CONCEPTUAL PROJECT ASSESSMENT

CPA NO. 97-42
TITLE: SPENT FUEL POOL ISLAND PROJECT
COST ESTIMATE: $4,353,627
ORIGINATOR: W. Henries & SFPI Engineering Team WE Henries DATE: 10/9/97
ENGINEERING PROJECT MANAGER: S. Dahlgren DATE: 10/16/97
ENGINEERING SECTION HEAD REVIEW: W. Henries WE Henries DATE: 10/13/97
COGNIZANT PSS REVIEW: J. Diles for JOA DATE: 10/14/97

PURPOSE/PROBLEM(S):
This CPA describes the work required to create a Spent Fuel Pool Island (SFPI). The purpose of the SFPI creation is to permit, along with other planned activities, the unencumbered dismantling of the remainder of the Maine Yankee plant. A conceptual overview of the proposed SFPI is provided on the following pages and more thorough descriptions of the proposed installations are provided in Attachment A of this CPA.

RECOMMENDATION(S):
Proceed with the SFPI design and construction as described in this CPA. Due to the requested expedited schedule of this effort, final design details will be developed and approved by the SFPI Project Team.

PROJECTED SCHEDULE:
CPA approval 10/16/97; EDCR PORC approval 12/31/97; Installation & Testing complete 3/30/98.

ATTACHMENTS: (1)Completed Team Assignment sheet (2)PAR and SFPI Cost Benefit Analysis (In lieu of Financial Analysis Form), (3)Estimated REM exposure sheet, (A) SFPI Design Details

ROUTING FOR APPROVAL:

1. APPLICABLE ENGINEERING MANAGER: 10/14/97
2. PLANT MANAGER: 11/4/97
3. VP L&E: 11/4/97
4. VPO: 11/4/97
5. PRESIDENT: Mike Sellman 11/4/97

COMMENTS BY MANAGEMENT:

Page 3 - HVAC, building exhaust include HEPA filtration

Page 2 - There must be a method to remove ethylene glycol from the pool should there be a leak

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PURPOSE (continued):

As the decommissioning and dismantling of Maine Yankee proceeds, the current spent fuel pool (SFP) support systems (i.e. PCCW/SW for pool cooling, electric power, building HVAC, etc.) will be gradually removed and replacement components and systems will have to be installed to allow safe operation of the SFP until the spent fuel is removed from the pool and/or from the site. Decommissioning studies prepared for Maine Yankee indicate that rapid creation of a SFPI results in the most cost effective option since its creation speeds up the overall decommissioning time line.

Based upon this conclusion, Design Engineering was instructed to design a new SFPI and to aim for an April 1, 1998 operability date. Given this ambitious schedule, the Design Engineering Team reviewed the SFPI plans from Yankee Rowe and Connecticut Yankee and selected the following basic SFPI support systems: (Note: Detailed descriptions of each of these support systems are provided in Attachment A of this CPA).

It should be clarified that the creation of this SFP "Island" is not sufficient to provide the desired "cold, dark plant." Additional work, separate from this effort, will be required to power non-SFPI electrical loads and systems which will be needed for some of the plant decommissioning time-frame. These needs are currently being identified and it is anticipated that subsequent engineering efforts will be performed to resolve the identified needs.

Spent Fuel Pool Cooling:
The existing "primary side" spent fuel cooling operation which utilizes P-17A/B and E-25 will remain essentially as-is except that it will be powered by the new SFPI electrical system and new globe valves will be installed (replacing the existing pump discharge gate valves) which will permit throttling of the system to improve the performance of the existing pumps (i.e. push the pumps back onto their pump curves). The "secondary-side" cooling, currently supplied by PCCW/SW, will be replaced by an air/fan-cooled system. The fan coolers will be installed on a new diked structure (to assure containment of any potential leakage of the system's glycol solution) and will be located to the north of the Boron Waste Storage Tanks (BWST). (Note: The use of ethylene glycol has been evaluated and approved for the proposed usage.)

