of the critical attributes of an inspection procedure. Inspectors are also encouraged to identify areas in the inspection procedures that require either additional critical attributes or better attribute guidance or where critical attributes or guidance are inappropriate for the activities being inspected. This information should be provided to the SCSR who will forward it to the NRR's Inspection Program Branch for action.

Specialist inspectors are expected to discuss their planned inspection activities with the SCMI, SCSI, or SCEI as appropriate. Inspection findings will be discussed with the SCMI, SCSI, or SCEI before the specialist inspector exits with the licensee. The SCMI, SCSI, and SCEI will attend the exit meetings between the licensee and special inspectors for all inspections that they coordinate or participate in.

Although the site specific inspection plan will contain the minimum inspection requirements for a specific facility under construction, situations may arise where parts of the plan cannot be completed or otherwise satisfied by related programs referenced in this chapter. However, in all cases sufficient information shall be collected to provide adequate confidence that all design and license commitments (and acceptance criteria of facilities licensed under 10 CFR Part 52) have been satisfied. Authorization for modifications to the site specific inspection plan that reduce the level of inspection effort shall be made by the SCSR after review by NRR and Regional management. Documentation of the basis for the changes and approval of the reduction in inspection effort shall be forwarded to the CSS, who will make the changes to the site specific inspection plan and related inspection schedules. Each inspection procedure that

was planned to be performed but subsequently was either not performed or only partially completed shall be closed in the CIPIMS by attaching a note indicating the reason, basis, and/or references for closure.

08.02 <u>Inspection Results.</u> As stated in Title 10 CFR and in MC 2500, NRC inspectors perform a basic mission in determining whether a licensee meets current regulatory requirements and commitments. Identifying specific instances where a licensee fails to meet such requirements and commitments, although important, can result in correction of symptoms rather than correction of the underlying causes of licensee problems. Inspection results and findings should provide early identification and resolution of problems, their root causes, and generic implications. Documentation of inspection results, findings, and observations should contain sufficient detail to allow an independent reviewer to determine what was observed, reviewed, monitored, and/or analyzed during the inspection (by specific reference); when and where the inspection activities were conducted; what the bases for performing the inspection were; what criteria were used to assess licensee performance; and the inspectors conclusions regarding the activities observed.

Inspection results shall be documented in the CIPIMS in accordance with the guidance provided in Appendix D to this manual chapter. Inspectors are encouraged to record their input to the CIPIMS in sufficient detail to accurately portray their inspection efforts. Inspection reports will be developed using the information provided by the inspectors that is contained in the NRC management reviewed portion of the CIPIMS in accordance with the requirements of Appendix C to this manual chapter.

Because of limited inspector resources and the minimal baseline aspects of the program, the inspection procedures cover only a small sample of licensee activities. Thus, it is important that an inspector such as the SCMI, SCSI, and SCEI evaluate whether a noncompliance or deficiency represents an isolated case or may be symptomatic of a broader, more serious problem in that area. To provide the perspective to perform this evaluation, the inspector (SCMI, SCEI, and SCSI) should:

a. Keep currently informed of deficiencies, audit findings, and plant problems identified by the licensee's own organization or by the licensee's contractor organization.

b. Ascertain whether additional NRC inspection effort is merited in the area under consideration. The recommendation for additional NRC inspection effort shall be made to the CSS who will review the recommendation considering existing inspection plans. The CSS will then recommend whether to modify the site specific inspection plan to the SCSR.

Where the evidence indicates a symptomatic problem, NRR and Regional management should be consulted. Enforcement action, if warranted, should be in accordance with NRC enforcement guidelines. The SCSR will discuss and coordinate enforcement actions with NRR and Regional management before initiating actions against the licensee.

08.03 <u>Inspection Planning.</u> Appendix A provides the basic inspection procedures to be incorporated into the site specific inspection plan. The CSS shall develop a site specific inspection plan as soon as practical, preferably during license application review, incorporating the inspection procedures and the licensee's site specific construction schedule. The site specific inspection plan shall

provide the level of detail necessary to determine: 1) the minimum number of times each inspection procedure shall be performed; 2) the relation between the inspection procedures and ITAAC (for facilities licensed under 10 CFR Part 52 Subpart C); 3) the relation to the issuance of significant inspection findings; 4) the relation to SAYGO points, if used; and 5) the general timeframe in which each occurrence of an inspection procedure is to take place.

Completion of the site specific inspection plan will provide the foundation for the development of the construction inspection schedules. The CIPIMS provides the flexibility for the CSS to schedule inspection activities at the critical attribute level of each inspection procedure. When practical the CSS should take advantage of this capability to schedule inspection activities in detail. Appendix E of this manual chapter **[to be developed from the CIPIMS description (attachment 4 to the draft CIP report)]** provides instructions for the use of the CIPIMS.

After the site specific inspection plan is completed, the CSS will develop inspection schedules as outlined below:

- Overall Construction Inspection Schedule
- 12 Month Rolling Inspection Schedule
- Quarterly Rolling Inspection Schedule
- Monthly Rolling Inspection Schedule
- Weekly Inspection Schedule

The overall schedule will incorporate all of the planned inspection activities for the entire planned period of construction (the maximum duration the licensee has planned). The CSS should review this schedule periodically (at least quarterly) to adjust it for changes to the licensee's long range construction schedule. The Overall Construction Inspection Schedule will be used for long range planning of inspection resources (i.e., ensuring the required inspection skills or engineering disciplines are available when required). Therefore it is imperative that the overall schedule be completed as soon as possible during application review.

The 12 month schedule provides the first level of resource planning. This schedule is a rolling schedule that looks 12 months ahead. During development of this schedule the CSS shall identify the types of inspection skills and engineering disciplines that will be needed for specific periods of construction activity during the next 12 months. The CSS shall update this schedule at the end of each month for the next 12 month period and incorporate any changes in the licensee's construction schedule for the period that affect the inspection schedule.

The quarterly schedule provides the second level of resource planning. This schedule is a rolling schedule that looks 3 months ahead. During development of this schedule the CSS should identify individual inspectors (by name) with the required inspection and engineering skills to perform specific inspection procedures. As a minimum, this schedule shall be updated monthly for the subsequent 3 month period. The CSS should also review this schedule on a weekly basis and update it as necessary to accommodate changes to the licensee's construction schedule and changes to available inspection resources.

The monthly schedule provides the final level of resource planning. This schedule is a rolling schedule that looks 1 month ahead. During development of this schedule the CSS shall identify the inspectors (by name) performing specific inspection procedures at specific periods during the month (i.e., days the inspector will be onsite or at an offsite location performing their inspection). Little or no changes should be made to this schedule after issuance.

The weekly schedule provides an inspection planning tool for the inspectors performing specific inspection procedures. This is a 1 week rolling schedule. During development of this schedule, the CSS shall identify the specific inspectors (by name) performing specific inspection procedures, and shall identify licensee activities available for inspection related to those inspection procedures based on the licensee's construction schedule (i.e., what construction activities will be conducted during the next week that the inspector can observe during performance of a specific inspection procedure?). The weekly schedule will provide the inspector with the universe of possible inspection samples from which they will select a representative sample for inspection. The CSS shall also include in the weekly schedule the expected number of inspection samples the inspector should obtain during performance of each inspection procedure.

2512-09 INTERFACE WITH RELATED PROGRAMS

09.01 Construction Appraisal Team (CAT) Inspection Program. The CAT program uses integrated, multidisciplined inspections to determine if a facility is being constructed in accordance with regulatory requirements and if the applicant's management and quality control programs are effective. The inspections are focused primarily on hardware installation and construction quality. CAT inspections will be coordinated with the CSS when identified for performance at a specific site and will be incorporated into the site specific inspection plan. Although specific responsibilities are provided by MC 2920 (may need to revise MC 2920 to address changes to the CIP), the NRR/Region interfaces are summarized here.

a. NRR will solicit the region to provide inspectors who will participate as active team members. A member of the permanent resident inspection staff, although not assigned as a team member, should attend the daily CAT briefing meetings and the exit meeting with the licensee.

b. The SCSR has the responsibility for followup action on potential enforcement actions described in the CAT inspection reports.

c. The SCSR will be sent recommendations on the extent to which the CAT effort satisfied the inspection program requirements of this manual chapter. The SCSR will determine how the CAT results will be input and used by the CIPIMS.

d. The CAT inspection results will be used in the assessment of NRR and regional performance of the construction inspection program described in this manual chapter.

09.02 Licensee Contractor and Vendor Inspection Program (LCVIP). General policies for Vendor Program/Region interfaces are described in MC 2700. Changes, as they occur, will be addressed in a revision of MC 2700. Vendor inspections may be necessary to verify satisfactory completion of design and license commitments (or acceptance criteria for facilities licensed under 10 CFR Part 52)

for specific components manufactured for the facility, or for modular construction activities away from the construction site. The site specific inspection plan will provide recommended inspection activities for the Vendor Inspection Program. The SCSR will ensure that those inspection activities not performed by the Vendor Inspection Program required to verify satisfactory completion of design and license commitments are conducted under the CIP.

09.03 <u>Systematic Assessment of Licensee Performance (SALP) Program.</u> The SALP program (NRC Management Directive 8.6) is a comprehensive, periodic appraisal by the NRC staff of power reactor licensees. It is designed to improve licensee performance, improve the NRC regulatory performance by determining which areas need increased inspection emphasis, and to provide a basis for management allocation of resources. The SCSR has the responsibility and authority to adjust the expenditure of inspection resources based on the performance of the licensee.

The permanent resident inspection staff (SCSR, SCSI, SCMI, and SCEI) plays a vital role in the development of the assessment of licensee performance. Each of the chief inspectors is required to review all of the inspector findings and assessments in their areas of responsibility to create an integrated assessment of licensee performance for their responsible functional areas. The SCSR will review each of the individual assessments and supporting inspection generated information provided by the chief inspectors, and will develop an overall assessment of licensee performance. The assessments and supporting inspection generated information will provide the foundation for the development of the SALP report in accordance with the requirements of NRC Management Directive 8.6.

Refer to NRC Management Directive 8.6 for the SALP functional areas related to the assessment of licensee performance at nuclear power plants under construction. The SCSR will assign functional area responsibilities to the SCSI, SCMI, and SCEI consistent with their areas of inspection coordination.

09.04 <u>Security and Safeguards Inspections.</u> The security and safeguards inspection activities, as judged appropriate by the SCSR and Regional management, will be conducted as an early effort of the program to ensure adequate safeguards are in place for receipt of new fuel at the facility under construction. For facilities licensed under 10 CFR Part 52, the combined license application may contain additional ITAAC that address security and safeguards issues. In this case, security and safeguards inspections will be performed to verify satisfactory completion of the acceptance criteria in this area. Conduct of security and safeguards inspections will be coordinated with the CSS and will be incorporated into the site specific inspection plan and inspection schedules. Selected portions of preoperational safeguards inspection activities, such as barriers for alarm stations and vital areas, should be conducted as early as practical during construction and installation of security features. Such early onsite inspection is intended to preclude the late identification of problems. Some of these early reviews may be possible during onsite accompaniment of licensing reviewers.

09.05 <u>Early Site Permit and Site Characterization Phase Inspection Program (IMC 2511).</u> Inspection activities performed during this phase of the inspection program may be used to verify completion of some design or license commitments (including ITAAC) applicable to site characterization and preparation. The CSS will incorporate the inspections conducted under MC 2511 into the site specific inspection plan, noting when these activities were performed. If the inspection

activities of MC 2511 have not been completed at the time the COL application is submitted, or if it is difficult to verify that the required inspections were completed, the CSS will incorporate the inspection guidance of MC 2511 into the site specific inspection plan and inspection schedules.

09.06 Operator Licensing Program. The operator licensing program will be used to provide input to the SCSR, and Regional and NRR management for determining recommendations regarding fuel load authorization and operation of the facility. The licensee will be required to have licensed operators for receipt, handling, and loading fuel. Evaluation of the operator licensing program and its implementation should be conducted as early as possible and will be coordinated with the CSS for incorporation into the site specific inspection plan and inspection schedules.

END

Appendices

APPENDIX A
CONSTRUCTION INSPECTION PROGRAM
INSPECTION PROCEDURES
RELATED TO
AREAS OF RESPONSIBILITY

STRUCTURAL ENGINEERING DISCIPLINE
(responsibility of the Site Chief Civil/Structural Inspector - SCSI)

Quality Assurance

35020*	Audit of Applicant's Surveillance of Contractor QA/QC
35051*	Site Erected Reactor Vessels - QA Procedures
35060*	Licensee Management of QA Activities
35061*	In-Depth QA Inspection of Performance
35065*	Procurement, Receiving, and Storage
35100*	Review of QA Manual
35701*	Quality Assurance Program Annual Review
35960*	QA Program Evaluation of Engineering Service Organization
38701*	Procurement Program
38702*	Receipt, Storage and Handling of Equipment and Materials Program
38703*	Commercial Grade Procurement Inspection
39701*	Records Program
39702*	Document Control Program
40500*	Evaluation of Licensee Self-Assessment Capability

Design and Design Changes

37051*	Verification of As-Builts
37055*	On-Site Design Activities
37301*	Comparison of As-Built Plant to FSAR Description

Geotechnical/Foundation Activities

45051	Procedure Review
45053	Work Observation
45055	Record Review

Structural Concrete

46051	Structural Concrete Procedure Review
46053	Structural Concrete Work Observation
46055	Structural Concrete Record Review
46061	Structural Masonry Construction
46071	Concrete Expansion Anchors

Containment and Structures

47051	Containment (Post-Tensioning) Procedure Review
47053	Containment (Post-Tensioning) Work Observation
47055	Containment (Post-Tensioning) Record Review

* Responsibility for completion of the (*) inspection procedures is to be shared between all of the chief construction inspectors.

Structural Steel and Supports

48051	Structural Steel and Support Procedure Review
48053	Structural Steel and Support Work Observation
48055	Structural Steel and Support Record Review
55100	Structural Welding General Inspection Procedure

Component Supports

50090	Pipe Support and Restraint Systems

Containment Penetrations

53051	Containment Penetrations (Mechanical) Procedure Review
53053	Containment Penetrations (Mechanical) Work Observation
53055	Containment Penetrations (Mechanical) Record Review

Environmental Protection

80210	Environmental Protection - Initial and Periodic Inspections

Testing

39301*	Preoperational Test Records
61700*	Surveillance Procedures and Records
61701*	Complex Surveillances
70300*	Preoperational Test Procedure Review
70301*	Overall Preoperational Test Program Review
70302*	Preoperational Test Program Implementation
70311*	Preoperational Test Procedure Verification
70312*	Preoperational Test Witnessing
70329*	Preoperational Test Result Evaluation Verification
63050	Containment Structural Integrity Test
70307	Containment Integrated Leak Rate Test - Procedure Review
70313	Containment Integrated Leak Rate Test
70323	Containment Leak Rate Test Results Evaluation
70342	Containment Combustible Gas Control System Test
70353	Cranes, Hoists, and Lifting Equipment Test - Preoperational Test Procedure Review
70370	Testing Piping Support and Restraint Systems
70442	Containment Combustible Gas Control System Test - Preoperational Test Witnessing
70453	Cranes, Hoists, and Lifting Equipment Test - Preoperational test Witnessing

* Responsibility for completion of the (*) inspection procedures is to be shared between all of the chief construction inspectors.

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MECHANICAL ENGINEERING DISCIPLINE
(responsibility of the Site Chief Mechanical Inspector - SCMI)

Quality Assurance

35020*	Audit of Applicant's Surveillance of Contractor QA/QC
35051*	Site Erected Reactor Vessels - QA Procedures
35060*	Licensee Management of QA Activities
35061*	In-Depth QA Inspection of Performance
35065*	Procurement, Receiving, and Storage
35100*	Review of QA Manual
35701*	Quality Assurance Program Annual Review
35960*	QA Program Evaluation of Engineering Service Organization
38701*	Procurement Program
38702*	Receipt, Storage and Handling of Equipment and Materials Program
38703*	Commercial Grade Procurement Inspection
39701*	Records Program
39702*	Document Control Program
40500*	Evaluation of Licensee Self-Assessment Capability

Design and Design Changes

37051*	Verification of As-Builts
37055*	On-Site Design Activities
37301*	Comparison of As-Built Plant to FSAR Description

Fire Prevention and Protection

42051	Fire Protection Procedure Review
64704	Fire Protection/Prevention Program

Reactor Coolant Pressure Boundary Piping

49051	QA Review
49053	Work Observation
49055	Record Review

Safety-Related Piping

49061	QA Review
49063	Work Observation
49065	Record Review

Mechanical Components and Equipment

50051	Reactor Vessel and Internals QA Review
50053	Reactor Vessel and Internals Work Observation
50055	Reactor Vessel and Internals Records Review
50071	Safety-Related Components - Procedure Review
50073	Mechanical Components - Work Observation

* Responsibility for completion of the (*) inspection procedures is to be shared between all of the chief construction inspectors.

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50075	Safety-Related Components - Records Review
50082	Site-Erected Reactor Vessels - Review of Procedures
50083	Site-Erected Reactor Vessels - Observation of Erection Activities
50085	Site-Erected Reactor Vessels - Review of Records
50095	Spent Fuel Storage Racks
50100	Heating, Ventilating, and Air Conditioning Systems

Welding

55050	Nuclear Welding General Inspection
55092	Site Erected Reactor Vessels Observation of Welding and Associated Activities
55093	Reactor Vessel Internals (Welding) Observation of Welding and Associated Activities
55150	Weld Verification Checklist

Non-Destructive Examination

57050	Nondestructive Examination Procedure Visual Examination Procedure Review/Work Observation/Record Review
57060	Nondestructive Examination Procedure Liquid Penetrant Examination Procedure Review/Work Observation/Record Review
57070	Nondestructive Examination Procedure Magnetic Particle Examination Procedure Review/Work Observation/Record Review
57080	Nondestructive Examination Procedure Ultrasonic Examination Procedure Review/Work Observation/Record Review
57090	Nondestructive Examination Procedure Radiographic Examination Procedure Review/Work Observation/Record Review

Preservice and Inservice Testing

73051	Inservice Inspection - Review of Program
73052	Inservice Inspection - Review of Procedures
73053	Preservice Inspection - Observation of Work and Work Activities
73055	Preservice Inspection - Data Review and Evaluation

Testing

39301*	Preoperational Test Records
61700*	Surveillance Procedures and Records
61701*	Complex Surveillances
70300*	Preoperational Test Procedure Review
70301*	Overall Preoperational Test Program Review
70302*	Preoperational Test Program Implementation
70311*	Preoperational Test Procedure Verification
70312*	Preoperational Test Witnessing
70329*	Preoperational Test Result Evaluation Verification
70304	Engineered Safety Features Test - Preoperational Test Procedure Review
70308	Preoperational Hot Functional Testing - PWR Procedure Review
70314	Hot Functional Testing Witnessing
70315	Engineered Safety Features Test - Preoperational Test Witnessing
70322	Preoperational Test Results Evaluation - ESF
70324	Preoperational Test Results Evaluation - HFT
70331	Vibration Test - Preoperational Test Procedure Review

* Responsibility for completion of the (*) inspection procedures is to be shared between all of the chief construction inspectors.

70332	Control Rod System Test - Preoperational Test Procedure Review
70333	Chemical Control System Test - Preoperational Test Procedure Review (PWR only)
70335	Safety and Relief Valve Test - Preoperational Test Procedure Review
70336	Residual/Decay Heat Removal System Test - Preoperational Test Procedure Review
70337	Main Steam Isolation Valve Test - Preoperational Test Procedure Review
70338	Auxiliary Feedwater System Test - Preoperational Test Procedure Review (PWR only)
70339	Component Cooling Water System Test - Preoperational Test Procedure Review
70343	Containment Spray System Test - Preoperational Test Procedure Review
70344	Containment Isolation Valves Test - Preoperational Test Procedure Review
70345	Containment Heat/Cool/Vent System Test - Preoperational Test Procedure Review
70346	Auxiliary Building Heat/Cool/Vent System Test - Preoperational Test Procedure Review
70355	Compressed Gas System Test - Preoperational Test Procedure Review
70356	Standby Liquid Control System Test - Preoperational Test Procedure Review
70357	Reactor Core Isolation Cooling System Test - Preoperational Test Procedure Review
70358	Reactor Building Heat/Cool/Vent System Test - Preoperational Test Procedure Review
70362	Reactor Coolant System Hydrostatic Test Procedure Review
70431	Vibration Test - Preoperational Test Witnessing
70432	Control Rod System Test - Preoperational Test Witnessing
70433	Chemical Control System Test - Preoperational Test Witnessing
70435	Safety and Relief Valve Test - Preoperational Test Witnessing
70436	Residual/Decay Heat Removal System Test - Preoperational Test Witnessing
70437	Main Steam Isolation Valve Test - Preoperational Test Witnessing
70438	Auxiliary Feedwater System Test - Preoperational Test Witnessing
70439	Component Cooling Water System Test - Preoperational Test Witnessing
70443	Containment Spray System Test - Preoperational Test Witnessing
70444	Containment Isolation Valve Test - Preoperational Test Witnessing
70445	Containment Heat/Cool/Vent System Test - Preoperational Test Witnessing
70446	Auxiliary Building Heat/Cool/Vent System Test - Preoperational Test Witnessing
70455	Compressed Gas System Test - Preoperational Test Witnessing
70456	Standby Liquid Control System Test - Preoperational Test Witnessing
70457	Reactor Core Isolation Cooling System Test - Preoperational Test Witnessing
70458	Reactor Building Heat/Cool/Vent System Test - Preoperational Test Witnessing
70462	Reactor Coolant System Hydrostatic Test - Test Witnessing
70562	Reactor Coolant System Hydrostatic Test Results Evaluation

* Responsibility for completion of the (*) inspection procedures is to be shared between all of the chief construction inspectors.

ELECTRICAL AND I&C ENGINEERING DISCIPLINES
(responsibility of the Site Chief Electrical and I&C Inspector - SCEI)

Quality Assurance

35020*	Audit of Applicant's Surveillance of Contractor QA/QC
35051*	Site Erected Reactor Vessels - QA Procedures
35060*	Licensee Management of QA Activities
35061*	In-Depth QA Inspection of Performance
35065*	Procurement, Receiving, and Storage
35100*	Review of QA Manual
35960*	QA Program Evaluation of Engineering Service Organization
38701*	Procurement Program
38702*	Receipt, Storage and Handling of Equipment and Materials Program
38703*	Commercial Grade Procurement Inspection

Design and Design Changes

37051*	Verification of As-Builts
37055*	On-Site Design Activities
37301*	Comparison of As-Built Plant to FSAR Description

Electrical Components and Systems

51051	Electrical Components and Systems - Procedure Review
51053	Electrical Components and Systems - Work Observation
51055	Electrical Components and Systems - Record Review
51061	Electrical Cable - Procedure Review
51063	Electrical Cable - Work Observation
51065	Electrical Cable - Record Review
71710	Engineered Safety Feature System Walkdown

Instrumentation Components and Systems

52051	Instrument Components and Systems - Procedure Review
52053	Instrument Components and Systems - Work Observation
52055	Instrument Components and Systems - Record Review

Testing

39301*	Preoperational Test Records
61700*	Surveillance Procedures and Records
61701*	Complex Surveillances
70300*	Preoperational Test Procedure Review
70301*	Overall Preoperational Test Program Review
70302*	Preoperational Test Program Implementation
70311*	Preoperational Test Procedure Verification
70312*	Preoperational Test Witnessing
70329*	Preoperational Test Result Evaluation Verification
35750	QA Program Measuring and Test Equipment
61705	Calibration of Nuclear Instrumentation Systems
61725	Surveillance Testing and Calibration Control Program
70305	Reactor Protection System Test - Preoperational Test Procedure Review

* Responsibility for completion of the (*) inspection procedures is to be shared between all of the chief construction inspectors.

70306	Loss of Offsite Power Test - Preoperational Test Procedure Review
70316	Loss of Offsite Power Test - Preoperational Test Witnessing
70317	Reactor Protection System Test - Preoperational Test Witnessing
70325	Preoperational Test Results Evaluation - Reactor Protection System
70326	Preoperational Test Results Evaluation - Loss of Offsite Power
70334	Engineered Safety Features Actuation System Test - Preoperational Test Procedure Review
70340	DC Power System Test - Preoperational Test Procedure Review
70347	Pressurizer and Level Control System Test - Preoperational Test Procedure Review
70348	Main Feedwater Control System Test - Preoperational Test Procedure Review
70349	Reactor Coolant Leak Detection System Test - Preoperational Test Procedure Review
70350	Loose Parts Monitoring System Test - Preoperational Test Procedure Review
70351	Integrated Reactor Control System Test - Preoperational Test Procedure Review
70352	Remote Reactor Shutdown Test - Preoperational Test Procedure Review
70354	Nuclear Instrumentation System Test - Preoperational Test Procedure Review
70359	Recirculation System Flow Control Test - Preoperational Test Procedure Review
70360	Manual Reactor Control System Test - Preoperational Test Procedure Review
70361	Traversing Incore Probe System Test - Preoperational Test Procedure Review
70434	Engineered Safety Features Actuation System Test - Preoperational Test Witnessing
70440	DC Power System Test - Preoperational Test Witnessing
70441	Emergency/Standby Power Supply System Test - Preoperational Test Witnessing
70447	Pressurizer and Level Control System Test - Preoperational Test Witnessing
70448	Main Feedwater Control System Test - Preoperational Test Witnessing
70449	Reactor Coolant Leak Detection System Test - Preoperational Test Witnessing
70450	Loose Parts Monitoring System Test - Preoperational Test Witnessing
70451	Integrated Reactor Control System Test - Preoperational Test Witnessing
70452	Remote Reactor Shutdown Test - Preoperational Test Witnessing
70454	Nuclear Instrumentation System Test - Preoperational Test Witnessing
70459	Recirculation System Flow Control Test - Preoperational Test Witnessing
70460	Manual Reactor Control System Test - Preoperational Test Witnessing
70461	Traversing Incore Probe System Test - Preoperational Test Witnessing

* Responsibility for completion of the (*) inspection procedures is to be shared between all of the chief construction inspectors.

APPENDIX B
CERTIFIED DESIGN SAFETY-RELATED SYSTEMS AND STRUCTURES

1. GENERAL ELECTRIC - ADVANCED BOILING WATER REACTOR (ABWR)

A. Structures: For the structures listed below, include their foundations, basemats, structural steel, reinforcing steel (concrete), internal supports and structures, etc.

Primary Containment System and Structures
Reactor Building
Control Building
Intake Structure

B. Systems: For the systems listed below, include individual components, supports, instrumentation and controls.

Class 1E Direct Current Power Supply System (see ITAAC 2.12.12)
Class 1E Vital AC Power Supply
Class 1E Instrument and Control Power Supply
Class 1E Electrical Power Distribution System (see ITAAC 2.12.1)
Containment Atmospheric Monitoring System
Control Rod Drive System (Scram and reactor pressure retaining components)
Control Room Habitability Area HVAC System
Control Building Safety-Related Equipment Area HVAC System
Electrical Penetrations
Emergency Diesel Generator System
Flammability Control System
Fuel Pool Cooling and Cleanup System (piping and valves for fuel pool makeup)
High Pressure Nitrogen Gas Supply System (portions, see ITAAC 2.11.13)
High Pressure Core Flooder System
HVAC Emergency Cooling Water System
Leak Detection and Isolation System
Local Control Panels (portions, see ITAAC 2.7.3)
Main Control Room Panels
Makeup Water (Condensate) System (level sensors and associated piping only)
Makeup Water (Purified) System (primary containment isolation function only)
Multiplexing System (Essential Multiplexing System only)
Neutron Monitoring System
Nuclear Boiler System
Oil Storage and Transfer System
Process Radiation Monitoring System (portions, see ITAAC 2.3.1)
Radwaste System (primary containment isolation function only)
Reactor Building Cooling Water System (portions, see ITAAC 2.11.3)
Reactor Building HVAC System
Reactor Building Safety-Related Equipment HVAC System
Reactor Building Safety-Related Diesel Generator HVAC System
Reactor Service Water System
Reactor Protection System
Reactor Recirculation System (Motor cover and its nuts and bolts only)
Reactor Water Cleanup System (from RPV to outboard isolation valve only)
Reactor Pressure Vessel System
Reactor Core Isolation Cooling System
Recirculation Flow Control System (core plate differential pressure sensors)
Remote Shutdown System
Residual Heat Removal System
Standby Liquid Control System
Standby Gas Treatment System
Suppression Pool Temperature Monitoring System

APPENDIX C
INSPECTION REPORT GUIDANCE

1.0 Purpose:

To provide guidance for the preparation of construction inspection reports using a draft inspection report generated by the Construction Inspection Program Information Management System (CIPIMS). [Note: When IMC 2512 is finalized, this guidance should be included as an attachment to IMC 0610, "Inspection Reports."]

2.0 Background:

To address concerns with the ability to track and retrieve inspection generated data from past power reactor construction projects, the NRC developed the CIPIMS. This system allows the NRC to store detailed inspection information in a data base structure to facilitate retrieval and input into routine inspection reports and non-routine management reports. The data base structure is shown in figure 1.

The inspectors will be required to record their inspection observations and findings in accordance with the guidance provided in Appendix D to MC 2512. The CIPIMS will be used to create a draft inspection report directly from the raw information gathered by inspectors. Beyond data input in the CIPIMS, minimal effort should be required by most inspectors for preparation of the inspection report.

3.0 Guidance:

3.1 COVER LETTER

The cover letter will be prepared by the Senior Construction Site Representative (SCSR) for each inspection report. The cover letter should discuss the major issues identified in the inspection report body, focusing on issues that require additional licensee management attention or indicate superior licensee performance. Any Notices of Violation resulting from inspections documented in the inspection report will be attached to the cover letter. Notices of Violation will be prepared in accordance with the guidance provided in the NRC's Enforcement Policy.

The cover letter will be issued (signed) by the SCSR and in accordance with the requirements of MC 0610, "Inspection Reports."

3.2 COVER PAGE

The cover page will be developed using a standard format and the following information from the CIPIMS:

- Unit Number
- Inspection Report Number
- Inspection Report Title
- Inspection Start Date
- Inspection End Date
- Inspector Name(s)

The cover page will also provide for concurrences by the SCSI, SCMI, SCEI, and approval by the SCSR. The cover page will be arranged as outlined in Figure 2.

3.3 TABLE OF CONTENTS

Each of the inspection procedures discussed in the inspection report will be assigned a unique section number. The subsections under each inspection procedure should proceed as follows:

X.0	[Inspection Procedure No.] - [IP Occurrence No.] - [IP Title]
X.X	[Critical Attribute No.]
X.X.1	[Critical Attribute No.] Basis
X.X.2	[Critical Attribute No.] Assessment
X.X.3.x	[Exception No.] - [Brief title of exception]

If the reports are stored electronically in a text retrieval data base, this arrangement should facilitate directly searching electronically the inspection reports, without the need to interface with the CIPIMS using text retrieval software. Figure 3 contains a typical inspection report table of contents.

3.4 EXECUTIVE SUMMARY

The Executive Summary will be developed using information from the CIPIMS. This information will include inspection procedure numbers, inspection procedure titles, exception numbers, exception text, and exception status. Using this information the SCSI, SCMI, and the SCEI will prepare open items to include in the executive summary for their responsible inspection procedures (see Appendix A to manual chapter 2512). Each open item will include the related exceptions identified during inspection of critical attributes completed during the inspection period. For example, if multiple exceptions were identified under different inspection procedures related to procedure adherence, a single open item could be opened that references all of the exceptions. The SCSI, SCMI, and/or SCEI shall indicate the status (open or closed) of each open item referenced in the inspection report in the Executive Summary. If no exceptions are identified for the critical attributes of an inspection procedure completed during the inspection period, the SCSI, SCMI, and/or SCEI shall list the inspection procedure number and title, and critical attribute number, and state there were no exceptions.

Open items shall be numbered with the following format: the type of open item; the inspection report number the open item was initially described in; and a unique sequential number for each of the open items in the inspection report (i.e., VIO4-52-001/99-001-01 would be a Level 4 violation and the first open item in the inspection report numbered 52-001/99-001). The open item numbers will be recorded in the CIPIMS, and will be related to each of the associated exceptions described in the inspection report. Followup of open items will be scheduled in accordance with the guidance of Section 07.03 of manual chapter 2512. Open item closeout should generally not occur until each of the exceptions associated with the open item have been reviewed and closed.

The SCSI, SCMI, and SCEI shall review the critical attribute assessments documented in the CIPIMS by the assigned inspectors for each of the inspection procedures in their responsible areas. Following this review they shall summarize and assess the overall results of the inspections performed in their areas of

responsibility. This assessment and summary shall be documented in the Executive Summary. An overall assessment and summary shall be prepared by the SCSR considering the inputs from the SCSI, SCMI, and SCEI. Figure 4 provides an example of a typical inspection report Executive Summary.

3.5 REPORT BODY

The body of the report will be developed the draft inspection report generated by the CIPIMS. Figure 5 provides an example of a typical section of the body of an inspection report. The draft inspection report will contain information on the following:

Inspection procedure number
Inspection procedure cycle
Inspection procedure critical attribute number
Basis for review of each critical attribute
Assessment of construction activities observed and/or procedures and/or records reviewed for each critical attribute.
Exception number(s) identified during review of each critical attribute.
The basis for each exception.

The report will be organized as outlined in Section 3.0. The purpose for structuring the inspection reports in this fashion is to allow the reports to be readily searched by a text retrieval system using standard search parameters. The SCSI, SCMI, and SCEI will use the information from the rough inspection report, for each of the inspection procedures in their are of responsibility, to develop the final inspection report. The SCSI, SCMI, and SCEI shall review the data provided in the draft report and determine whether adequate documentation is available to identify what the inspector did to verify each critical attribute; the inspector's assessment of the activities or items observed; and whether any of the activities or items observed by the inspector require additional followup.

It is imperative that the information in the CIPIMS be as complete and accurate as possible to ensure that the NRC can readily determine the status of inspection activities for a given site and easily retrieve supporting information. In this light, the inspector should make every effort to provide sufficient detail to allow an independent observer to determine what the inspector did to assess licensee performance for a given inspection procedure. If the inspector is unable, for any reason, to complete a critical attribute, the inspector shall inform the SCSI, SCMI, or SCEI, as applicable, as soon as practical, and as a minimum before the inspector leaves the construction site or fabrication facility.

3.6 SAMPLE SUMMARY TABLE

The draft report data summary table generated by the CIPIMS will contain the following information:

- Inspection Report No.
- Inspection Procedure Numbers
- Inspection Procedure Cycle
- Critical Attribute Numbers
- Sample Identifiers
- Sample Descriptions

- Date the sample was first inspected for the IP, cycle, and critical attribute.

Essentially, the draft report Sample Summary Table as created by the CIPIMS will be used as an attachment to the inspection report body without changes. The SCSI, SCMI, and SCEI, shall review the Sample Summary Table. If technical errors are identified they shall be corrected in the CIP data base and the Sample Summary Table recreated. The summary table will be a hardcopy of what licensee items were observed or reviewed by NRC inspectors that are referenced or assessed in a specific inspection report that can be distributed to the public document rooms. Figure 6 provides an example of a typical Sample Summary Table that would be attached to a construction inspection report.

