Wisconsin Electric POWER COMPANY
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July 20, 1982

EXPRESS MAIL

Mr. H. R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. NUCLEAR REGULATORY COMMISSION
Washington, D. C. 20555

Attention: Mr. R. A. Clark, Chief
Operating Reactor Branch 3

Gentlemen:

DOCKET NOS. 50-266 AND 50-301
ADDITIONAL INFORMATION CONCERNING
NUREG-0737 IMPLEMENTATION SCHEDULES
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

By letter dated April 16, 1982, Wisconsin Electric Power Company (Licensee) provided information related to schedule requirements and implementation status of all NUREG-0737 items. This information had been requested by Mr. Darrel G. Eisenhut in his letter dated March 17, 1982. The attachments to the April 26 letter presented the implementation schedule we believed we could meet for the outstanding NUREG-0737 requirements and included explanatory notes discussing, among other things, the reasons for the schedules noted.

During the week of June 14, 1982, Licensee participated in two lengthy telephone conference calls with Mr. Tim Colburn of your staff. The purpose of these calls was to provided additional elaboration and details concerning the revised implementation schedule listed in the attachment to our April 26 letter for two specific NUREG-0737 items. These items are II.B.2, "Plant Shielding", and II.F.1, subitems 1 through 6, "Accident Monitoring".

On July 12, 1982, we received a telephoned request from Mr. Clark asking that we provide in written form those details discussed with Mr. Colburn during the June conference calls. Accordingly, we are providing, as an enclosure to this letter, a synopsis of the justification and reasons for the revised scheduled implementation dates for NUREG-0737, Items II.B.2 and II.F.1.

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We trust this information will provide the necessary written justification you require to confirm our proposed implementation schedule. Please contact us if you have any questions regarding this information.

Very truly yours,

C W Fay

Assistant Vice President

C. W. Fay

Enclosure

Copy to NRC Resident Inspector

Subscribed and sworn to before me this 20th day of July 1982.

Dorothy Fleischmann
Notary Public, State of Wisconsin

My Commission expires July 1, 1984.

II.B.2.2 PLANT SHIELDING

A number of repeated evaluations and changes in conceptual resolution and design of the required shielding have resulted in unavoidable delay in the final implementation, i.e., actual installation of plant shielding. The historical development of our approach is given in the following summary of our submittals to date. Comments in parentheses are based on the present perspective.

12/31/79 Submittal (Item 2.1.6.b)
Assumptions were identified and the complete initial plant shielding review was transmitted. Problem areas and appropriate modifications were identified in concept. Expected implementation date was 1/1/81.

3/14/80 Submittal (Item 2.1.6.b)
Additional details on assumptions were provided. It was noted that shielding was required at the C-59 control panel in Auxiliary Building. The related review of environmental qualification was in progress; the preliminary review indicated no components should fail.

4/9/80 Submittal (Item 2.1.6.b)
Repeated same information as provided in previous submittal.

6/11/80 Submittal (Item III.D.3.4)
It was noted that reevaluation of control room habitability would be provided by 1/1/81.

(In the course of other post-TMI modifications in progress, comparatively little priority was placed on shielding implementation during 1980, based on the conclusion at that time that only a single concrete wall was required near the C-59 panel such that construction could be easily accommodated along with the construction of the battery room structure for the forthcoming instrument bus upgrade. While the problem of radiation levels in vicinity of the 1B32 and 2B32 motor control center (MCCs) was recognized, it was believed that the problem would eventually be solved by analysis showing the acceptability of the dose to the MCCs. Accessibility requirements were significantly different depending on MCC requirements. It was recognized that the MCCs could be moved or shielded or SI lines could be moved or shielded. Final resolution of these considerations was further hampered by the departure of certain key personnel, including the plant Operations Superintendent who had contributed a lead effort.)

12/23/80 Submittal (Items II.b.2.2 and III.D.3.4)
Determined the need to reevaluate shielding status based on changed source term assumptions from NUREG-0578 to NUREG-0737. Based on the need for reevaluation and the refueling schedule for Unit 2, an implementation date of 6/1/82 was predicted.