Spent Fuel Pool Make-up, Chemical Addition and Filtration:
The current purification system (which will be re-powered via the SFPI's new electrical system) will be used for filtration on an as-needed basis. The proposed "boron addition system" will consist of a the ability to connect a simple temporary system (tank, mixer, pump, hoist and funnel) which can be used when/if needed. An underwater ion exchange demineralizer system, which will rest on the bottom of the SFP, will operate either continuously or on an "as-needed" basis. Primary and secondary make-up capabilities will be provided. The primary system will have normal make-up provided by either the PWST or truck. Emergency make-up is supplied either from the fire pond (via P-4 or P-5) or the plant's Wiscasset Town water connection. Secondary make-up and glycol addition will be available via hose connections and system feed and bleed. The hose connections will be provided with appropriate check valve/back flow devices.

Electric Power:
Dedicated electric power for the SFPI will be provided to eliminate the current SFP's tie to the remainder of the plant. The conceptual design calls for the use of existing transformer X-16 and the installation of a 2500/3125 KVA step-down transformer and outdoor unit substation. This 480v power will supply existing MCC-11B and a new SFPI MCC (Note: The "new" MCC is currently a spare which is located in the Warehouse). The ability to power the SFPI loads via a manually-started diesel generator connection will be provided. The decision to use DG-2 for the back-up power supply or to purchase a new DG is still being evaluated. Necessary local emergency lighting and electrical power outlets and UPS power supplies for Security and Operations will also be provided for the SFPI.

HVAC:
A new HVAC system will be installed for the Fuel Building so that the existing multi-building HVAC system can be dismantled as part of the decommissioning effort. The new system will consist of inlet air louvers, dampers (manual), and filters. Two building exhaust fans will be roof mounted. A minimum flow fan will be used for winter operation and a high flow fan for summer operation. The existing exhaust ductwork in the Fuel Building will be used for the new system. Required ductwork modifications include the appropriate sealing of the M-line penetration into the PAB. Radiation monitoring and sampling capability of the system's exhaust will be provided. Electric resistance heaters will replace the existing auxiliary steam system.

The following modifications to the existing Gatehouse HVAC system will be required to accommodate the new Control Room/ Security CAS area : (a) repower the area from the SFPI electrical distribution system and (b) install a new roof-mounted chiller to replace the current system's reliance on SCCW.

Security Modifications:
Security modifications associated with the SFPI include relocation of the plant's vehicle threat barrier system so that it only protects the SFP, relocation of the CAS to the Gatehouse area (where it will share a room with the re-located control room), and modifications to various area alarms, detectors, gates and barriers. (Exact details will be maintained as part of the revised site SAFEGUARDS security plan.) Security inspections for personnel requiring access to the Fuel Building will be performed at the El. 36' entrance from the PAB. It is anticipated that this area may eventually become the HP Checkpoint after the remainder of the plant has been de-contaminated.

Instruments and Control/Control Room Re-location:
A remote monitoring station/control room for the SFPI will be created in the current Gatehouse area. In addition to kitchen, bathroom and communication facilities (normal and emergency), the following PLC-based instrumentation will be provided: level instrumentation and alarms, temperature indication (2) and alarms, SFP power supply monitoring and SFP RMS monitoring. The PLC control system will be installed with sufficient reserve capacity to permit the addition of future plant systems which will be selected in conjunction with the Operations Department as part of the planned phase-out of the current control room. It is anticipated that additional architectural enhancements to the new control room will be installed after the SFPI becomes operational and the existing security force manpower is reduced. Enlargement of the new control room into the current Security locker area and the installation of a window in the west wall are envisioned.

Fire Protection:

A fire detection and alarm system will be installed to monitor the new SFPI as directed by the Maine Yankee Fire Protection Coordinator. *It is anticipated that the existing exterior fire main and hose* stations, backed by the existing fire pumps, will remain functional for the life of the SFPI and will be sufficient to provide adequate SFPI fire protection.

Radioactive Waste Processing:

The SFPI will initially depend upon the plant's existing waste processing systems. The existing Fuel Building sump pumps (P-59A/B) will continue to pump accumulated wastes to the RCA building. *Current plans call for the installation of isolation valves and a tee-connection into the sump discharge* piping which will permit the SFPI wastes to be connected to the to-be-designed future treatment system and/or storage tanks which may be used in conjunction with a to-be-named waste processing/disposal vendor.