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Figure 1 - CIPIMS DATABASE STRUCUTRE

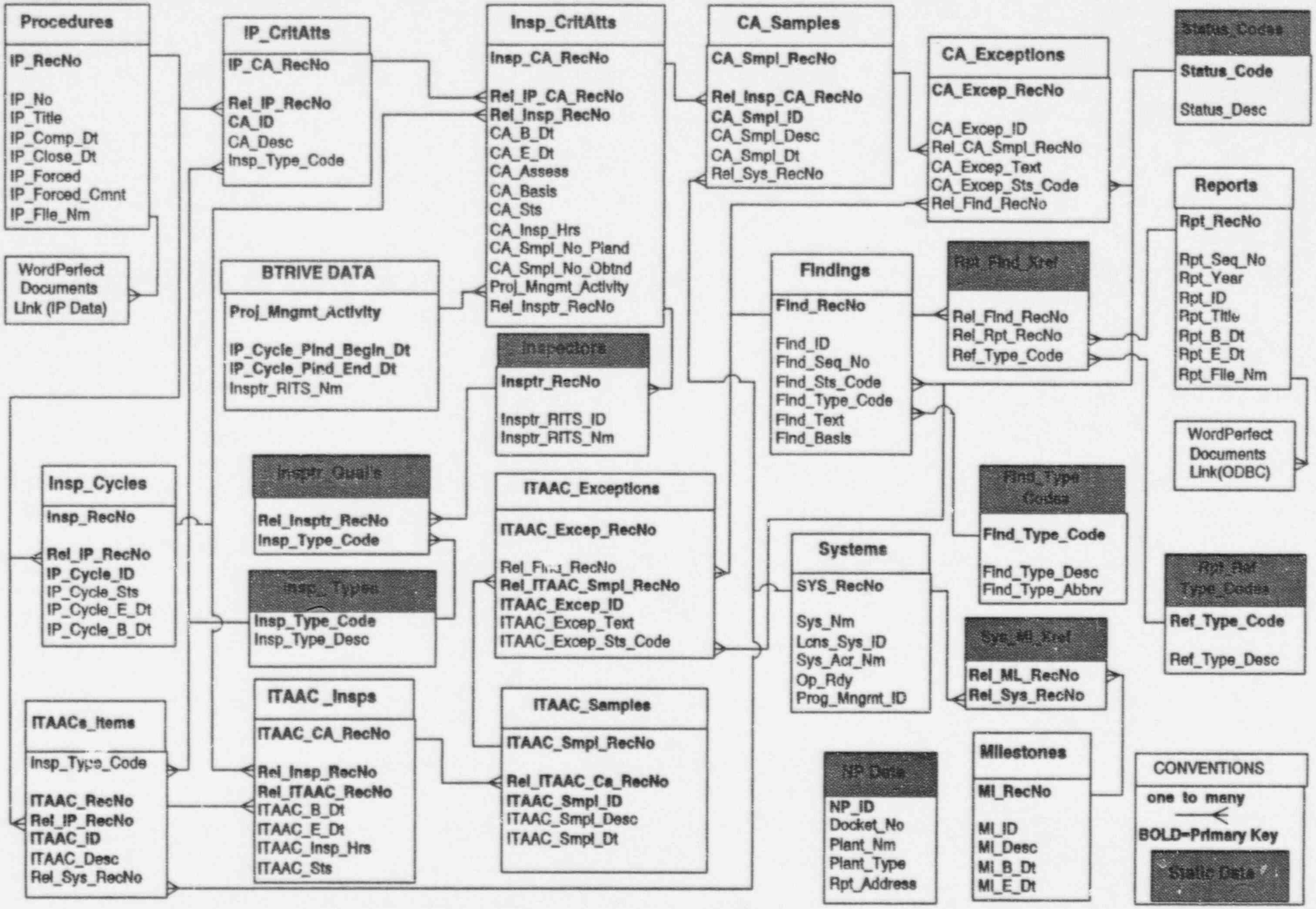

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FIGURE 2
INSPECTION REPORT COVER PAGE

U.S. NUCLEAR REGULATORY COMMISSION

Report No.:	52-001/99-001
Report Title:	ROUTINE CONSTRUCTION INSPECTION REPORT - EMPHASIS ON PROCUREMENT, PIPE FABRICATION, & MECHANICAL EQUIPMENT
Addressee:	Nicholas U. Power
Company:	Vice President, Nuclear Facilities Construction Savannah Power Station U. S. Nuclear Power Construction Corporation 238 Uranium Way Savannah, GA 30323
License No.:	CNPR-01
Facility Name:	Savannah Power Station, Unit 1
Report Period:	January 1, 1999 - January 31, 1999
Inspection Locations:	Savannah Power Station, Unit 1 238 Uranium Way Savannah, GA 30323 Nuclear Module Fabricators 493 Virtual Drive Avondale, LA 70094
Inspectors:	J. A. Nakoski, Site Chief Mechanical Inspector P. I. Castleman, Site Chief Electrical Inspector A. G. Howe, Site Chief Structural Inspector M. D. Shannon, Mechanical Inspector J. E. Beall, Electrical and I&C Inspector F. I. Young, Structural Inspector

Concurrence:

______________________________ ________
Site Chief Structural Inspector Date

______________________________ ________
Site Chief Mechanical Inspector Date

______________________________ ________
Site Chief Electrical & I&C Inspector Date

Approval: ______________________________ ________
Senior Construction Site Representative Date

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FIGURE 3
INSPECTION REPORT TABLE OF CONTENTS

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1.1.3.1	VIO4-52-001/99-001-001; Procurement Documents Specified Equipment Specifications Contrary to Design	1
1.2	35065.03.02	2
1.2.1	35065.03.02 Basis	2
1.2.2	35065.03.02 Assessment	2
1.2.3.2	CDR-52-001/99-001-002; Followup on Construction Deficiency Report Related to Procurement of HPCF pump.	2
1.3	35065.03.03	3
1.3.1	35065.03.03 Basis	3
1.3.2	35065.03.03 Assessment	3
1.3.3.1	UNR-52-001/99-001-003; Certificate of Conformance not Available with Procured Component	4
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2.4	50073.03.04	10
2.4.1	50073.03.04 Basis	10
2.4.2	50073.03.04 Assessment	10
2.5	50073.03.05	11
2.5.1	50073.03.05 Basis	11
2.5.2	50073.03.05 Assessment	11

OVERALL ASSESSMENT OF CONSTRUCTION ACTIVITIES
[To be provided by the SCSR based on review of all inspections completed during the inspection period]

INSPECTION FINDINGS AND ASSESSMENTS

1.0 IP No: 35065, "Procurement, Receiving, and Storage"
Related ITAAC: HPCF System - 2.4.2.1 and 2.4.2.3.e

1.1 During this inspection report period, inspection activities were completed for critical attributes 03.01, 03.02, 03.03, and 03.04 of inspection procedure (IP) 35065, "Procurement, Receiving, and Storage." While there were minor exceptions to the licensee's safety-related equipment procurement program (noted below), overall, based on the inspection activities completed this period, the licensee maintained effective controls on the procurement of safety-related equipment.

1.2 (OPEN) VIO4-52-001/99-001-001: Procurement documents referenced equipment specifications contrary to design. During review of purchase order (PO) 99-QVMO-A-00251 the inspector identified that it did not specify the correct environmental conditions necessary for qualification in accordance with design specifications for the High Pressure Core Flooder (HPCF) injection valve (HPCF-MOV-025) motor operator. Failure to accurately reflect environmental qualification requirements in PO 99-QVMO-A-00251 is contrary to the requirements of the Quality Assurance Procedure (QAP) established for procurement documents (QAP-498EP-0031, revision 2, "Purchase Order Requirements").

1.3 (CLOSED) CDR-52-001/99-001-002: Followup on construction deficiency report (CDR 99-QMP-0010) related to procurement of an HPCF pump. The licensee identified that the as procured HPCF pump (HPCF-P-002) did not comply with the engineering specifications for pump internal inlet diameter. The pump internal inlet diameter was required to be 3100 $\pm$ 5 mm, while the as procured pump inlet diameter was 3087 mm. The design range of pump internal inlet diameters were used in the preliminary analysis of the HPCF system capability to deliver 50% of the design flow at elevated suction temperatures. Re-engineering was performed by the licensee to address this issue and a design change was implemented by the licensee that allowed use of the as procured HPCF pump.

1.4 (OPEN) UNR-52-001/99-001-003: The required certificate of conformance (COC) was not available with the procured component at receipt inspection. While reviewing procurement documents for receipt inspection of HPCF pump (HPCF-P-002) on January 25, 1999, the inspector noted that the COC required by Purchase Order (PO) 99-QP-A-0324 was not received with the pump when it was delivered on January 15, 1999. The licensee had discussed the lack of a COC with the pump supplier who indicated that a duplicate COC was being forwarded. This issue will remain open pending NRC review of the licensee's investigation regarding the missing COC and their response to the pump supplier's actions.

FIGURE 5

INSPECTION REPORT: 52-001/99-001
TITLE: ROUTINE CONSTRUCTION INSPECTION REPORT - EMPHASIS ON PROCUREMENT, PIPE FABRICATION, & MECHANICAL EQUIPMENT

1.0 35065, "Procurement, Receiving, and Storage" Cycle: 01

1.1 35065.03.01

•1.1.1 35065.03.01 Basis

The inspector reviewed requirements specified in the procurement documents listed in the attached Sample Summary Table for the technical fabrication requirements, seismic/environmental requirements, and manufacturing specifications. Relevant design documentation and quality assurance procedures for each procurement document were also reviewed. The associated design documentation and quality assurance procedures are also provided in the attached Sample Summary Table.

1.1.2 35065.03.01 Assessment

With the exception of purchase order (PO) for the High Pressure Core Flooder (HPCF) system injection valve (PO 99-QVMO-A-00251), each of the procurement documents in the Sample Summary Table were found to provide specifications that were consistent with the approved facility design. It appears that the failure to provide specifications consistent with design requirements for the HPCF system injection valve was an isolated case. While the specified environmental conditions were not as required by the approved design, the specified conditions provided some margin to those expected during design basis accident conditions. As a result, the safety significance of this item is low.

1.1.3.1 VIO4-52-001/99-001-001; Procurement documents referenced equipment specifications contrary to design.

During review of purchase order (PO) 99-QVMO-A-00251 the inspector identified that the PO did not specify the correct environmental conditions necessary for qualification in accordance with design specifications for the High Pressure Core Flooder (HPCF) injection valve (HPCF-MOV-025) motor operator. HPCF drawing CAE-HPCF-MOV-025, revision 1, note 3, specifies that the design accident atmospheric conditions for the injection valve are a steam environment at 130°C and 105 KPaG for up to 10 hours. PO 99-QVMO-A-00251 specified environmental conditions of 122°C and 105 KPaG.

Failure to accurately reflect environmental qualification requirements in PO 99-QVMO-A-00251 is contrary to the requirements of the Quality Assurance Procedure (QAP) established for procurement documents (QAP-498EP-0031, revision 2, "Purchase Order Requirements"). Specifically, paragraph 3.1 of QAP-498EP-0031, states that the design environmental qualification requirements shall be included in any procurement documents for equipment or components subject to harsh environments. While environmental conditions for qualification of HPCF-MOV-025 were specified, the conditions specified were incorrect. This violation remains open pending NRC followup of the licensee's review of this error.

1

FIGURE 6

SAMPLE SUMMARY TABLE

20-Mar-95

CRITICAL ATTRIBUTE No.: 35065.03.01
SAMPLE ID: 99-QVMO-A-00251
SYSTEM ID: HPCF
ITAAC No.: 2.4.2.1

SAMPLE DESCRIPTION
PURCHASE ORDER FOR THE HPCF INJECTION VALVE

CRITICAL ATTRIBUTE No.: 35065.03.01
SAMPLE ID: HPCF-MOV-025
SYSTEM ID: HPCF
ITAAC No.: 2.4.2.1

SAMPLE DESCRIPTION
254 mm HPCF INJECTION VALVE FOR DIVISION B

CRITICAL ATTRIBUTE No.: 35065.03.01
SAMPLE ID: CAE-HPCF-MOV-025
SYSTEM ID: HPCF
ITAAC No.: 2.4.2.1

SAMPLE DESCRIPTION
COMPUTER AIDED ENGINEERING DRAWING FOR HPCF MOV-025, REVISION 1, "DESIGN SPECIFICATIONS FOR HPCF-MOV-025"

CRITICAL ATTRIBUTE No.: 35065.03.01
SAMPLE ID: QAP-498EP-0031
SYSTEM ID: QA
ITAAC No.: N/A

SAMPLE DESCRIPTION
QUALITY ASSURANCE PROCEDURE, REVISION 2, "PURCHASE ORDER REQUIREMENTS"

CRITICAL ATTRIBUTE No.: 35065.03.01
SAMPLE ID: 99-QSS-B-00849
SYSTEM ID: RB
ITAAC No.: 2.15.10.1

SAMPLE DESCRIPTION
PURCHASE ORDER FOR REACTOR BUILDING 42 METER ELEVATION - STRUCTURAL STEEL NE CORNER ROOM FLOOR SUPPORT GIRDER 42-GS-X27000-Y25500

CRITICAL ATTRIBUTE No.: 35065.03.01
SAMPLE ID: 42-GS-X27000-Y25500
SYSTEM ID: RB
ITAAC No.: 2.15.10.1

SAMPLE DESCRIPTION
REACTOR BUILDING 42 METER ELEVATION FLOOR SUPPORT GIRDER - NE CORNER ROOM - EDG A

CRITICAL ATTRIBUTE No.: 35065.03.01
SAMPLE ID: 99-QWR-A-00025
SYSTEM ID: RPV
ITAAC No.: 2.2.1d.5

SAMPLE DESCRIPTION
PURCHASE ORDER FOR WELD ROD USED IN WELDING THE CRD HOUSING TO THE RPV - LOT No. WRI-99-QWR-00231 MANUFACTURED BY WELD ROD INCORPORATED

CRITICAL ATTRIBUTE No.: 35065.03.01
SAMPLE ID: WRI-99-QWR-00231
SYSTEM ID: RPV
ITAAC No.: 2.2.1d.5

SAMPLE DESCRIPTION
WELD ROD LOT No. FOR WELDING CRD HOUSINGS TO RPV PROCURED UNDER P.O. 99-QWR-A-00025

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1 **INSPECTION REPORT No.:** 52-001/99-001

DRAFT

APPENDIX D
INSPECTION FINDINGS AND OBSERVATIONS
DOCUMENTATION GUIDANCE

To ensure accurate inspection information is consistently recorded for retrieval from the Construction Inspection Program Information Management System (CIPIMS), predefined requirements for recording inspection findings and observations were developed. The data the inspectors shall record when performing inspections are provided below:

1. Inspection procedure number being performed by the inspector.

2. The occurrence of the inspection procedure being performed.

3. The start date inspection the inspection procedure occurrence.

4. How many samples were observed for the inspection procedure occurrence by the inspector.

5. What systems, structures, or components were inspected during the inspection procedure occurrence.

6. The critical attribute number from the inspection procedure.

7. The basis the inspector used to inspect the critical attribute.

8. The inspector's assessment of the activities, procedures, and processes observed during inspection of the critical attribute.

9. The date the inspector started inspecting the critical attribute.

10. The date the inspector completed inspecting the critical attribute.

11. How many hours the inspector spent inspecting the critical attribute.

12. The status of the critical attribute. Whether the inspector feels adequate inspection has been performed to close the critical attribute, if there is an outstanding exception, or if more inspection is required to close the critical attribute.

13. The specific identifiers used by the licensee to uniquely identify the activity, procedure, component, record, etc., that were observed by the inspector during inspection of a specific critical attribute.

14. The date an inspected item was first observed by the inspector for the subject critical attribute.

15. A text description of the specific items observed by the inspector during inspection of a specific critical attribute.

16. The exception number for any exception identified during inspection of the critical attribute. [The format of the exception number was still under development when this document was prepared]

17. A text discussion of the circumstances surrounding the exceptions.

18. The inspection report number obtained from the resident staff (this item applies only when inspection of a critical attribute of the inspection procedure is completed). The inspection report number will use the same format as operating reactors. However, if multiple units are under construction at the same site, each of the units will have a unique inspection report number (no combined inspection reports).

19. The inspector's Regulatory Information Tracking System (RITS) initials. The RITS initials will be used to document which inspectors provided input (via the CIPIMS) for a specific inspection report.

To facilitate recording the inspection information, a standard form was developed for use by inspectors to record their inspection findings and observations (see Figure 1). As computer software and hardware technology advance, this form will be incorporated as an input screen on a personal computer taken into the field by the inspector during inspections. The inspector will use the form in the personal computer to enter inspection generated information as the inspection is performed directly into the CIPIMS. In the near term however, a paper form is available that the inspector can take into the field to record information for later input to the CIPIMS either by the inspector or by a data input operator. Refer to Appendix E to manual chapter 2512 for information related to the use of the CIPIMS.

Using the form, or a similar form, the inspector shall record the data specified during inspection activities as much as practical. A new form shall be used for each critical attribute of the inspection procedure. If necessary, attach additional information to this form for the critical attribute basis and assessment, exception text (including exception number and associated text if more than two exceptions are identified during inspection of a single critical attribute), and information related to the inspection item.

After the inspectors' data is recorded on the form, the resident staff (SCSI, SCMI, and SCEI) will review the information and ensure the information in Figure 2 is recorded in addition to the inspectors' data. With the input of the information in Figures 1 and 2, all inspection generated information should be contained in the data base for each completed critical attribute of an inspection procedure occurrence.

FIGURE 1 - PROPOSED INSPECTION DOCUMENTATION FORM 1

TO BE PROVIDED AT A LATER DATE

FIGURE 2 - PROPOSED INSPECTION DOCUMENTATION FORM 2

TO BE PROVIDED AT A LATER DATE

DRAFT

ATTACHMENT 2

TABLES OF INSPECTION PROCEDURES ASSIGNED TO FUTURE PREOPERATION PHASE INSPECTION MANUAL CHAPTERS

NEW 2511 INSPECTION PROGRAM TABLE

02-Aug-95

IP No.:	TITLE:	CURRENT/REVISED PROGRAM
30001	IE/UTILITY CORPORATE MANAGEMENT MEETING	2511/2511
30703	MANAGEMENT MEETINGS - ENTRANCE AND EXIT INTERVIEWS	2511/2511
35002	NRR/IE/UTILITY EARLY QA MEETINGS	2511/2511
35003	QUALITY ASSURANCE MANUAL REVIEW	2511/2511
35004	INITIAL PREDOCKETING QA INSPECTION	2511/2511
35006	IE PREDOCKETING ASSESSMENT AND CONCLUSION	2511/2511
35008	NRR/IE/UTILITY MEETINGS - SUBSTANTIVE QA FINDINGS	2511/2511
35012	SECOND PREDOCKETING QA INSPECTION	2511/2511
35016	INITIAL PRE-CP QUALITY ASSURANCE INSPECTION	2511/2511
35018	SECOND PRE-CP/SER QUALITY ASSURANCE INSPECTION	2511/2511
35020	AUDIT OF APPLICANT'S SURVEILLANCE OF CONTRACTOR QA/QC ACTIVITIES	2511/2511
35022	IE PRE-CP SUMMARY SER POSITION STATEMENT	2511/2511
35024	FOLLOW-UP PRE-CP SER OR SER SUPPLEMENT - QA INSPECTION	2511/2511
35026	IE PRE-CP SUMMARY SER POSITION STATEMENT SUPPLEMENT	2511/2511
35028	PRE-CP INSPECTION OF SITE LWA-2 ACTIVITIES	2511/2511
35100	REVIEW OF QA MANUAL	2511/2511
36100	10 CFR PART 21 INSPECTIONS AT NUCLEAR POWER REACTORS	2511/2511
45051	GEOTECHNICAL/FOUNDATION ACTIVITIES PROCEDURE REVIEW	2511/2511
45053	GEOTECHNICAL/FOUNDATION ACTIVITIES WORK OBSERVATION	2511/2511
45055	GEOTECHNICAL/FOUNDATION ACTIVITIES RECORD REVIEW	2511/2511
80210	ENVIRONMENTAL PROTECTION - INITIAL AND PERIODIC INSPECTIONS	2511/2511
92701	FOLLOWUP	2511/2511
92702	FOLLOWUP ON CORRECTIVE ACTIONS FOR VIOLATIONS AND DEVIATIONS	2511/2511
92703	FOLLOWUP OF CONFIRMATORY ACTION LETTERS	2511/2511
94010	IE TESTIMONY FOR ASLB OR ASLAB HEARINGS	2511/2511

NEW 2512 INSPECTION PROGRAM TABLE

02-Aug-95

IP No.:	TITLE	CURRENT/REVISED PROGRAM:
30050	CONSTRUCTION PERMIT CORPORATE MANAGEMENT MEETING	2512 / 2512
30702	MANAGEMENT MEETINGS - AS NEEDED	2512 / 2512
30703	MANGEMENT MEETING - ENTRANCE AND EXIT INTERVIEWS	2512 / 2512
35020	AUDIT OF APPLICANT'S SURVEILLANCE OF CONTRACTOR QA/QC ACTIVITIES	2512 / 2512
35051	SITE ERECTED REACTOR VESSELS REVIEW OF QA IMPLEMENTING PROCEDURES	2512 / 2512
35060	LICENSEE MANAGEMENT OF QA ACTIVITIES	2512 / 2512
35061	IN-DEPTH QA INSPECTION OF PERFORMANCE	2512 / 2512
35065	PROCUREMENT, RECEIVING AND STORAGE	2512 / 2512
35100	REVIEW OF QA MANUAL	2512 / 2512
35301	PREOPERATIONAL TESTING QUALITY ASSURANCE	2513 / 2512
36100	10 CFR PART 21 INSPECTIONS AT NUCLEAR POWER REACTORS	2512 / 2512
37051	VERIFICATION OF AS-BUILTS	2512 / 2512
37055	ON-SITE DESIGN ACTIVITIES	2512 / 2512
37301	COMPARISON OF AS-BUILT PLANT TO FSAR DESCRIPTION	2513 / 2512
38702	RECEIPT, STORAGE AND HANDLING OF EQUIPMENT AND MATERIALS PROGRAM	2512 / 2512
45051	GEOTECHNICAL/FOUNDATION ACTIVITIES PROCEDURE REVIEW	2512 / 2512
45053	GEOTECHNICAL/FOUNDATION ACTIVITIES WORK OBSERVATION	2512 / 2512
45055	GEOTECHNICAL/FOUNDATION ACTIVITIES RECORD REVIEW	2512 / 2512
46051	STRUCTURAL CONCRETE PROCEDURE REVIEW	2512 / 2512
46053	STRUCTURAL CONCRETE WORK OBSERVATION	2512 / 2512
46055	STRUCTURAL CONCRETE RECORD REVIEW	2512 / 2512
46061	STRUCTURAL MASONRY CONSTRUCTION	2512 / 2512
46071	CONCRETE EXPANSION ANCHORS	2512 / 2512
47051	CONTAINMENT (POST-TENSIONING) PROCEDURE REVIEW	2512 / 2512
47053	CONTAINMENT (POST-TENSIONING) WORK OBSERVATION	2512 / 2512
47055	CONTAINMENT (POST-TENSIONING) RECORD REVIEW	2512 / 2512
48051	STRUCTURAL STEEL AND SUPPORT PROCEDURE REVIEW	2512 / 2512
48053	STRUCTURAL STEEL AND SUPPORT WORK OBSERVATION	2512 / 2512
48055	STRUCTURAL STEEL AND SUPPORT RECORDS REVIEW	2512 / 2512
49051	REACTOR COOLANT PRESSURE BOUNDARY PIPING - QA REVIEW	2512 / 2512
49053	REACTOR COOLANT PRESSURE BOUNDARY PIPING - WORK OBSERVATION	2512 / 2512
49055	REACTOR COOLANT PRESSURE BOUNDARY PIPING RECORD REVIEW	2512 / 2512
49061	SAFETY RELATED PIPING - QA REVIEW	2512 / 2512
49063	PIPING - WORK OBSERVATION	2512 / 2512

IP No.:	TITLE	CURRENT/REVISED PROGRAM:
49065	SAFETY RELATED PIPING - RECORDS REVIEW	2512 / 2512
50051	REACTOR VESSEL AND INTERNALS QA REVIEW	2512 / 2512
50053	REACTOR VESSEL AND INTERNALS WORK OBSERVATION	2512 / 2512
50055	REACTOR VESSEL AND INTERNALS RECORD REVIEW	2512 / 2512
50071	SAFETY RELATED COMPONENTS - PROCEDURE REVIEW	2512 / 2512
50073	MECHANICAL COMPONENTS - WORK OBSERVATION	2512 / 2512
50075	SAFETY-RELATED COMPONENTS - RECORDS REVIEW	2512 / 2512
50082	SITE ERECTED REACTOR VESSELS - REVIEW OF PROCEDURES	2512 / 2512
50083	SITE ERECTED REACTOR VESSELS - OBSERVATION OF ERECTION ACTIVITIES	2512 / 2512
50085	SITE ERECTED REACTOR VESSELS - REVIEW OF RECORDS	2512 / 2512
50090	PIPE SUPPORT AND RESTRAINT SYSTEMS	2512 / 2512
50095	SPENT FUEL STORAGE RACKS	2512 / 2512
50100	HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS	2512 / 2512
51051	ELECTRICAL COMPONENTS AND SYSTEMS - PROCEDURE REVIEW	2512 / 2512
51053	ELECTRICAL COMPONENTS AND SYSTEMS - WORK OBSERVATION	2512 / 2512
51055	ELECTRICAL COMPONENTS AND SYSTEMS - RECORDS REVIEW	2512 / 2512
51061	ELECTRIC CABLE - PROCEDURE REVIEW	2512 / 2512
51063	ELECTRIC CABLE - WORK OBSERVATION	2512 / 2512
51065	ELECTRIC CABLE - RECORD REVIEW	2512 / 2512
52051	INSTRUMENT COMPONENTS AND SYSTEMS - PROCEDURE REVIEW	2512 / 2512
52053	INSTRUMENT COMPONENTS AND SYSTEMS - WORK OBSERVATIONS	2512 / 2512
52055	INSTRUMENT COMPONENTS AND SYSTEMS - RECORDS REVIEW	2512 / 2512
53051	CONTAINMENT PENETRATIONS (MECHANICAL) PROCEDURE REVIEW	2512 / 2512
53053	CONTAINMENT PENETRATIONS (MECHANICAL) WORK OBSERVATION	2512 / 2512
53055	CONTAINMENT PENETRATIONS (MECHANICAL) RECORD REVIEW	2512 / 2512
55050	NUCLEAR WELDING GENERAL INSPECTION PROCEDURE	2512 / 2512
55092	SITE ERECTED REACTOR VESSELS OBSERVATION OF WELDING AND ASSOCIATED ACTIVITIES	2512 / 2512
55093	REACTOR VESSEL INTERNALS (WELDING) OBSERVATION OF WELDING AND ASSOCIATED ACTIVITIES	2512 / 2512
55100	STRUCTURAL WELDING GENERAL INSPECTION PROCEDURE	2512 / 2512
55150	WELD VERIFICATION CHECKLIST	2512 / 2512
57050	NDE PROCEDURE VISUAL EXAMINATION PROCEDURE REVIEW/WORK OBSERVATION/RECORD REVIEW	2512 / 2512
57060	NDE PROCEDURE LIQUID PENETRANT EXAMINATION PROCEDURE REVIEW/WORK OBSERVATION/RECORD REVIEW	2512 / 2512
57070	NDE PROCEDURE MAGNETIC PARTICLE EXAMINATION PROCEDURE REVIEW/WORK OBSERVATION/RECORD REVIEW	2512 / 2512
57080	NDE PROCEDURE ULTRASONIC EXAMINATION PROCEDURE REVIEW/WORK OBSERATION/RECORD REVIEW	2512 / 2512

IP No.:	TITLE	CURRENT/REVISED PROGRAM:
57090	NDE PROCEDURE RADIOGRAPHIC EXAMINATION PROCEDURE REVIEW/WORK OBSERVATION/RECORD REVIEW	2512 / 2512
61720	CONTAINMENT LOCAL LEAK RATE TESTING	2513 / 2512
63050	CONTAINMENT STRUCTURAL INTEGRITY TEST	2512 / 2512
64051	PROCEDURES - FIRE PREVENTION/PROTECTION	2512 / 2512
64053	FIRE LOOP INSTALLATION	2512 / 2512
65051	LOW-LEVEL RADIOACTIVE WASTE STORAGE FACILITIES	2512 / 2512
70300	PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70301	OVERALL PREOPREATIONAL TEST PROGRAM REVIEW	2513 / 2512
70302	PREOPERATIONAL TEST PROGRAM IMPLEMENTATION	2513 / 2512
70304	ENGINEERED SAFETY FEATURES TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70305	REACTOR PROTECTION SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70306	LOSS OF OFFSITE POWER TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70307	CONTAINMENT INTEGRATED LEAK RATE TEST - PROCEDURE REVIEW	2513 / 2512
70308	PREOPERATIONAL HOT FUNCTIONAL TESTING - PWR PROCEDURE REVIEW	2513 / 2512
70311	PREOPERATIONAL TEST PROCEDURE VERIFICATION	2513 / 2512
70312	PREOPERATIONAL TEST WITNESSING	2513 / 2512
70313	CONTAINMENT INTEGRATED LEAK RATE TEST	2513 / 2512
70314	HOT FUNCTIONAL TEST WITNESSING	2513 / 2512
70315	ENGINEERED SAFETY FEATURES TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70316	LOSS OF OFFSITE POWER TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70317	REACTOR PROTECTION SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70322	PREOPERATIONAL TEST RESULTS EVALUATION - ESF	2513 / 2512
70323	CONTAINMENT LEAK RATE TEST RESULTS EVALUATION	2513 / 2512
70324	PREOPERATIONAL TEST RESULTS EVALUATION - HFT	2513 / 2512
70325	PREOPERATIONAL TEST RESULTS EVALUATION - REACTOR PROTECTION SYSTEM	2513 / 2512
70326	PREOPERATIONAL TEST RESULTS EVALUATION - LOSS OF OFFSITE POWER	2513 / 2512
70329	PREOPERATIONAL TEST RESULT EVALUATION VERIFICATION	2513 / 2512
70331	VIBRATION TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70332	CONTROL ROD SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70333	CHEMICAL CONTROL SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70334	ENGINEERED SAFETY FEATURES ACTUATION SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70335	SAFETY AND RELIEF VALVE TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512

IP No.:	TITLE	CURRENT/REVISED PROGRAM:
70336	RESIDUAL/DECAY HEAT REMOVAL SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70337	MAIN STEAM ISOLATION VALVE TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70338	AUXILIARY FEEDWATER SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70339	COMPONENT COOLING WATER SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70340	DC POWER SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70341	EMERGENCY/STANDBY POWER SUPPLY SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70342	CONTAINMENT COMBUSTIBLE GAS CONTROL SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70343	CONTAINMENT SPRAY SYSTEM TEST - PREOPERATION TEST PROCEDURE REVIEW	2513 / 2512
70344	CONTAINMENT ISOLATION VALVES TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70345	CONTAINMENT HEAT/COOL/VENT SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70346	AUXILIARY BUILDING HEAT/COOL/VENT SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70347	PRESSURIZER AND LEVEL CONTROL SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70348	MAIN FEEDWATER CONTROL SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70349	REACTOR COOLANT LEAK DETECTION SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70350	LOOSE PARTS MONITORING SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70351	INTEGRATED REACTOR CONTROL SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70352	REMOTE REACTOR SHUTDOWN TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70353	CRANES, HOISTS, AND LIFTING EQUIPMENT TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70354	NUCLEAR INSTRUMENTATION SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70355	COMPRESSED GAS SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70356	STANDBY LIQUID CONTROL SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70357	REACTOR CORE ISOLATION COOLING SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70358	REACTOR BUILDING HEAT/COOL/VENT SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70359	RECIRCULATION SYSTEM FLOW CONTROL TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512

IP No.:	TITLE	CURRENT/REVISED PROGRAM:
70360	MANUAL REACTOR CONTROL SYSTEM TEST - PREOPERATIONAL TEST PROCEDURE REVIEW	2513 / 2512
70362	REACTOR COOLANT SYSTEM HYDROSTATIC TEST PROCEDURE REVIEW	2513 / 2512
70370	TESTING PIPING SUPPORT AND RESTRAINT SYSTEMS	2513 / 2512
70400	PREOPERATIONAL TEST RESULT EVALUATION	2513 / 2512
70431	VIBRATION TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70432	CONTROL ROD SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70433	CHEMICAL CONTROL SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70434	ENGINEERED SAFETY FEATURES ACTUATION SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70435	SAFETY AND RELIEF VALVE TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70436	RESIDUAL/DECAY HEAT REMOVAL SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70437	MAIN STEAM ISOLATION VALVE TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70438	AUXILIARY FEEDWATER SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70439	COMPONENT COOLING WATER SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70440	DC POWER SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70441	EMERGENCY/STANDBY POWER SUPPLY SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70442	CONTAINMENT COMBUSTIBLE GAS CONTROL SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70443	CONTAINMENT SPRAY SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70444	CONTAINMENT ISOLATION VALVE TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70445	CONTAINMENT HEAT/COOL/VENT SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70446	AUXILIARY BUILDING HEAT/COOL/VENT SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70447	PRESSURIZER AND LEVEL CONTROL SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70448	MAIN FEEDWATER CONTROL SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70449	REACTOR COOLANT LEAK DETECTION SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70450	LOOSE PARTS MONITORING SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70451	INTEGRATED REACTOR CONTROL SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70452	REMOTE REACTOR SHUTDOWN TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70453	CRANES, HOISTS, AND LIFTING EQUIPMENT TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512

IP No.:	TITLE	CURRENT/REVISED PROGRAM:
70454	NUCLEAR INSTRUMENTATION SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70455	COMPRESSED GAS SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70456	STANDBY LIQUID CONTROL SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70457	REACTOR CORE ISOLATION COOLING SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70458	REACTOR BUILDING HEAT/COOL/VENT SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70459	RECIRCULATION SYSTEM FLOW CONTROL TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70460	MANUAL REACTOR CONTROL SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70461	TRAVERSING INCORE PROBE SYSTEM TEST - PREOPERATIONAL TEST WITNESSING	2513 / 2512
70462	REACTOR COOLANT SYSTEM HYDROSTATIC TEST - TEST WITNESSING	2513 / 2512
70562	REACTOR COOLANT SYSTEM HYDROSTATIC TEST RESULTS EVALUATION	2513 / 2512
71302	PREOPERATIONAL TEST PROGRAM IMPLEMENTATION VERIFICATION	2513 / 2512
73051	INSERVICE INSPECTION - REVIEW OF PROGRAM	2515 / 2512
73052	INSERVICE INSPECTION - REVIEW OF PROCEDURES	2515 / 2512
73053	PRESERVICE INSPECTION - OBSERVATION OF WORK AND WORK ACTIVITIES	2513 / 2512
73055	PRESERVICE INSPECTION - DATA REVIEW AND EVALUATION	2513 / 2512
80210	ENVIRONMENTAL PROTECTION - INITIAL AND PERIODIC INSPECTIONS	2511 / 2512
90712	INOFFICE REVIEW OF WRITTEN REPORTS OF NONROUTINE EVENTS AT POWER REACTOR FACILITIES	2512 / 2512
92050	REVIEW OF QUALITY ASSURANCE FOR EXTENDED CONSTRUCTION DELAYS	2512 / 2512
92700	ONSITE FOLLOWUP OF WRITTEN REPORTS OF NONROUTINE EVENTS AT POWER REACTOR FACILITIES	2512 / 2512
92701	FOLLOWUP	2512 / 2512
92702	FOLLOWUP ON CORRECTIVE ACTIONS FOR VIOLATIONS AND DEVIATIONS	2512 / 2512
92703	FOLLOWUP OF CONFIRMATORY ACTION LETTERS	2512 / 2512
92720	CORRECTIVE ACTION	2512 / 2512
92901	FOLLOWUP - PLANT OPERATIONS	2512 / 2512
92902	FOLLOWUP - MAINTENANCE	2512 / 2512
92903	FOLLOWUP - ENGINEERING	2512 / 2512
92904	FOLLOWUP - PLANT SUPPORT	2512 / 2512
93807	SYSTEMS BASED INSTRUMENTATION AND CONTROLS INSPECTIONS	2515 / 2512
94010	IE TESTIMONY FOR ASLB OR ASLAB HEARINGS	2512 / 2512
94300	STATUS OF PLANT READINESS FOR AN OPERATING LICENSE	2512 / 2512
TBD	NEED TO DEVELOP AN IP TO REVIEW THE ANALYSIS OF THE AS-BUILT FUEL STORAGE RACKS - SUBCRITICAL CALCULATION	N/A / 2512
	NEED TO DEVELOP AN INSPECTION PROCEDURE FOR TESTING THE REFUELING MACHINE INTERLOCKS	N/A / 2512

IP No.:	TITLE	CURRENT/REVISED PROGRAM:
TBD	NEED TO DEVELOP AN INSPECTION PROCEDURE FOR TESTING THE HPCF SYSTEM	N/A / 2512
	NEED TO DEVELOP AN IP TO REVIEW THE ANALYSIS OF THE RCW SYSTEM HEAT REMOVAL CAPABILITY	N/A / 2512
	NEED TO DEVELOP IP FOR MONITORING TESTING OF RIP M/G AND ASDs FOR RIP COAST DOWN CHARACTERISTICS	N/A / 2512
	NEED TO DEVELOP PROCEDURE(S) TO ADDRESS CONSTRUCTION OF MICROPROCESSOR BASED CONTROL SYSTEMS	N/A / 2512
	NEED TO DEVELOP AN INSPECTION PROCEDURE FOR DIGITAL/MICROPROCESSOR BASED CONTROL SYSTEM CONSTRUCTION	N/A / 2512
	NEED TO DEVELOP AN IP TO OBSERVE OR REVIEW RESULTS OFTHE TEST OF THE HECW SYSTEM REFRIGERATOR	N/A / 2512
	MAY NEED TO DEVELOP A GENERIC NON-SAFETY-RELATED MECHANICAL SYSTEM TESTING INSPECTION PROCEDURE	N/A / 2512
	NEED TO DEVELOP AN IP FOR TESTING OF THE HECW SYSTEM	N/A / 2512
	MAY NEED TO DEVELOP AN POST INSTALLATION PHYSICAL SEPARATION IP FOR MECHANICAL ASPECTS OF SAFETY-RELATED SYSTEMS	N/A / 2512
	NEED TO DEVELOP AN IP FOR REVIEW OF BOP RESPONSE DURING SSE - SEISMIC ANALYSIS REVIEW	N/A / 2512
	NEED TO DEVELOP AN IP FOR REVIEW OF TURBINE TESTING RESULTS	N/A / 2512
	NEED TO DEVELOP AN IP FOR TESTING EMS SINGLE FAILURE SUSEPTIBILITY AND ALARM IN CONTROL ROOM	N/A / 2512
	NEED TO DEVELOP AN INSPECTION PROCEDURE FOR TESTING THE HPCF SYSTEM FOR MINIMUM FLOW CONSIDERATIONS	N/A / 2512
	NEED TO DEVELOP AN INSPECTION PROCEDURE TO TEST THE SAFETY-RELATED PORTIONS OF THE PRM SYSTEM	N/A / 2512
	NEED TO DEVELOP AN INSPECTION PROCEDURE TO OBSERVE/REVIEW RESULTS OF RCIC TURBINE/PUMP TEST FACILITY TESTING	N/A / 2512
	NEED TO DEVELOP AN IP FOR TESTING THE EMS COMMUNICATIONS PROTOL	N/A / 2512
	NEED TO DEVELOP A SEPARATE CONTROL ROOM INSTRUMENTATION AND CONTROL VERIFICATION INSPECTION PROCEDURE	N/A / 2512
	NEED TO DEVELOP AN IP FOR TESTING SAFETY-RELATED MAKEUP WATER SOURCE FOR THE SPENT FUEL POOL	N/A / 2512
	NEED TO DEVELOP AN IP FOR TESTING LOSS OF ONE EMS DIVISION IMPACT ON SAFE PLANT OPERATION	N/A / 2512
	NEW IP MAY BE REQUIRED FOR INSPECTION OF ELECTRICAL WIRING PENETRATION CONFIGURATION	N/A / 2512
	NEED TO DEVELOP PROCEDURE TO ADDRESS TESTING OF NON-SAFETY RELATED MICROPROCESSOR BASED CONTROL SYSTEMS	N/A / 2512
	POST INSTALLATION ELECTRICAL CHECKS INSPECTION PROCEDURE SHOULD BE DEVELOPED	N/A / 2512
	SHOULD DEVELOP A SYSTEM BASED RELIEF VALVE TESTING INSPECTION PROCEDURE FOR SAFETY RELATED SYSTEMS	N/A / 2512
	MICROPROCESSOR BASED SYSTEM INSPECTION PROCEDURE	N/A / 2512
	IP FOR ALTERNATE ROD INJECTION TESTING PROCEDURE REVIEW AND TESTING OBSERVATION	N/A / 2512