Control room habitability study in progress; preliminary report will be provided 1/9/81 with final report to follow in early 1981.

1/9/81 Submittal (Item III.D.3.4)
Preliminary report of control room habitability was provided. Need to evaluate control room shielding was identified.

2/23/81 Submittal (Item III.D.3.4)

Complete report on control room habitability was provided. The requirement for additional shielding for the windows and doorways was identified, due to the gamma contribution of the theoretical semi-infinite gas cloud surrounding the control building. Portable shielding was to be provided, but no commitment date was specified.

3/3/81 Submittal (Item II.B.2.2)

It was noted that shielding was required at C-59 panel and at one electrical equipment location in each unit. (Although not specified in this submittal, these are the 1B32 and 2B32 MCCs. Identification of these two additional areas resulted from reexamination of our assumptions regarding personnel access routes and the times required for motor control center availability.) The submittal noted that the Unit 1 safety injection (SI) line would be moved and that a consultant was retained for this purpose. In Unit 2, the SI line would be shielded.

The 3/3/81 submittal also noted that proposals for shielding the Unit 2 SI line and the C-59 control panel were being evaluated. The target implementation date was moved to 1/1/82. (The vendor proposals were subsequently rejected, and we determined to do the radiation design portion of the work in-house.)

The need for shielding the wall penetrations between the Auxiliary Building and the Control Building was recognized in the course of IE Bulletin 80-11 modifications; installation of this shielding was expected before 6/30/82.

3/31/81 Submittal (Item III.D.3.4)

This submittal noted that portable shielding would be provided for the control room by 1/1/83.

9/14/81 Submittal (Items II.B.2.2 and II.B.2.3)

Preliminary evaluation, i.e., rough estimation of overall impact, of the source term change was completed by a consultant. (The relief afforded by omitting noble gases in depressurized coolant as allowed by the revised NUREG-0737 source term was insufficient to eliminate any major shielding modifications.) Design evaluations for moving the Unit 1 SI line were in progress. At this time, we expressed considerable reluctance to proceed with a major move of this safety-related pipe. (In fact, further work on moving the SI line was suspended shortly after this submittal.)

The need to evaluate shielding simultaneously for personnel access (NUREG-0578 and NUREG-0737) and for equipment qualification (IE Bulletin 79-01B) was expressed at this time. Although the preliminary study indicated no equipment should fail within 30 days, it was subsequently determined that additional study was needed for the two major MCCs. (This tied resolution of both MCCs to the schedule for IE Bulletin 79-01B. In the course of work on the bulletin, a request was sent to the original MCC vendor for a proposal to perform a qualification analysis; the response in early 1982 demonstrated that proceeding with shielding was the preferred approach.)

Proposals for portable and permanent shielding for the C-59 panel were being evaluated. (It later turned out these were primarily offers of

equipment and did not propose adequate design service.) Projected completion dates were 4/1/82 for the portable shielding and 9/1/82 for the permanent shielding.

Shielding for the wall penetrations between the Auxiliary Building and the Control Building was being installed; a completion date of 6/30/82 was estimated. (Actual completion occurred before the 4/26/82 submittal.)

4/26/82 Submittal (Items II.B.2.2 and II.B.2.3)
It was noted that conceptual design engineering was in progress to determine exact shielding material and thickness requirements for each area requiring shielding upgrading as follows:

C-59 Control Panel - Design engineering to determine material and thickness requirements will be completed by 5/31/82; installation will be completed by 1/1/83. (The first sentence of this subsection referenced a review of proposals. This does not make sense, since radiological design was already in progress in-house. It appears that the statement was inadvertently picked up from a previous submittal. We withdraw the statement.)

Motor Control Centers - The proposed relocation of the Unit 1 SI line was withdrawn. Radiological design was to be complete by 5/31/82. Overall completion of installation was projected for the same schedule as IE Bulletin 79-01B. In the table attached to the submittal, 1/1/84 was shown (thereby anticipating the relief recently granted; a 1984 date would apply to Unit 1).

Wall Penetrations - Implementation completed.