SFPI Design Basis:

Due to the expedited schedule of this design change, definitive licensing and design basis guidance for the SFPI do not currently exist. Revisions to the Plant's Technical Specification and FSAR are currently in progress. Similarly, changes to the safety classification of existing (and future) systems are in progress. It is anticipated that final completion and review of the design *and licensing basis* changes will not be completed until December 1997. In order to proceed with the SFPI design change, the following design basis assumptions have been made. All of the assumptions will be verified prior to approval of the EDCR in late December. (Note: The assumptions were made based upon our review of the Yankee Rowe and CY designs.)

1. The new SFPI systems will be classified as NNS (non-nuclear safety) based upon the inherent passive safety of the Maine Yankee SFP, the significant amount of time available for plant operators to respond to any system *failure and the availability of back-up systems. The current* applicable Chapter 14 accidents (fuel handling and cask drop accidents) only rely on the height of water available above the top of the spent fuel (>23' based upon draft TS 3.1.1). Very conservative estimates currently indicate that when the SFPI goes into operation next April the minimum time required for the pool to begin boiling, assuming a complete loss of SFP cooling, is approximately four days. A spent fuel pool heat-up test will be conducted to more accurately predict the current and projected future pool heat-up rate. Based upon the experience at Yankee Rowe, we anticipate that significantly more than four days will be available for operators to restore pool cooling (and other *SFPI functions). Although the new SFPI systems* will be classified as NNS, a substantial level of quality will be engineered into them based upon the planned engineering oversight and functional testing. A more detailed discussion of the "good, commercial quality" design parameters utilized for each sub-system design is provided in Attachment A of this CPA. (Note: The SFPI design does not consider a radwaste processing accident to be credible due to the small amount of waste being generated by Island operation. It is assumed that the Liquid Radwaste Incident (14.21) will either be removed from the FSAR prior to the SFPI commissioning or that clarifying language will be added to the FSAR eliminating the SFPI *as a source of concern.)*

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SFPI Design Basis (continued):

2. Given the time available for operator intervention noted above, system redundancy is not required. In order to assure the design adequacy of the new SFPI system, built-in spare active components are planned for the new secondary-side cooling pumps. (The existing primary side pumps (P-17A/B) provide similar built-in spare capability.) This small increase in cost will permit on-line testing and maintenance activities. In addition to the built-in spare pumps, the currently yellow-tagged hose connections (both fire water and SCCW) to the E-25 heat exchanger will be maintained and made permanent as part of this design change. A fire hydrant hose connection to the Wiscasset water supply, located adjacent to the Fire Pump House, will provide added back-up capability to the current Maine Yankee plant fire water system.

3. The normal SFP make-up water system will be designed to provide for a maximum SFP boil-off rate of 60 gpm. Normal make-up will draw from the PWST (which will be insulated and have it's current auxiliary steam heater replaced with an electric resistance heater). Emergency make-up suction sources include the fire pond and the Wiscasset town water system.

4. Seismic design and 1E qualification of the new installations is not required. Although not required, the existing SFP cooling lines have been seismically evaluated based upon their previous SC-3 classification and all new components will be installed using good structural/seismic engineering principles to assure that they will be available, within the time provided for Operator action, even after a significant seismic event. Similarly, structural loads will be as defined in the Maine State Building Code (wind, snow, rainfall, etc.). Electrical design will be in accordance with the National Electric Code (NEC) and appropriate Maine Yankee standards.

5. Since 10CFR50.73 requires emergency back-up power for the SFPI security system and ANSI/ANS 57.7 recommends emergency back-up power for SFP monitoring, we will provide 2 hour UPS power supplies for both the Security and new control room's monitoring systems. A manually started diesel generator will be used to provide power beyond the 2 hour coping period. (Note: The availability of this diesel enhances the NNS classification arguments made in Item (1) above.)