IP No.:	TITLE	CURRENT/REVISED PROGRAM:
TBD	NEED TO DEVELOP AN INSPECTION PROCEDURE TO REVIEW INSPECTIONS/ANALYSIS OF RCIC CAPABILITIES W/ NO AC POWER AVAILABLE	N/A / 2512
	MAY NEED TO DEVELOP AN IP TO TEST THAT NO CONNECTION EXISTS BETWEEN DIVISIONAL AREA DRAINS	N/A / 2512
	NEED TO DEVELOP AN IP TO REVIEW THE ANALYSIS OF THE AS-BUILT FUEL STORAGE RACKS - COOLING WATER FLOW	N/A / 2512
	MAY NEED TO DEVELOP AN IP TO TEST THE ISOLATION FUNCTION OF THE RADWASTE SYSTEM	N/A / 2512
	NEED TO DEVELOP AN IP FOR TESTING THE ISOLATION BETWEEN THE SAFETY-RELATED EMS AND THE NON-SAFETY-RELATED NEMS	N/A / 2512
	NEED TO DEVELOP AN INSPECTION PROCEDURE TO TEST THE CAMS (SAFETY-RELATED)	N/A / 2512
	MAY NEED TO DEVELOP A BOP HYDROSTATIC TEST INSPECTION PROCEDURE	N/A / 2512
	MAY NEED TO DEVELOP AN IP TO REVIEW ANALYSIS OF THE LPMS OPERABILITY FOLLOWING AN EARTHQUAKE NOT REQUIRING A SHUTDOWN	N/A / 2512
	IP FOR TESTING OF ELECTRICAL COMPONENTS MAY BE REQUIRED	N/A / 2512
	MAY NEED TO DEVELOP AN IP TO TEST THE ISOLATION FUNCTION OF STEAM AUXILIARY VALVES	N/A / 2512
	NEED TO DEVELOP AN INSPECTION PROCEDURE TO TEST THE ARM SYSTEM (NON-SAFETY-RELATED)	N/A / 2512
	MAY NEED TO DEVELOP AN INSPECTION PROCEDURE TO REVIEW THE ANALYSIS OF THE RCIC PUMPS AVAILABLE NPSH	N/A / 2512
	NEED TO DEVELOP A GENERIC SYSTEM HYDROSTATIC TEST MODELED AFTER THE REACTOR COOLANT SYSTEM HYDRO	N/A / 2512
	NEED TO DEVELOP IP FOR TESTING AS INSTALLED MICROPROCESSOR BASED CONTROL SYSTEM ELECTRICAL SEPARATION	N/A / 2512
	MAY NEED TO DEVELOP AN IP TO TEST THE SENSITIVITY OF THE LPMS	N/A / 2512
	MAY NEED TO DEVELOP AN INSPECTION PROCEDURE TO REVIEW HEAT REMOVAL CAPABILITIES OF RHR SYSTEM	N/A / 2512
	NEED TO DEVELOP AN INSPECTION PROCEDURE FOR TESTING THE HPCF SYSTEM FOR ELECTRICAL SEPARATION	N/A / 2512
	MICROPROCESSOR BASED CONTROL SYSTEM IP REQUIRED	N/A / 2512
	NEED TO DEVELOP AN INSPECTION PROCEDURE TO REVIEW THE ANALYSIS OF HPCF PERFORMANCE AT DEGRADED SUCTION TEMPERATURE	N/A / 2512
	MAY NEED SEPARATE POST INSTALLATION ELECTRICAL CHECK IP	N/A / 2512
	NEED TO DEVELOP A SEPARATE REMOTE SHUTDOWN SYSTEM INSTRUMENTATION AND CONTROL VERIFICATION INSPECTION PROCEDURE	N/A / 2512
	NEED TO DEVELOP AN INSPECTION PROCEDURE TO REVIEW THE ANALYSIS/TEST OF HPCF PUMP AVAILABLE NPSH	N/A / 2512
	MAY NEED TO DEVELOP AN INSPECTION PROCEDURE TO REVIEW THE ANALYSIS OF THE RHR PUMP AVAILABLE NPSH	N/A / 2512
TI 2512/021	EQUIPMENT SEISMIC	2512 / 2512
TI 2512/023	HANGER UPDATE	2512 / 2512
TI 2512/024	HEAT CODE TRACEABILITY	2512 / 2512

IP No.:	TITLE	CURRENT/REVISED PROGRAM:
TI 2512/030	SEISMIC ANALYSIS	2512 / 2512
TI 2512/032	WELDING	2512 / 2512
TI 2512/035	CONTROL ROOM DESIGN REVIEW	2512 / 2512
TI 2512/036	ENVIRONMENTAL QUALIFICATION	2512 / 2512
TI 2512/038	MECHANICAL EQUIPMENT QUALIFICATION	2512 / 2512
TI 2515/107	ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION	2515 / 2512
TI 2515/109	INSPECTION REQUIREMENTS FOR GL 89-10, "SAFETY-RELATED MOTOR-OPERATED VALVE TESTING AND SURVEILLANCE	2515 / 2512
TI 2515/110	PERFORMANCE OF SAFETY-RELATED CHECK VALVES	2515 / 2512

NEW 2513 INSPECTION PROGRAM TABLE

02-Aug-95

IP No.:	TITLE:	CURRENT/REVISED PROGRAM:
35740	QA PROGRAM (QA/QC ADMINISTRATION)	2513 / 2513
35741	QA PROGRAMS (AUDITS)	2513 / 2513
35742	QA PROGRAM (DOCUMENT CONTROL)	2513 / 2513
35743	QA PROGRAM (MAINTENANCE)	2513 / 2513
35744	QA PROGRAM (DESIGN CHANGES AND MODIFICATIONS)	2513 / 2513
35745	QA PROGRAM (SURVEILLANCE TESTING AND CALIBRATION CONTROL)	2513 / 2513
35746	QA PROGRAM (PROCUREMENT CONTROL)	2513 / 2513
35747	QA PROGRAM (RECEIPT, STORAGE, AND HANDLING OF EQUIPMENT AND MATERIALS)	2513 / 2513
35748	QA PROGRAM (RECORDS)	2513 / 2513
35749	QA PROGRAM (TESTS AND EXPERIMENTS)	2513 / 2513
35750	QA PROGRAM (MEASURING AND TEST EQUIPMENT)	2513 / 2513
36301	OPERATIONAL STAFFING	2513 / 2513
40301	SAFETY COMMITTEE ACTIVITY	2513 / 2513
40702	AUDIT PROGRAM	2513 / 2513
40704	IMPLEMENTATION, AUDIT PROGRAM	2513 / 2513
42400	PLANT PROCEDURES	2513 / 2513
42450	OPERATION PROCEDURES	2513 / 2513
42451	MAINTENANCE PROCEDURES	2513 / 2513
45452	EMERGENCY PROCEDURES	2513 / 2513
60501	FUEL RECEIPT AND STORAGE	2513 / 2513
64100	POSTFIRE SAFE SHUTDOWN, EMERGENCY LIGHTING AND OIL COLLECTION CAPABILITY AT OPERATING AND NEAR-TERM OPERATING, REACTOR FACILITIES	2513 / 2513
64150	TRIENNIAL POSTFIRE SAFE SHUTDOWN CAPABILITY REVERIFICATION	2513 / 2513
64704	FIRE PROTECTION PROGRAM	2513 / 2513
65051	LOW-LEVEL RADIOACTIVE WASTE STORAGE FACILITIES	2513 / 2513
71301	TECHNICAL SPECIFICATION REVIEW	2513 / 2513
73756	INSERVICE TESTING OF PUMPS AND VALVES	2513 / 2513
79501	LWR WATER CHEMISTRY CONTROL AND CHEMICAL ANALYSIS - AUDITS	2513 / 2513
79502	PLANT SYSTEMS AFFECTING PLANT WATER CHEMISTRY	2513 / 2513
79701	LWR WATER CHEMISTRY CONTROL AND CHEMICAL ANALYSIS - PROGRAM	2513 / 2513

IP No.:	TITLE:	CURRENT/REVISED PROGRAM:
80521	RADIOLOGICAL ENVIRONMENTAL MONITORING (PREOPERATIONAL AND SUPPLEMENTAL)	2513 / 2513
81018	SECURITY PLAN AND IMPLEMENTING PROCEDURES	2513 / 2513
81020	MANAGEMENT EFFECTIVENESS - SECURITY PROGRAM	2513 / 2513
81022	SECURITY ORGANIZATION	2513 / 2513
81034	SECURITY PROGRAM AUDIT	2513 / 2513
81038	RECORDS AND REPORTS	2513 / 2513
81042	TESTING AND MAINTENANCE	2513 / 2513
81046	LOCKS, KEYS, AND COMBINATIONS	2513 / 2513
81052	PHYSICAL BARRIERS - PROTECTED AREAS	2513 / 2513
81054	PHYSICAL BARRIERS - VITAL AREAS, MATERIAL ACCESS AREAS, AND CONTROLLED ACCESS AREAS	2513 / 2513
81058	SECURITY SYSTEM POWER SUPPLY	2513 / 2513
81062	LIGHTING	2513 / 2513
81064	COMPENSATORY MEASURES	2513 / 2513
81066	ASSESSMENT AIDS	2513 / 2513
81070	ACCESS CONTROL - PERSONNEL	2513 / 2513
81072	ACCESS CONTROL (POWER REACTOR) - PACKAGES	2513 / 2513
81074	ACCESS CONTROL - VEHICLES	2513 / 2513
81078	DETECTION AIDS - PROTECTED AREAS	2513 / 2513
81080	DETECTION AIDS - VITAL AREAS, MATERIAL ACCESS AREAS, AND CONTROLLED ACCESS AREAS	2513 / 2513
81084	ALARM STATIONS	2513 / 2513
81088	COMMUNICATIONS	2513 / 2513
81401	PLANS, PROCEDURES, AND REVIEWS	2513 / 2513
81403	RECEIPT OF NEW FUEL AT REACTOR FACILITIES	2513 / 2513
81431	FIXED SITE PHYSICAL PROTECTION OF SPECIAL NUCLEAR MATERIAL OF LOW STRATEGIC SIGNIFICANCE	2513 / 2513
81501	PERSONNEL TRAINING AND QUALIFICATION - GENERAL REQUIREMENTS	2513 / 2513
81502	FITNESS FOR DUTY PROGRAM	2513 / 2513
81601	SAFEGUARDS CONTINGENCY PLAN - IMPLEMENTATION REVIEW	2513 / 2513
81810	PROTECTION OF SAFEGUARDS INFORMATION	2513 / 2513
82102	STATUS OF THE LATE PREOPERATIONAL PHASE EMERGENCY PREPAREDNESS PROGRAM	2513 / 2513
82301	EVALUATION OF EXERCISES FOR POWER REACTORS	2513 / 2513

IP No.:	TITLE:	CURRENT/REVISED PROGRAM:
82302	REVIEW OF EXERCISE OBJECTIVES AND SCENARIOS FOR POWER REACTORS	2513 / 2513
83522	RADIATION PROTECTION, PLANT CHEMISTRY, RADWASTE, AND ENVIRONMENTAL: ORGANIZTION AND MANAGEMENT CONTROLS	2513 / 2513
83523	RADIATION PROTECTION, PLANT CHEMISTRY, RADWASTE, AND ENVIRONMENTAL: TRAINING AND QUALIFICATIONS (PREOPERATIONAL AND SUPPLEMENTAL	2513 / 2513
83524	EXTERNAL OCCUPATIONAL EXPOSURE CONTROL AND PERSONAL DOSIMETRY (PREOPERATIONAL AND SUPPLEMENTAL)	2513 / 2513
83525	INTERNAL EXPOSURE CONTROL AND ASSESSMENT (PREOPERATIONAL AND SUPPLEMENTAL)	2513 / 2513
83526	CONTROL OF RADIOACTIVE MATERIALS AND CONTAMINATION, SURVEYS, AND MONITORING (PREOPERATIONAL AND SUPPLEMENTAL)	2513 / 2513
83527	FACILITIES AND EQUIPMENT (PREOPERATIONAL AND SUPPLEMENTAL)	2513 / 2513
83528	MAINTAINING OCCUPATIONAL EXPOSURES ALARA (PREOPERATIONAL)	2513 / 2513
84522	SOLID WASTES (PREOPERATIONAL AND SUPPLEMENTAL)	2513 / 2513
84523	LIQUIDS AND LIQUID WASTES (PREOPERATIONAL AND SUPPLEMENTAL)	2513 / 2513
84524	GASEOUS WASTE SYSTEM (PREOPERATIONAL AND SUPPLEMENTAL)	2513 / 2513
84525	QUALITY ASSURANCE AND CONFIRMATION MEASUREMENTS FOR IN-PLANT RADIOCHEMICAL ANALYSIS	2513 / 2513
85102	MATERIAL CONTROL AND ACCOUNTING - REACTORS	2513 / 2513
90711	NONROUTINE EVENT REVIEW	2513 / 2513
90712	INOFFICE REVIEW OF WRITTEN REPORTS OF NONROUTINE EVENTS AT POWER REACTOR FACILITIES	2513 / 2513
92701	FOLLOWUP	2513 / 2513
92702	FOLLOWUP ON CORRECTIVE ACTIONS FOR VIOLATIONS AND DEVIATIONS	2513 / 2513
92703	FOLLOWUP OF CONFIRMATORY ACTION LETTERS	2513 / 2513
92719	SAFETY EVALUATION REPORT (SER) REVIEW AND FOLLOWUP	2513 / 2513
92720	CORRECTIVE ACTION	2513 / 2513
92901	FOLLOWUP - PLANT OPERATIONS	2513 / 2513
92902	FOLLOWUP - MAINTENANCE	2513 / 2513
92903	FOLLOWUP - ENGINEERING	2513 / 2513
92904	FOLLOWUP - PLANT SUPPORT	2513 / 2513
94300	STATUS OF PLANT READINESS FOR AN OPERATING LICENSE	2513 / 2513

NEW 2514 INSPECTION PROGRAM TABLE

02-Aug-95

IP No.:	TITLE:	CURRENT/REVISED PROGRAM:
35501	QA FOR THE STARTUP TEST PROGRAM	2514 / 2514
64100	POSTFIRE SAFE SHUTDOWN, EMERGENCY LIGHTING AND OIL COLLECTION CAPABILITY AT OPERATING AND NEAR-TERM OPERATING, REACTOR FACILITIES	2514 / 2514
64150	TRIENNIAL POSTFIRE SAFE SHUTDOWN CAPABILITY REVERIFICATION	2514 / 2514
72300	STARTUP TEST PROCEDURE REVIEW	2514 / 2514
72301	STARTUP TEST RESULTS EVALUATION	2514 / 2514
72302	STARTUP TEST WITNESSING AND OBSERVATION	2514 / 2514
72400	OVERALL STARTUP TEST PROGRAM	2514 / 2514
72500	INITIAL FUEL LOADING PROCEDURE	2514 / 2514
72502	INITIAL CRITICALITY PROCEDURE REVIEW (BWR)	2514 / 2514
72504	HEATUP PHASE PROCEDURE REVIEW	2514 / 2514
72508	POWER ASCENSION PROCEDURE REVIEW: HPCI SYSTEM	2514 / 2514
72509	POWER ASCENSION PROCEDURE REVIEW: CONTROL ROD DRIVE SYSTEM	2514 / 2514
72510	POWER ASCENSION PROCEDURE REVIEW: RELIEF VALVES AND MSIVs	2514 / 2514
72512	STARTUP TEST PROCEDURE REVIEW - RCIC OR RECIRCULATION PUMP TRIP	2514 / 2514
72514	STARTUP PROCEDURE REVIEW - TURBINE TRIP/GENERATOR TRIP	2514 / 2514
72516	STARTUP TEST PROCEDURE REVIEW - SHUTDOWN FROM OUTSIDE THE CONTROL ROOM (GROUP A)	2514 / 2514
72517	STARTUP TEST PROCEDURE REVIEW: LOSS OF OFFSITE POWER (GROUP A & B)	2514 / 2514
72518	STARTUP TEST PROCEDURE REVIEW - CORE PERFORMANCE	2514 / 2514
72524	INITIAL FUEL LOADING WITNESSING	2514 / 2514
72526	BWR INITIAL CRITICALITY WITNESSING	2514 / 2514
72532	POWER LEVEL PLATEAU DATA REVIEW (BWR)	2514 / 2514
72564	PRECRITICAL TEST PROCEDURE REVIEW - PROTECTIVE TRIP CIRCUIT OR ROD DROP MEASUREMENT	2514 / 2514
72566	PRECRITICAL TEST PROCEDURE REVIEW - RES LEAD TEST OR PRESSURIZER EFFECTIVENESS	2514 / 2514
72570	INITIAL CRITICALITY PROCEDURE REVIEW (PWR)	2514 / 2514
72572	LOW POWER TEST PROCEDURES REVIEW MODERATOR TEMPERATURE COEFFICIENT AND BORON WORTH OR CONTROL ROD WORTH AND PSEUDO ROD EJECTION WORTH	2514 / 2514
72576	POWER ASCENSION TEST PROCEDURE REVIEW - NATURAL CIRCULATION OR POWER REACTIVITY COEFFICIENT MEASUREMENT	2514 / 2514

IP No.:	TITLE:	CURRENT/REVISED PROGRAM:
72578	POWER ASCENSION TEST PROCEDURE REVIEW - EVALUATION OF CORE PERFORMANCE	2514 / 2514
72580	POWER ASCENSION TEST PROCEDURE REVIEW - TURBINE TRIP OR GENERATOR TRIP	2514 / 2514
72582	POWER ASCENSION TEST PROCEDURE REVIEW - LOSS OF OFFSITE POWER (GROUP A)	2514 / 2514
72583	POWER ASCENSION TEST PROCEDURE REVIEW: SHUTDOWN FROM OUTSIDE THE CONTROL ROOM (GROUP B)	2514 / 2514
72584	POWER ASCENSION TEST PROCEDURE REVIEW - EVALUATION OF FLUX ASYMMETRY OR PSEUDO ROD EJECTION TEST	2514 / 2514
72592	PWR INITIAL CRITICALITY WITNESSING	2514 / 2514
72596	PRECRITICAL DAT REVIEW	2514 / 2514
72600	POWER LEVEL PLATEAU DATA REVIEW (25% PWR)	2514 / 2514
72608	POWER LEVEL PLATEAU DATA REVIEW (50% PWR)	2514 / 2514
72616	POWER LEVEL PLATEAU DATA REVIEW (75% PWR)	2514 / 2514
72624	POWER LEVEL PLATEAU DATA REVIEW (100% PWR)	2514 / 2514
81502	FITNESS FOR DUTY PROGRAM	2514 / 2514
82301	EVALUATION OF EXERCISES FOR POWER REACTORS	2514 / 2514
82302	REVIEW OF EXERCISE OBJECTIVES AND SCENARIOS FOR POWER REACTORS	2514 / 2514
83521	RADIATION PROTECTION - STARTUP	2514 / 2514
84521	RADWASTE - STARTUP	2514 / 2514
90501	REPORTABLE MATTERS - STARTUP TEST PROGRAM	2514 / 2514
90711	NONROUTINE EVENT REVIEW	2514 / 2514
90712	INOFFICE REVIEW OF WRITTEN REPORTS OF NONROUTINE EVENTS AT POWER REACTOR FACILITIES	2514 / 2514
92703	FOLLOWUP OF CONFIRMATORY ACTION LETTERS	2514 / 2514
92720	CORRECTIVE ACTION	2514 / 2514
92901	FOLLOWUP - PLANT OPERATIONS	2514 / 2514
92902	FOLLOWUP - MAINTENANCE	2514 / 2514
92903	FOLLOWUP - ENGINEERING	2514 / 2514
92904	FOLLOWUP - PLANT SUPPORT	2514 / 2514
93806	OPERATIONAL READINESS ASSESSMENT TEAM INSPECTIONS	2514 / 2514
94300	STATUS OF PLANT READINESS FOR AN OPERATING LICENSE	2514 / 2514

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ATTACHMENT 3

CONSTRUCTION INSPECTION PROCEDURE FORMAT AND CONTENT GUIDANCE

Addendum 1: Construction Inspection Procedure Format

Addenda 2 - 5: Sample Inspection Procedures (IPs)

Addendum 2	IP 35065	Procurement, Receiving, and Storage
Addendum 3	IP 37051	Verification of As-Builts and Effectiveness of Design Change Process
Addendum 4	IP 49063	Safety-Related Piping Work Observation
Addendum 5	IP 50073	Mechanical Components - Work Observation

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INSPECTION PROCEDURE
FORM AND CONTENT GUIDANCE

BACKGROUND:

During development of the revised Construction Inspection Program (CIP), and in particular the CIP Information Management System (CIPIMS), the staff determined that the format and content of inspection procedures should be enhanced to maximize the effectiveness in implementing the new concepts in the revised CIP. Under the revised CIP, inspection procedures (IPs) will provide more detained requirements on what the inspector shall inspect (sample sizes and critical attributes), and will provide the inspector with guidance on how to perform the inspection and what acceptance criteria to use to assess licensee performance (attribute guidance).

By using a more systematic approach in directing inspection performance and documenting inspection results, accurate and detailed data will be obtained by the inspector. This data will then be stored in the CIP IMS for retrieval, sorting, and report generation. This method of gathering and storing inspection information will provide an auditable trail of the NRC activities performed to monitor construction of power reactors and to provide a method for quickly and thoroughly assessing the licensee performance to determine facility operational readiness following completion of construction.

It is assumed that when this program is implemented, the inspectors will have access to the inspection procedures, NRC references (Standard Review Plan, NUREGs, Regulatory Guides, and others as appropriate), and many industry codes and standards on a full text retrieval system. Such electronic availability will allow the inspector to have rapid access to an accurate body of information that can be used to prepare for inspections.

FORMAT:

When preparing IPs for the revised CIP, the general guidance for IP preparation and technical writing in IMC 0040, "Preparing, Revising, and Issuing Documents for NRC Inspection Manual," should be followed. However, to permit the IPs to conform to their intended integrated use with the CIPIMS, the modified IP format presented in the following examples should be used. When CIP development is resumed, this attachment should be included as an addendum to IMC 0040.

The responsible technical branch shall be indicated in the upper right corner of the first page of the inspection procedure. The unique inspection procedure number, title, applicability, SALP functional area, and inspection level of effort will be as shown. Applicability, SALP functional area, and inspection level of effort shall be determined by the responsible technical branch.

The inspection procedure will have four major areas of discussion. Section 01 will describe the inspection procedure objective. Section 02 will describe the sampling criteria to be used by the Construction Site Scheduler (CSS) to schedule inspection activities throughout the construction phase, and by the inspector to select the sample size for each occurrence of the procedure.

Section 03 contains the critical attributes (those aspects of a licensee's process, procedure, or practice that must be verified to determine its adequacy) that the inspector shall assess during the inspection. This section also includes the attribute guidance for verifying the adequacy of the selected inspection sample. The attribute guidance may also contain lessons learned during past inspections related to the critical attribute.

Section 04 contains the references used either to develop the inspection procedure, or from which the inspector can gain additional insights into the purpose of the inspection or into acceptable practices. When practical, the references should include an SRP section related to the activity or process being inspected to create a link between the facility's licensing basis and how to inspect the licensee's compliance with their permit or license and applicable NRC rules and regulations.

Six addenda to this section follow. Addendum 1 is the sample IP format for CIP inspection procedures. Addenda 2 through 5 provide four example CIP inspection procedures for process oriented inspections. Addendum 6 provides an example CIP inspection procedure covering system functional testing. Existing IPs served as a technical basis for developing the critical attributes, attribute guidance, and sampling criteria that appear in the example IPs. The examples are provided to illustrate the format and typical content. They should be reviewed by the cognizant technical organization before implementing the revised CIP to ensure adequate technical requirements and guidance has been provided.

INSPECTION PROCEDURE FORMAT

NRC INSPECTION MANUAL

PIPB

INSPECTION PROCEDURE 37051

VERIFICATION OF AS-BUILTS AND EFFECTIVENESS OF DESIGN CHANGE PROCESS

PROGRAM APPLICABILITY: 2512

SALP FUNCTIONAL AREA: [TO BE PROVIDED LATER]

LEVEL OF EFFORT: 80 DIRECT INSPECTION HOURS PER OCCURRENCE

37051-01 INSPECTION OBJECTIVES

37051-02 SAMPLING CRITERIA

37051-03 CRITICAL ATTRIBUTES

37051-04 REFERENCES

CONTENT:

SECTION 01 INSPECTION OBJECTIVES

This section shall clearly define the objectives of the inspection procedure (IP). State what the inspector is to accomplish in a broad sense while performing the IP. The responsible technical organization shall develop the inspection objectives.

SECTION 02 SAMPLING CRITERIA

The responsible technical branch shall develop sampling criteria for the inspection procedure. General areas to consider in developing the sampling criteria include:

- The safety significance of the activity to inspect (the more safety significant, the more samples should be taken);
- The historical performance of the nuclear industry in performing the activity being inspected (if there have been significant problems in the past, consider increasing the number of inspection samples);
- The ability of a single inspector to complete the inspection of the specified number of samples during a maximum two week inspection procedure occurrence (not including preparation and documentation time - 80 hours of direct inspection). If the effort required to complete the inspection is expected to take more than two weeks (80 hours DIE) by a

single inspector, consider reducing the scope of the IP or reducing the depth (number of samples per occurrence) of the IP;

- Consideration of the impact of advanced construction techniques on the activity being inspected (i.e., modular construction techniques may entail inspections at offsite fabrication facilities that might need more inspection effort and additional sampling requirements);

- Insights from the sources (NRC or industry) used to develop the inspection procedure; and

- Consideration of the basis for determining the minimum acceptable sample size for each inspected activity.

<u>SECTION 03</u> <u>CRITICAL ATTRIBUTES</u>

A critical attribute is a characteristic or quality of a material, object, action, or process that is vital to meeting design requirements or the successful performance of construction-related activities. The responsible technical branch shall identify specific critical attributes for the inspection procedure. Each critical attribute should be a one sentence statement that concisely describes the characteristic or quality the inspector is to inspect and assess. Limited explanatory text can be used to clarify or establish limitations or restrictions on the applicability of the critical attribute.

The responsible technical branch shall develop attribute guidance in support of each critical attribute. Attribute guidance includes the inspection methods and/or specific actions the inspector should accomplish to inspect the licensee's performance related to the critical attribute. It is not expected that the inspector will complete all of the attribute guidance for each critical attribute. However, the inspector should be instructed to accomplish a sufficient portion of the attribute guidance to provide an adequate basis for assessing licensee processes and performance for the specific critical attribute.

This section shall contain an introduction that specifies, as a minimum, requirements for the following:

- Completion of the critical attributes during each occurrence;

- Attribute guidance completion requirements necessary to ensure the associated critical attribute has an adequate basis for assessing licensee processes and performance;

- Exceptions for inspecting attributes different from those specified in the inspection procedure; and

- Inspector preparation expectations.

SECTION 04 REFERENCES

This section contains those NRC (SRP sections, certified design sections, NUREGS, Regulatory Guides, SAR, BTP, SER, etc.) or industry (ASME, IEEE, etc.) references used during development of the inspection procedure. This section should also include references the inspector can use to review past performance concerns or to gain an understanding of industry practices. This section should be the last page of the main body of the inspection procedure. The references should not list the revision of the document and there should be a note or statement directing the inspector to the licensing basis documentation to determine the appropriate revision.

INSPECTION PROCEDURE 35065

PROCUREMENT, RECEIVING, AND STORAGE

PROGRAM APPLICABILITY: 2512

SALP FUNCTIONAL AREA: [TO BE PROVIDED LATER]

LEVEL OF EFFORT: 80 DIRECT INSPECTION HOURS PER OCCURRENCE

35065-01 INSPECTION OBJECTIVES

01.01 To determine whether equipment procurement specifications include the applicable quality assurance (QA) and technical requirements identified in the safety analysis report (SAR) or license.

01.02 To determine whether receipt inspection and storage activities are conducted in compliance with QA program requirements.

01.03 To determine whether the licensee's processes and procedures for procurement, receiving, inspection, and storage of safety-related equipment and components are adequately and effectively implemented.

35065-02 SAMPLING CRITERIA

02.01 Verification of procurement specifications, receipt inspection, and storage activity adequacy should be performed periodically early in the construction phase. The intent of this procedure is to accomplish the critical attributes as specified in Section 03 for each of the occurrences. Inspections should start shortly after the licensee begins receiving safety-related equipment or components from vendors (or for modular construction, shortly after module fabricators begin receiving equipment and components) and should be finished by the end of the construction phase. For a typical 60 month construction inspection period, the procedure should be performed annually or at least four occurrences.

02.02 For each occurrence of the inspection procedure select as a minimum the number of safety-related equipment or components as listed below. At least one of the selected components or equipment should be a complex engineered component (if available). The inspector should attempt to select samples for each class of component storage (Class A, B, C, and D, as defined in ANSI Standard N45.2.2) and different storage conditions (in an established storage facility, in-place storage, or in-plant storage).

1 nuclear steam supply system (NSSS) electrical panel/component
1 NSSS mechanical component
1 Non-NSSS electrical component or panel
1 Non-NSSS pump, valve, heat exchanger, and pipe fitting (4 samples)
1 Non-NSSS structural steel procurement
1 Non-NSSS welding consumable procurement
1 Non-NSSS cable procurement

02.03 For each occurrence of the inspection procedure, the inspector should select a minimum of one component or piece of equipment using the guidance provided in 02.03 for which the receipt inspection and acceptance was based on a certificate of conformance from the supplier (if available).

02.04 For each occurrence of the inspection procedure select at least two audit reports by the licensee's Quality Assurance organization that document the licensee's review of a suppliers' or vendors' Quality Assurance Programs. If modular construction techniques are used, this sampling criterion shall be applied to the module fabrication facility consistent with the licensee's Quality Assurance Program. For example, if the licensee's QA Program relies on the module fabrication facility to audit their suppliers or vendors QA program, then the NRC should review the audit reports developed by the facility's QA organization. However, if the licensee's QA organization audits the module fabrication facility vendors' and suppliers' QA programs, the NRC should not routinely review the audit reports developed by the facility's QA organization.

02.05 For facilities constructed using modular construction techniques: Inspections shall be performed both at the module fabrication facilities and at the construction site. Each occurrence, in addition to onsite inspection, select at least one module fabrication facility that performs safety-related work for the licensee. Inspection at individual fabrication facilities should be of reduced scope (focusing on a small (1 or 2) sample of safety-related equipment or components procured to fabricate a single module). Because of the potential for differences in the QA programs at module fabrication facilities and the need to send an inspector to the facility, it is expected that an additional 24 hours of direct inspection effort at each selected module fabrication facility will be required to satisfactorily complete each occurrence of this inspection procedure. The intent of this sampling criterion is to ensure each module fabrication facility is assessed by the NRC either by direct observations at the fabrication facility or by inspection of the licensee's procurement, receipt inspection, and storage of completed modules at the construction site. Inspection of the components and equipment listed in 02.03 above may occasionally (no more than every other occurrence) be substituted by inspection of a module or modules that contain equivalent components or equipment.

35065-03 CRITICAL ATTRIBUTES

Critical attributes shall be verified for each inspection procedure occurrence by ensuring that attribute guidance has been performed correctly based on direct observation and record review of procurement, receipt inspection, and storage practices and policies.

03.01 The specified design parameters in the procurement documentation for the selected equipment and/or components are consistent with the specifications in the certified design, license, SAR, or other approved licensee documentation.

Attribute Guidance:

1. Check, by record review, that the procurement documents and specifications identify the applicable technical requirements committed to by the licensee that the vendor/ supplier shall adhere to during fabrication of the component or piece of equipment.

2. Check, by record review, that requirements for seismic and/or environmental qualification (as applicable) of equipment, components, and replacement parts are included in the procurement specifications.

3. Check, by record review, that adequate manufacturing specifications (i.e., component drawings and specifications include material, dimensions, tolerances, etc.) are provided with the procurement documents for the selected components and/or equipment.

03.02 The procured equipment and/or components (for the selected samples) satisfy the design and manufacturing specifications in the procurement documentation.

Attribute Guidance:

1. Check, by record review of related vendor/supplier documentation, whether the technical manufacturing requirements (codes and standards) specified in the licensee's procurement documentation, were met for the purchased material or equipment.

2. Check that the vendor/supplier documentation includes adequate detail to determine the environmental and/or seismic qualification, as applicable, of selected equipment or components.

3. Check, by direct observation and record review, that the selected equipment and/or components conform to the material and physical requirements in procurement documents.

03.03 The licensee's administrative controls and procedures establish adequate guidance for receipt inspection and acceptance of procured equipment and/or components.

Attribute Guidance:

1. Check, by procedure and/or record reviews, that the licensee has adequate procurement document requirements for acceptance of the selected components and/or equipment during receipt inspection. Factors such as safety significance and whether the procurement relates to an engineered item or one of standard design (off the shelf) should be considered. Where a certificate of conformance (COC) is to be used for acceptance in lieu of some or all final conformance records, examine specifications for the COC document to determine whether the following information was required to be included in the COC:

   (a) Identification of the purchased material or item (COC reference to the purchase order or procurement document is acceptable).

   (b) Identification of what requirements specified in the procurement documents or purchase order were met and those requirements not met.

   (c) Identification of the supplier's QA organization member (by name or position) required to sign the COC.

   (d) Identification of the procedures or QA program to be followed for filling out, reviewing, and approving the COC.

2. For the selected components and/or equipment, check the requirements specified in the procurement document for documentation and acceptance of the item to ascertain whether receipt inspection and acceptance was based on one or more of the following:

   (a) An acceptable certificate of conformance.

(b) Supplier-forwarded documentation (inspection, test, material, etc.) required by the procurement document.

(c) Direct examination (of items or sample thereof) to verify that specified "design/physical" acceptance requirements are met (i.e., other than review of supplier documentation or a check for damage).

(d) Receiving inspection based on record of source verification resulting in acceptance, or conditional acceptance, of the item(s).

3. For the selected components and/or equipment, check, by record review, that receipt inspection records are available.

4. Check, by record review, that acceptance of the selected components and/or equipment complied with receipt inspection requirements.

5. Observe a receipt inspector performing a receipt inspection of one of the selected components and/or equipment, and determine whether the following aspects are adequate. If it is not possible to observe an inprogress receipt inspection, the inspector should review the licensee's procedures, interview receipt inspectors, and inspect the receipt inspection facility to determine if the following aspects are adequate.

(a) Inspection facilities such as proper tools and handling is available.

(b) Staff is adequate and properly trained in receipt inspection.

(c) Proper tools are dedicated for inspection purposes.

(d) Review the documented records, such as procurement specifications, purchase order, COC, material certifications, etc., available to the receiving inspector to assist him in his inspection.

(e) Observe if the inspector follows a QA/QC receiving procedure or uses a check form.

6. Check whether an approved bidders list is readily available and that the selected equipment and/or components were supplied by a listed vendor. The approved list should identify the type of components or material the vendor is qualified to supply. Refer to RG 1.123/ANSI N45.2.13, Section 10.3.1.

03.04 Licensee administrative controls for the identification, documentation, segregation, storage, and disposition of nonconforming procured equipment and components are adequate to ensure only equipment and/or components that satisfy design requirements are used in the construction of the facility.

Attribute Guidance:

1. For the selected components and/or equipment, check that discrepancies identified during receipt inspection (if any) were adequately documented, reviewed, and dispositioned by QA and/or engineering, as appropriate.

2. If nonconformances are identified for the selected components and/or equipment, review the nonconformance file for the nonconforming items and inspect areas where these item are stored to determine whether they are properly tagged and segregated, and if precautions are taken to prevent

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their release for installation or use. If no nonconformances were identified for the selected components and/or equipment, review the nonconformance files and select a minimum of two nonconforming items and inspect the storage areas as described above.