Control Room Windows - Radiological design was to be completed by 6/30/82; orders for portable shielding where to be placed by end of 1982.

Summary and Current Status:
Radiological design for the C-59 control panel and the two MCCs was completed about a month later than anticipated in our last submittal, due to the unanticipated need for modifications to our computer programs and to the differing source term assumptions required for the MCCs. For personnel access, dose rates for only the first few hours of an accident were required in accordance with the NUREG-0737 source term; for equipment qualification, 30-day integrated doses were required in accordance with the NUREG-0578 source term.

Recommendations for permanent and portable shielding have been provided to the Point Beach Nuclear Plant Staff for review. A Scope of Work for the structural design of the seismic, permanent shielding for the C-59 Panel and the two motor control centers has been drafted and will be mailed to our structural consultant shortly. The Plant review will determine the ability to accommodate the portable shielding recommended for the C-59 area.

Resolution of the portable shielding required for the control room windows and the doorways has been delayed by the determination that our first analysis was overly conservative due to the assumption of an excessive infiltration rate. We received notification of this over-conservatism from Battelle-Northwest in the course of their performing the NRC contract evaluation of our submittal. Upon repetition of our study, an additional over-conservatism was determined in the time assumed for the commencement of containment spray. Completion of this final adjustment to the study is expected in about four weeks. The radiological design to determine portable shielding thickness is estimated to require an additional two weeks. Portable shielding for both the control room and the C-59 area will be ordered immediately thereafter.

There are several potential areas of uncertainty in completing implementation:

(1) The plant review has not yet determined the capability to accommodate portable shielding in the recommended areas;
(2) An estimate of the response time required for the consultant's structural design of the seismic, permanent shielding and an evaluation of the building capabilities is not yet available;
(3) Installation of the permanent shielding is likely to require special construction methods; the plant staff cannot make a determination of the requirements until design and construction details are known.

Therefore, while implementation appears to be readily achievable, these difficulties together with our over-optimism in the past led us to the 1/1/84 date specified in our 4/26/82 submittal. As indicated to the NRC project manager, we will attempt completion by 6/30/83 but are unable to provide confidence in that date until structural design is complete.

II.F.1.1/2 <u>Radiation Monitoring</u>

Wisconsin Electric (WE) has procured an entire new radiation monitoring system and is in the process of installing the equipment. The procurement of this system included four pallet mounted instruments which were intended to satisfy the criteria of II.F.1 and II.F.2 as set forth in NUREG-0737. Subsequent to procurement, it was determined that these instruments were only capable of satisfying the noble gas sampling criteria of NUREG-0737. Upon determination of the discrepancy between the particulate and iodine sampling criteria and the procured equipment capabilities, WE proceeded to design a revised system to satisfy the iodine sampling criteria. The following paragraphs detail the obstacles encountered which have forced WE to delay scheduled installation and operation.

II.F.1.1 <u>Noble Gas Monitoring</u>

WE procured four Eberline SPINGs to serve as noble gas effluent monitors on plant exhaust points. The installation of these instruments, with the exception of one which is being used for training, is expected to occur by August 31, 1982. The equipment installation has involved installing approximately 1000 feet of sample tubing with tube supports approximately every 4 feet. In order to accomplish a task of this magnitude, a substantial amount of engineering must be done. This engineering must include the

system integration and consideration of plant environments. WE has experienced delays in the engineering process such as turnaround time on tube mounting drawings prepared by an architect-engineer and specification of long lead time items such as tubing and supports by the architect-engineer. In addition to these items, WE was delayed by seismic support design of the pallet mounts and material shortages at installation. The above discussion is directed primarily at the mechanical installation. However, electrical installation and system integration details also needed to be engineered. WE has been delayed for these items primarily by non-receipt of vendor information and equipment. The balance of the new radiation monitoring system was received in mid-March 1982 and the system documentation was received near the end of April 1982. The situation has been further complicated by the fact that WE has not been able to get some of the hardware to function properly during pre-installation testing and training.