6. Specially designed ventilation for the SFP area and for the new control room is not required due to the age of the spent fuel. Ongoing fuel and cask handling accident analyses will demonstrate that the anticipated doses at both locations are considerably below the applicable regulatory limits.

7. Radiation monitoring of the new SFPI ventilation system exhaust will be required in order to comply with Maine Yankee's Offsite Dose reporting requirements. Radiation monitoring of the secondary-side cooling system will not be required based upon the same arguments used to eliminate the PCCW radiation monitoring (i.e. the secondary side pressure is greater than the primary side pressure and there is adequate level indication of both systems to assure rapid leakage detection. Additionally, the need for a periodic sampling program is being explored with Chemistry).

SFPI Design Basis (continued):

8. The conceptual revisions to the site Security response plan are based upon our review of the SANDIA evaluation of Rowe and CY. We believe that the design is conservative and the actual SANDIA evaluation of Maine Yankee may permit elimination of the re-location of the vehicle threat barrier system.

9. A thermal analysis of the spent fuel pool concrete and liner is being prepared to demonstrate the adequacy of both items at the anticipated "worst-case" temperature of 212°F. The SFP cooling piping, heat exchanger and pumps are also being re-evaluated at this elevated temperature.

10. Potential draining of the SFP via freezing of the fuel transfer canal or operator error will be addressed as a parallel effort via either (a) abandonment of the canal and plugging it with concrete, (b) permanent installation of the coffer dam or (c) installation of blank flanges in lieu of or adjacent to FP-21.

11. The new 1000 ppm minimum boron concentration specified in the draft technical specification is not anticipated to present any real operator action concerns since the current concentration of boron in the pool greatly exceeds this value and loss through evaporation is anticipated to be negligible. A small manual system will be provided simply to assure its availability.

12. Pool chemistry and cleanliness will be monitored and maintained by means of the described filtration and demineralization systems. The need for a new UV treatment system to handle possible organic contamination concerns was considered and rejected at this time due to the past operating history of the pool (i.e. there has never been an organic contamination problem). This decision will be reviewed after the new SFPI has operated for a reasonable period of time.

List of Attachments

(1) Completed Team Assignment Sheet

(2) PAR and SFPI Cost Benefit Analysis (In lieu of Financial Analysis Form)

(3) Estimated REM Exposure Sheet

(A) SFPI System Descriptions

(A1) SFPI Cooling System
(A2) SFPI Purification And Make-up Systems
(A3) SFPI Ventilation System
(A4) SFPI Electrical System
(A5) SFPI Security System
(A6) SFPI Instrumentation & Controls System

ATTACHMENT (1)

PROJECT TEAM ASSIGNMENT

TITLE SPENT FUEL POOL ISOLATION PROJECT ID No.: 97-042

The project team will be made up of plant personnel assigned by appropriate managers to represent various organizations. These individuals are expected to become cognizant of, and assist in, the development of engineering projects by:

a. assessing the impact of the project relative to nuclear safety, personnel safety, plant operation, maintainability of plant equipment/systems, personnel training needs, ALARA considerations, and the adequacy of functional testing.

b. informing the Cognizant Engineering Manager of any known or suspected conditions that might cause an unreviewed safety concern.

c. informing the Project Manager of any constraints in licensing submittals prepared throughout the course of a project.

d. informing the Project Manager of any constraints or scope changes that may impact schedule or cost.

e. identifying configuration documents potentially affected by a modification and preparing changes for configuration documents and databases impacted by a modification, as necessary.

f. providing input to selected project documents, as appropriate, for inspectability; acceptance criteria; proper application of codes, specifications and standards; documentation and records requirements.