3. Check that in cases where the receipt inspection (or the NRC inspection) identifies a deviation in the COC or other vendor-supplied documentation, that corrective actions are proposed that include a requirement to reaudit the vendor's system for preparation and issuance of COCs or the other vendor-supplied documentation specified by the procurement documents. Also, determine whether the "deviation" is subject to a 10 CFR Part 21 evaluation.

03.05 Adequate documentation is available for the selected components and/or equipment (if any) that were receipt inspected and accepted based on a vendor's certificate of conformance (COC) to ensure the component and/or equipment satisfies procurement specifications and design requirements. This critical attribute applies only if a COC was used as the basis for receipt inspection and acceptance of the material.

Attribute Guidance:

1. Check that other documentation (e.g., test, material and inspection data) presented with certificates of conformance are reviewed by technical personnel who are capable (through experience, education, or training) to assure that the components meet all specified safety-related requirements and that the other vendor documentation includes data required to perform this review.

2. Check, by record review, that the COC identifies the purchased material or item (reference to purchase order or procurement document, if available, is acceptable).

3. Check, by record review, that the COC identifies which requirements specified in the procurement document or purchase order were met and which procurement requirements were not met, if any.

4. Check, by record review, that the COC was signed by the appropriate member of vendor/supplier's QA organization as specified in the purchase order or procurement documentation.

5. Check, by record and procedure reviews, that the appropriate QA procedures and programs were followed for filling out, reviewing, and approving the COC.

6. Check, by interviews, and by procedures and records review, that the licensee's receipt inspection organization has the ability to determine that purchaser/agent has verified by audit (or source verification) the validity and effectiveness of the supplier's COC system.

7. Check, by record and procedure reviews, that when source verification is specified for acceptance of an item in addition to a COC, the appropriate receipt inspection organization is aware of the source verification results.

03.06 Licensee administrative and Quality Assurance programs and procedures are established that verify the adequacy of the supplier/vendor Quality Assurance programs.

Attribute Guidance:

1. For the selected components and equipment, determine whether the procurement documents impose the requirements of 10 CFR 21 when "basic components" are purchased. (Basic components are discussed in NUREG 0302.)

2. For the selected licensee QA audit report, check by interviews, and by record and procedure reviews, whether the vendors' quality assurance (QA) programs have been audited by the purchaser's organization.

3. Check that the licensee has established an approved list of suppliers that have been audited by the licensee's QA organization.

4. Check that the licensee's vendor/supplier QA program verification adequately considers requirements for approval of supplier special processes such as welding, nondestructive examination (NDE), heat treatment, coating, and plating (including post-plating processes to prevent hydrogen embrittlement).

03.07 Adequate administrative controls and procedures are established to ensure that procurement documents are developed consist with the requirements (NRC or industry) committed to by the licensee.

Attribute Guidance:

1. Check, by procedure review, that administrative controls exist that require the licensee to identify each site contractor who prepares and/or issues procurement documents.

2. Check, by procedure review, that the administrative controls specified for development of procurement documents are adequate for the protection, handling, and control of procurement specifications and purchasing documents.

3. Check, by procedure and record reviews for the selected components and/or equipment, that the administrative controls for development of the procurement documents require that the documents specify appropriate requirements that are consistent with the practices committed to by the licensee and that include requirements for protection of the material against environmental conditions, packaging, and shipping.

4. Check, by procedure review, that administrative controls exist that require the licensee to monitor and assess through surveillance, reviews, or audits, each contractor's (onsite and offsite as applicable) procurement activities.

5. Check, by procedure review, that the administrative controls require the procurement documents to specify any source verification requirements relative to acceptance of the components and/or equipment in addition to a certificate of conformance for complex engineered components.

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03.08 **For storage of equipment and components in established storage facilities, the administrative controls and processes, and facilities for the storage of safety-related equipment and components are adequate and in accordance with the practices committed to by the licensee.** As a minimum the inspector shall perform the actions described in attribute guidance 1, 3, and 4.

Attribute Guidance:

1. Review the QA/QC procedures established for storage of safety-related items in Class A, B, C, and D (as available) levels of storage to determine whether these procedures are adequate. Refer to ANSI Standard N45.2.2, Sections 2.7 and 6.1.2.

2. Check, by direct observation of the storage facilities, that storage of Class A equipment is in an environmentally controlled atmosphere and that provisions are established to prevent animals (especially rodents and birds) from entering.

3. Check, by direct observation of the storage facilities, that the facilities and/or other requirements for Class A, B, C, and D equipment storage are being satisfactorily implemented consistent with licensee commitments and in accordance with the licensee's approved procedures.

4. For the selected components and/or equipment, check, by direct observation, their storage conditions to ensure the appropriate environmental conditions are established, the components and/or equipment are adequately protected from damage, access to the storage area is appropriately controlled, stored items are adequately identified, adequate controls are established and implemented for control of the items before use, and any special storage requirements specified by engineering or the supplier are appropriately implemented.

5. Check, by direct observation and record review, that the testing equipment is available and suitable for their intended use.

6. Check, by record reviews and/or interviews, that the licensee performs periodic inspections of the storage facility as specified by approved procedures, and that the inspection are conducted in accordance with the requirements committed to by the licensee.

7. Check, by record review, that the storage records for the selected components and/or equipment are being maintained as specified and are current. This review should verify: that the site (or project) storage documents adequately identify the type of storage and inspections required for each type of equipment; that the records reflect licensee inspection of storage facilities and storage activities, and; that the records reflect that specified storage conditions are met.

8. For the selected components and/or equipment, check, by record reviews and/or interviews, that the licensee satisfactorily performs the periodic maintenance or storage requirements specified in licensee procedures or by the vendor/supplier (such as lubrication, periodic rotation, nitrogen blankets, desiccants, etc.).

03.09 For in-place storage of equipment and components, the administrative controls and processes for the storage of safety-related equipment and components are adequate and in accordance with the practices committed to by the licensee.

Attribute Guidance:

1. Review QA/QC and work (installation) procedures established to conduct activities for equipment such as heat exchangers, large motors, diesel generators, large pumps, and other components, that are stored in-place to determine whether they comply with licensee commitments.

2. For the selected components and/or equipment stored in-place, check, by direct observation, their storage conditions to ensure the appropriate environmental conditions are established, the components and/or equipment are adequately protected from damage by construction debris and activities, and that any special storage requirements specified by engineering or the supplier are appropriately implemented.

3. For the selected components and/or equipment stored in-place, check, by record reviews and/or interviews, that the licensee satisfactorily performs the periodic maintenance or storage requirements specified in the licensee procedures or by the vendor/ supplier (such as lubrication, periodic rotation, nitrogen blankets, desiccants, etc.).

4. Check, by record review, that the storage records for the selected components and/or equipment stored in-place are being maintained as specified and are current. This includes that the site (or project) storage documents adequately identify the type of storage and inspections required for each type of equipment; that the records reflect licensee inspection of storage facilities and storage activities, and; that the records reflect that specified storage conditions are met.

5. For the selected components and/or equipment stored in-place, check by record review and/or interview that the licensee performs periodic inspections as specified by approved procedures and vendor requirements, and that the inspections are conducted in accordance with the requirements committed to by the licensee.

03.10 For in-plant storage of equipment and components, the administrative controls and processes for the storage of safety-related equipment and components are adequate and in accordance with the practices committed to by the licensee. It is expected that in-plant storage of safety-related equipment and components will be a transient condition. If the licensee uses in-plant storage for long periods, the inspector should follow the attribute guidance specified in 03.08 to assess licensee performance.

Attribute Guidance:

1. Review QA/QC and work (installation) procedures established to conduct activities related to the selected equipment and/or components stored in-place (such as valves), and other items not being stored in-place, to determine whether they comply with licensee commitments.

2. For the selected components and/or equipment stored in-plant, check, by direct observation, their storage conditions to ensure that the components and/or equipment are adequately protected from damage by construction debris and activities, and any special storage requirements specified by engineering or the supplier are appropriately maintained.

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If no safety-related components and/or equipment were selected for this occurrence of the inspection procedure, the inspector should select an area in the plant where safety- or non-safety-related components and equipment are temporarily being stored, and assess the storage conditions of the components.

35065-04 REFERENCES

The inspector should refer to the licensing basis documentation to determine the applicable revision to the references listed below.

Most of the chapters in the facility SAR, including pertinent codes and standards referenced in these chapters.

NUREG-0302, Rev. x (10 CFR 21 Remarks and Discussion) - especially staff positions relative to paragraphs 21.3(d), 21.31, and 21.51.

Regulatory Guide 1.123, "Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants."

Regulatory Guide 1.28, "Quality Assurance Program Requirements (Design and Construction)."

Regulatory Guide 1.38, "Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage and Handling of Items for Water-Cooled Nuclear Power Plants."

ANSI - N45.2 - Quality Assurance Program for Nuclear Facilities.

ANSI - N45.2.13 - Quality Assurance Requirements for Control of Procurement of items and Services for Nuclear Power Plants.

ANSI - N45.2.2 - Packaging, Shipping, Receiving, Storage, and Handling of Items for Nuclear Power Plants.

END

VERIFICATION OF AS-BUILTS AND
EFFECTIVENESS OF DESIGN CHANGE PROCESS

PROGRAM APPLICABILITY: 2512

SALP FUNCTIONAL AREA: [TO BE PROVIDED LATER]

LEVEL OF EFFORT: 80 DIRECT INSPECTION HOURS PER OCCURRENCE

37051-01 INSPECTION OBJECTIVES

01.01 Determine whether the as-built design and construction drawings and specifications correctly reflect the as-built condition of the plant.

01.02 Determine whether the changes from the original design (or SAR) were properly reviewed and approved.

01.03 Determine whether plant seismic and other stress calculations are based on as-built conditions.

37051-02 SAMPLING CRITERIA

02.01 Verification of the as-built condition of systems and structures should be performed routinely during the construction of the facility. Inspection should start approximately 6 months after system or structure fabrication begins (either offsite or onsite) and ends at the completion of the construction phase. The inspections should be performed at least annually (this is approximately 5 occurrences during a typical 60 month construction inspection period). The intent of this procedure is to accomplish the critical attributes as specified in Section 03 for each of the occurrences. Exceptions to completion of critical attributes will be made on a case by case basis by the Senior Construction Site Representative.

02.02 For each occurrence of the inspection procedure, select representative final design documents (including detailed design drawings and construction specifications relative to the specified inspection items) following the guidance provided in criteria 02.04 through 02.10 below. By comparing final detailed construction drawings and specification requirements with the actual installation, determine whether final design drawings and specifications reflect as-built conditions for each selected item. Except as noted below, each item should be completed and accepted through quality control inspection prior to this inspection.

02.03 <u>Piping systems</u>. From the safety-related piping systems, select a minimum of two (or two groups of) isometric drawings (accepted through QC inspection) showing pipe welds, supports and restraints. All safety-related piping systems should be inspected before completion of the last occurrence of this inspection procedure.

02.04 Electrical raceways. From different safety-related electrical divisions and locations in the plant, select appropriate electrical drawings and specifications (accepted through QC inspection) that include a minimum of two Class 1E conduit and two Class 1E cable tray runs.

02.05 Electric cables. From different electrical divisions and locations in the plant, select appropriate electrical drawings and specifications (accepted through QC inspection) that include a minimum of one Class 1E cable run from each of the different safety-related electrical systems.

02.06 Structures. Select appropriate drawings and specifications (accepted through QC inspection) for a minimum of one structural steel assembly from a Seismic Category I structure. Each assembly selected should contain at least three welded and/or bolted joints. Samples shall be inspected from all Seismic Category I structures before completion of the last occurrence of this inspection procedure.

02.07 From the drawings and specifications reviewed for the samples selected in criteria 02.04 through 02.07 for this inspection procedure occurrence, select a minimum of two plant changes for safety-related systems and/or structures not yet incorporated into as-built drawings to verify the status of the review, approval, and revision of these identified changes from the "original" design. The plant changes selected are not required to have been completed and accepted through QC inspection.

02.08 From the drawings and specifications reviewed for the samples selected in criteria 02.04 through 02.07 for this inspection procedure occurrence, select a minimum of two as-built changes on design/construction drawings for safety-related systems and/or structures that have been incorporated into the as-built drawings to verify that the changes were properly reviewed and approved by appropriate personnel (including QC inspection). For early inspection procedure occurrences, there may not be any as-built changes yet incorporated into as-built drawings. If this condition exists, this sampling criterion does not apply. However, significant delay in incorporating as-built design changes into as-built drawings and specifications should be assessed for impact on development of the final as-built drawings and specifications.

02.09 Select a minimum of four drawings and associated specification, from any licensee drawing on a safety-related system or structure, in which changes have been incorporated to determine whether the as-built condition of the plant is used as the input to the seismic analysis of the system. At least two of these drawings and specifications should be from safety-related piping systems. This criteria should only be applied to the last occurrence of the inspection procedure and an additional 20 direct inspection hours (100 hours total for the last occurrence) is expected to complete evaluation of these samples.

02.10 The sampling criteria specified in 02.01 through 02.10 apply to modularly constructed facilities also. Because the intent of this procedure is to verify the as-built configuration of the facility, inspection will be performed at the construction site. No inspections at module fabrication facilities are expected.

37051-03 CRITICAL ATTRIBUTES

Critical attributes shall be verified for each inspection procedure occurrence by ensuring that attribute guidance has been performed correctly based on direct observation of as-installed systems and structures, and review of licensee

requirements and applicable industry codes and standards. Emphasis shall be on directly comparing the as-installed configuration with the as-built drawings when practical.

03.01 **As-installed system, subsystems, and components conform to the as-built drawings and specifications.** To complete this critical attribute, the inspector(s) shall review and assess licensee performance in each of the subsets of attribute guidance provided below. For each subset, most of the attribute guidance should be considered by the inspector(s) before completing their review.

Attribute Guidance:

For piping systems:

1. Check by direct observation that all accessible piping supports for the selected samples are in the proper location, of the specified type, and in the correct configuration. For those inaccessible supports review installation documentation and records.

2. Check by direct observation that all accessible pipe welds for selected samples are in the location specified in the as-built drawing and are appropriately identified consistent with requirements (industry codes and standards or NRC requirements) committed to by the licensee. For inaccessible welds review welding records.

3. For the selected samples, check all accessible piping by direct observation that the location, size, and configuration are as shown on the as-built drawing. For inaccessible portions of the system piping, review installation documentation and records.

4. For the selected samples, check by direct observation and record review that component location, weight and orientation (including valve operators) are as shown on the as-built drawings.

5. Check by record review that the material used to fabricate the system piping and components for the selected samples are consistent with the design specifications.

For conduits and cable tray runs:

1. For the selected samples, check by direct observation that the location, size, and routing of all accessible conduits and cable tray runs conform to the as-built drawings. For inaccessible portions of the conduits or cable trays, review installation documentation and records.

2. Check by direct observation that all accessible conduit and cable tray run supports for the selected drawings are in the proper location, of the specified type, and in the correct configuration. For inaccessible conduit or cable tray support, review installation documentation and records.

3. Check by direct observation that the as-installed configuration of the selected conduits and cable tray runs maintains appropriate separation and isolation in accordance with the requirements (industry codes and standards or NRC documents) committed to by the licensee. This includes checking separation and isolation into and out of structural penetrations.

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4. Check by record review and direct observation that the as-installed configuration of the selected conduits and cable tray runs are in accordance with the licensee requirements for cable loading (physical and thermal) and are consistent with the commitments made by the licensee.

5. Check by direct observation that the as-installed identification of the selected conduits and cable tray runs are in accordance with the as-built drawings.

For electrical cable:

1. For the selected electrical cable, check by direct observation and/or record/procedure review that the as-installed cable has been routed consistent with as-built drawings and design requirements. This includes checking that cable splices, bends, and pulls are made in accordance with accepted industry practices committed to by the licensee.

2. For the selected electrical cable, check by direct observation that the as-installed cable identification is consistent with the as-built drawing and system design at each termination point and as required by licensee procedures (based on licensee commitments to Industry or NRC guidance) between termination points.

3. Check by direct observation that adequate physical and electrical protection/isolation are provided for the selected electrical cable that is consistent with requirements (Industry or NRC) committed to by the licensee. This includes checking electrical cabling electrical protection/isolation into and out of structural penetrations.

4. Check by direct observation that adequate physical and electrical separation exists between the selected electrical cables and redundant cable(s) consistent with requirements (Industry or NRC) committed to by the licensee.

5. Check by record review that the as-installed cable meets design specifications, such as electrical capacity (current and voltage), insulation resistance, environmental qualification, and other relevant characteristics.

For structures:

1. Check by direct observation that the configuration of the selected structural assembly conforms to as-built drawing and design specifications.

2. Check by direct observation for selected structural drawings, that the joint location/orientation, dimensions and configuration conforms to as-built drawing and design specifications.

3. For the selected structural drawings, check by record review that the proper material is used to fabricate the structural assembly as required by design specifications.

03.02 Licensee controls for generating and completing as-built design documents, including design modifications (i.e., drawings, specifications, and calculations), are adequate to accurately maintain as-built drawings and facility design.

1. Verify for the selected plant changes that, as modifications are completed, the controlled copies of all as-built documents are either revised and distributed for design changes, or have been legibly marked-up on an interim basis to show all relevant changes.

2. Using the selected plant changes, check that the administrative procedures and responsibilities have been established for updating and maintaining the as-built documents. These administrative procedures should include requirements for incorporating design changes on an interim basis, reviewing and approving changes, verification and authentication of the marked-up documents, safeguarding the documents and related information until all marked-up changes have been incorporated into the revised documents, and the as-built record retention period.

3. Check that the administrative procedures direct users of as-built documents to use and refer to, the marked-up copy for the purpose of testing, maintenance, and future design change activities, until the revised as-built document incorporating all the marked-up changes is officially issued.

4. Using the selected plant changes, check completion schedules for as-built design documents to monitor for a growing backlog of incomplete as-built design documents.

5. Check that the revision of documents incorporating all marked-up changes for the selected plant changes are issued and distributed in a timely manner.

03.03 Engineering evaluation has been performed to provide an adequate basis to allow implementation of the design or field change and has determined the impact on original design specifications.

1. Check by review of the selected drawings, specifications, and supporting engineering analysis that all associated design and field changes have received an engineering evaluation (by the licensee or for the licensee) that clearly documents the basis for the change.

2. Check by review of the selected drawings, specifications, and supporting engineering analysis that if design and/or field changes have been implemented that the engineering evaluation clearly documents the impact of the change on the plants original design.

03.04 Final seismic and other stress calculations and evaluations are performed using the as-built drawings and specifications. This critical attribute shall be performed during the last occurrence of this inspection procedure only.

1. Through independent review of the selected drawings and specifications, and independent review of the final seismic calculation, check that the as-built condition of the plant was used as the input to the final seismic analysis of the system/structure, or that the as-built condition conforms to the original seismic criteria, as applicable.

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2. Through independent review of the selected drawings and specifications, and independent review of licensee stress calculations (such as pipe stresses induced during normal, abnormal, and accident conditions), check that the as-built condition of the plant was used as the input to the final stress calculation for the system/structure, or that the as-built condition conforms to the original design criteria, as applicable.

3. Check that adequate administrative controls are in place to ensure that final as-built design documents (drawings, specifications, and calculations) will be readily available to site operations personnel when commercial operation is initiated. If certain as-built design documents (e.g., system analysis) are to be retained by the nuclear steam system supply (NSSS) vendor or architect-engineer (A-E) examine adequacy of licensee's timely access to such records for analysis of plant operating conditions.

37051-04 REFERENCES

Applicable chapters of the SAR, including pertinent codes and standards referenced in these chapters

ASME Boiler and Pressure Vessel Code, "NCA 4137.7 and NCA 3554."

IE Bulletins 79-14 and 79-04

Regulatory Guide 1.26, "Quality Group Classifications and Standards"

Regulatory Guide 1.28, "Quality Assurance Program Requirements (Design and Construction)"

Regulatory Guide 1.29, "Seismic Design Classification"

Regulatory Guide 1.32, "Criteria for Safety-Related Electrical Power Systems for Nuclear Power Plants"

Regulatory Guide 1.75, "Physical Independence of Electrical Systems"

ANSI N45.2, "Quality Assurance Program Requirements for Nuclear Facilities"

ANSI N45.2.11, "Quality Assurance Requirements for the Design of Nuclear Power Plants"

END

NRC INSPECTION MANUAL

INSPECTION PROCEDURE 49063

SAFETY-RELATED PIPING WORK OBSERVATION

PROGRAM APPLICABILITY: 2512

SALP FUNCTIONAL AREA: [TO BE PROVIDED LATER]

LEVEL OF EFFORT: 60 DIRECT INSPECTION HOURS PER Occurrence

49063-01 INSPECTION OBJECTIVES

01.01 By direct observation, and independent evaluation of work performance, work in progress and completed work, determine whether activities relative to safety-related piping (except welding and nondestructive examination (NDE)) outside the reactor pressure coolant boundary are being accomplished in accordance with NRC requirements, CP or COL conditions, licensee commitments, and licensee procedures.

01.02 Assess the adequacy of the completed work, partially completed work, or work activities in progress to determine if there are any indications of management control problems or generic weaknesses.

49063-02 SAMPLING CRITERIA

02.01 Observation of safety-related piping fabrication should be performed routinely during the construction of the facility. The inspections should be performed at least semi-annually while pipe work is ongoing. The intent of this procedure is to accomplish the critical attributes as specified in Section 03 for each of the occurrences. Inspection should start shortly after piping system fabrication begins onsite and ends at the completion of the construction phase.

02.02 Select at least two safety-related piping systems each occurrence to observe piping fabrication.

02.03 From the selected piping systems, select at least four piping sections for observation. The selection of activities to be observed should be from diverse piping systems and pipe fabricators. The selection should <u>not</u> establish a pattern so that the licensee/contractor can expect only certain activities or components to be inspected. About three-fourths of the selected activities should be from Quality Group B (see Regulatory Guide (RG) 1.26).

02.04 For facilities constructed using modular construction techniques: Inspections shall be performed both at the module fabrication facilities and at the construction site. As appropriate, inspections shall be schedule at the module fabrication facilities and/or the construction site for each inspection occurrence. In periods of high offsite fabrication, more inspection effort should be expended observing safety-related pipe fabrication and installation at the fabrication facilities. Because of the potential for differences in work processes and QA programs at module fabrication facilities and the need to send inspectors to the facility, it is expected that an additional 32 hours of direct

inspection effort at each selected module fabrication facility will be required to satisfactorily complete each occurrence of this inspection procedure. The intent of this sampling criterion is to ensure each module fabrication facility is assessed by the NRC through direct observation to determine whether adequate controls are in place for safety-related piping fabrication and installation.

49063-03 CRITICAL ATTRIBUTES

The critical attributes are intended to be inspected by direct observation of the selected samples of piping fabrication and the installation process to determine whether conformance to applicable requirements is being accomplished. Each critical attribute shall be completed each occurrence to satisfy the objectives of this procedure.

03.01 **For the selected piping sections, determine whether piping fabrication is being performed in accordance with licensee approved procedures and consistent with the industry codes and standards, and/or NRC documents, committed to by the licensee.** Refer to the licensee's fabrication instructions when necessary to determine dimensions, tolerances, and specifications.

Attribute Guidance:

1. Check by direct observation and record review that the proper materials are used to fabricate the piping section by verifying that the markings on the material or packaging are consistent with the material specified in design drawings and specifications.

2. Check by direct observation and/or record review that for the selected piping sections the piping material dimensions (diameter, wall thickness) are within the tolerance specified in the licensee fabrication procedure and design specifications. Additional guidance can be found in the revision to RG 1.28, if applicable, committed to by the licensee.

3. Check by direct observation that handling and storage of the selected piping sections during fabrication precludes material degradation such as denting, corrosion, and chemical contamination. Additional guidance can be found in the revision of RG 1.38, if applicable, committed to by the licensee.

4. For the selected piping sections, check by direct observation (of the fabrication process itself or subsequent measurement by the licensee or the inspector) that fabrication processes such as cutting, grinding, and bending do not adversely impact the minimum wall thickness, and that they satisfy industry practices committed to by the licensee.

5. Check by direct observation that the installation of components in the selected piping sections (such as pipe spools, fittings, valves, orifices, and bellows) meet design requirements and are properly oriented. Additional guidance can be found in the revision of RG 1.28, if applicable, committed to by the licensee.

03.02 For the selected piping sections determine whether piping installation is being performed in accordance with licensee installation instructions and are consistent with industry practices committed to by the licensee. Refer to the licensee's installation instructions when necessary to determine dimensions, tolerances, and specifications.

Attribute Guidance:

1. Check by direct observation that handling of the selected piping sections during installation precludes material degradation such as denting, corrosion, and chemical contamination. Additional guidance can be found in the revision of RG 1.38, if applicable, committed to by the licensee.

2. Check by direct observation that the installation of the selected piping sections to adjacent components meet design requirements regarding placement, orientation, and alignment. Additional guidance can be found in the revision of RG 1.28, if applicable, committed to by the licensee.

3. Check by direct observation or record review that attachments (especially welded) to the selected piping sections do not cause excessive distortion or result in less than the specified minimum wall thickness. Additional guidance can be found in the revision of RG 1.28, if applicable, committed to by the licensee.

4. Check that the piping/component supports and restraints for the selected piping sections are installed in accordance with applicable drawings, specifications, and procedures. Additional guidance can be found in the revision of RG 1.28, if applicable, committed to by the licensee.

03.03 Configuration controls of the selected piping systems and sections are adequate to ensure that piping fabrication and installation are consistent with final plant design requirements/specifications, or that design and/or field changes are appropriately incorporated into the final plant requirements.

Attribute Guidance:

1. During piping fabrication for one of the selected piping sections, check by procedure review that the fabrication procedures or work instructions include all of the field and/or design changes to the fabrication drawings and specifications associated with that piping section.

2. During piping installation for one of the selected piping systems, check by procedure review (for all of the installed piping sections) that the installation procedures or work instructions include all of the field and/or design changes to the installation drawings and specifications associated with the installed piping sections for that system.

3. For one of the selected piping systems, check by direct observation that the installed piping sections are configured as required by the latest approved specifications, drawings, and procedures for that system.

03.04 Licensee management/supervision oversight of the selected piping section fabrication and installation is adequate to ensure adherence to licensee approved procedures and applicable industry practices.

Attribute Guidance:

1. Check, by record reviews or interviews, worker/inspector qualifications and training. Personnel performing quality-sensitive or special processes related to piping fabrication and installation, inspection, and testing work, should be qualified by certification, experience or training that satisfies licensee commitments. Additional guidance can be found in the revision of RG 1.58, if applicable, committed to by the licensee.

2. Check, through interviews with the work crew or by direct observation, licensee management's control over piping fabrication and/or installation activities by determining the level of interaction between licensee and/or contractor managers and supervisors and the work crew.

3. During piping fabrication and installation, check, by direct observation, the ability of the licensee staff to perform their assigned duties and assume their assigned responsibilities.

4. For the selected piping sections, check by procedure review that fabrication and installation specifications and/or work instructions are complete, including necessary reference materials and are of the correct revision.

03.05 Quality assurance and control (QA/QC) processes and procedures implemented during piping fabrication and installation demonstrate the licensee's ability to adequately monitor and control piping fabrication and installation processes to identify and address discrepancies in a timely manner.

Attribute Guidance:

1. For the selected piping systems, check by direct observation that measures are used to maintain piping cleanliness and preclude the entry of foreign material into the piping systems. Additional guidance can be found in the revisions of RG 1.28 and 1.37, if applicable, committed to by the licensee.

2. For the selected piping systems, check that the licensee appropriately implements procedures for cleaning and flushing the piping systems during and following piping fabrication and installation. Additional guidance can be found in the revision of RG 1.37, if applicable, committed to by the licensee.

3. For the selected piping sections, check that quality-related inspections including NDE, independent checks, and "hold point" verifications are performed in sequence and according to the work document. Quality related checks include checks by line workers and supervisors, as well as independent organizations. Additional guidance can be found in the revision of RG 1.28, if applicable, committed to by the licensee.

4. For the selected piping sections, check that the work documentation is up-to-date and in conformance with licensee record-keeping requirements.

5. For the selected piping sections, check that nonconformances are identified, documented, prioritized, tracked, and resolved according to their importance and licensee procedures. Additional guidance can be found in the revision of RG 1.28, if applicable, committed to by the licensee.

49063-04 REFERENCES

SAR Chapters 1, 3, 5, 7, and 17, including pertinent Codes and Standards referenced in these chapters

Regulatory Guide 1.28, "Quality Assurance Program Requirements (Design and Construction)"

Regulatory Guide 1.37, "Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants"

Regulatory Guide 1.38, "Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage and Handling of Items for Water-Cooled Nuclear Power Plants"

Regulatory Guide 1.58, "Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel"

Regulatory Guide 1.64, "Quality Assurance Requirements for the Design of Nuclear Power Plants"

END

MECHANICAL COMPONENTS - WORK OBSERVATION

PROGRAM APPLICABILITY: 2512

SALP AREA: [TO BE PROVIDED LATER]

LEVEL OF EFFORT: 60 DIRECT INSPECTION HOURS PER Occurrence

50073-01 INSPECTION OBJECTIVES

01.01 By direct observation and independent evaluation of work performance, work in progress, and completed work, determine whether activities relative to safety-related components (other than the reactor pressure vessel and piping) are being accomplished in accordance with NRC requirements, SAR commitments, and licensee procedures.

01.02 To determine whether inadequacies in completed work, partially completed work, or work activities in progress associated with safety-related components indicate a management control problem or generic weakness.

50073-02 SAMPLING CRITERIA

02.01 Because of the importance and extent of safety-related component installation, observation of work activities in this area shall be scheduled to be performed at least quarterly during active mechanical systems work (this is approximately 16 occurrences during a typical 60 month construction inspection period). The intent of this procedure is to accomplish all of the critical attributes of Section 03 for each of the occurrences starting when component installation activities begin (either offsite or onsite) and ending at the completion of the construction phase. For each occurrence of the inspection procedure follow the guidance provided in criteria 02.02 through 02.05 below.

02.02 Select a minimum of 2 representative mechanical components within the reactor coolant pressure boundary and a minimum of 5 components in safety-related systems outside the reactor coolant pressure boundary. If available, at least one of these components is to be a motor-operated valve.

02.03 As used in this and related procedures, mechanical components pertain to those components important to safety within the reactor coolant pressure boundary (as defined in 10 CFR 50.2(v)) and components in quality groups B and C (as defined in RG 1.26) except the reactor pressure vessel and piping. Component selection should be representative of the type of plant components involved, such as pumps, heat exchangers, system valves (and operators), safety/relief valves, pressure vessels, and storage tanks.

02.04 The inspector may not be able to observe all facets of all activities identified in Section 03 of this procedure. However, direct observation of important activities should be made on a sampling basis. In some cases it will be necessary to observe a completed activity rather than work in progress. The

inspector's judgment in sample selection should consider both the importance of the component to overall plant safety and the opportunity to inspect during the most advantageous part of the installation effort.

02.05 For facilities constructed using modular construction techniques: Inspections shall be performed both at the module fabrication facilities and at the construction site. As appropriate, inspections shall be scheduled at the module fabrication facilities and/or the construction site for each inspection occurrence. In periods of high offsite fabrication, more inspection effort should be expended observing safety-related work at the fabrication facilities. Because of the potential for differences in work processes and QA programs at module fabrication facilities and the need to send inspectors to the facility, it is expected that an additional 32 hours of direct inspection effort at each selected module fabrication facility will be required to satisfactorily complete each occurrence of this inspection procedure. The intent of this sampling criteria is to ensure each module fabrication facility is assessed by the NRC through direct observation to determine whether adequate controls are in place for safety-related mechanical component installation.

50073-03 CRITICAL ATTRIBUTES

Critical attributes should be verified for each inspection procedure occurrence by ensuring that most of the attribute guidance have been performed correctly based on direct observation, and review of licensee installation requirements and applicable industry codes and standards. Emphasis shall be on directly observing licensee compliance with approved procedures and industry codes and standards to which they are committed. Each critical attribute shall be completed each occurrence to satisfy the objectives of this procedure.

03.01 **The selected components were installed using the applicable licensee approved installation procedures.** Refer to the licensee installation instructions when necessary to determine dimensions, tolerances, specifications, etc.

Attribute Guidance:

1. Check that the proper material and equipment are installed by verifying that the markings on the material or packaging are consistent with the material and equipment specified in design drawings and specifications. In the case of fasteners, compliance with the applicable material specification (e.g., ASTM or ASME material and grade) should be verified by required markings on bolts and nuts and certified material test reports or certificates of conformance as required by the applicable procurement drawings and specifications and/or by the applicable codes and specifications. In the case of vendor-supplied equipment assemblies containing fasteners, samples should be inspected to verify compliance with approved vendor drawings and specifications and other information such as materials used for equipment qualification tests and/or analyses. Caution should be exercised to ensure that the required markings on material and equipment, including fasteners, not only exist but that the markings indicate the correct material and grade as specified.

2. Check proper location, placement, orientation, and alignment of the component during installation.

3. Check mounting (torquing of bolts and expansion anchors) of components, supports, and attachments.

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4. For valves check flow direction.

5. For motor operated valves check that torque switches, limit switches, and bypass switches are properly installed, adjusted and checked out in accordance with established licensee procedures.

6. Check that interferences with other components/structures, tolerances, and expansion clearance are satisfactory based on direct comparison of the as-built/final design drawings to the as installed configuration.

03.02 Pre-installation/installation handling and control of the selected components are adequate to prevent damage to the component.

Attribute Guidance:

1. Check that precautions in the installation instructions to prevent damage during placement/mounting are adhered to, where appropriate.

2. Check on the availability and use of specially trained personnel and equipment if required to meet manufacturer's instructions.

03.03 Post-installation control of the selected components are adequate to prevent damage to the component, and post-installation preventive maintenance activities are performed as required.

Attribute Guidance:

1. Check that protection is provided as required, including protection against adverse temperature, humidity, flooding, and foreign material intrusion.

2. Check that the component manufacturer's recommended preventive maintenance tasks are scheduled and performed appropriately. Examples include component lubrication, rotation, and electrical resistance checks.

3. Check that appropriate records are maintained regarding the status of installed components.

4. Check that the licensee uses appropriate controls (such as stamps, tags, markings, etc.) to ensure that the required inspections are performed, post-installation component or system tests are completed when required, verification of operational acceptance of the component is documented, and inadvertent operation of the component is prevented.

5. Check that the preparation and maintenance of installation and inspection records are adequate.

03.04 Control and oversight of the selected components installation are adequate to ensure adherence to licensee approved procedures and applicable industry practices.

Attribute Guidance:

1. Check that appropriate drawings and work procedures are available and used by the installers.

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2. Check that installation requirements, construction drawings, specifications, and work procedures have received appropriate licensee review and approvals. The process for developing licensee approved installation instructions, construction drawings, specifications, and work procedures will be assessed separately. However, obvious errors or deficiencies should be identified to the licensee for correction.

3. Check, through record review and direct observation, that hold points are observed, when required.

4. Check that licensee inspection activities including scope and frequency are being performed according to instructions.

5. Check, through interviews and/or direct observation, that QA/QC personnel are allocated adequate time to study installation specifications and instructions, and to perform the required component inspections.

6. Check, through interviews with the work crew or direct observation, licensee management's control over component installation activities by determining the level of interaction between licensee and/or contractor managers and supervisors and the work crew during component installation.

7. Check, by record review, that the qualification and/or training of licensee staff engaged in component installation and inspection work are adequate and commensurate with the work in progress. In determining the adequacy of QA/QC staffing, the effectiveness of their activities should be considered.

8. Check, through direct observation, the ability of the licensee staff to perform their assigned duties and assume their assigned responsibilities.

03.05 System configuration and design controls are adequate to ensure field changes are incorporated into the as-built drawings and the impact on design specifications are adequately addressed.

Attribute Guidance:

1. Check that field and design changes relevant to the work being observed have been appropriately processed through the required review and approval processes approved by the licensee. Discrepancies observed may be due to in-process changes such as those initiated by the design organization or those initiated in the field.

2. Review the as-built drawings, and installation specifications, drawings, and records to verify that field changes made during the selected components installation are adequately incorporated into the latest as-built drawing.

3. Review the engineering analysis/evaluation providing the justification for implementing the field or design change for the selected components to verify that appropriate consideration is provided on the impact of the change on the design specifications.

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50073-04 REFERENCES

Regulatory Guide 1.26, "Quality Group Classifications and Standards"

Regulatory Guide 1.28, "Quality Assurance Program Requirement (Design and Construction)"

Regulatory Guide 1.29, "Seismic Design Classification"

Regulatory Guide 1.38, "Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage and Handling of Items for Water-Cooled Nuclear Power Plants"

Regulatory Guide 1.39, "Housekeeping Requirements for Water-Cooled Nuclear Power Plants"

Regulatory Guide 1.58, "Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel"

Regulatory Guide 1.88, "Collection, Storage and Maintenance of Nuclear Power Plant Quality Assurance Records"

NRC report, AEOD/C203, "Survey of Valve Operator-Related Events Occurring During 1978, 1979 and 1980," dated May 7, 1982

END

STANDBY LIQUID CONTROL SYSTEM PREOPERATIONAL SYSTEM TESTING

PROGRAM APPLICABILITY: 2512

SALP FUNCTIONAL AREA: (TO BE PROVIDED AT A LATER DATE)

LEVEL OF EFFORT: 80 DIRECT INSPECTION HOURS PER Occurrence

70456-01 INSPECTION OBJECTIVES

01.01 Through direct observation of system testing, and review of the test procedures and test results determine whether the performance of the standby liquid control (SLC) system satisfies design basis commitments contained in the safety analysis report (SAR) and/or the inspections, tests, analysis, and acceptance criteria (ITAAC) provided in combined license.