Even though the noble gas monitors can be installed by August 31, 1982, they will have to be operated on temporary power supplies because their power service is designed to come from the new station batteries, which are part of the bus upgrade. These monitors are part of the new radiation monitoring system and will not be integrated into that system until it is installed and operational approximately December 1982. As a stand-alone system, the noble gas monitors can be made operational on power from an interim power source.

II.F.1.2 <u>Particulate and Iodine Sampling</u>

In July 1981, WE prepared the conceptual design of an Isokinetic Stack Sampling System (ISSS) which met the criteria outlined in NUREG-0737. WE submitted this conceptual design and the requirements to a number of vendors which were to submit design details in a proposal. Upon receipt of these proposals and subsequent evaluations, WE discovered that the vendors had taken a number of exceptions to the conceptual design. Based on the vendor responses, in November 1981 WE prepared a more detailed specification and again submitted to the design vendors with requests for proposals. Upon receipt of the second set of proposals, WE selected a vendor at the end of 1981 and resolved some of the exceptions to the specification, such that the ISSS would conform to plant requirements in addition to those of NUREG-0737. WE ordered the equipment on March 1, 1982 with an expected delivery near the end of May 1982. The vendor has subsequently changed the delivery date twice, and the expected delivery date is now the first week in August 1982. In addition to late delivery of equipment, the vendor has also not supplied detailed ISSS drawings and documentation. The lack of drawings and documentation which we must provide to our architect-engineer has severely impacted the installation engineering and system integration of the ISSS into the new radiation monitoring system. We expect to complete the engineering by October 1982 and the system installation by December 1982.

The ISSS is subject to the same power supply considerations as the noble gas monitors and its initial operation will be from the same interim power source.

II.F.1.3/6 ACCIDENT MONITORING-INSTRUMENTATION

The implementation of new instrumentation for monitoring post accident conditions includes containment high-range pressure (.4) located outside of the containment and containment high-range radiation (.3), containment sump water level (.5) and containment hydrogen concentration (.6) located inside the containment. All of these instruments are interrelated in the use of common raceways, penetrations, signal processing equipment, power supplies, and display panels in the control room. The loops are subject to the same problems of installation, startup, and testing. They must meet the same criteria for separation, redundancy, and qualification. Because of this similarity, the delays in each case can best be discussed by first looking at each item individually relative to specific design, equipment, or installation concerns and then by covering the common items relative to overall schedule.

II.F.1.3 High Range Containment Radiation Monitoring System

This system contains three redundant instruments and channels per unit. The components include detectors, supports, and raceways in containment. Channel related penetrations and raceways from containment to the computer room are shared with other new instrumentation. Detector power supplies and receivers are mounted in the auxiliary rack in the computer room and receive power from both of the new and one of the existing vital busses while outputing the signals to the Foxboro SPEC 200 process racks. The SPEC 200 system provides signal processing and isolation for alarms, annunciation, indication, recording, and trip functions. Display is done on the Auxiliary Safety Instrumentation Panel (ASIP) for each unit. Signals also go to the containment ventilation isolation circuitry in the plant protection racks and to the plant computer systems for monitoring.

Implementation of the high-range containment radiation monitoring system began with delivery of the General Atomic (GA) supplied detectors and readout modules with attached power supplies. Modification of the NIMBINs which will support the readout modules and power supplies in the auxiliary racks was required to provide for proper electrical separation. The NIMBIN layout, design, and modifications were completed in the Spring of 1982. The calibrated Cs-137 gamma source was delivered to Point Beach Nuclear Plant on March 10, 1982 and QA documentation received April 8, 1982. Detectors, seismic supports, conduit, and cabling (replacement cable not yet received from GA) will be installed in Unit 1 during the Fall 1982 refueling outage and in Unit 2 during the Spring 1983 refueling outage.

The major delays in the implementation of this system have been related to cabling and penetration qualification problems identified in October 1981, delays in equipment delivery (auxiliary and Foxboro racks), bus upgrade design and construction, and ASIP design and procurement as discussed below. The design of isolation circuit modifications has just recently been started and can only be installed during a unit's outage.