Engineering

☒ Electrical Design J. BONNER
☒ Mechanical Design J. DOFNER
☒ Structural Design D. MAGNARELLI
☒ Licensing B. JORDAN
☒ Reactor Eng. D. RIVARD
☐ ISI/IST Coord. ______
☐ Computer Eng. ______
☐ Consultants ______
☒ Procurement Eng. J. FAIRBANKS
☐ Eng. Asst. (EAG) ______
☒ Other Rad. Eng. S. DAHLGREN
☒ YNSD ENG LEAD B. HENRIES

Plant

☒ Operations J. NILES
(cognizant PSS)
☒ Plant Eng. J. BROWN
☒ Elec. Maint. R. BUSHEY
☒ Mech. Maint. C. WOODWARD
☒ I&C Maint. K. BERGQUIST
☒ ALARA R. ADAMS
☒ QA C. LLOYD
☒ QC ______
☒ Other SCHED. J. KETO
☒ DRAFTING M. RICHARDS
☒ OBSD G. BRADLEY

Support

☒ Purchasing C. TIBBETS
☒ Stores ______
☒ Training M. WYMAN
☐ Simulator ______
☒ Safety S. POOLER
☐ Haz. Waste Coord. ______
☒ Rad Controls D. HICKEY

☒ Fire Prot. Coord. M. CUMMINGS
☐ Facilities ______
☐ Outage Planning ______
☒ OPIT J. CARD
☒ Security H. TORBERG
☒ Other CHEM L. THORNBURG
☐ Vendor ______
☐ Craft ______

APPROVAL:

8-18-97
Project Manager / Date

Mark 8/18/97
Cog. Eng. Manager / Date

8/18/97
Plant Manager / Date

(Procedure 17-313, Rev. 1, Page 8 of 11) (Attachment B)

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ATTACHMENT I

ATTACHMENT A Continued (Page 1 of 2)

MAINE YANKEE
PROJECT AUTHORIZATION REQUEST

A. PAR No: 97-042 Capital: ☒ Deferred:
O&M: ☐ Insurance Claim: ☐

B. TITLE: SPENT FUEL POOL ISOLATION

C. **BRIEF DESCRIPTION:** The spent fuel pool will be isolated from the rest of the plant. This will incl but not limited to the following: spent fuel pool cooling, filtration, chemical addition, fuel building HV control room relocation, security perimeter reductions, fire protection isolation, and the associa electrical changes required to isolate the fuel building from the remainder of the plant.

D. **PROJECT DESCRIPTION/DISCUSSION/JUSTIFICATION:** (Information from Estimator's worksheet Part
See attached cost benefit analysis for justification.

TOTAL ESTIMATE: $4,353.6
(Figure Determined on Estimator's Worksheet Pa

E. MILESTONE SCHEDULE: (MONTH/YEAR)

PLANNING/PRELIMINARY ENGINEERING PHASE:

ESTIMATED START DATE:	08/13/97
ESTIMATED FINISH DATE:	12/15/97

CONSTRUCTION/INSTALLATION PHASE:

ESTIMATED START DATE:	01/14/98
ESTIMATED FINISH DATE:	03/23/98

ACCEPTANCE PHASE:

START DATE:	03/24/98
FINISH DATE:	03/31/98

F. ROUTING FOR APPROVA

9/2
Steven Dahlgren 09/30
Originator

Department Manager

Plant Manager
(For Plant Depts.)

Cognizant VP

Cost Management
(Funding Review)

VP Fin. & Adm.
(All Capital PAR's > $50,000)

President (O&M PAR's
> $250,000 and all Capital PAR's)

Accounting (All PAR'S)

RETURN COMPLETED FORM TO ACCOUNTING

ATTACHMENT A Continued (Page 2 of 2)

F. ESTIMATORS WORKSHEET PART I: (Include in "Justification for Project" Part D Page 1)

1. Does project replace or update an existing system?	YES
2. Does project require stocked spare parts? (If YES complete Part II line 8)	NO
3. What is the) EDCR # 97-042 and CPA # 97-042	
4. Safety Related?	YES
5. Is an environmental related permit required?	NO
6. Emergency preparedness related?	NO
7. Mandated by (NRC, State of Maine, OSHA, etc.)	NO