01.02 Through review of the test procedures, ensure that they are technically adequate, provide appropriate provisions for the use of measuring and testing equipment (M&TE), and qualifications of licensee personnel performing the test(s).

01.03 Through review of the test result records, ensure that the required information related to M&TE used during the tests and test results are accurately recorded.

70456-02 SAMPLING CRITERIA

02.01 This inspection procedure will be performed for one occurrence unless previous performance of this inspection procedure identified issues requiring licensee corrective action that includes reperformance of all or parts of the standby liquid control system testing. Should it be necessary to reperform portions of this procedure, the construction site scheduler (CSS) will schedule their performance in coordination with the licensee.

02.02 All of the critical attributes of Section 03 shall be completed during the performance of this inspection procedure. All of the test procedures used to functionally test the SLC system related to critical attributes 03.03 through 03.11 of this inspection procedure shall be reviewed. All of the test results for the SLC system related to critical attributes 03.03 through 03.11 of this inspection procedure shall be reviewed.

02.03 If testing is performed at offsite testing or fabrication facilities for components or subassemblies of the SLC system, the CSS shall schedule the performance of the appropriate critical attributes of this inspection procedure at the offsite lccation(s), including the test procedure(s) and record review critical attributes.

70456-03 CRITICAL ATTRIBUTES

For each facility, the Senior Construction Mechanical Inspector (SCMI) shall ensure that this inspection procedure is revised to contain site specific information related to SLC system performance in critical attributes 03.03 through 03.11 listed below. For facilities licensed under 10 CFR Part 52, the SCMI should reference the applicable ITAAC associated with critical attributes 03.03 through 03.11 listed below. For each facility, the SCMI shall ensure that the SLC system piping and instrumentation drawing(s) (P&IDs) provided in the SAR or license for the facility is/are attached to this inspection procedure.

03.01 **The test procedure(s) provide adequate guidance for performance of the functional testing of the standby liquid control system.** (Note: the adequacy of the procedures used to test system performance will be performed using inspection procedure 70300, "Test Procedure Review." Inspection procedure 70300 will, on a sampling basis, validate the process used by the licensee to develop the testing procedure, and review procedure format and general content. The intent of this critical attribute is to provide a quick review of the inspection procedure for technical adequacy.)

Attribute Guidance:

1. Check, by procedure review, that adequate controls are in-place to ensure the measuring and testing equipment (M&TE) used during performance of the test(s) are currently in calibration and of the appropriate scale.
2. Check, by procedure review, that the qualifications of the licensee personnel performing the testing are clearly defined.
3. Check, by procedure and design basis information review, that the test procedure accurately reflects the safety-related performance characteristics of the SLC system specified in the design basis information. (This attribute guidance shall be performed)
4. Check, by procedure review, that adequate controls are in place to prepare the system, subsystem, or component for testing (i.e., system alignment and test equipment installation).
5. Check, by procedure review, that adequate system, subsystem, or component restoration controls are in place.
6. Check, by procedure review, that adequate human factors considerations have been incorporated into the procedures' organization and appearance to facilitate completion of the procedures.

03.02 **The test result records completely document the results required by the test procedure(s) and provide an auditable record that can be used to verify that the SLC system satisfies design requirements.**

Attribute Guidance:

1. For each test procedure, review the final record copy of the procedure to ensure all of the required information is recorded in the test procedure.

2. Ensure adequate technical justification is provided with the test records documenting any deviations from the results specified in the test procedure(s).

3. Ensure that the results are consistent with the design basis requirements for the SLC system contained in the SAR and/or license condition (ITAAC).

4. Ensure that the records are legible and adequately controlled to prevent misuse or unintentional damage.

03.03 The as-built SLC system has the capability for testing the system during plant operation.

1. Testing of the as-built SLC system demonstrates the ability to inject water from a test tank to the reactor pressure vessel. (GE ABWR ITAAC 2.2.4.3.a.(2))

2. During testing of the SLC system, each division of the SLC system can pump against a pressure greater than or equal to **8.72 MPaA** at greater than or equal to **189 L/min** in a closed loop on the test tank. (GE ABWR ITAAC 2.2.4.3.a.(1))

03.04 The SLC system can deliver greater than or equal to 378 L/min to the reactor pressure vessel against a pressure of greater than or equal to 8.72 MPaA with both pumps running (GE ABWR ITAAC 2.2.4.3.b).

03.05 The SLC system can deliver greater than or equal to 189 L/min to the reactor pressure vessel against a pressure of greater than or equal to 8.72 MPaA with either pump running (GE ABWR ITAAC 2.2.4.3.c).

03.06 Testing of the as-built SLC system demonstrates that each division of the system can be initiated manually using the division's manual initiation switch. (GE ABWR ITAAC 2.2.4.3.d)

03.07 Both divisions of the as-built SLC system automatically initiate when an anticipated transient without scram (ATWS) signal is generated (GE ABWR ITAAC 2.2.4.3.e).

03.08 The as-built SLC system pump starting logic prevents the system pumps from operating unless signal exist indicating that a suction path is available from the storage tank (pump suction valve fully open) or test tank (test tank outlet valve fully open) (GE ABWR ITAAC 2.2.4.3.f).

03.09 The as-built SLC system available net positive suction head (NPSH) at the pump suction exceeds the required NPSH as demonstrated by the SLC system injecting greater than or equal to 378 L/min into the reactor pressure vessel at normal operating pressure using both system pumps with the storage tank at the low level trip (pump trip level) and a temperature greater than or equal to 43°C (GE ABWR ITAAC 2.2.4.3.h).

03.10 The SLC system pump relief valves open when the inlet pressure to the valve equals or exceeds 10.76 MPaG as demonstrated during shop or field testing (GE ABWR ITAAC 2.2.4.3.i). This critical attribute can be verified by either direct observation of the relief valve testing or by record review during SLC system functional testing.

03.11 The as-installed SLC system motor operated valves (MOVs) open upon receipt of an actuating signal under preoperational differential pressure, fluid flow, and temperature conditions. (GE ABWR ITAAC 2.2.4.6)

03.12 The as-installed SLC system check valves (CVs) either opens, closes, or both opens and closes, depending on the valve's safety function, based on the direction of the differential pressure across the valve under system preoperational pressure, fluid flow, and temperature conditions. (GE ABWR ITAAC 2.2.4.7)

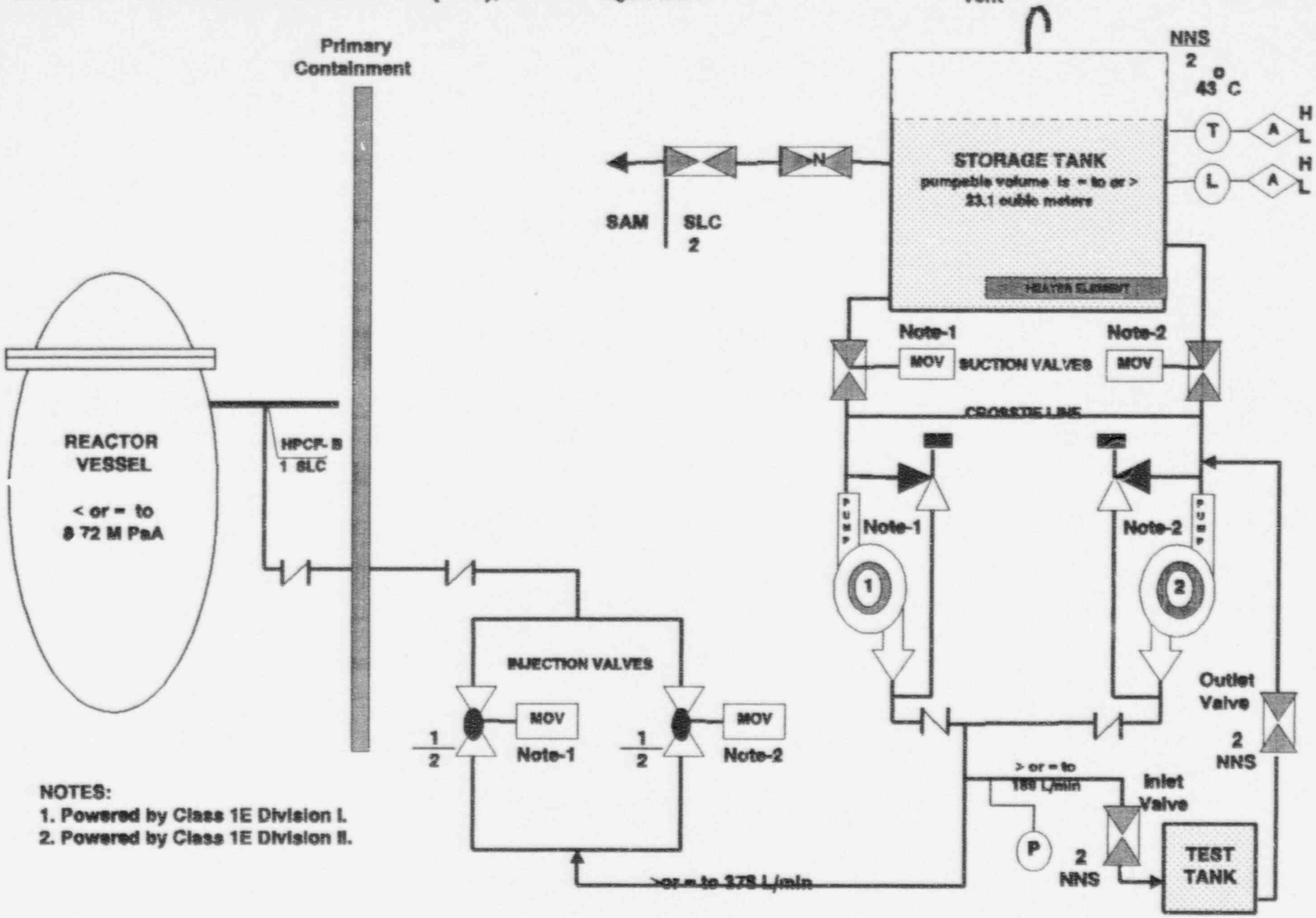
70456-04 REFERENCES

The inspector should refer to the licensing basis documentation to determine the applicable revision to the references listed below.

General Electric Advanced Boiling Water Reactor (GE ABWR) Certified Design Material (specifically Table 2.2.4, "Standby Liquid Control System" and Figure 2.2.4, "Standby Liquid Control System," of the ITAAC).

10 CFR Part 52, Appendix ??, "General Electric ABWR Certified Design Rule"

STANDBY LIQUID CONTROL SYSTEM (SLC), ABWR - **Figure 2.2.4**



NOTES:
1. **Powered by Class 1E Division I.**
2. **Powered by Class 1E Division II.**

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ATTACHMENT 4

CONSTRUCTION INSPECTION PROGRAM INFORMATION SYSTEM DESCRIPTION

Final Report from Pacific Northwest National Laboratory
for Task 94-02 of JCN L-2502

NRC

REV 1 - 7/30/96

JCN L-2502:

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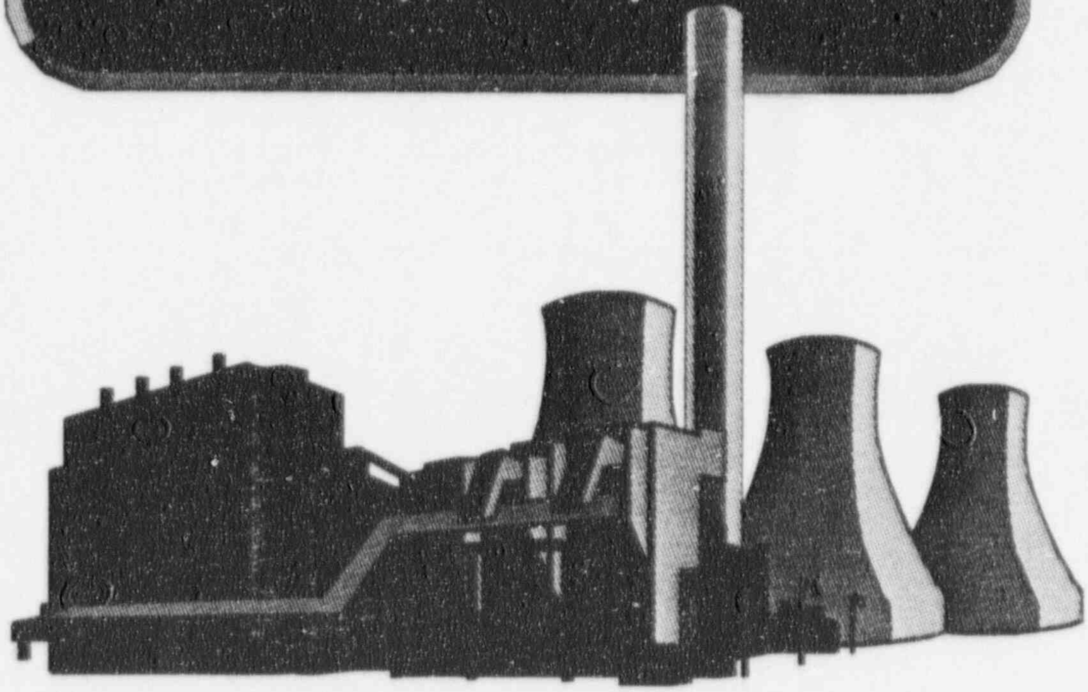
CONSTRUCTION INSPECTION PROGRAM INFORMATION MANAGEMENT SYSTEM (CIPIMS)



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CIPIMS INTRODUCTION

<u>Background</u>: The Integrated System (Application)

CIPIMS is not a software or program, but instead an integrated application of several commercially available software which collectively serve as a Schedule/Resource Manager (SRM), an Inspection Database, and a interface to the data via a mimic of the inspection process called the Work-Flow User Interface (WFUI). Since no single software has both the capability and flexibility to manage the complexities of project and information management cheaply and easily, this system (based upon smart-coding--discussed later) was devised to easily and practically share information between software applications. Highly compatible software was chosen which minimized the need to do programming *(which would have also necessitated expending time and resources for developing user manuals/guides, on-line help, and training.)*

The software; ABC Flow-Charter, Primavera SureTrak, and MS ACCESS collectively, form CIPIMS. MS ACCESS was chosen because of its compatibility with the other software, and because of its good Graphic-User-Interface (GUI) capability. One of the most important design feature of CIPIMS is its reporting flexibility/capabilities. CIPIMS can **report** from MS ACCESS or to WordPerfect, or from SureTrak directly, or to WordPerfect through a Btrieve link to ACCESS ,or to WordPerfect via preset macros.

The SRM work breakdown structure (WBS) provides a structure for the inspection procedures that will be used to monitor and verify construction activities during site development and construction. This WBS will be used in the project management software (only the schedule / resource management features are currently being utilized) to relate construction activities to inspection procedures and inspection cycles so that the inspection process can be monitored, tracked, statused, and documented.

Besides serving as a graphics aid to depict the inspection process and relationships, the WFUI (Attachment ONE-1) which mimics the construction work flow can also serve as the road map (i.e., home-page) to guide the user's to specific compartmentalized information while at the same time keeping track of the information's source, path, and relationships. A generic hierarchical workflow layout (mimic) was developed for each inspection preparation, planning, or performance step. These steps were then coded to serve as the basis and foundation for common understanding/ agreement to **"Smart-Code"** activities into/for the **project management software.**

In addition to the database, other tools were developed ---The layout of the generic inspection preparation, planning, or performance steps was managed by a software called ABC FlowCharter. This layout could also serve as a WFUI / Home-Page which would act as an information layering structure through which necessary information can be retrieved either in storage within ABC or by launching to various applications like SureTrak or MS ACCESS. Other obvious use for this tool could be to serve as a basis for the inspection planning and preparation phases, and to access and manage inspection procedures.

The Highly Relational Database provides the inspector with the interface to the Database, and makes the inspection activities truly "Schedule-Driven" because the Project Management Activity smart-code from the SureTrak project management software is broken down into its component parts ("PARSED") along with the corresponding planned activity start, end date, and resource. This data, which is Btrieve linked to the Relational Database, generates a record for each identified activity, and fills in the Activity ID (Proj_Mngmt_Activity code, resource, planned begin and end dates. (The data is parsed via a query from the MS ACCESS Relational Database to the SureTrak SRM. The query returns with and distributes the information into the appropriate Database table and fields.

Report Design:

The CIPIMS design report consists of three sections. These sections are, by intent, designed to be "stand-alone". The rational for this approach is, that since there are three different and distinct application that are being integrated together, it is rather overwhelming for the reader to try and digest and understand the integrated application without first understanding some things about the individual parts. Additionally some users will not have an interest in all parts, so the individual sections need to be able to stand on their own.

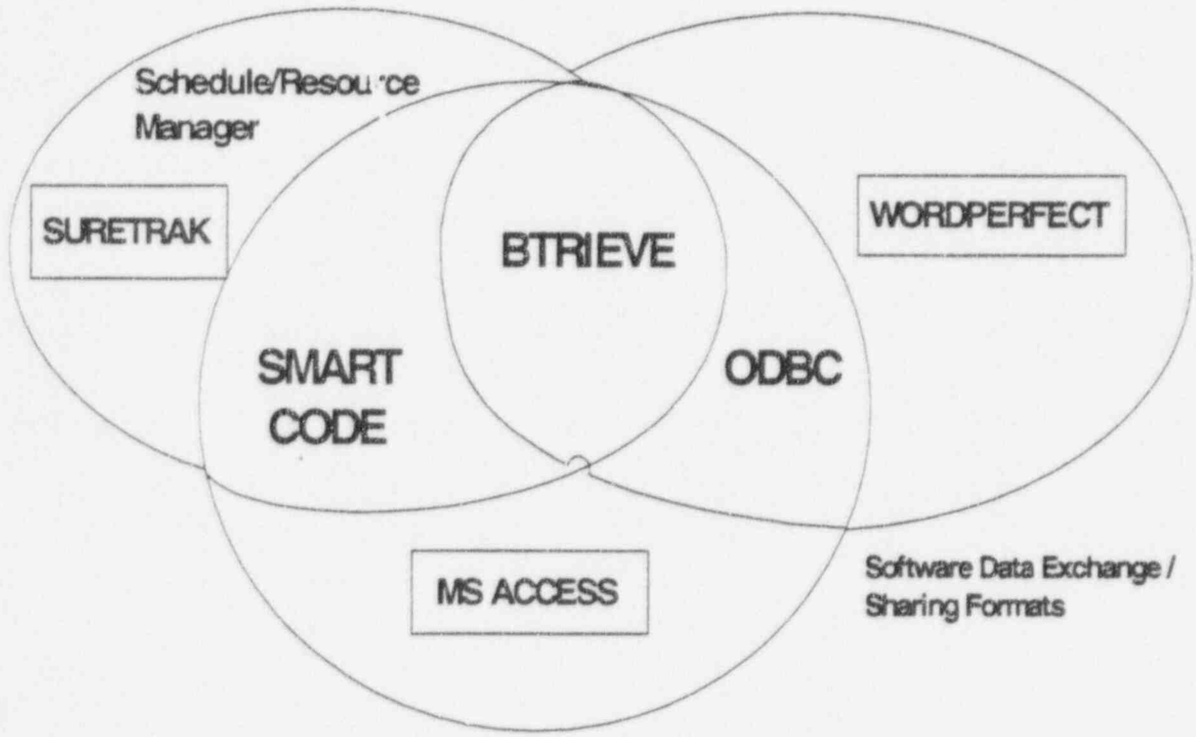
These three sections are: 1) The Work-Flow User Interface, 2) The Schedule and Resource Manager, and the 3) Assessment Database Design. Several important appendices are included, which are also intended to serve as stand-alone's so that this report will also serve to document the design, installation, and operation of the CIPIMS. These appendices are: 1) A User instillation guide which provides step-by-step CIPIMS workstation installation instructions is included herein as Appendix - A.

Appendix - B, How the tutorial gets installed, provides installation instructions for installing the database tutorial. (The tutorial is an ABC flowcharter created file that contains screen-captured images of all of the database forms. These forms contain representative data within the database fields/forms) The tutorial requires installation of a *viewing program*. This viewing program i.e., ABC Viewer, is a royalty-free run-time application that allows viewing, manipulation, and printing of ABC Flowcharter created files.

Appendix - C, CIPIMS Administrators Guide, provides installation instructions that a "Database Administrator" would require to set-up the CIPIMS for Workstation Sharing. The primary configuration for the CIPIMS is envisioned to be installation onto a network share system instead of a network system with a dedicated SQL server (for example, a system using Windows-95 to create a network at a construction site). This document will provide step-by-step instructions for setting up the network shared Database (MS Access), setting up the network shared scheduler/resource manager (SureTrak) that includes configuring SureTrak to format the schedules in the P-3 protocol (create the Btrieve files to attach to the network shared Database); installation of the WFUI (ABC Viewer) on network and on individual workstations; and the CIPIMS Tutorial. The Database Dictionary and description of the relationships between tables and fields i.e., definition of the field variable, where it comes from, where it goes to, how it is used in relationships, etc is included within the database.

SECTION ONE

SCHEDULE / RESOURCE MANAGER



Conceptual Design: D. Willett
DataBase Design: R. Smoter

SCHEDULE / RESOURCE MANAGER

Introduction: SRM

The Schedule and Resource Manager (SRM) acts as a work breakdown structure (WBS) for the inspection procedures which will be used to monitor and verify construction activities and completion during site development and plant construction. This WBS will be used in the project management software (only the schedule / resource management features are currently being utilized) to relate construction activities to inspection procedures and inspection cycles so that the inspection process can be monitored, tracked, statused, and documented.

The Work-Flow User Interface (WFUI) Home-Page (Attachment ONE-1) mimics the inspection work flow and serves as the road map to guide the user to specific compartmentalized information while at the same time keeping track of the information's source, path, and relationships. Additionally, a generic hierarchical work flow layout (mimic) is then developed for each inspection preparation, planning, or performance type of activity. These steps are then coded to serve as the basis and foundation for common understanding/ agreement to **"Smart-Code"** activities into/for the **project management software.**

The layout of the generic inspection preparation, planning, or performance activities is managed by a software called ABC FlowCharter. This layout becomes a WFUI / Home-Page which serves as an information layering structure through which necessary information can be retrieved either in storage within ABC or by launching to various applications like SureTrak, ACCESS, FOXPRO, etc.

Information Coding: "Smart-Coding"

The "Smart-Coding" evolved into two separate but related code areas. These are WBS code and Activity Code. Since the constraints of the project management software dictated the coding size, characters and format, it took significant trial and error to come up with both a practical and workable solution. Using Primavera, the WBS consists of at most 25 digits, the activity code 10 digits.

The **activity code** (which is a subset of a specific WBS Code) depends upon and relates to the process step (inspection activity). However, the WBS can be constructed based upon systems, design document sections (CIPIMS WBS is based upon the Design Document sections [refer to Attachment ONE-2]), or other logical, ordered or systematic categories. For activities that are repeated within multiple WBS -- part of the WBS or additional codes can be included within the activity code to make it unique.

Letters allow up to 26 permutations per code position instead of 10 for numeric. The key is to set up your process breakdowns to get to the lowest level in as few steps as is practical. The goal of smart-coding is to provide easily understood information imbedded within the code so as to be useful, rather than a dumb-code that would not be associated with any specific or reoccurring process, step, activity, or etc. (*The smart-code, when derived from a generic*

The CIPIMS Activity smart code is designed as follows:

10 positions total:

Position 1-5 = Inspection Procedure Number
Position 6-7 = Plant System (same as WBS Code)
Position 8-9 = Critical Attribute (The prefix for all critical Attributes is 3., so it is assumed for economy of space/size)
Position 10 = Cycle Number (alpha numeric starting at a and ending with Zero for a total of 36)

Example: as in **Figure ONE-1 37051BC01D**

Inspection Procedure No. **37051**

Plant System **BC**=FWCS (Feedwater Control System)

Critical Attribute 3.**01**

Cycle **4** (A=1, B=2, C=3, etc)

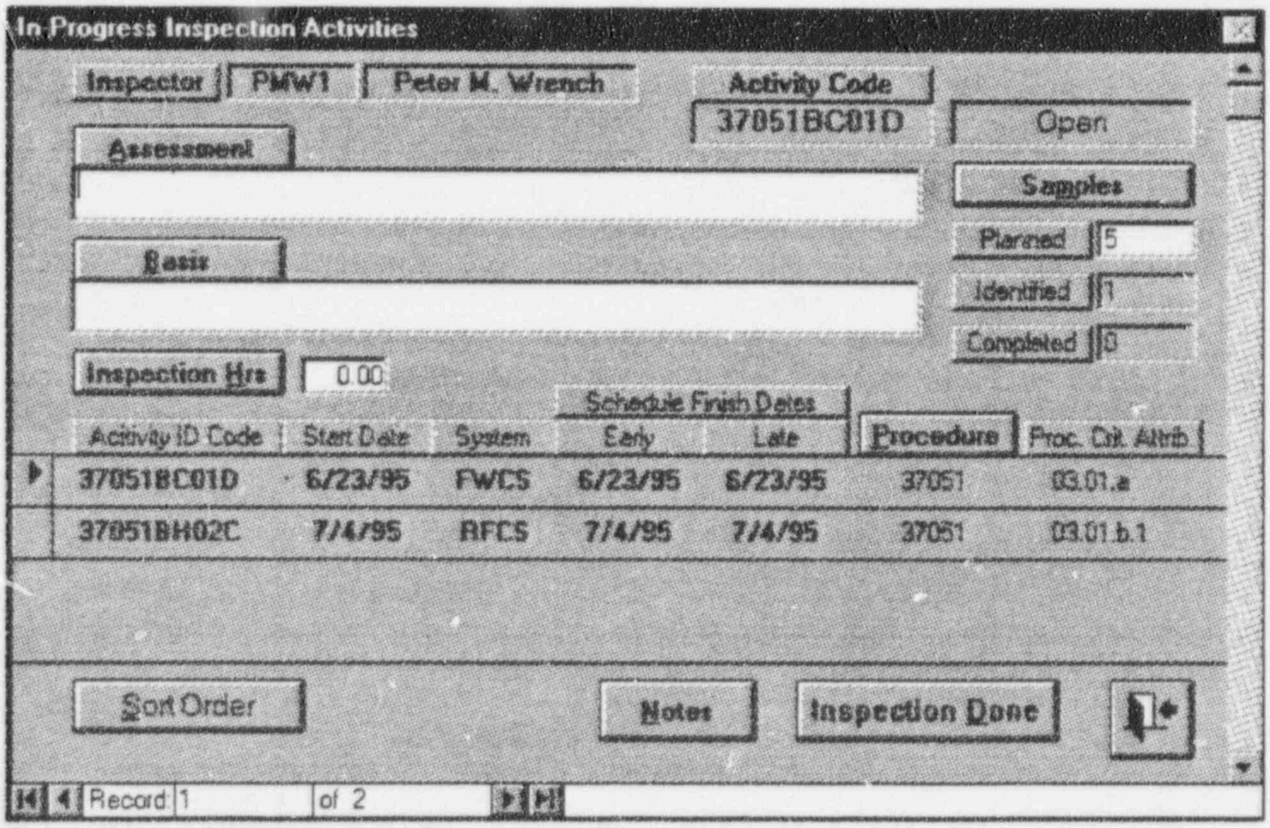


Figure ONE-1 CIPIMS Activity Smart-Code Example

<u>System Design</u>:

The goal of integrating the Schedule / Resource Manager with the Inspection database and WFUI was to obtain optimum efficiency and practical implementation. To accomplish this goal it was determined that an integration of technology and a systems approach must occur. History, indicated that relying on either technology or a systems approach alone was both inefficient and impractical. Relying to much on technology can be overwhelming for an already over burdened staff or system. Likewise too dramatic of a change in the systematic day-to-day business can be to disruptive in achieve successful change.

In order to apply a systems approach it was accepted that it was necessary to first be able to recognize all the parts of a system, and be able to create a hierarchy of system parts-- where any part can be traced through the hierarchy to identify its predecessors or successors. Experience indicates that most *system* problems are due to sin's-of-omission where critical parts are left out, or interfaces between parts, components, or organizations are not established appropriately. *(Systems engineering identifies the most practical way to complete an action -- i.e., exhaustive evaluation of the alternatives but not necessarily an acceptable method.)*

Some of the advantages of standardizing an organizations project management system are: 1) This provides the foundation and basis for training, improvement, and documentation, and 2) a standard system enables staff to switch from project to project and to focus on the project specifics rather than learning new fundamentals (i.e, software, procedures, processes, forms, etc).

<u>The Integrated System:</u> (Application)

CIPIMS is not a software or program, but instead an Integrated Application of several commercially available software. Since no single software has both the capability and flexibility to manage the complexities of project and information management cheaply and easily, this system (based upon smart-coding) was devised to easily and practically share information between three applications. Highly compatible software was chosen which minimized the need to do programming *(which would have also necessitated expending time and resources for developing user manuals/guides, on-line help, and training. Instead, the user manuals/guides, on-line help, tutorial training, and technical support help lines are all available, automatically updated and free of charge from the software vendors.)*

ABC Flow-Charter, Primavera SURETRAK, and MS ACCESS collectively, form CIPIMS. MS ACCESS was chosen because of its compatibility with the other software, and because of its good Graphic-User-Interface (GUI) capability. The second most important design feature of CIPIMS is its reporting flexibility/capabilities. CIPIMS can **<u>report</u>** from MS ACCESS or to WordPerfect, or from SURETRAK directly, or to WordPerfect through a BTRIEVE link to MS ACCESS, or WORDPERFECT via specific macros.

To make a project or activity truly "Schedule-Driven" the project management activity smart-code from the SURETRAK project management software is broken down into its component parts ("PARSED") along with the corresponding planned activity start date, end date, and resource. This data, which is BTRIEVE linked to the Relational Database, generates a record

for each identified activity, and fills in the Activity ID, (project management activity code, resource, and planned begin and end dates). The data is parsed via a query which returns and distributes the string information into a database table and fields that have pre-established relationships with other database tables and fields. *(Refer to page 590 of the MS ACCESS 2.0 manual for further information on the parse capabilities -- or search the Microsoft knowledge based articles at FTP.Microsoft.com -- look at Q100135 and/or Q115915).*

<u>Importing and Exporting:</u> **Information**

ODBC (Open Data Base Connectivity) and BTRIEVE files are used to import information from the SRM to the CIPIMS Database. The following describes how to setup SURETRAK for use with MS ACCESS: (be sure you have the BTRIEVE file BTRV110A.DLL or BTRV200.DLL in the Windows system subdirectory [you can get these files from the Microsoft public access directory at microsoft.com]). **The Run-Time Application will install these BTRIEVE files.**

1) Use NOTEPAD (or some other text editor) and modify the STWIN.INI file in the WINDOWS directory as follows:

   ```
   [DDFOptions]
   NoDDF=0
   ActivityCodes=1
   CustomDataItems=1
   Advanced=0
   ```

2) **After restarting** SURETRAK, save the SURETRAK Project in the P3 file format.

3) When the Update Data Dictionary dialog box appears.. choose yes (accept the default settings [which you established in 1 above when you edited the STWIN.INI file]). This creates two files; FIELD.DDF and FILE.DDF which are required for MS ACCESS to open project files. The .DDF files are created in the current project directory (usually \STWIN\PROJECTS).

4) Quit SURETRAK and start MS ACCESS.

5) In ACCESS Choose the database you want the SURETRAK data to be in.

6) Choose ATTACH TABLE under FILE. When prompted for the SOURCE of data -- select BTRIEVE.

7) When prompted for the location of the DATA SOURCE files... enter the directory where the FIELD.DDF, FILE.DDF, and SURETRAK project files are stored (usually \stwin\projects), and select OK.

8) When you are prompted for the file you wish to *ATTACH* to your MS ACCESS database... select the desired file and click attach. Repeat as necessary.

The files you can attach are listed with the four-character project filename (????) plus three

characters that identify the contents of the files. The following is a brief listing of the kind of information you will find in the different project files:

????ACT:	Activity Information
????DTL:	Activity Code Dictionary Information
????REL:	Predecessor/successor relationship information
????RES:	Resource Assignments
????STR:	WBS structure
????RLB:	Resource Dictionary Information
????WBS:	Activity WBS assignments
????ACC:	Cost accounts (Supported by P3 not SURETRAK)
????ATT:	Custom data items (Supported by P3 not SURETRAK)
????LOG:	Activity log records (Supported by P3 not SURETRAK)
????RIT:	Resource custom data items (Supported by P3 not SURETRAK)

NOTE: To use BTRIEVE data you must have the BTRIEVE for Windows dynamic-link library; WBTRCALL.DLL, which is not provided with MS Access but comes with SURETRAK (move this dll to the **C:\ Windows\System** directory. **The Run-Time Application will install this file.**

For MS ACCESS to use BTRIEVE Tables (which are the format of data generated by SureTrak and P3), you must have the data definition files FILE.DDF and FIELD.DDF, which describe the structure of the BTRIEVE tables. When you make the modifications to your .INI file and save the project in P3 format, as described earlier, you have configured SURETRAK to generate these files.

You can use MS ACCESS as you normally do to create custom reports. You can make changes to data such as descriptions, durations, calendar ID's etc. Generally, you should not change calculated information (such as early start and finish dates). Any changes you make using MS ACCESS will be saved to the SURETRAK project files. *(You can find additional information relative to BTRIEVE Tables and MS Access on page 166 & 167 of the MS ACCESS User's Guide Ver. 2.0)*

Setting up the Schedule / Resource Manager:

Setting up the SRM is relative simple (once you have determined the WBS Scheme). The most practical approach is to set up a SURETRAK project as a P3 subproject for each Nuclear Facility i.e., plant. The sample project; NRCX has been set up for a ABWR. This project uses the GE- ABWR Design Document Sections prefixed by a NP.3.1.1 *(NP is a place holder for a alpha-numeric designation for a specific facility/plant. 3 is for nuclear facility, 1 is for BWR and .1 is for ABWR).*

Once a WBS for facility / plant type has been developed it is a simple matter to utilize this as a template for others of the same type. Designating each project (i.e., facility / plant) as a subproject, allows them to all be "rolled-up" into a master project that share common resources and work calendar, which then enables an organization to do resource management & schedule leveling (also provides a basis for budget management).

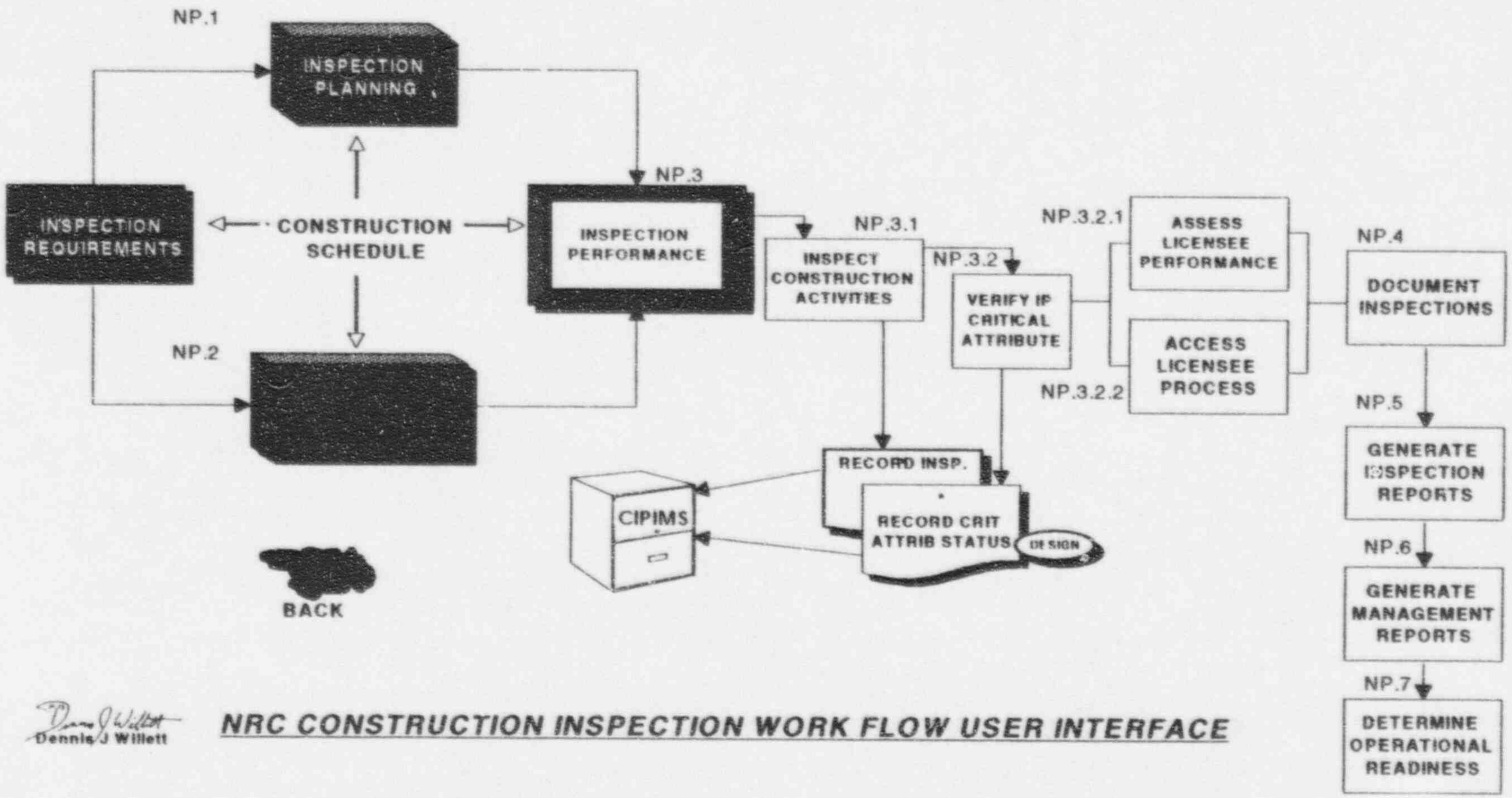
Since only part of the capabilities of the SRM are being used, only a portion of the normal project management information needs to be loaded to set up a CIPIMS project/subproject. The CIPIMS Database is looking for a particular activity code and the resource associated with it i.e., RITS ID. In addition the database looks for the scheduled start and stop date for each activity. The CIPIMS Database will operate without this project information because it only queries the SRM for this information, and if it does not exist it will continue to run anyway. All of the data for the SRM must be loaded, nothing is automatic. Data can however, come from another source such as an EXCEL spreadsheet and then be imported to convert the EXCEL data to WBS/Project Activities. Data does not come from the CIPIMS Database automatically or directly. However, there is a report in the CIPIMS Database that provides all of the activities in the CIPIMS Database that are not part of the SRM, so that the SRM can be manually updated.