II.F.1.4 High-Range Containment Pressure

This instrumentation consists of two wide range containment pressure instruments per unit, located outside the containment. Raceways to the computer

room and Foxboro racks are shared with other new instrumentation. The instruments connect directly to the SPEC 200 system for signal processing similar to that stated above, but the indication is to be integrated with existing containment pressure channels on the main control board as well as displayed and recording on the ASIP for each unit. Signals are also sent from the SPEC 200 system to the computer for monitoring and to the plant protection racks for incorporation into the containment spray actuation logic circuitry. The bus upgrade will provide power for this system.

The pressure transmitters have been installed on both units since the Unit 2 Spring 1982 refueling outage (Unit 1 installation was in Fall 1981). Delays in implementation are related to integrated cable pulling, the delivery of the Foxboro racks, bus upgrade design and construction, and ASIP design and procurement as discussed below. Installation in the control board is outage dependent, since cutouts must be made in the main control board safeguards panel. Protection system design changes have just recently been started and can only be installed during a unit's outage.

II.F.1.5 Containment Sump Water Level System

This system consists of four Delaval-Gems level transmitters per unit. Two are located in containment in the keyway beneath the vessel (sump A) and two are in the containment lower level (sump B) of each unit. These are connected to individual receivers in the computer room via channel related penetrations and cable in raceways in and out of containment. The output signals of these receivers are processed by the Foxboro racks for output to the computer system for monitoring and ASIP for display for each unit. The bus upgrade will provide power for this system.

The major delays in the system implementation have been due to problems with the architect-engineer design of the transmitter support and protection structure, the delivery of the Foxboro racks, bus upgrade design and construction, and ASIP design and procurement as discussed below.

The transmitters are installed in both units with cable pulled only in the Unit 2 in containment. Unit 1 cable will be installed during the Fall 1982 outage. The receivers in the computer room will not be installed until the adjacent vital bus distribution panels are received and installed, since they connect directly to the associated bus.

II.F.1.6 Containment Hydrogen Monitoring System

This system consists of four Exosensor hydrogen detectors per unit appropriately located in containment to provide a representative indication of the hydrogen concentration. These detectors are connected via channel related penetrations and cable in raceways in and out of containment to two channel-associated microprocessors mounted in the auxiliary racks. The outputs of the microprocessors are processed by the Foxboro racks for output to the computer system for monitoring and ASIP for display for each unit. The bus upgrade will provide power for this system.

The major delays in system implementation have been due to delays in: obtaining an acceptable design from the architect-engineer for a detector support platform for Unit 1, Exosensor equipment qualification and delivery, the delivery of the auxiliary and Foxboro racks, the bus upgrade design and

construction, and ASIP design and procurement as discussed below. The detectors were not received until the Spring 1982 during the Unit 2 outage. Installation was not possible because of fire detection system work in containment but, in any event, would not have resulted in an operable system because of the outside of containment component delays. The micro-processors are not yet qualified but are scheduled for shipment to WE by September 1, 1982. The detectors will be installed in each unit during the next refueling outages.

A. Cabling and Penetrations

To accommodate for wiring for the new in-containment instrumentation, it was necessary to provide new electrical penetrations in a seismically protected containment penetration area. Due to the small number of spare penetration sleeves available in seismic pipeways and the restrictions regarding channel and train separation, some electrical penetrations which were in use had to be modified. The spare penetrations used were blank sealed sleeves. Therefore, in both instances the installation of new electrical penetrations in these positions results in a period during which containment integrity is breached. This condition is only allowed by Technical Specifications during a period of cold shutdown of the reactor when fuel movement is not in progress. Three new modular type penetrations per unit were ordered in early 1980 by WE from Westinghouse with wiring configurations specified that were anticipated to meet the needs of the instrumentation required by NUREG-0578 at the time of the order.

The first three penetrations were delivered in late 1980. Since the delivery was near the end of the Unit 1 Fall 1980 refueling outage, only the two penetrations going into the spare positions were able to be installed. The third "in use" penetration could not be installed because of time restrictions at the end of the outage combined with the fact that splices and wiring would have to be removed and replaced since the penetration was "in use" (power for containment fan coolers). Early in the outage it was discovered that it was necesssary to cut out a piece of service water piping and reroute the pipe to allow for removal of the "in use" penetration and insertion of the new penetration. The piping design, fabrication, removal, rework, and installation was completed during the Fall 1980 outage.