G. ESTIMATORS WORKSHEET PART II:

ENTER THE ESTIMATED AMOUNTS FOR EACH AREA

1. MAINE YANKEE LABOR AND OVERHEAD	$ 10,000
2. FEES - PERMITS - LICENSES	0.00
3. CONTRACTED SERVICES	
ENGINEERING/PROFESSIONAL (YNSD)	1,238,400
TECHNICAL/CRAFT	1,273,382
OTHER/ PROJ MNGMNT / SCHED / COST	70,000
______	______
______	______
4. MATERIALS, PARTS, SUPPLIES & STOCK ISSUES**	1,327,860
5. SALVAGE-CREDIT	0.00
6. AFC - use 1%/mo. x 50% Const. Cost x project length *(only for projects over $50,000)*	38,201
7. TOTAL ESTIMATE (includes 10% contingency)	$ 4,353,627
8. NEW INVENTORY REQUIREMENTS	$ 0.00
9. REMOVAL COSTS INCLUDED IN TOTAL PROJECT COST (Project Costs $ ______ x Est______% for removal)	$ 0.00

H. PROPOSED FUNDING

PRIOR YEAR(S) EXPENDITURES			$ 0.00
	PAR # or B/L	Amt.	
CURRENT YR. FUNDING SOURCE AND AMT.	97-042	$2,000,000	
	______	______	
	______	______	
TOTAL CURRENT YEAR FUNDING			2,000,000
FUTURE YEAR(S) ESTIMATE			2,353,627
TOTAL PROJECT			$ 4,353,627

**INCLUDES SALES TAX & SHIPPING

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ENCLOSURE B
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SPENT FUEL POOL ISOLATION
COST BENEFIT ANALYSIS

PURPOSE:

It has been proposed that the Spent Fuel Pool and supporting systems be isolated from the remainder of the plant in order to better support plant decommissioning activities. Currently the Spent Fuel Pool is supported by numerous systems and components not located within the Spent Fuel Pool Building. This analysis will examine the potential cost benefit of creating a Spent Fuel Pool "island", while also considering potential affects on personnel and plant safety.

ASSUMPTIONS:

The latest "Decommissioning Cost Analysis for the Maine Yankee Atomic Power Station", prepared by TLG Services, assumed that a Spent Fuel Pool island would be created to support decommissioning activities. This study is being used in preparation for the upcoming FERC rate case.

This cost benefit analysis will be valid regardless of whether the Maine Yankee plant is decommissioned by Maine Yankee personnel, a Decommissioning Operating Company (DOC), or some combination thereof.

The ultimate purpose of this project is to allow for the decommissioning of the Maine Yankee plant, unencumbered by the presence of operating, pressurized, or energized equipment. The Spent Fuel Pool isolation project will accomplish the majority of work required to reach this objective; however, additional projects will be required in order for the plant to reach a fully "deenergized" state.

The removal cost of operating equipment, that will be abandoned as a result of this project, has not been included in this analysis. This is a reasonable assumption, as MaineYankee is currently decommissioning, and removal cost for all equipment, currently installed, is included under decommissioning costs. The removal and disposal cost of any new equipment installed by this project are included in this analysis.

The majority of the equipment installed by this project will be installed in non-contaminated areas, and is assumed to be free released as part of future dismantlement. New equipment, that is assumed to become contaminated, includes HVAC motors, the unit heaters closest to the pool, the Spent Fuel Pool filtration and chemical addition skids, as well as a new fuel pool skimmer system. It is assumed that these waste will be compacted as necessary to obtain at least a 60.1 lbs/ft^3 density, and will be disposed of at the current cost of $5.50 / lb.

The man-rem estimate found in the current TLG decommissioning cost study represents dose received by personnel directly involved in the decontamination and dismantlement activities, as well as associated health physics personnel. As decontamination and dismantlement activity durations are reduced, a corresponding reduction in dose is recognized. The dose savings used in this analysis represents the difference between the man-rem estimate found in the TLG cost study and that found in the Generic Environmental Impact Study. This is roughly half of the dose savings calculated using expected reductions in decontamination and dismantlement activity durations. It is assumed that decon activities would be undertaken, to the extent necessary, to remain under the man-rem estimate found in the GEIS. This assumption is consistent with the PSDAR. The cost of additional "loop decon" activities is not considered in this analysis.

It is assumed that the amount of materials required to be stocked is negligible, when compared to the amount of stock items required currently for Spent Fuel Pool support systems. Any spare parts required to be stocked, that are not currently stocked, have been included in the project estimate.