As stated earlier, MS ACCESS can be used to modify SURETRAK BTRIEVE Tables by changing data such as descriptions, durations, calendar IDs etc. Generally, you should not change calculated information (such as early start and finish dates). *Remember, when you save these changes that are Btrieve attachments to MS ACCESS, you change the attached BTRIEVE files.*

ATTACHMENT ONE-1, WFUI Home-Page

Battelle
Pacific Northwest Laboratories

NRC CONSTRUCTION INSPECTION PROCESS

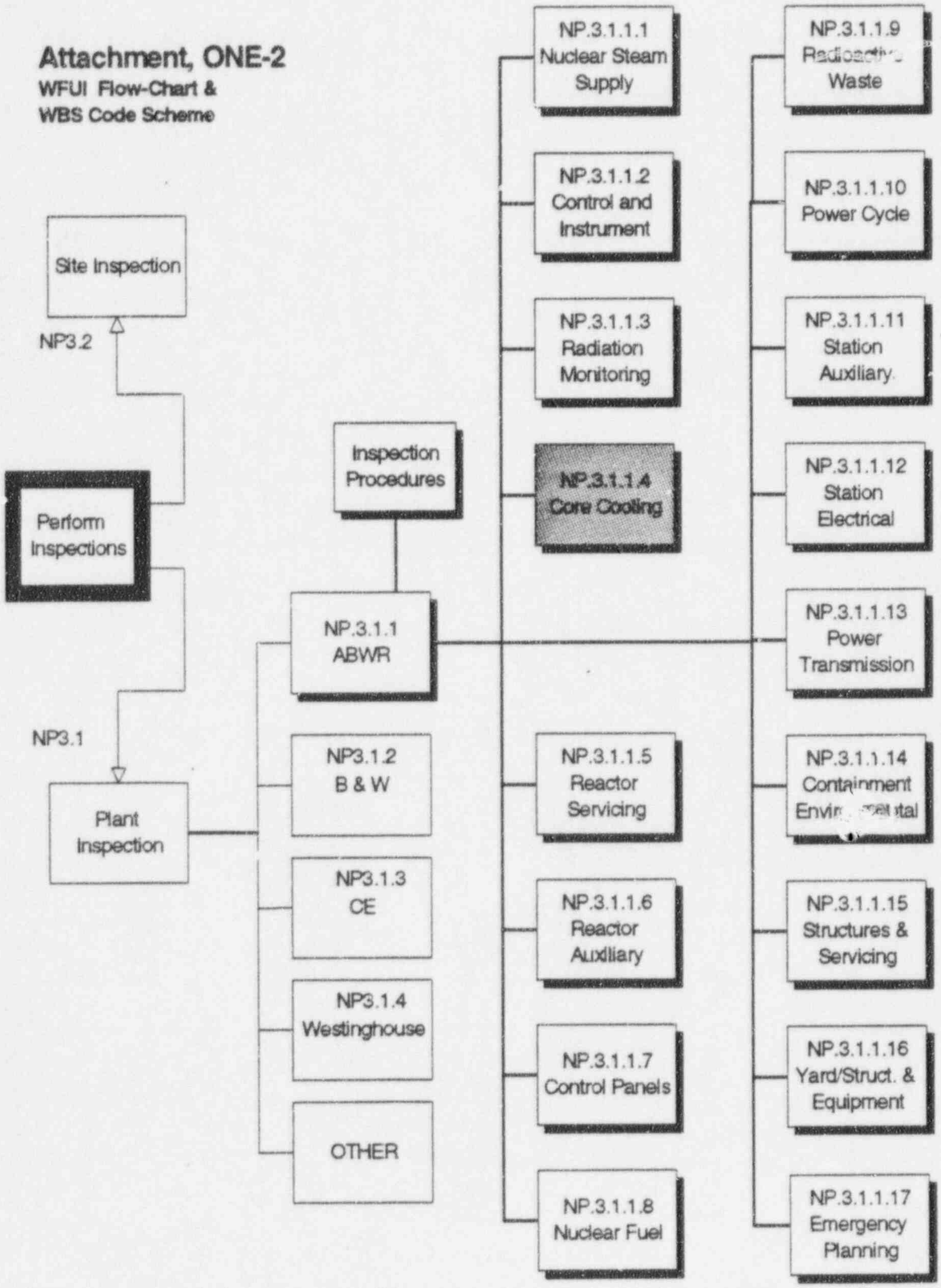


Dennis J Willett

NRC CONSTRUCTION INSPECTION WORK FLOW USER INTERFACE

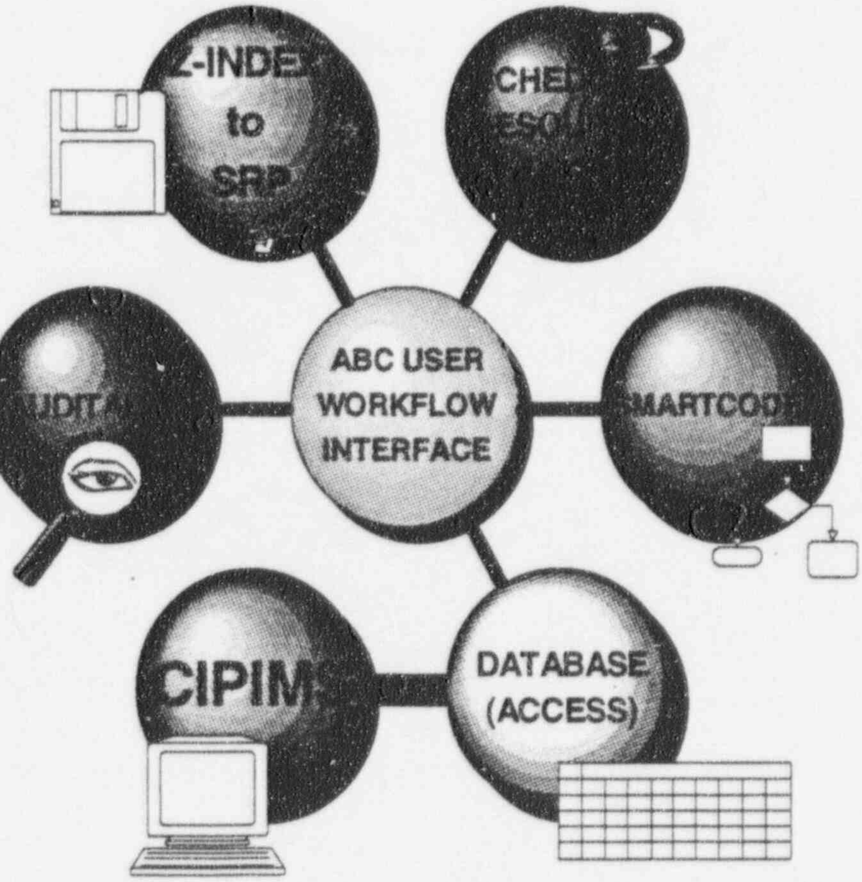
Attachment, ONE-2

WFUI Flow-Chart & WBS Code Scheme



SECTION TWO

WORK FLOW USER INTERFACE (WFUI)



Conceptual Design: D. Willett
DataBase Design: R. Smoter

WORK-FLOW USER INTERFACE (WFUI)

Introduction: WFUI

The WFUI, which mimics the inspection work-flow, acts as a "Home-Page" by serving as the road-map to guide the user to specific compartmentalized information while at the same time keeping track of the information's source, path, and relationships. The second level below the Home-Page (see Attachment, ONE-1) consists of generic hierarchical work-flow layouts (mimics) for each inspection preparation, planning, or performance type of activity. These steps are then coded to serve as the basis and foundation for common understanding/ agreement to **"Smart-Code"** activities into/for the **project management software.**

The layout (process map) of the inspection preparation, planning, or performance activities is managed by a software called ABC Flowcharter. This layout becomes a WFUI i.e., Home-Page, or lower tier layer and serves as part of the information layering structure through which necessary information can be retrieved either in storage within ABC or by launching to various applications like SURETRAK, MS ACCESS, FOXPRO, etc.

The WFUI is "Point-and-Click" in the Windows environment, and allows for password protection of information at all levels. In addition this interface has features which will enable the users to incorporate specific templates for work and instruction while not penalizing the proficient user by a routine of inescapable menus. The WFUI provides information in a user friendly, logical, and layered structure that is easily retrievable and auditable which also links together the component parts of the CIPIMS, and serves as a road-map and guide to the process and information. The WFUI can interface with the CIPIMS if a link (launch) to Microsoft Access is built. This link is accomplished economically by using a "Run-Time" MS ACCESS executable routine that allows access/input to the database without owning MS ACCESS itself.

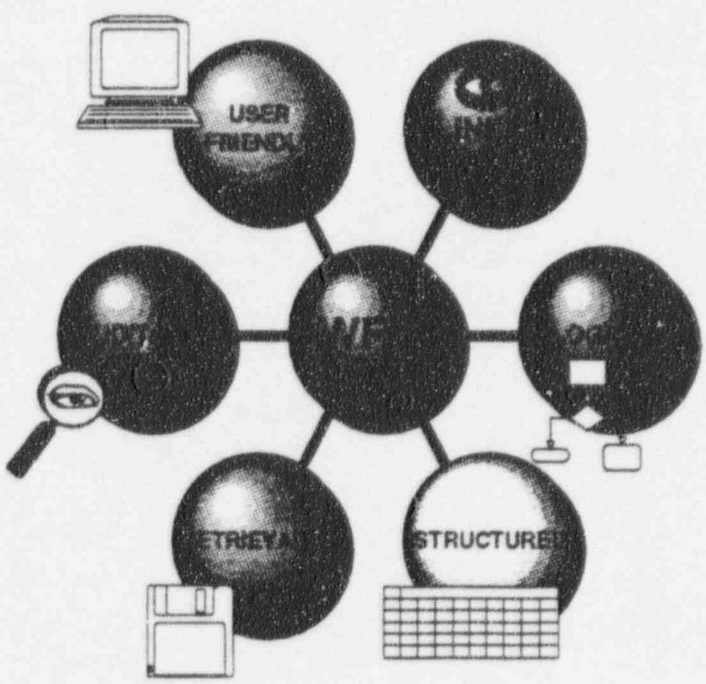


Figure TWO-1. CIPIMS Attributes

WFUI Schemes:

There are multiple schemes possible for implementation of the WFUI. Originally it was envisioned (in the earliest designs) that the CIPIMS user would utilize the WFUI to manage the inspection process -- focusing on managing the process rather than the person. The goal was to use the WFUI to visually mimic the inspection process and use this mimic to help guide the inspector through the maze of information needed both for preparation and performance of the inspection i.e., inspection procedures, critical attributes, sample selection, etc, and the required documentation of the inspection i.e., sample ID, exceptions, findings, etc.

This earliest design is still a viable implementation scheme. This scheme breaks inspection procedures down by section (see Attachments, TWO-1 & 2) And provides for a link to the database (access to information is all "Point-and-Click"). There are several ways to handle the inspection procedure information. The procedures can be divided up according to their respective sections and be handled via ABC Flowcharter, or they could be handled by a database with links that could keep the sections updated as the master database is updated. Another option is to use the flowcharter tool for developing the process graphics which can then be pasted into the front-end of a database on top of which "Hot-Buttons" can be overlaid to access database info, etc.

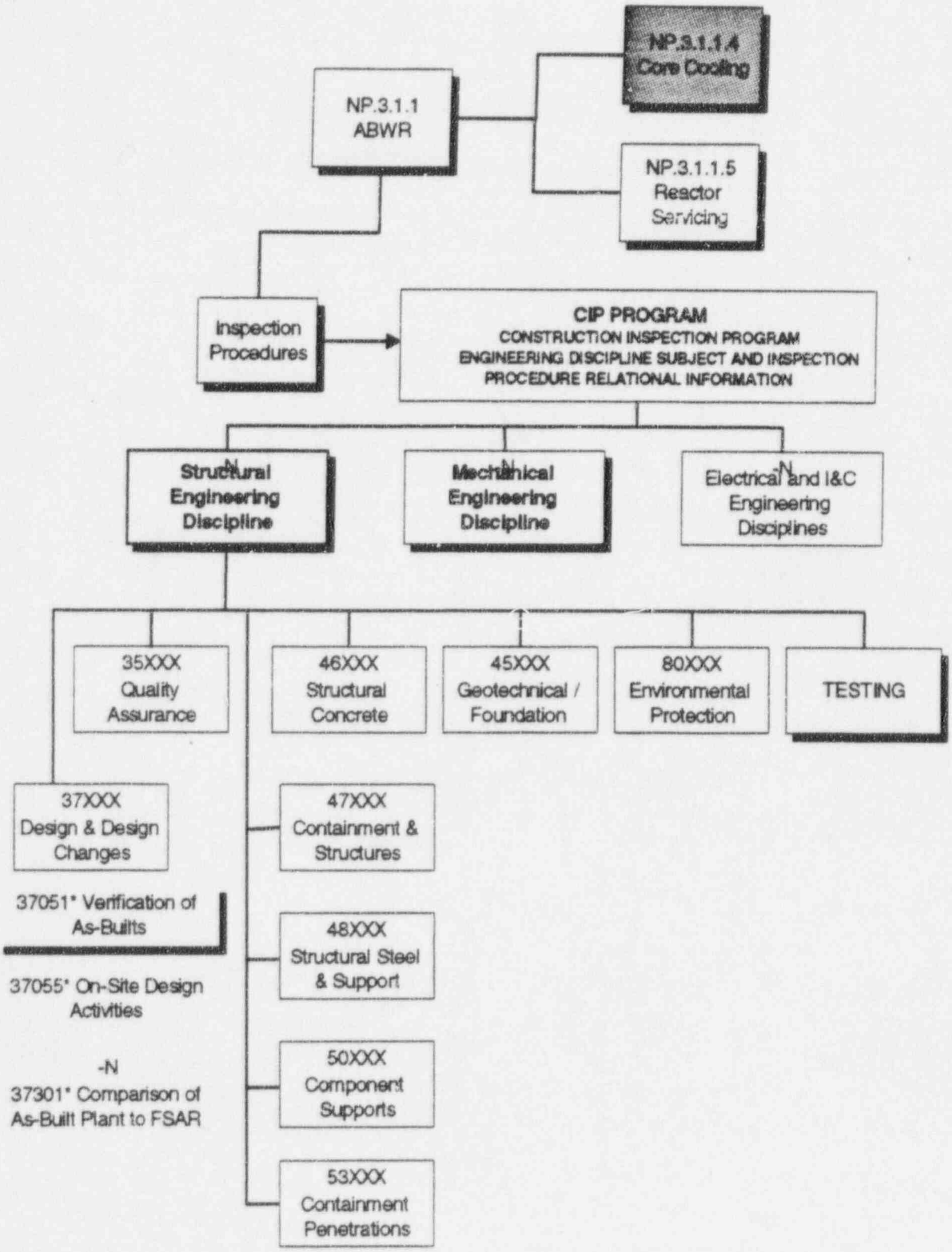
In addition to providing the user with the process interface and serving as the foundation for the RMS WBS "Smart-Coding" scheme, the WFUI is also envisioned to offer significant utility as the foundation for plant systems information, i.e., system design. Simplified system drawings for standard plant types can be used and modified to reflect specific plants. Specific facility nomenclature i.e., names, valve numbers, etc, can be easily modified, and notes attached (see example in Attachment, TWO-3) to individual components, lines, etc for information before, after or during the inspection process.

This system offers great economy-- since once the generic plant design has been laid-out it can be used over and over and tailored for similar plants. In addition to their primary functions -- the same lay-outs can be used for discussions, training, and as the foundation for presentations. (*ABC Flowcharter has a Viewer Program i.e., a royalty-free "Run-Time" program, that can view, manipulate, and print the files created with the main application*). As stated earlier, the WFUI mimic manages the process, but an additional goal is to train the user in the process while it is being used. Hopefully, after using the process for some time, the user will become so familiar with the process and steps that they will have a broader understanding of the inspection process as a whole, and how individual components interface and complement one another.

An example WFUI demonstration using an Advanced Boiling Water Reactor was developed. The directory name is **ABWR**, and the beginning file is named **begin.af3**. Also available is a Tutorial for the WFUI that is accomplished using the Flowcharter itself to run the tutorial. The directory for the tutorial is **tutor**, and the beginning file is named **intro.af3**. Both of these directories/files can be run using the ABC Viewer program. The Viewing program, the necessary DLL files, and demo files are available via "self-extracting" files.

These files are contained withinin **viewer.exe, dllfiles.exe**, **ABWR.exe**, and **tutor.exe**. Put these files in your "root-directory", i.e., **C:\viewer.exe**. Then call up the files as follows-- in Windows go to **RUN** and type **C:\viewer**. Respond yes (Y) to the two queries, and the excecutable will place on your system a directory called C:\VIEWER. Repeat the same for the DLLfiles.exe. To run the Viewer program type **C:\VIEWER\ABC.exe**, then select the directory/files to view i.e., **C:\ABC\tutor\intro.af3** or **ABWR\begin.af3.**

ATTACHMENT TWO-1, WFUI Inspection Procedure Interface



ATTACHMENT TWO-2, Inspection Procedure Example (Point-and-Click interface)

NRC INSPECTION MANUAL **PIPB**

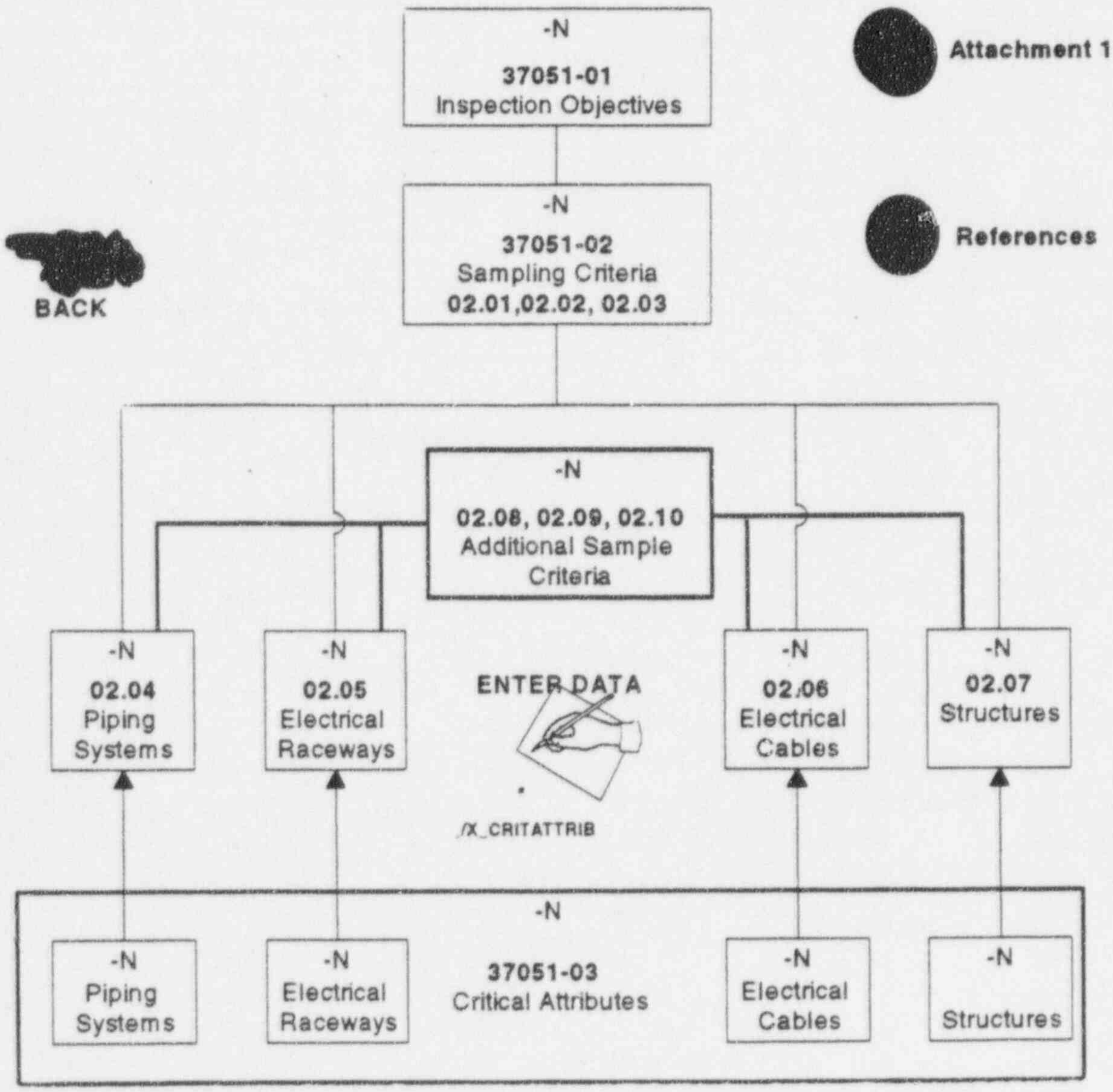
INSPECTION PROCEDURE 37051

VERIFICATION OF AS-BUILTS

PROGRAM APPLICABILITY: 2512

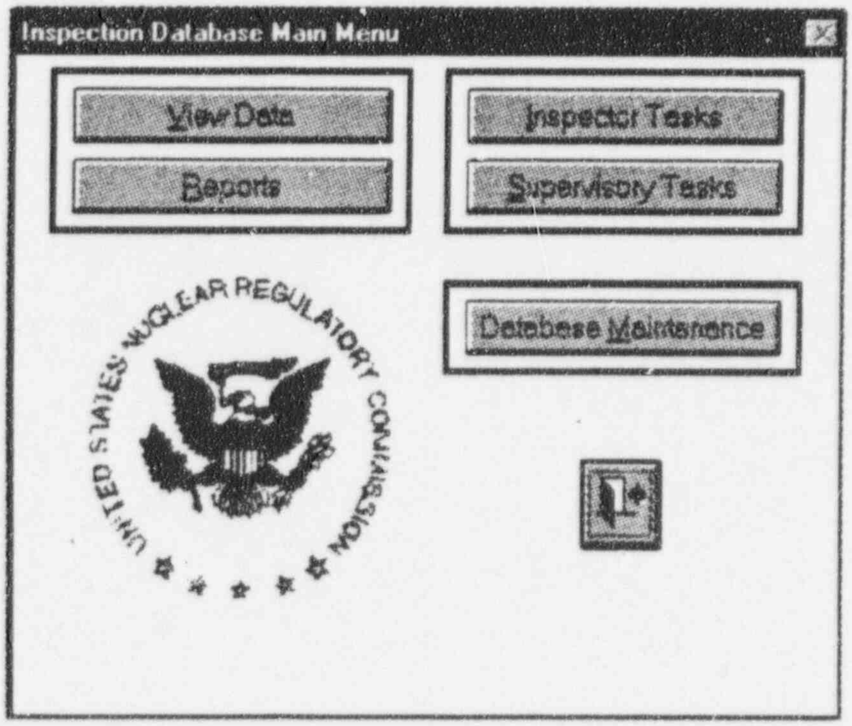
SALP FUNCTIONAL AREA: ENGINEERING

LEVEL OF EFFORT: 80 DIRECT INSPECTION HOURS PER CYCLE



SECTION THREE

DATABASE DESIGN (RELATIONAL)



Conceptual Design: D. Willett
DataBase Design: R. Smoter

Construction Inspection Program Information Management System (CIPIMS) Database Design

Introduction:

Although database design is guided by several norms (rules), appropriate construction still remains some what of an art form. And like all art forms, there are a variety of styles and approaches utilized to accomplish the same ends. Although a database structure may be designed appropriately, it may in fact not be the most practical in use. Reasons for this are many, such as it may lack flexibility to accommodate any future change, or it may operate inefficiently requiring extensive time to function or great amounts of repetitive data storage areas. Many database designers employ rules-of-thumb that they have developed via trial and error, and these are as obvious signatures of their work as are Picasso's and other artists works.

Database designs can also employ and include many features that enhance usability and/or reliability. These include referential-integrity and cascading features for updating or deleting related data fields within or linked to other databases or tables.

Unfortunately, even though you may develop a very satisfactory and efficient database design on paper, it may not work within the confines of the computer database program you have to work with. So there is a constant iterative design/re-design as you attempt to balance the requirements of good database construction with the rules and limits of the computer database program (this is a "tuning-up" process).

In addition to the conditions and restraints already mentioned, this database was designed to interface and integrate with two other software programs. These are a flow-charting program that **can** act as a work flow user interface to input/extract information with the database and/or scheduling/resource management software. The only flowcharting capability currently being used, in conjunction with the database, is to provide the tutorial for the database. In addition it can be used to act as the home page to drive the planning and/or preparation phases of inspections--which is outside the scope of the this project. The SRM and database are currently linked by queries.

Another consideration during database design, as equally important as efficiency and data integrity, is ease of use (user-friendliness). Many pure database programs are cumbersome and/or require a high level of computer expertise to use them reasonably well. This is why many after-market suppliers have developed graphic user interface (GUI) programs to support database input/output/management. Some database programs give up database capabilities to enhance user-friendliness.

Lastly, and as equally important as the previous mentioned considerations, is the ease of database modification to accommodate the user's changing needs. Many database programs require someone with programming capability to effectively implement changes. However, some programs utilize extensive GUI which allows the user to

easily modify the database design (many employ "Wizards" which are templates and cook-book approaches to modifications) to accommodate individual needs.

How the CIPIMS Database was designed:

The CIPIMS Database was designed in three phases by following the classical steps outlined by database and engineering principles. The basic premise was to adhere to first principles as closely as possible in order to develop a solution that could be applied generically. To do this, first the inspection process was modeled by laying out the process steps in sequence (using a flowchart). Once this process was understood, the individual components of each step were identified and analyzed. Then a data dictionary was developed to describe and identify each component of the step along with its expected format (i.e., number, alpha-numeric, counter, text, etc). Then each process step was further defined and uniquely identified (smart-coded) to assure uniqueness, and practical construction relative to the rest. This concluded Phase One.

Phase Two started once the data fields were smart-coded and they were grouped together by function. The resulting data sets (Tables) were then laid onto the process flowchart to further establish and define the set relationships of the data tables (database design is based upon "set theory"). The entities (fields within the data sets) were examined to determine which, if any, contained unique (non-repetitive) data. Fields that contain unique entries are used to form controls for that data set to relate data in other fields of the set to each unique entry in the control field. The control field is called the "Primary Key" (the primary key may however consist of several fields within the set that collective constitute a unique entity- this is called a "Concatenated Key"). If no field in the set contains truly unique data, a record number can be assigned to each row of the set. This record number can be generated by assigning a counter function to automatically assign a unique number to each row of the set. This record number can then becomes the "Primary Key".

With the identification of the "Primary Key" for each table there exists a method to uniquely identify and relate each field within any table to any other field of another table. Once this was accomplished, other data of the nice-to-have nature was also identified and treated in the same manner before including it within the process flowchart model. In addition, sets of data can be separated into static and dynamic data sets to facilitate and speed up data input, and data queries. *(Static data is information that is not expected to change very often such as addresses, etc.)*

The third phase of database development was to establish the relationships between the sets. As stated earlier, this was a iterative process –a constant design/re-design attempt to balance the requirements of good database construction with the rules and limits of the database program. A flowchart identifying the individual components of each step of the inspection process and relationships is included as Attachments THREE-1 and THREE-2a.

Why the CIPIMS Database was designed the way it was:

NRC is developing a revised Construction Inspection Program (CIP) to complement the new and different approaches to licensing plants under 10 CFR Parts 50 & 52. As part of the revised CIP, NRC is developing new methods to administer the program including, the use of computerized databases. The NRC approach to construction inspection will be based upon completion of plant systems. The program's framework will closely follow the plants construction schedule, and will provide the NRC staff with the management tool for planning, conducting, and documenting inspections by plant system, from initial construction, through final testing. The CIPIMS Database was designed to record inspection data with a systematic and quality method to assure data integrity, security, and retrievability.

The database was designed to integrate with and complement two other software applications, ABC Flow-Charter and Primavera SureTrak (see Figure THREE-1) which, collectively, form the Construction Inspection Program Information Management System (CIPIMS). MS ACCESS was chosen because of its compatibility with the other software, and because of its good Graphic-User-Interface (GUI) capability. This eliminated most of the need to do any programming which would have also necessitated significant time and resources to develop detailed user's manuals and guides, on-line help, and training. Instead, the user's manuals and guides, on-line help, tutorial training, and technical support help lines for the system software applications are all available from the software development companies (Microsoft, Micrografx, and Primavera) and are automatically updated when the system software is updated.

Once the construction inspection process was understood and flow-charted, and all the information that was needed at each step of the process was identified, the CIPIMS design basis was essentially complete. Minor additions of the nice-to-have nature continue to be added to simplify and enhance the overall CIPIMS. This includes such items as a cross reference to the NP (nuclear plant) code (two digit [letters]) and NP System Code (two digit [letters] system number) that are used within the Schedule/ Resource Manager (SRM) to code inspection activities.

Dynamic data was separated (as much as possible) from static data to increase the efficiency of the database. Record numbers were used as much as possible to give flexibility to the database design and to make it easier to modify the database later on. In addition, the design focused on structuring the database so that referential integrity could be maintained, and cascade forward updates or deletions could be accomplished. Additional rules for data relationships within and between tables were incorporated to facilitate Form Design and database input. (*The tables, fields, definitions, and rules for data relationships, are contained within the database in the data dictionary.)*

Database Dictionary of terms, source and use, and rules:

The database dictionary of terms, source and use, and rules have also been included in the CIPIMS Database to assist and inform users. The database was configured to provide easy public access to the information while maintaining database security/integrity. Database access is facilitated by using royalty-free software so that users do not have to purchase either the viewing software or database software in order to access or use the database. Attachment THREE-3 is provided as an example of how a similar "smart-coded" database design would interface with the Schedule/Resource Manager.

When it is time to put the CIPIMS in to operation it will be prudent and practical to put the database into a SQL Server database. This makes the database "Bullet-Proof" because the database is still manipulated using MS ACCESS, and if the system "crashes" for any reason while the database is open, the database will not be corrupted because SQL does not modify the data unless and until it is saved in a "Transaction Table" first. This transaction table also keeps a log (record of changes & date) of all the changes so that you can go to and recover any previous data version by date. Another major advantage of having the database mimicked in SQL is that SQL format is compatible with all other database systems including the INTERNET and SRP database. The costs for this conversion are about $100 to purchase a MS ACCESS "Up sizing Tool" part # 077-051-455 (order 1-800-451-4239) that can save MS ACCESS files to SQL (migrate the data structure to SQL), and about $2500 for the SQL database program (multi-user MS SQL Server).

How the CIPIMS Works:

Data Table Design: Primary Key Determination

Primary keys were carefully selected and record numbers were used as much as possible in relationships between tables to give flexibility to the database design, and make it easier to modify the database later on. "Concatenated Keys" (a primary key consisting of several fields within the table that collective constitute a unique entity) were not used in relationships between tables because MS ACCESS will not allow a concatenated key to be the primary key in a relationship with another table ***and also*** maintain referential integrity.

MS ACCESS will not index record numbers (create a map of where the data is located on the disk to speed-up access) nor will it allow a relationship between a record number and a data type field in another table that is other than a long-integer. Therefore, when establishing primary keys and/or relationships for the CIPIMS Database, record numbers are used in relationships with long-integer fields that are identified in the CIPIMS Database design schema as "Related" field (Rel_??). Attachment THREE-1 depicts how one table is related to another table using the record number and the related field.

Just how this works is difficult to visualize, and may become clearer later on in the discussion of database form design and use. But for now, just focus upon the fact that the database knows the relationship between the record number from one table and the related record field in another table, and the database knows the relationship between the record number field and the other fields in its table. The use of record numbers is a round-about-method for establishing data table relationships, but it compensates for some limitations and restrictions of MS ACCESS.

Reference Tables:

Reference tables are used to overcome many-to-many relationships between tables. Many-to-many relationships prevents referential integrity and thus significantly reduces the confidence in the data integrity. The inspector qualifications table (in Attachment THREE-2a) is an example of a reference table. Note that in the Inspector Qualification Table there are two fields that corresponds to one field in the Inspection Type Table (Qual_Code_Type_No), and one field in the Inspectors Table (Insptr_RITS_ID). This database schema overcomes the many-to-many relationship between the inspectors and their qualifications (since each inspector may have several different qualifications). (NOTE-- A table set up with inspectors in one field (column) and qualification in another corresponding field (column) would show duplicate names and qualification records in each column. Even though, collectively, their would be no duplicates, MS ACCESS will not allow us to establish referential integrity because the table would require a concatenated "Primary Key" using two fields in the same table.

Relationships:

The key relationships are somewhat self-explanatory as they follow (since they are based upon) the inspection process, and the relational tables and concept has been previously explained.

The inspection process is layed out in Attachment THREE-1, the Database Flowchart, and the relation of the individual steps is further depicted in Attachment THREE-2a, Database Relationships. Inspections are all completed using an inspection procedure. The procedure contains inspection criteria called critical attributes. The critical attributes identify sample area and size/numbers. The logic is as follows: one inspection procedure can have many critical attributes... each critical attribute can have many samples.. each sample can have many exceptions. The logic is the same for ITAAC's because there is a relationship between the ITAAC criteria and inspection procedures. Plant Systems are related to the many ITAAC's and Critical Attribute Samples. Milestones are related to many Plant Systems. Inspectors are related to many critical attributes, and Exceptions are related to Reports.

Referential-integrity:

Referential integrity is essential to ensure accurate imformation is maintained in a ddatabase. During design and development of the CIPIMS, Referential Integrity was an important consideration because of the nature of the inspection process being modeled and the importance of data accuracy. Briefly, what referential integrity implies is that there could not exist (in the database) a finding or exception that cannot be traced to the sample, the inspector, the criteria, the inspectors qualifications, etc. Additionally, this feature prevents deletion of data that is part of this chain.

Cascading Update / Deletion:

A component of referential integrity provides for "Cascade" updating or deletion of data. What Cascade means is that if, for example; a category like "violation" is changed to "deviation" -- everywhere in the database where the violation category is used it will be changed to deviation. When an entry is made into a table such as Critical Attribute a corresponding Sample ID is generated. This Sample ID is automatically cascaded-foreward into the Exception Table. Likewise if a sample is deleted... all of the related information is deleted also. This precludes information in the database like an exception that has no history or trail to what generated it.

Data form Construction:

Main Form:

Database inpuy/output forms were generated to provide a graphically friendly method to input and view database information. One form can be used to input and view information in several tables at one time. In addition, you can easly set-up the form (because of the relationships inside of the table) to select one field in the table but out-put a related field in the same table into another table.

A usefull feature of MS ACCESS when using forms is that you can set up rules, and parameters when in the forms mode that are different (but not conflicting) with those establised when the tables were set up. For example: you can establish a rule in the forms mode that you cannot have an entry in the Critical Attribute Exception Text field (CA_Excep_Text) unless there is an entry in the Critical Attributes Assessment field (CA_Asses).

Subforms:

Subforms are those which are included within a main form. It is possible to generate a form that has a main and subform part, and then include it as a subform in another form (i.e., you would have three form sections in one form).

Combo-boxes:

For ease of data entry, **and** to insure that the data entries are of the correct type, combination boxes are used in the forms. This allows rapid input of data by simply ponting and clicking on the desired input. This also displays all possible input options, and keeps from miss-keying information as all of the allowed choices have already been typed.