All three Unit 2 electrical penetrations were installed during the Unit 2 Spring 1981 refueling outage. This third "in use" penetration was then installed during the Unit 1 Fall 1981 refueling outage.

In October of 1981, WE received a 10 CFR 21 notification from GA, the supplier of the High-Range Containment Radiation Monitoring System [illegible] Rockbestos cable supplied with the GA system and also incorporated in six of the penetration modules (one in each penetration supplied by Westinghouse) was found to be defective and thus the wiring for the GA system and [illegible] penetration modules would be subject to failure if the system were [illegible] and an accident occurred. GA discovered this during the qualification testing of some unrelated radiation monitoring equipment which used the same cable, and it was confirmed by Rockbestos to be a design/m[illegible] defect for this type cable. This required that the six penetrat[illegible] be replaced and also that any cable already installed be replaced. [illegible] modules were ordered from Westinghouse in Fall 1981. At this t[illegible]

revised the mix of cable types to be included in these modules to account for the NUREG-0737 required wiring for the in-containment instrumentation, now better defined by the instrument suppliers. The new modules for Unit 2 were delivered in time to do the replacement (removal of splices made in Spring 1981, removal of the old modules, insertion of the new modules, leak testing, and some resplicing of the cables) during the Unit 2 Spring 1982 refueling outage. The modules for Unit 1 have also been received and will be replaced during the Unit 1 Fall 1982 refueling outage.

The cabling for the GA system, however, had already been installed in Unit 2 in the Spring of 1981 (~ 1600 feet), and, since it is run with other vital instrumentation cables, it cannot be used. To be able to use the new conduit installed in containment, it would have to be pulled out of the conduits and new cable repulled into the same conduits. This cannot be done because the procedure would be contrary to both code and good practice; since there were other cables run in the same conduit, one cannot verify that no damage occurs due to the removal and repull of the cable. Therefore the cable must be abandoned, and a redesign of the routing and conduit supports for these three trains of instrumentation was required for Unit 2. This was not completed in time to install any conduit or new cable in Unit 2 during the Spring 1982 refueling outage. Even if the conduit would have been able to be installed, the replacement cable from GA has not yet been received as noted above. It is anticipated that this cable will be received prior to the Unit 1 Fall 1982 outage. Then it could be installed during the outage along with other instrumentation cable which was not able to be installed in the Fall of 1981.

The cabling and penetration defects, by themselves, have delayed implementation of the in-containment instrumentation to the Fall 1982 (Unit 1) and Spring 1983 (Unit 2) outages. An additional item which has delayed the cable installation work effort was the need to install a dedicated electrical penetration in each containment to handle the NRC-required fire detection system cabling as well as an extensive work effort to install conduits, supports, cables, detectors, and panels associated with this system.

B. Foxboro Racks

Most of the instruments being installed are being processed and isolated in the Foxboro racks. For each nuclear unit, three redundant instrument channels are being installed with a total of five cabinets for each nuclear unit.

The Foxboro SPEC 200 instrumentation racks were delivered to the Point Beach Nuclear Plant site in February 1982. QA documentation for this equipment has not yet been provided by Foxboro nor has a schedule been given to WE. The racks however, were installed in the plant computer room by the end of the Unit 2 Spring 1982 refueling, i.e. physically mounted in place on seismic supports. No cabling or temporary power supplies are yet available to permit WE to energize this equipment. Conduit and cable trays have been installed in the computer room to provide raceways for the input signal cables. No cable can be pulled in these raceways until the raceways from the respective containment penetrations are completely installed up to the computer room penetrations. (All cabling in a channel or train which

goes in the same raceway is pulled together as continuous, unspliced lengths from the containment penetration splices to the SPEC 200 terminations.) It is expected that some raceways will be completed by the end of August 1982, and the cabling will be pulled as these raceways become available. From each containment, three of the four instrumentation channels in the plant are used, and all have required new raceways to accommodate this cabling.