While substantial changes to tax and insurance rates are expected due to plant decommissioning, these are not a direct result of Spent Fuel Pool isolation, and will not be considered in this analysis.

The schedule for Spent Fuel Pool isolation is attached. As a summation, the EDCR should be complete by 1/98, with installation and testing being completed by 4/98. These dates support the current decommissioning schedule found in the PSDAR.

The construction of a Independent Spent Fuel Storage Installation is assumed to be completed in a time frame which would permit the spent fuel to be transferred out of the Spent Fuel Pool by June of 2003. This is consistent with the assumptions made in the TLG cost study.

The cash flow graphics are attached for the Spent Fuel Pool isolation project. The current cash flow projections estimate that approximately two million dollars will be spent in 1997, with the remaining 2.35 million dollars being spent in 1998.

The isolation of the spent fuel pool is not required by regulation, and no regulatory action would be expected if the fuel pool island would not be created.

ASSESSMENT OF NEED:

This project is not required to meet regulatory requirements, and thus is not categorized as *mandatory*.

Additionally, it is not required for the safe operation of the plant (or Spent Fuel Pool and associated systems), and would not be viewed as a *critical* project. While the creation of a Spent Fuel Pool island may decrease the probability of damage to fuel pool cooling and auxiliary systems during the demolition of the plant, it is not essential to the safe operation of these systems.

The Spent Fuel Pool Isolation project is categorized as *important.* This classification includes projects which are economically justifiable, based upon the resulting cost savings.

ALTERNATIVES:

1) Isolation of the Spent Fuel Pool island in order to allow for the decommissioning of the Maine Yankee plant, unencumbered by the presence of operating, pressurized, or energized equipment. This alternative is reflected in the latest "Decommissioning Cost Analysis for the Maine Yankee Atomic Power Station", as prepared by TLG Services.

2) Utilize the current systems to maintain the Spent Fuel Pool and associated auxiliaries in their current configuration. Demolition activities would be "engineered" so as not to damage active systems required for spent fuel pool cooling. Additional activities resulting from this approach would include: heavy load drop analysis', determinations of electrical equipment, additional component danger tagging by operations, labeling of systems approved for demolition to allow craft identification, etc. An overall increase in the decommissioning cost estimate would be expected if this alternative were selected.

3) The third alternative considered was to implement some portion of the proposed project. It has been determined that the benefits of ensuring that the plant is in a deenergized state can not be fully realized until project completion. Thus, by delaying, or canceling, some portion of the proposed project, the return on investment would not be realized.

QUALITATIVE BENEFITS:

The proposed project consolidates systems and equipment important to maintaining the spent fuel in a safe manner, and in accordance with plant technical specifications. These systems *would be isolated from the remainder of the site, which will become, effectively,* a demolition site. This will protect workers from energized systems, and critical systems from demolition activities. Creating a Spent Fuel Pool island will inherently increase safety, both for the worker and the plant.

The creation of a Spent Fuel Pool island also allows decommissioning activities to be undertaken in a much more efficient and expedient manner. This allows the entire decommissioning process to be completed in a shorter time frame. The cost benefit of being "green in seven" as opposed to being "green in eight or nine" is not limited to the quantitative benefits found in this analysis. The consolidation of decommissioning activities within a shorter time frame, allows the truncation of expenditures that represent "support" activities earlier, thus reducing the overall decommissioning cost. This reduction of cost is not being quantified within this analysis.

In addition, the Spent Fuel Pool island approach is essential to the successful completion of our mission to safely and cost effectively decommission the Maine Yankee plant, while being responsible to our community and our employees.

RECOMMENDED ACTION:

The results of this cost benefit analysis support the estimated expenditure of 4.35 million dollars in order to isolate the spent fuel pool. The pay back period is approximately two years with the overall cost benefit of over nineteen million dollars, net present value, through the end of decommissioning. In addition, the implementation of this project will substantially enhance the safety of the work place, throughout the decommissioning process.