Data Queries:

Data and cross-tab queries are accomplished visually by query by example. The user can develop whatever combination they desire. Common queries have been developed for repetative or periodic type data reports. These are in the database query table. The common queries that are to be included with the CIPIMS are those to be used to generate the management reports and the inspection reports. Other queries will be created by the user if the user is knowledgeable in Access or through a request to a CIPIMS system administrator.

Reports:

Report Design:

All reports, are formated in the MS ACCESS report mode, much the same way forms are designed, including the monthly Inspection Report which can also be formated in WordPerfect. All reports have a filter capability, that allows the user to selectively identify and sort the information for the desired report.

To convert MS ACCESS data to Word Perfect reports can be done by: saving the report (output option under File) in ACCESS as: Rich Text Format (.rtf), and then retreiving the file in MS WORD and saving the MS WORD file as a Word Perfect Document. However, this method generates an extreme amount of pagination information so that any attempt to edit the information, either in WORD or Word Perfect, is extremely challenging.

To overcome this difficulty, one approach that could be used is to format the reports in Word Perfect and then use the Word Perfect Merge Function to bring in the MS ACCESS database information. The method to be used includes using Word Perfect (6.1) to establish a "LINK" to the database using open database connectivity (ODBC) software. Select "Establish Link" and then "Data Source Type".

Initially, there were some difficulties experienced in WP for this ODBC link. These problems were eliminated by purchasing and installing "Version 2" of the Microsoft ODBC Desktop Database Drivers ["Fulfillment Kit", part number 273-054-030, Microsoft sales at 1-800-426-9400 for $ 5.00 + $ 5.00 for shipping.]

The ODBC Version 2 does not require a license and is distributable (the Version 1 was licensed because of a PARADOX Software interface component).

Unfortunately, when using ODBC to bring MS ACCESS database information into Wordperfect as a table there does not seem to be a straight foreward way to be able to set the table up in WP so that it does not exceed the right margin (theryby loosing data). To overcome this obstacle, we have resorted to the following steps.

Numerous attempts were made using several different approaches to convert MS ACCESS data into a readly editible WordPerfect format. A "brut force" approach was finally taken before it was discovered that there were easy work-arrounds to the problems of using ODBC directly with WordPerfect. A couple of unsurmountable problems surfaced during development of several approaches. MS ACCESS; 1) does not allow any sub-report output (e.g., for a monthly report of inspection activities, findings would be a sub-report to an activity.), 2) the ASCI output function limits the character length, based upon font size & type. The brut-force approach was to generate 12 pages of computer code, that along with a WordPerfect MACRO collects and distributes the data into the merge-fields of a editable WordPerfect "Boiler Plate" Document.

When using ODBC, depending on table field size and/or the number of fields within the table, a table is often created that exceeds the WordPerfect page and column widths. The table and field sizes can sometimes be adjusted to acceptable dimensions while in WordPerfect, but each time the report is run the settings return to the MS Access defaults. The work-arround for using ODBC:

1) Make smaller tables, and do the query of MS ACCESS in WordPerfect by linking to the Query in MS ACCESS (It was only recently learned that WP could ODBC link to an MS ACCESS query. Previous approaches used a query generated in MS ACCESS which generated a table based upon this query, and then WordPerfect was ODBC linked to this query table).

2) Bring in several tables and place them side by side if necessary.

3) Use a WP MACRO to preset the table column widths.

This makes the reporting from MS ACCESS to WordPerfect relative simple and straight foreward.

Configuring your system to run the WP connection to Access tables, and for Using the WP macro

There are two WordPerfect files associated with the WordPerfect report function:

1) CIPIMS.WCM - A WordPerfect macro that generates the report.

2) CIPIMS.WPD - A WordPerfect boilerplate document file that defines the report layout. (This boilerplate contains the merge fields for the data from MS ACCESS)

Copy the two WordPerfect files to any directory. Just remember where you put them (I put them in a subdirectory "C:\Access\Cipims\WPFiles"). The first time you run the WordPerfect report feature, it will ask you specify the location of these files. At the first run, CIPIMS remembers where they are and only asks for the locations again if it can't find them. One other thing to keep in mind - After the WordPerfect report is generated, the report is saved as "<inspection report number>.WPD" (e.g., "96-01.WPD"). The file will be saved to same directory that CIPIMS.WPD is located. So, where you put CIPIMS.WPD controls the destination path of all WordPerfect reports created.

Integration With Scheduler / Resource Manager (SRM):

..nporting Info & Exporting Info:

OBDC (Open DataBase Connectivity) and BTRIEVE files are used to import information from the SRM to the database and to directly edit SRM project data files. The following describes how to use MS ACCESS with SURETRAK: (Btrieve file BTRV110A.DLL and BTRV200.DLL belong in the Windows/system subdirectory (available from the Microsoft public access directory at HTTP//WWWMicrosoft.com), are installed automaticaly during the installation of the runtime application). The following steps outline the method used to generate the Sample SRM files. The GE ABWR design was used as an example for this prorotype. When necessary these same steps can be performed to create new SRM files for different reactor designs.

1) Use NOTEPAD (or some other text editor) and modify the STWIN.INI file in the WINDOWS directory as follows:

   [DDFOptions]
   NoDDF=0
   ActivityCodes=1
   CustomDataItems=1
   Advanced=0

2) **After restarting** SURETRAK, save the SURETRAK Project in the P3 file format.

3) When the Update Data Dictionary dialog box appears.. choose yes (accept the default settings [which you established in 1 above when you editited the STWIN.INI file]). This creates two files; FIELD.DDF and FILE.DDF which are required for MS ACCESS to open project files. The .DDF files are created in the current project directory (usually \STWIN\PROJECTS).

4) Quit SURETRAK and start MS ACCESS.

5) In ACCESS Choose the database you want the SURETRAK data to be in.

6) Choose ATTACH TABLE under FILE. When prompted for the SOURCE of data – select Btrieve.

7) When prompted for the location of the DATA SOURCE files... enter the directory where the FIELD.DDF, FILE.DDF, and SURETRAK project files are stored (usually \stwin\projects), and select OK.

8) When you are prompted for the file you wish to *ATTACH* to your MS ACCESS database... select the desired file and click attach. Repeat as necessary.

The files you can attach are listed with the four-character project filename plus three characters that identify the contents of the files. The following is a brief listing of the kind of information you will find in the different project files:

????ACT:	Activity Information
????DTL:	Activity Code Dictionary Information
????REL:	Predecessor/successor relationship information
????RES:	Resource Assignments
????STR:	WBS structure
????RLB:	Resource Dictionary Information
????WBS:	Activity WBS assignments
????ACC:	Cost accounts (Supported by P3 not SURETRAK)
????ATT:	Custom data items (Supported by P3 not SURETRAK)
????LOG:	Activity log records (Supported by P3 not SURETRAK

You can use MS ACCESS as you would normally do to create custom reports. You can make changes to data such as descriptions, durations, calendar IDs etc. Generally, you should not change calculated information (such as early start and finish dates). Any changes you make using MS ACCESS will be saved to the SURETRAK project files.

To make the Inspection Program truely "Schedule-Driven" the Project Management Activity smart-code from the SureTrak project management software is broken down into its component parts ("PARSED") along with the corresponding planned activity start, end date, and resource. This data, which is BTRIEVE linked (refer to Figure THREE-1) to the Construction Inspection Relational Database, generates a inpection record for each identified activity, and fills in the Activity ID (Proj_Mngmt_Activity code, resource, planned begin and end dates. Refer to page 590 of the MS ACCESS 2.0 manual for further information on the parse capabilities (or search the Microsoft knowledge based articles at FTP.Microsoft.com – look at Q100135 and/or Q115915). The data is parsed via a query which returns and distributes the string information into a database table/fields that has pre-established relationships with other database tables/fields.

Converting Database Info:

MS ACCESS can export information to a great variety of formats as well as import from many formats. For a similar project, the develoment team has utilized the Microsoft ACCESS for Windows Upsizing Tools (MS product ID # 077-051-455, $ 99.85, available from 1-800-451-4239). The upsizing tool allows you to migrate a MS ACCESS database to an SQL format. What this realy means is that the database and relationships are recreated in an SQL format. Unfortunately this is not as straight foreward as it sounds because there are several significant differences between SQL and MS ACCESS. First SQL does not recognize counter data type, second SQL does not enforce referential integrity, and ACCESS allows characters in variable names that SQL does not. You must rename your variables or use aliases. SQL can use triggers to overcome some of these difficulties but this requires writing computer code and an intimate knowledge of SQL.

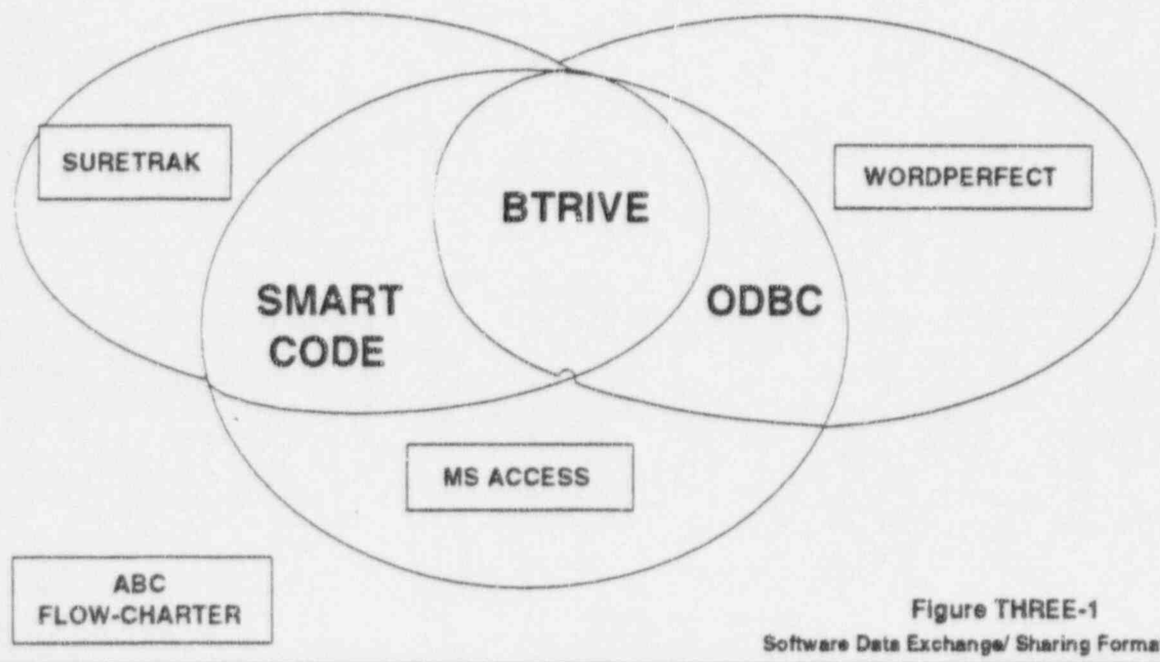


Figure THREE-1
Software Data Exchange/ Sharing Formats

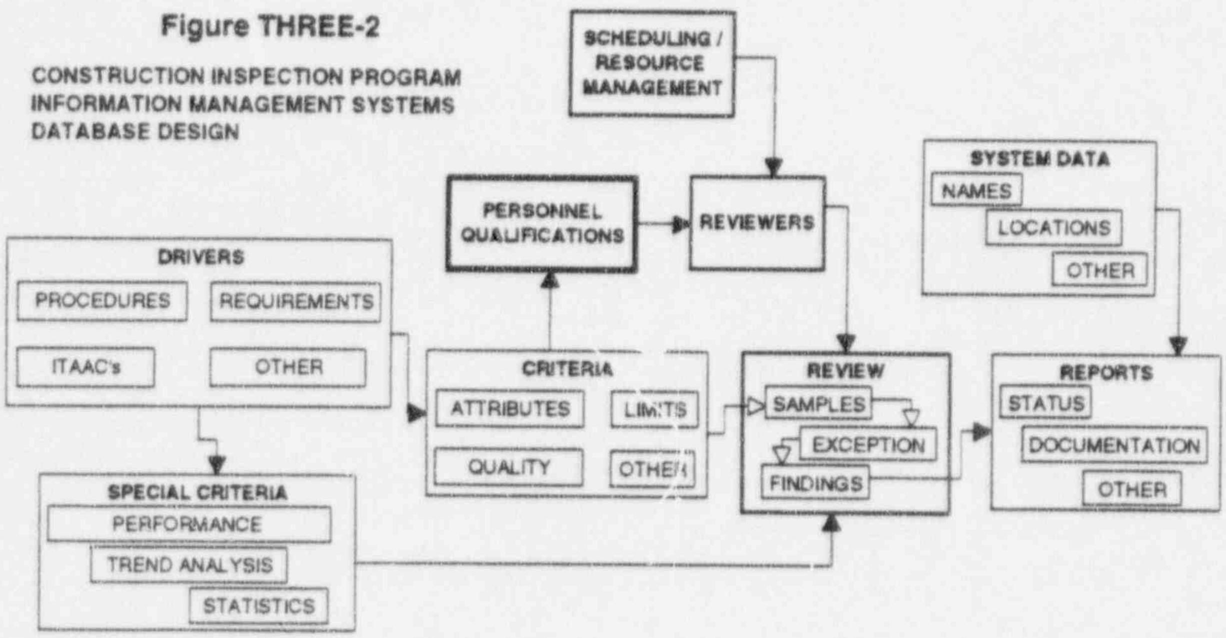
The way the previously mentioned project upsized the MS ACCESS database was to overcome these problems by SQL coding. This project labored to keep the SQL and MS ACCESS Databases syncronized so that the same forms could be used when attaching to either database type. This has the advantages in that individuals or groups can, at the same time, run their own copies of the same database (in MS ACCESS) in addition to the SQL datadase, to manage their individual work or group activities-- and this can be accomplished either on individual PC's . or network shares..

Alternate ITAAC Approach

The initial design (Attachment THREE-2a) of the ITAAC related tables currently duplicates the structure of the non-ITAAC inspection related records below the procedure level (ITACC and "non-ITACC" inspection records share the same Procedures table).
It is assumed that "non-ITAAC" inspections will be used to satisfy ITAAC inspection cycle requirements. The current NRC inspection procedure scheme does not provide any cross-reference between the the standard inspection program criteria and ITAAC inspection requirements/criteria (Provisions have been made for them to share the same Procedures table). The following (Figure THREE-3) illustrates an alternate approach (simplified scheme which was used for the final design) to the inspection data base structure regarding ITAAC items. This structure replaces four tables (ITAACs, ITAAC_Insp, ITAAC_Samples, and ITAAC_Exceptions) with one ITAACs table and two cross-reference tables (Attachment THREE-2b)

Figure THREE-2

CONSTRUCTION INSPECTION PROGRAM
INFORMATION MANAGEMENT SYSTEMS
DATABASE DESIGN



In this model all ITAAC items are verified by performing inspections documented in a single set of inspection records. All ITAAC items would be loaded at one time prior to starting construction inspections for a specific project. The source of the data is the ITAAC portion of the Design Control Document associated with the certified design being constructed. At the time of loading the ITAAC items, inspection procedures would be selected that relate to the ITAAC item (these relationships are recorded in the ITAAC_IP_Xref table).

It is not expected that every critical attribute for every procedure inspection cycle would always be related to verification of an ITAAC item, even if the associated inspection procedure is also related to an ITAAC item. Relationships to specific inspection activities (critical attributes associated with specific inspection cycles) are related to the ITAAC

items as inspection records are created. These relations would be established as inspection records are initiated by the project management software. When an inspection record is created, ITAAC items that reference the same inspection procedure as the inspection activity would be displayed. The user would then select those ITAAC items, if any, that are related to that specific inspection activity (of course, the application would also allow adding or deleting these relationships outside of inspection record creation time). These relationships between inspection activities and ITAAC items are recorded in the ITAAC_Insp_Xref table that cross-references the ITAACs table and the Insp_CritAtts table. It should be noted that this model also results in exceptions, findings, and inspection report records being related to specific ITAAC items through the relationship established with Insp_CritAtts table.

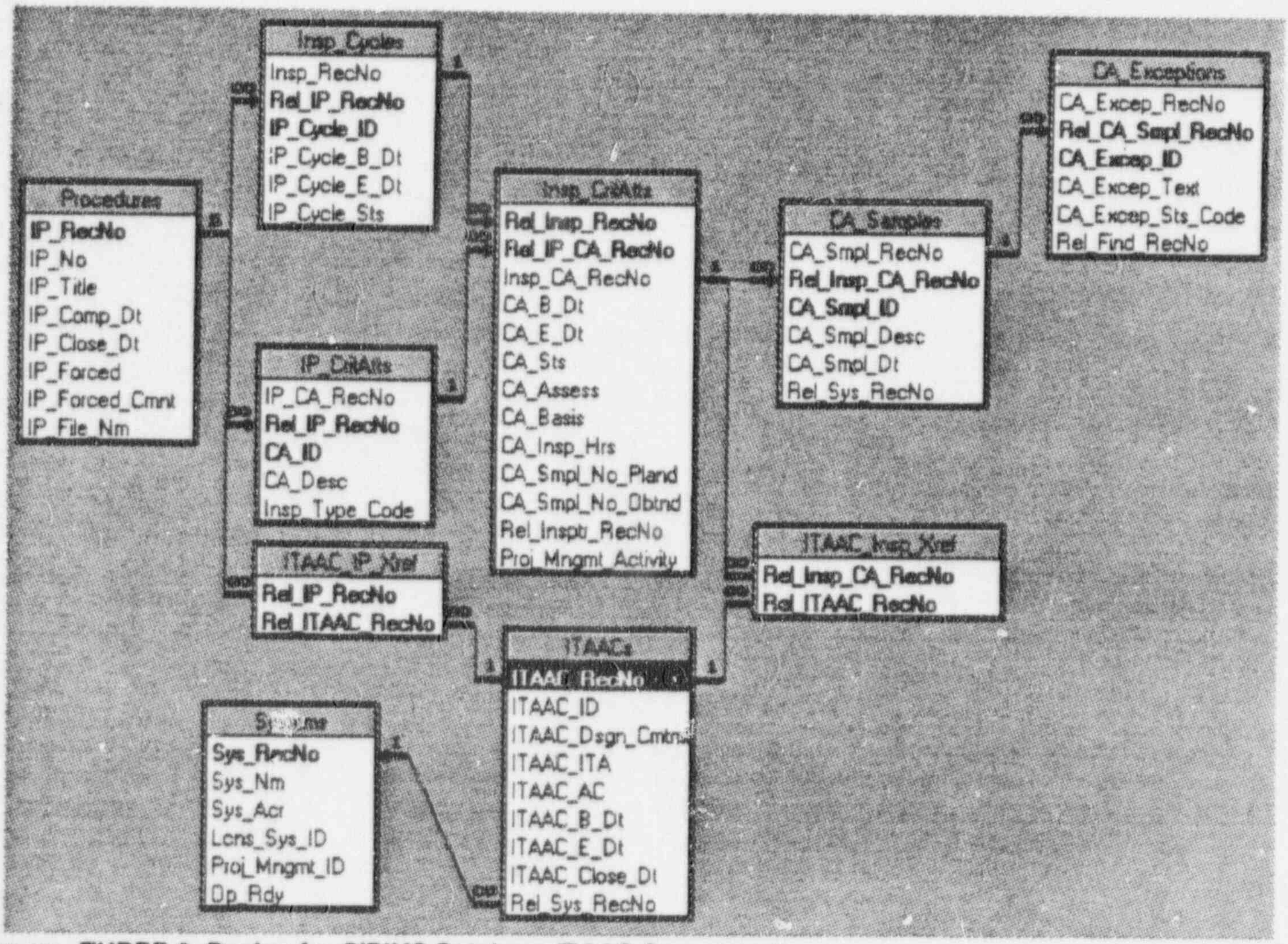


Figure - THREE-3. Design for CIPIMS Database ITAAC Component

Please note that any type of inspection activity (special, team, augmented, etc) could be substituted inplace of the ITAAC inspections and the current database and structure would support these activities equally well -- with only minor name changes.

Setting up & running the MS ACCESS Database as a "Run-Time" application:

The database can best be utilized by placing the database on a network "server" and then accessing this database from individual workstations. The way this is accomplished is by installing the database forms, on the individual workstations, as attachments to the database on the server. This configuration allows multiple concurrent database access.

A "Run-Time" version of the database can be generated using the MS ACCESS Developers Toolkit[1]. This must be generated using Windows 3.1 and not Windows 95 because if Win 95 is used it will replace the following Windows 3.1 system files with Win 95 equivalents (from MS Document Q130399):

COMPOBJ.DLL	OLE2.DLL	OLE2.REG
OLE2DISP.DLL	OLE2NLS.DLL	STDOLE.TLBx
STORAGE.DLL		

Once the Run-Time" application is compiled in Windows 3.1 it will run on a WIN 95 PC. When generating the "Run-Time" application a setup screen (Shell) must be generated because the main menu does not come across in the run-time version. To do this, set up the screen for the user to access different forms, tables, etc. To access the setup screen when the program is first started -- include an autoexec macro pointed to opening the setup screen. (It is important to remember when using the Developers Toolkit, that everything must be in or generated to the C: drive.) (Additionaly, the ACCESS 2.0 Service Pack (upgrade) should be installed to minimize subsequent problems)

The "Run-Time" application can be installed on a server and accessed from a workstation. This is accomplised by copying the setup disks to the server and then running setup.exe from Disk 1. **The command is SETUP /A**. This command is an *administrative setup*, and will setup the database so it can be accessed from workstations— but it will not run the application on the server. You then need to go to a workstation and setup to run either the entire application **OR** the workstation link to the database. To do the setup... from your directory c:\ type: (server drive id)setup. The program will give you the choice of complete or workstation setup.

<u>Setting Up the DataBase on a network share</u>:

There are two files: 1) insp_dat.mdb and 2) insp_usr.mdb. insp_dat.mdb contains the tables and data, insp_usr.mdb contains forms, queries, etc (the user interface). There

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[1]Be sure to install VSHARE.386 to your system directory. Insert MS ACCESS disk 4 and type Decomp A:\Vshare.38_ C:\Windows\SYSTEM\VSHARE.386

The connection of the CIPIMS database to the SureTrak BTRIEVE files (as attachments) is accomplished during the setup and installation of the CIPIMS when it is first run. These files should reside on a share that all users can access. They are included in a self-extracting file named Projects.exe (which includes file.ddf and field.ddf)

When the Run-Time application of CIPIMS is installed it puts a line in the BTRIEVE section of the WIN.INI file located in the WINDOWS directory. If MS ACCESS has been previously installed on the PC, the WIN.INI will look like the following and you will get an error (ERROR 3221, Invalid entries in [BTRIEVE] section of WIN.INI) when trying to connect to the FILE.DDF file for the first time. (This problem is documented in the Microsoft Knowledge Base under Q94827, Q121650, and Q122246)

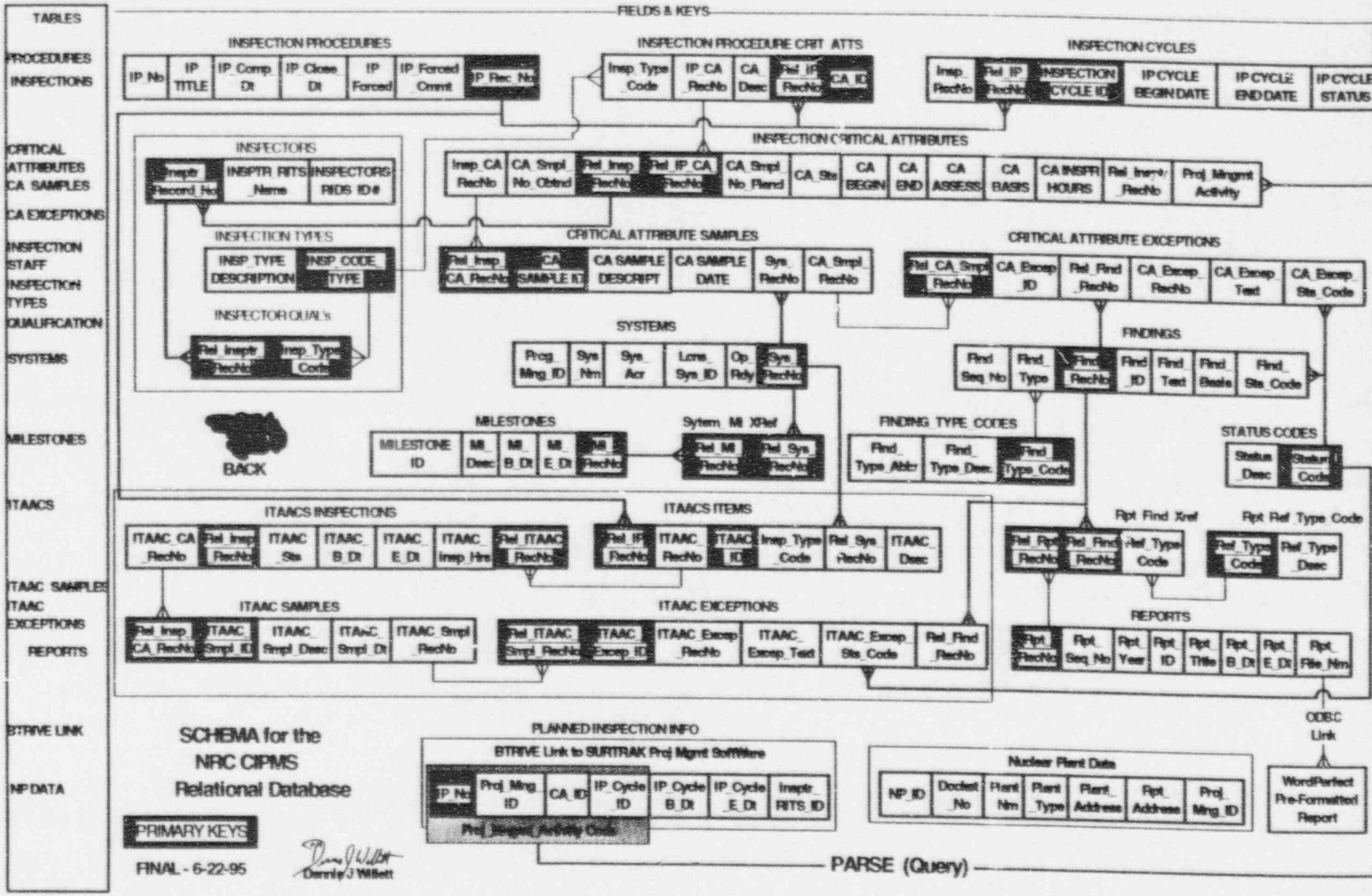
[BTRIEVE]
options=/M:64/P:4096/B:16/F:20L:40/N:12 /T:C:**ACCESS**\BTRIEVE.TRN
access_options=/m:64 /p:4096 /b:16 /f:20 /l:40 /n:12 /t:C:\CIPIMS-A\BTRIEVE.TRN

Change theWIN.INI to read as follows, and restart the PC after saving.

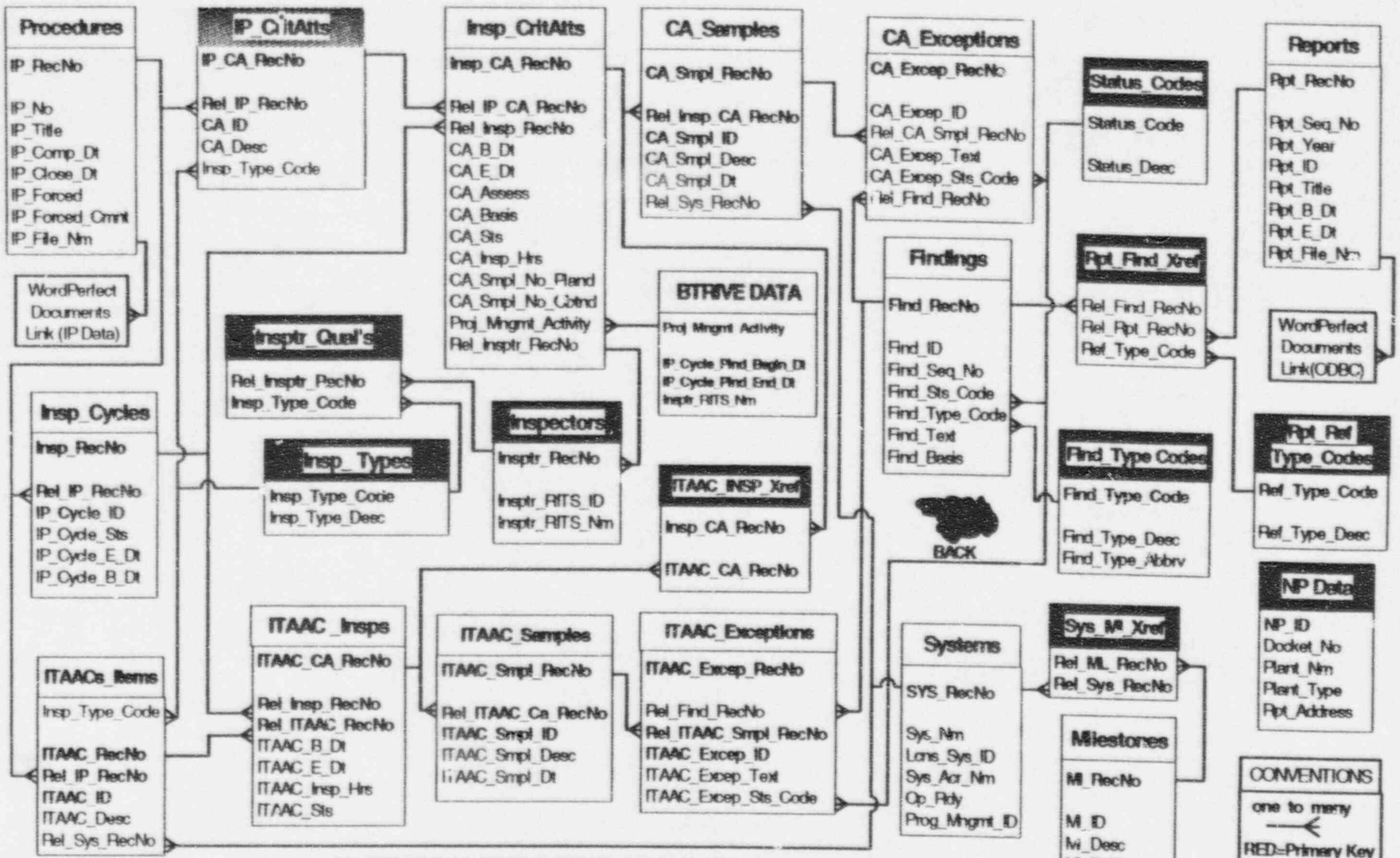
[Btrieve]
options=/M:64/P:4096/B:16/F:20L:40/N:12 /T:C:**CIPIMS-A**\BTRIEVE.TRN
~~access_options=/m:64 /p:4096 /b:16 /f:20 /l:40 /n:12 /t:C:\CIPIMS-A\BTRIEVE.TRN~~

(I.e., replace (under options=) ACCESS with CIPIMS-A, and delete the access_options line.)

ATTACHMENT THREE-1, DATABASE FLOWCHART



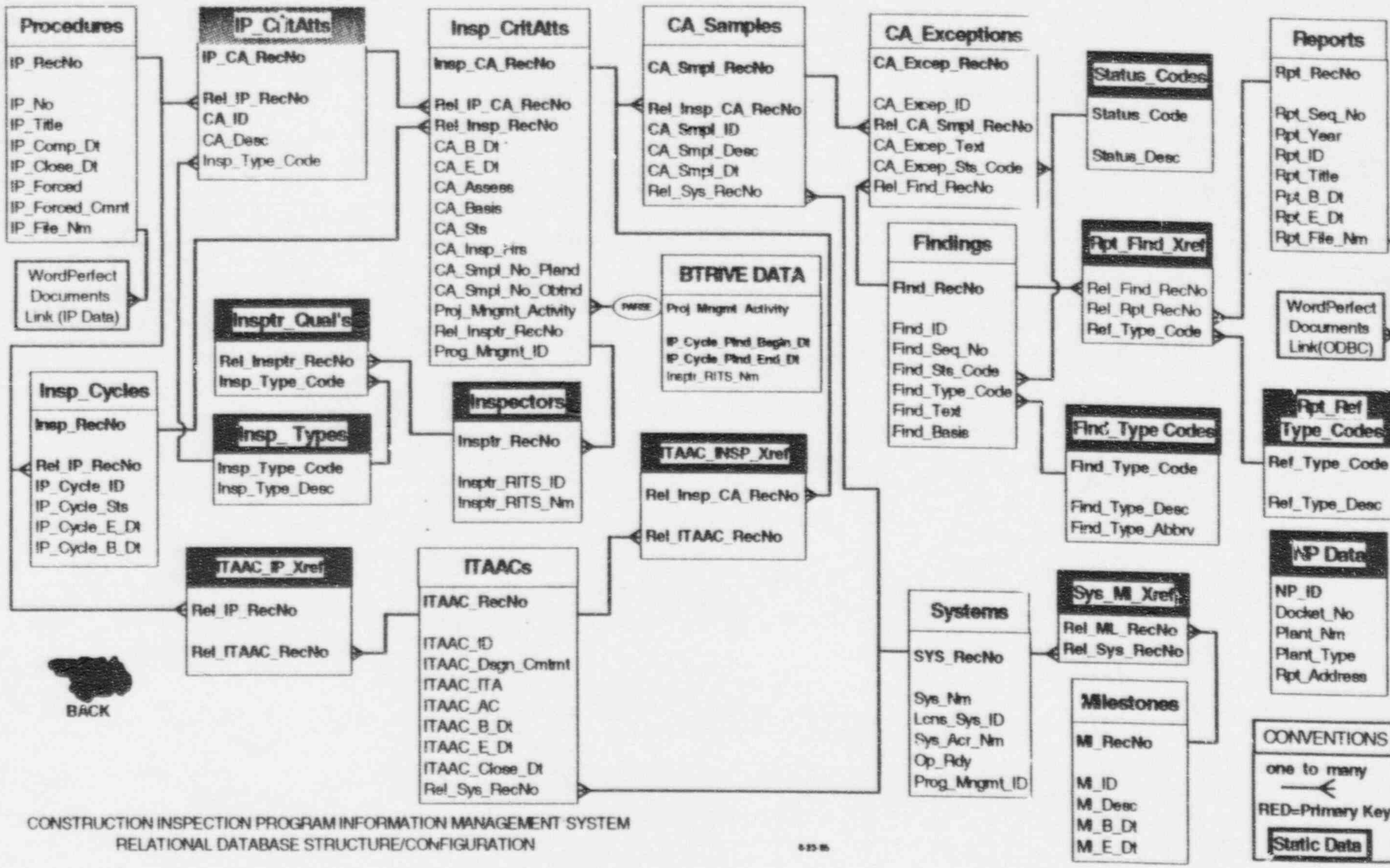
***ATTACHMENT THREE-2a, DATABASE RELATIONSHIPS*-Initial Design**