C. Auxiliary Racks

During the design process, it was determined that some of the instruments purchased could not be physically located in the Foxboro racks. Auxiliary racks were therefore needed to house these components. WE found it not possible to take separate instrument components and locate them in a common rack and still be able to state that the assembled rack, and all of its components, were seismically designed in conformance with NRC requirements.

The equipment which must be located in these auxiliary racks includes the NIMBINs which contain the power supplies and receivers for the high range containment radiation detectors, the hydrogen monitoring system microprocessor receivers, and multiplexing units which will provide processed signal displays to the ASIP. These racks have been designed and seismically tested empty but must still undergo complete testing with the equivalent of the Point Beach loading. Delivery of these racks is scheduled for September 1982, which is prior to receipt of the test results. Installation will proceed upon receipt.

D. Computer Room

Because of space considerations and seismic requirements, the existing computer room was selected as the location for most of the new instrumentation processing racks, components and power distribution panels. Prior to final installation of the auxiliary racks and computer system multiplexing cabinets, it will be necessary to have Bechtel, the original architect-engineer, perform a structural reanalysis of computer room floor and ceiling load capabilities using the known weights of the auxiliary racks, computer racks, SPEC 200 racks, seismic support bases, and other conduit and supports already installed for the other NUREG-0737, Reg. Guide 1.97, and IEB 79-01B instrumentation. As a result of this analysis, changes in the auxiliary and multiplexer rack support designs may be required or the building structure itself may have to be modified. This problem was recognized in 1981 when the amount of conduit first defined in conjunction with installation of the Foxboro racks and the rack installation was evaluated by Bechtel to be acceptable. Additional conduit has since been added and the remaining rack weights were not received from the vendors until June 1982, thus the analysis needs to be repeated.

E. Bus Upgrade

A related backfit item necessarily integrated into the overall instrumentation backfit effort is the upgrading of two instrumentation buses to be supplied from individual batteries. This design effort has been very difficult because it is necessary to put the four separate seismic rooms required to house the equipment within our existing facility, with the rooms having their own redundant ventilation system. The difficulty of

this design effort is compounded by the need to move existing plant electrical conduits, ventilation, lighting, and piping systems in the construction areas in order to provide space for the rooms. The following outlines our schedule of items remaining to be completed for this item:

Bus Upgrade Item		Schedule
Construction drawings received from A/E		Complete June 1982
Revise and correct		July 1982*
HVAC drawings		Complete June 1982
Piping System by A/E -	Layout and Design	In progress
	Drawings	Summer 1982
	Support Analysis	Fall 1982
	Procurement	Spring 1983
	Installation	Spring 1983
Room construction -	Vendor selection	Complete June 1982
	Procurement	August 1982*
	Construction	October 1982
	Equipment Instal ation	April 1983
HVAC System -	Equipment Spec.	August 1982*
	Vendor Selection	October 1982
	Procurement	December 1982
	Installation	Spring 1983
ASIP Interface -	Drawings	In progress
(see ASIP schedule)	Connection	June 1983
	Startup	Summer 1983

* Work on this item is in progress and should be completed by the end of the month stated.

F. Auxiliary Safety Instrumentation Panel (ASIP)

Our previous submittals have described the functionality of the ASIP. These panels contain most of the new instrumentation items to be located in the control room in a logical and acceptable manner to provide maximum benefit to the operator. The difficulty we have had is that this panel cannot be completely designed until every system that has equipment on it has been designed or its impact on the ASIP is known. This has delayed its procurement. Most of the backfit items will not be fully operational until the ASIP is installed and made operational. There is no way to get this equipment installed and operational except by going through each sequential step, the last of which will be wiring the ASIP. The following outlines the schedule of items yet to be completed for this item.

ASIP Procurement Item	Schedule
A/E revision by of Layout & Material List	August 1982*
Vendor selection (see note)	August 1982*
Delivery	March 1983
Install	June 1983
Startup	Summer 1983

ASIP Engineering Item	Schedule
Annunciator ESKs	
Preliminary issue	Complete June 1982
Final issue	July 1982
Final ASIP elementaries	July 1982* (received for review 4 weeks late)
Final internal wiring drawings for vendor	September 1982 (first issue scheduled 7/26/82)
Final external wiring drawings for vendor and construction use	October 1982
Issue termination tickets for cable installation	October 1982

Note: Added 1E entry and non 1E routing paths in ASIP were not identified until 6/28/82 which necessitates revised specification and vendor bids.

Related Engineering Item	Schedule
Foxboro Racks: Final drawing corrections	Complete June 1982
Revise external connection drawings	July 1982*
Auxiliary Racks: External wiring drawings	
Preliminary issue	August 1982
Final issue	September 1982
Test Loop Diagrams and Functional Test Procedures:	
95 individual loops first draft	July 1982 thru September 1982 (initial loops were received 1½ months late)
Final issue	September 1982 thru November 1982

* Work on this item is in progress and should be completed by the end of the month stated.

G. Interaction With Other Backfit Work

The TMI backfit items have interacted with other NRC required backfit work in two ways, by integration and by interference. Whenever possible, interrelated items were engineered together into integrated systems. Instrumentation changes due to TMI items, equipment qualification, and Regulatory Guide 1.97 were combined in the new racks, panels, and power supplies. In other cases, the NRC requirements for the installation of fire detection instrumentation and the reevaluation of block walls have adversely impacted the work schedule for this and other NUREG-0737 instrumentation systems. Limited physical access to areas of the plant have required that all work be integrated and scheduled in order of priority. Consequently when new conduit was being designed for NUREG-0737 instrumentation, the loading and proximity to block walls needed to be considered. Fire detection system conduit routing and support placement or detector placement needed to be factored into both physical routing paths available and separation requirements, which are severely limited in an operating plant. This prolonged the design schedule such that the fire detection system drawings were being

issued for construction just prior to their need. For NUREG-0737 instrumentation implementation, the engineering design contractor has not always been able to provide this information in parallel with the fire detection system work. Delivery of construction drawings and bill of materials has thus been delayed or limited to selected portions of the work. This has extended the material procurement process such that delays in installation have frequently been experienced due to material shortages or incomplete QA documentation when material delivery has been expedited. Installation planning has been limited by the late delivery schedule obtained from the engineering design consultant. Extensive engineering has been required in the field, and redesign by the consultant's engineers during construction has frequently been necessary. Generally, conduit installation has begun during the outage which follows drawing issue. Cable installation is not possible until all conduit work is completed for the full length of the raceway.

When installation began, the same requirements for integration extended the schedule for completion of NUREG-0737 items and fire detection beyond the anticipated dates for either effort taken separately. Physical limitations on the number of persons who could work in any given area limited the effort to sequential work, first to get the required portions of the fire detection system operational and then to go back and install other instrumentation. This resulted in the fire detection system being installed in the Unit 2 containment during the Spring 1982 refueling at the expense of work progress on the NUREG-0737 instrumentation electrical work. At times the efforts are in conflict in meeting diverse NRC implementation requirements. For example, fire barriers were required to be installed or upgraded during 1981 in the auxiliary building and control building and into or between rooms, equipment, and buildings. Subsequently, to implement NUREG-0737 requirements, fire barriers had to be breached to route new conduit and cabling, connect equipment differently (relative to signal, power supply or actuation needs), remove or reroute piping or conduit, or simply to access a work area. Then the barriers had to be reinstalled. If the schedule requirement were more flexible, the fire barriers would only have had to be installed once, after the NUREG-0737 and fire detection system work was completed.

In other areas the removal of solid concrete brick from inter-building penetrations to meet the block wall evaluation requirements of IE Bulletin 80-11 forced a complete reevaluation of equipment qualification and personnel access in the vicinity of penetration areas. The shielding being removed resulted in areas of unacceptable theoretical post-accident radiation levels for personnel and equipment. Extensive analysis and design work was required, and it was necessary to refill the wall penetration areas with support structure, concrete, and leaded foam just to get back to the acceptable pre-removal dose levels.