CONSTRUCTION INSPECTION PROGRAM INFORMATION MANAGEMENT SYSTEM
RELATIONAL DATABASE STRUCTURE/CONFIGURATION

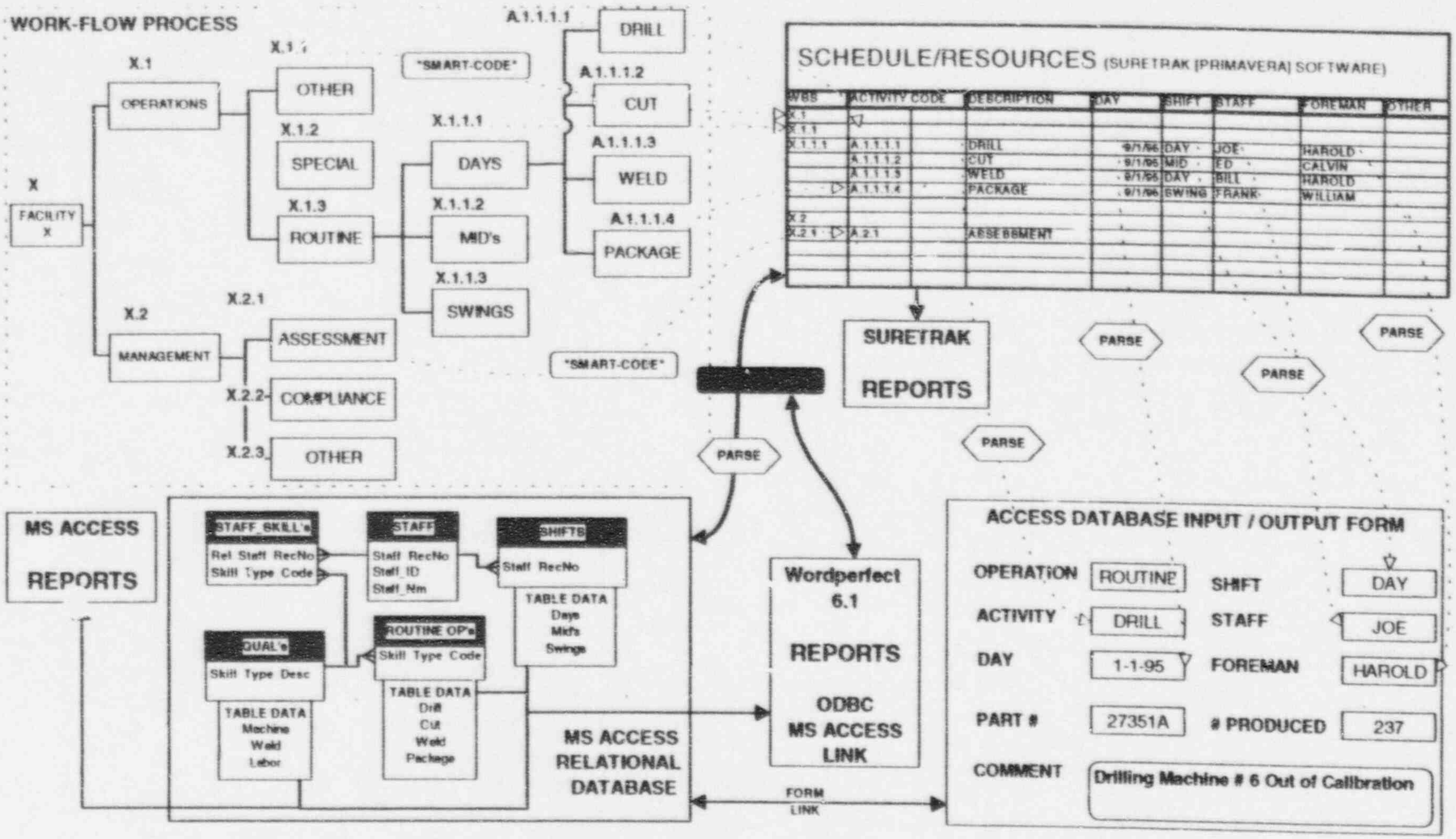
6-23-95

ATTACHMENT THREE-2b, DATABASE RELATIONSHIPS-**Final Design**



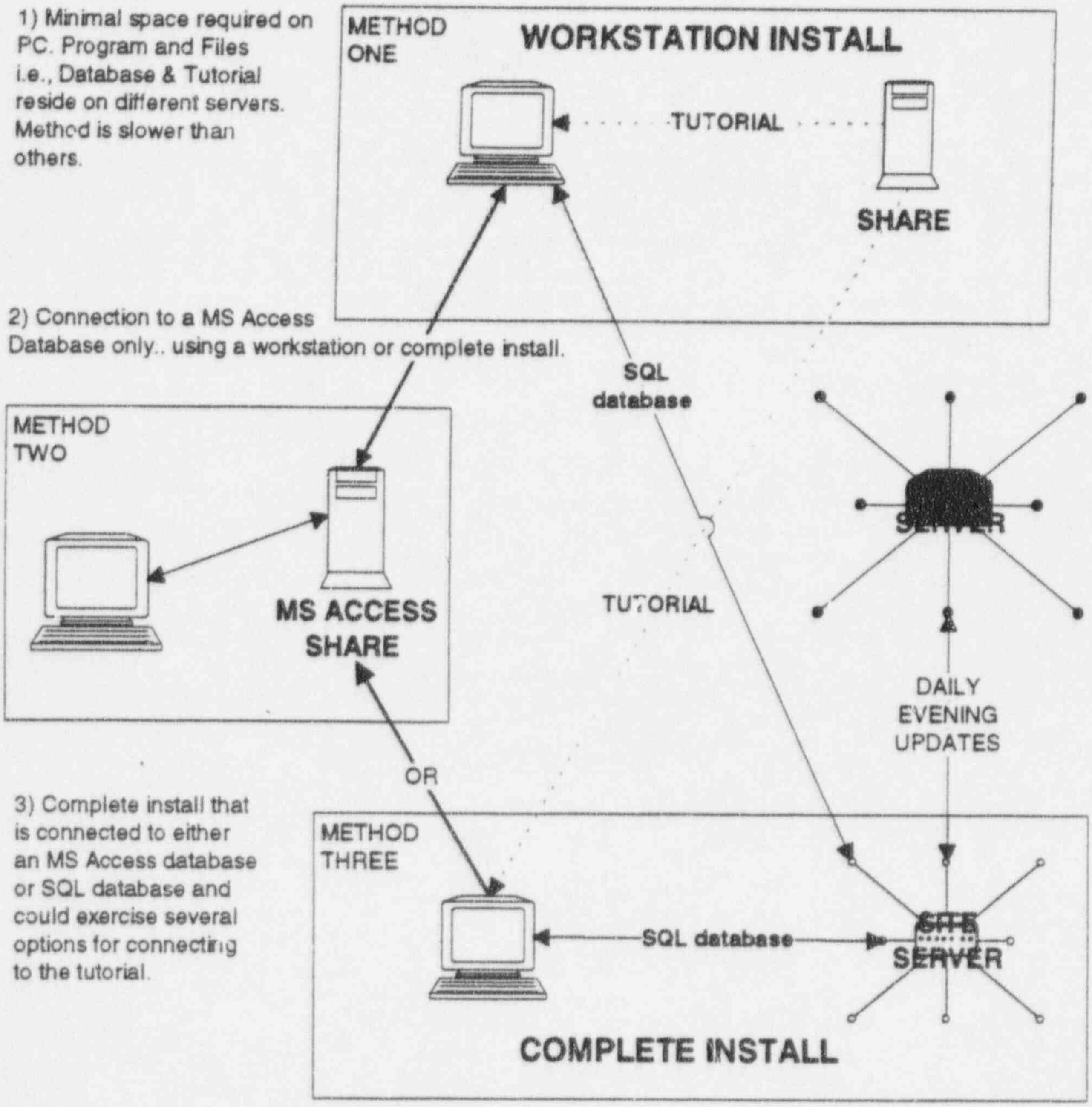
CONSTRUCTION INSPECTION PROGRAM INFORMATION MANAGEMENT SYSTEM
RELATIONAL DATABASE STRUCTURE/CONFIGURATION

ATTACHMENT THREE-3, DATABASE INTERFACE WITH SCHEDULER / RESOURCE MANAGER (EXAMPLE)



APPENDIX - A

CIPIMS INSTALLATION SCHEME'S



Appendix - A: User Installation Guide

General:

The database and forms are two separate entities. This allows the user to connect to different databases using the same forms. The database may be an MS ACCESS Database or a SQL Database.

For the Complete Install, the forms are installed on the PC while the database resides on the server/share. For the Workstation Install, the database connections are the same except the forms reside on a share and are accessed by the PC... obviously this is slower.

The recommended connection for the tutorial is on a share.. since it is believed that after initial use it will not be accessed often.

The CIPIMS "Run-Time" application can be installed from a share or disks. To install from a share a Network-Install must first be run. This is accomplished by copying the run-time disks to a network share and doing a "Administrative Install" the format for this is : C:\setup.exe\CIPIMS_/A.

Subsequently, Complete or Workstation installs can be accomplished from the file generated by the Network Install. The format for this is: C:\setup.exe.CIPIMS. The setup program will give you the option for a Complete or Workstation install.

Specific: Setting Up the DataBase on a network share:

There are two files: 1) insp_dat.mdb and 2) insp_usr.mdb. insp_dat.mdb contains the tables and data, insp_usr.mdb contains forms, queries, etc (the user interface). There should only be one central copy of insp_dat.mdb regardless of the number of database users. A copy of insp_usr.mdb goes on individual workstations or the network share.

The connection of the CIPIMS database to the SureTrak BTRIEVE files (as attachments) is accomplished during the setup and installation of the CIPIMS when it is first run. These files should reside on a share that all users can access. They are included in a self-extracting file named Projects.exe (which includes file.ddf and field.ddf)

When the Run-Time application of CIPIMS is installed it puts a line in the BTRIEVE section of the WIN.INI file located in the WINDOWS directory. If MS ACCESS has been previously installed on the PC, the WIN.INI will look like the following and you will get an error (ERROR 3221, Invalid entries in [BTRIEVE] section of WIN.INI) when trying to connect to the FILE.DDF file for the first time. (This problem is documented in the Microsoft Knowledge Base under Q94827, Q121650, and Q122246)

[BTRIEVE]
options=/M:64/P:4096/B:16/F:20L:40/N:12 /T:C:**ACCESS**\BTRIEVE.TRN
access_options=/m:64 /p:4096 /b:16 /f:20 /l:40 /n:12 /t:C:\CIPIMS-A\BTRIEVE.TRN

Change theWIN.INI to read as follows. and restart the PC after saving.

[Btrieve]
options=/M:64/P:4096/B:16/F:20L:40/N:12 /T:C:**CIPIMS-A**\BTRIEVE.TRN
~~access_options=/m:64 /p:4096 /b:16 /f:20 /l:40 /n:12 /t:C:\CIPIMS-A\BTRIEVE.TRN~~

(i.e., replace (under options=) ACCESS with CIPIMS-A. and delete the access_options line.)

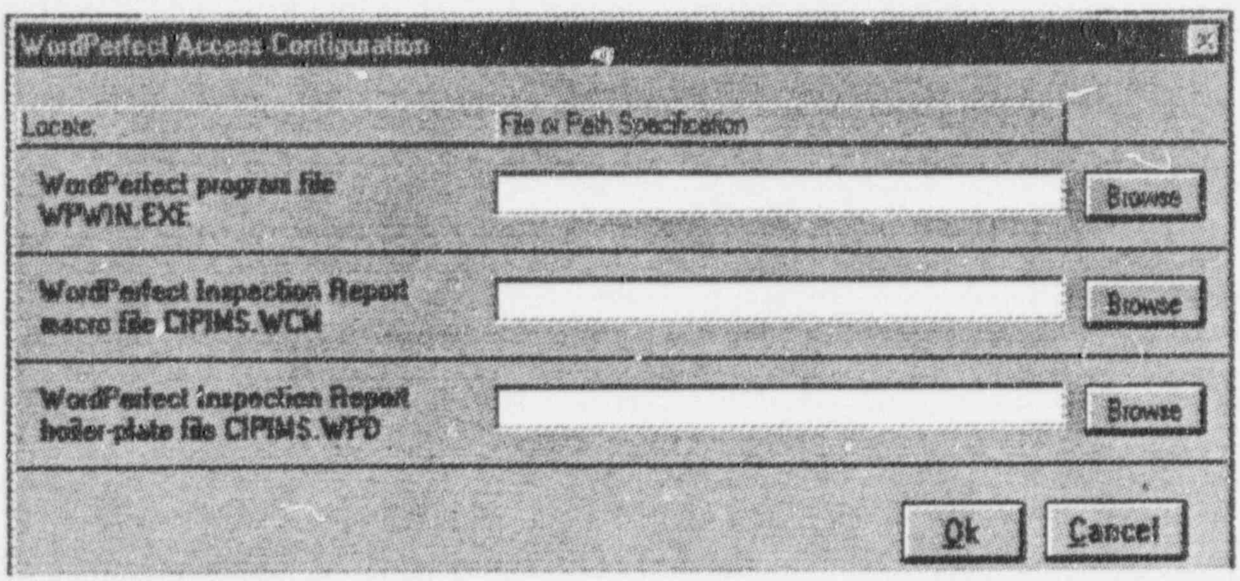
Configuring your system to run the WP connection to Access tables, and for Using the WP macro

There are two WordPerfect files associated with the WordPerfect report function:

1) CIPIMS.WCM - A WordPerfect macro that generates the report.

2) CIPIMS.WPD - A WordPerfect boilerplate document file that defines the report layout. (This boilerplate contains the merge fields for the data from MS ACCESS)

Copy the two WordPerfect files to any directory. Just remember where you put them (I put them in a subdirectory "C:\Access\Cipims\WPFiles"). The first time you run the WordPerfect report feature, it will ask you specify the location of these files. At the first run, CIPIMS remembers where they are and only asks for the locations again if it can't find them. One other thing to keep in mind - After the WordPerfect report is generated, the report is saved as "<inspection report number>.WPD" (e.g., "96-01.WPD"). The file will be saved to same directory that CIPIMS.WPD is located. So, where you put CIPIMS.WPD controls the destination path of all WordPerfect reports created.



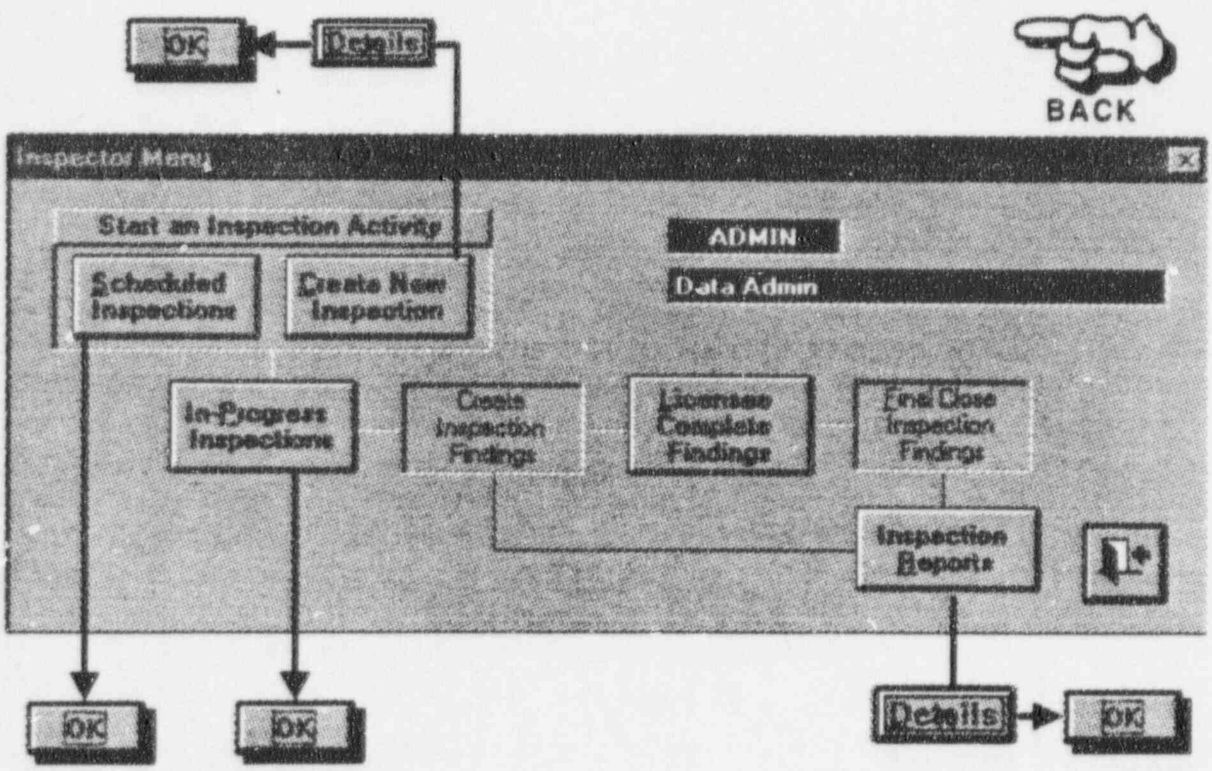
Appendix - B: CIPIMS Tutorial User Installation Guide

General:

The CIPIMS database/ forms and tutorial are two separate entities. This allows the user to access the tutorial where ever it is installed. This scheme also allows the tutorial to be modified without affecting the database or run-time application. The recommended connection for the tutorial is on a share.. since it is believed that after initial use it will not be accessed often.

Specific: Setting Up the Tutorial on a network share:

There are three files: 1) Viewer.exe, 2) DLLfiles.exe, and 3)CipTutor.exe. These are self-expanding compressed executable files. Viewer is the "Royalty-Free" run-time application of ABC Flowcharter. It is intended to be installed on the share, but can be installed on the workstation if desired. DLL Files.exe installs certain DLL files (Dynamic Linked Library files) to the Windows system directory. Some computer systems seem to be missing certain of these DLL Files, so it is recommended that they are installed on the individual workstations. Ciptutor.exe are the files that can be viewed with the viewer. Ciptutor, when it is expanded, constitutes about 50 meg of file space. If Ciptutor is installed on a share, than a Tutor administrator can control all changes and updates at a single point, allowing all users to be automatically updated.

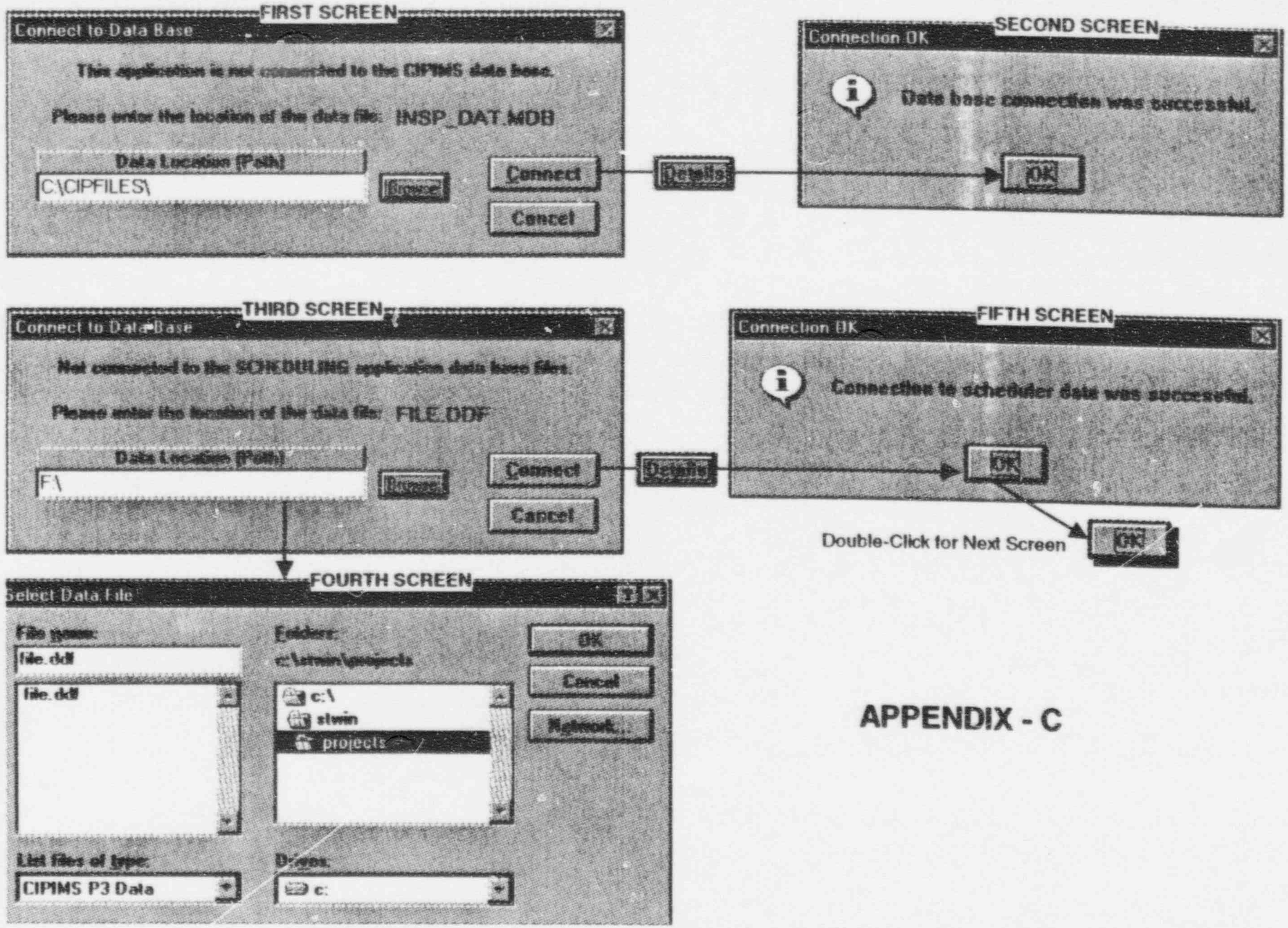


Operation of the Tutorial:

Operation of the tutorial is all Point-and-Click. Once the tutorial is launched, from the run-time-application, the user is effectively in and operating the viewing program so all view, and print functions operate.

Navigation within the tutorial is by means of following the foreword and back navigation (Double-Click on the OK Buttons or Pointing Fingers) aids. The tutorial contains actual images of the run-time application that contain representative inspection data for examples. The tutorial attempts to display all of the options and error messages that the user will encounter during operation and navigation of the run-time application.

The Title page for Appendix- C is an excerpt from the CIPIMS Tutor. Again, Tutorial screens are annotated screens of the run-time application with navigational aids added.


FIRST SCREEN
Connect to Data Base
This application is not connected to the CIPIMS data base.
Please enter the location of the data file: INSP_DAT.MDB
Data Location (Path)
C:\CIPFILES\
Browse
Connect
Cancel
Details
SECOND SCREEN
Connection OK
Data base connection was successful.
OK
THIRD SCREEN
Connect to Data Base
Not connected to the SCHEDULING application data base files.
Please enter the location of the data file: FILE.DDF
Data Location (Path)
F:\
Browse
Connect
Cancel
Details
FIFTH SCREEN
Connection OK
Connection to scheduler data was successful.
OK
Double-Click for Next Screen
OK
FOURTH SCREEN
Select Data File
File name:
file.ddf
file.ddf
Folders:
c:\
stwin
projects
OK
Cancel
Network...
List files of type:
CIPIMS P3 Data
Drives:
c:

APPENDIX - C

Appendix C

CIPIMS Initial Data Setup

I. Introduction

This document provides instructions for initially setting up CIPIMS for a specific project. This document is relevant to CIPIMS database administrators. **Note:** This document assumes that CIPIMS is installed and operating.

There are three types of CIPIMS user roles with regard to managing CIPIMS data: Inspectors, Supervisors, and Database Administrators. The CIPIMS interface (i.e., menus) are designed around these three roles. Inspectors and Supervisors are responsible for creating and updating data directly related to the inspection process (i.e., inspection-related records, findings, and inspection reports). Database Administrators are responsible for managing data that is not directly part of the inspection process (e.g., inspection procedure information, plant and plant systems identification, etc.). Before Inspectors and Supervisors can start working with CIPIMS, data needs to be entered into CIPIMS. This document describes the process of entering a minimum set of data to get up and running.

II. Clearing CIPIMS Test Data

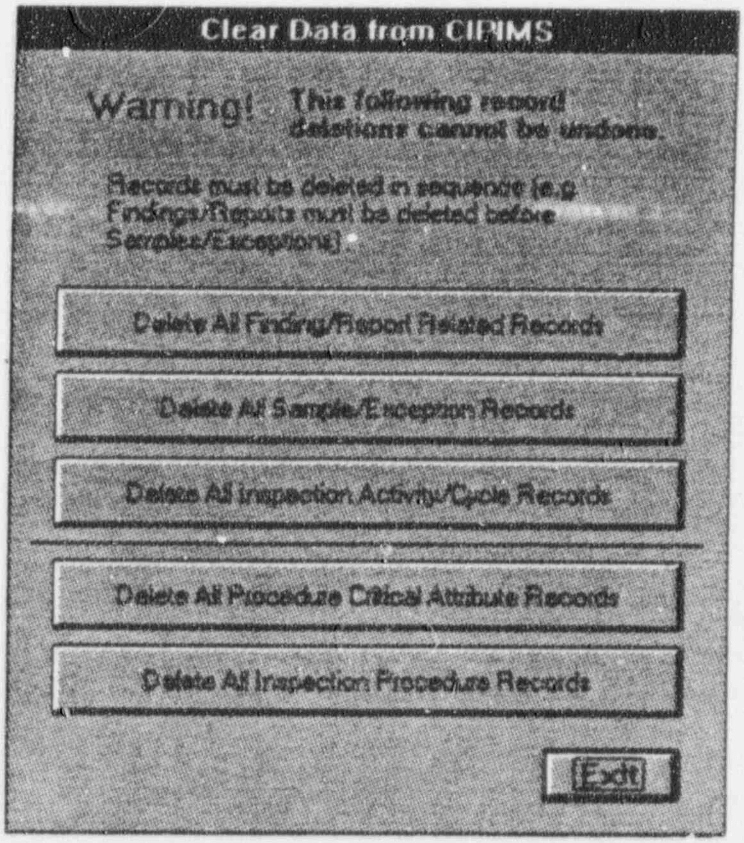
When first installed, CIPIMS will contain test data. This data allows CIPIMS to be experimented with on initial installation, but must be deleted prior to putting CIPIMS into production. The following outlines the process for clearing test data from CIPIMS.

Note: The following step requires the use of a full version of Microsoft Access®, Version 2.0. The run-time module version of CIPIMS does not provide access to the CIPIMS features described below.

1. Open the CIPIMS user database (INSP_USR.MDB): Hold the shift key down while opening to prevent starting the CIPIMS application.

2. Make sure the user database is attached to the appropriate CIPIMS data file (INSP_DAT.MDB) using the Attachment Manager (Menu: File/Add-ins/Attachment Manager).

3. From the database window, open the ClearInspectionData form. This form was not incorporated in the CIPIMS user interface since using the features of this form will **irretrievably delete all inspection data from the database**. The following form should be displayed:



4. Starting with the top button, press each button in series to delete all inspection data from the data base. (Note: Due to referential integrity enforcement, pressing the buttons out-of-sequence will generate an error message.)

5. Press the **`Exit`** button when done.

Note: The balance of this instruction can be completed from either from the run-time version of the CIPIMS application or under a full version of Microsoft Access®.

6. Start the CIPIMS application by opening the Startup form and log-in as database administrator.

7. Press **`Database Maintenance`** on the main menu.

8. Press **`Inspector Information`** on the database maintenance menu.

9. Use the **`Delete`** button to delete each of the inspector records.

10. Press `ITAAC` button on the database maintenance menu.

11. Use the `Delete` button to delete each of the ITAAC records.

12. Press `Systems` button on the database maintenance menu.

13. Use the `Delete` button to delete each of the System records.

III. Initializing CIPIMS Lookup Tables

The following tables provide look-up values for completing various CIPIMS forms and should be completed prior to starting a project.

- ***Inspection Types*** - are attributes attached to Inspection Procedures and Inspectors as this data is entered in CIPIMS. Inspection Types (e.g., "welding" or "electrical") are used to indicate the type of inspection associated with an inspection procedure and the qualifications of an inspector. Inspections Types are used to match appropriate inspectors to specific inspection activities.

- ***Exception and Finding Type Codes*** - these codes are used to define a "severity" scale for exceptions identified during inspections and for inspection findings identified in inspection reports.

- ***Nuclear Plant Data*** - This table is used to record information about the specific project being documented with CIPIMS.

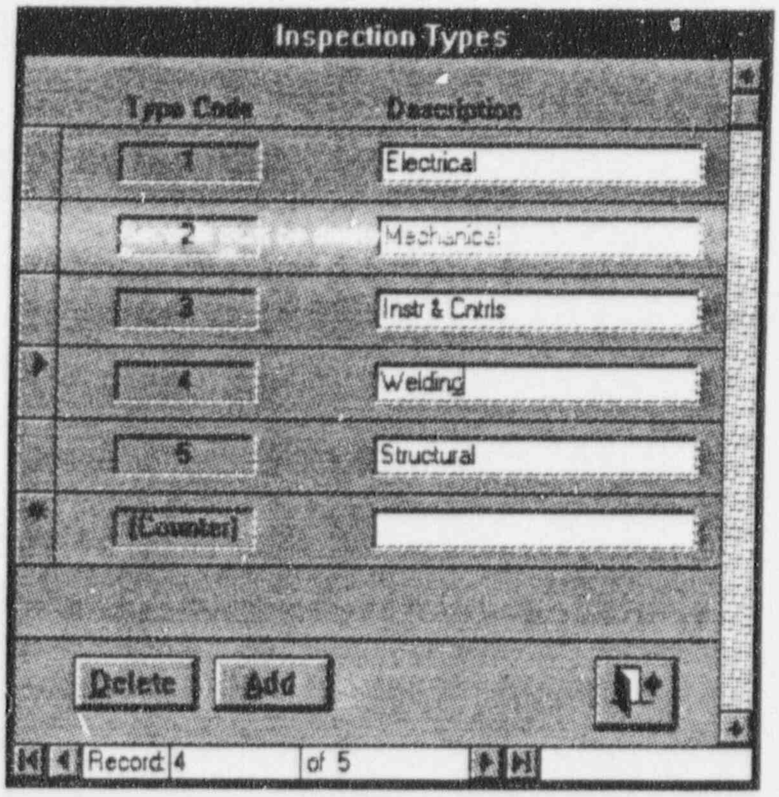
The following identifies that data that must be entered and describes considerations involved in completing each of these tables. Each of the tables is edited by accessing the database administrator menu as follows:

1. Start the CIPIMS application and log-in as database administrator.

2. Press `Database Maintenance` on the main menu.

Inspection Types

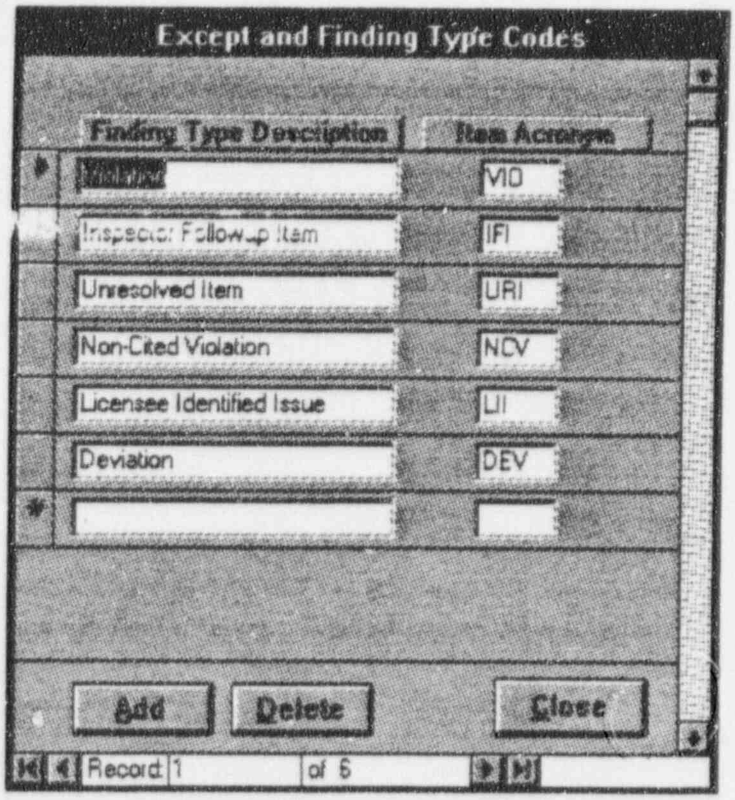
The following is the Inspection Types form:



The Inspection Types shown in the Description column will be available when entering Inspector or Inspection Procedure records in CIPIMS. Add, edit and/or delete inspection types as necessary. Although long descriptions can be entered (up to 50 characters) it is suggested that the descriptions be kept short so that they will display on CIPIMS forms without being truncated. The string "Instr & Cntrs" is the longest that will appear on all forms and reports without being truncated. The type codes are assigned by the database and are not displayed in any forms or reports.

Exception and Finding Type Codes

The following is the Exception and Findings Type Codes form:



The types shown in the description column will be available when entering Exception or Finding records in CIPIMS. Add, edit and/or delete types as necessary. When assigning Item Acronyms, consider the following:

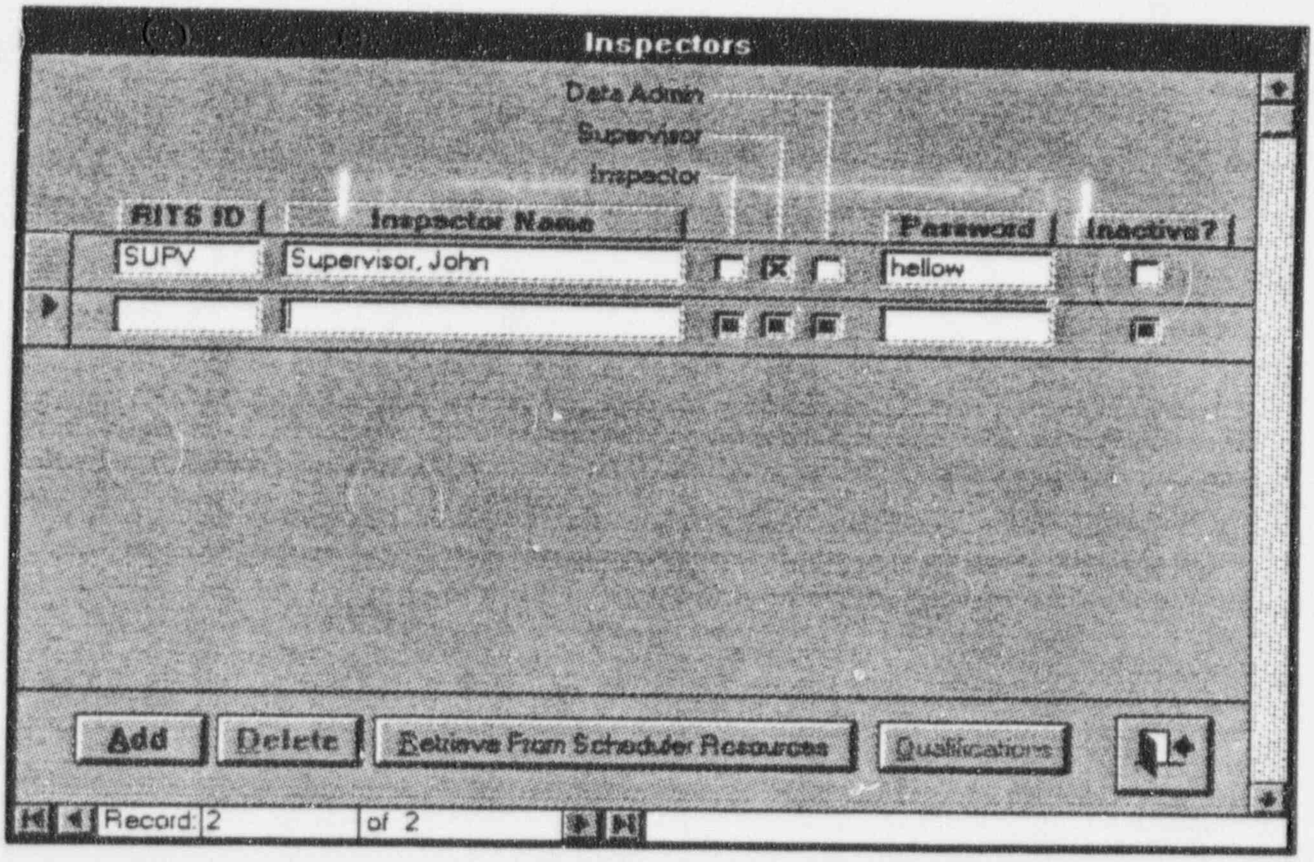
- The acronym is limited to three characters.
- The acronym is used by CIPIMS to generate finding identification numbers in inspection reports. CIPIMS generates finding identification numbers as follows: Finding type acronym + Docket +Report Number + Sequential Number (e.g. VIO 52-001/94-01-01).
- The acronym is used by CIPIMS when sorting based on finding type.

Nuclear Plant Data

Complete the Project Data form (one record). The docket number is needed to generate Finding and Inspection Report numbers. The balance of the information isn't strictly necessary (CIPIMS will work without it), but is used to create a header for inspection report documents (header will be blank if data is not entered)

IV. Identify Inspectors and Supervisors

At least one person designated as Supervisor must be entered in CIPIMS to allow completing an inspection process. Supervisors can act as Inspectors in CIPIMS, so the designation of Inspectors is optional. The form for identifying persons in CIPIMS is as follows:



The "Data Admin", "Supervisor", and "Inspector" designations control access to various portions of CIPIMS. The implications of these designations is a follows:

Access Type	**Designation**		
	Data Admin	*Supervisor*	*Inspector*
View Menu	Yes	Yes	Yes
Inspector Tasks Menu	Limited - Can only modify data created by currently logged user.	Yes - The supervisor is a "Super-Inspector" and can modify all inspection data.	Limited - Can only modify data created by currently logged user.
Supervisor Tasks Menu	Yes	Yes	No
Data Administration Menu	Yes	No	No

If none of the "Data Admin", "Supervisor", or "Inspector" designations is specified, the identified person can only access the View Menu.

The "Inactive?" switch is used to disable user access to CIPIMS without having to delete the users record. Database referential integrity enforcement will not allow these records to be deleted if there are inspection records referencing an inspector records.

The user designation and access scheme described above is a CIPIMS managed, application level, security process. System level security must be established using the Microsoft Access® security management facility to protect against unauthorized access to CIPIMS data from outside the CIPIMS application.

VI. Enter Inspection Procedures and Identify Critical Attributes

In order to create inspection records, there must be at least one Inspection Procedure record and one Critical Attribute record entered in CIPIMS. Data is entered using the forms loaded from the database administrator menu. There are four forms that make up the data entry screen for Inspection Procedures and Critical Attributes. When the data base is empty, only the forms associated with Inspection Procedures will open when the **`Procedures and Attributes`** button is pressed on the database administrator menu. Enter the first Inspection Procedure number and Title using the **`Add`** button. Close the Inspection Procedures data entry screen and then reopen with the **`Procedures and Attributes`** button. The forms for adding additional procedures information and Critical Attributes records will now be available.

VI. Enter Systems Data

In order to create inspection records, there must be at least one Systems record. Data is entered using the Systems form loaded from the database administrator menu.

CIPIMS Is Now Ready.