CASH FLOW MATRIX

Discount Rate	10.0%						
Years from 1997		1	2	3	4	5	
DESCRIPTION	1997	1998	1999	2000	2001	2002	TOTAL
Costs							
Initial Investment	2.000.000	2.353.627	0	0	0	0	4.353.627
Additional Waste Disposal Cost	0	0	0	0	0	23.338	23.338
Additional Removal Cost	0	0	0	0	0	150.000	150.000
Total Nominal Costs	2.000.000	2.353.627	0	0	0	173.338	4.526.965
Present Value	2.000.000	2.139.661	0	0	0	107.629	4.247.290
Benefits							
Impact on Operations	0	120.000	60.000	60.000			240.000
Impact on Maintenance	0	160.000	240.000	240.000	240.000	160.000	1.040.000
Impact on Security	0	240.000	360.000	360.000	360.000	240.000	1.560.000
Impact on Engineering	0	1.320.000	1.320.000	1.320.000	1.320.000	1.320.000	6.600.000
Impact on Personnel Dose	0	94.640	189.280	189.280	189,280	182.520	845.000
Impact on Demolition Activities	0	2.350,000	4,700.000	4,700.000	4.700,000	4.550.000	21.000.000
Total Nominal Benefits	0	4,284,640	6.869,280	6.869,280	6.809,280	6.452.520	31.285.000
Present Value	0	3.895,127	5.677,091	5,160,992	4.650,830	4.006,507	23.390.547
Total Nominal Impact	(2,000,000)	1,931,013	6.869.280	6.869.280	6.809,280	6.279,182	26.758.035
Cumulative Nominal Impact	(2,000,000)	(68,987)	6.800,293	13.669,573	20.478,853	26.758,035	
Total Impact (NPV)	(2,000,000)	1.755.466	5.677,091	5.160,992	4.650,830	3.898.878	19.143.257
Cumulative Impact (NPV)	(2.000.000)	(244.534)	5.432.557	10.593,549	15.244,379	19.143.257	

CASH FLOW DETAILS

DESCRIPTION		
Costs		
Initial Investment	Spent Fuel Pool Isolation	4353627 dollars
	TOTAL COST	4353627 dollars
Additional Waste Disposal Cost	HVAC motor weight	455 lbs
	HVAC unit heater wight	200 lbs
	SFP filtration/chem addition/skimmer weight	3550 lbs
	TOTAL weight	4205 lbs
	Disposal cost per pound	5.55
	TOTAL COST	23337.75 dollars
Additional Removal Cost	Manpower	10 people
	Duration in weeks	15 weeks
	Hours per week	40 hours/week
	Cost per hour	25 dollars/hr
	TOTAL COST	150000 dollars
Benefits		
Impact on Operations	Manpower	1 people
	Duration in years	2 years
	Hours per year	2000 hours/yr
	Cost per hour	60 dollars/hr
	TOTAL COST	240000 dollars
Impact on Maintenance	Manpower	2 people
	Duration in months	52 months
	Hours per month	166.67 hours/month
	Cost per hour	60 dollars/hr
	TOTAL COST	1040020.8 dollars
Impact on Security	Manpower in people per shift	3 people

	Shifts per day	3 shifts/day
	Duration in months	52 months
	Hours per month	166.67 hours/month
	Cost per hour	20 dollars/hr
	TOTAL COST	1560031.2 dollars
Impact on Engineering	Manpower	11 people
	Duration in years	5 years
	Hours per year	2000 hours/yr
	Cost per hour	60 dollars/hr
	TOTAL COST	6600000 dollars
Impact on Personnel Dose	GEIS Dose Estimate	1115 Man-rem
	TLG Study Dose Estimate	946 Man-rem
	Dose savings	169 Man-rem
	Cost per Man-rem	5000 dollars/man-re
	TOTAL COST	845000 dollars
Impact on Demolition Activities	Estimated cost with "island"	42000000 dollars
	Work difficulty factor	50 percent*
	TOTAL COST	21000000 dollars

* This factor was estimated at 100 percent by the D&D contractor at Yankee Rowe

Activity ID	Orig Dur	Rem Dur	Early Start	Early Finish	Resource ID	Budg M/Hrs	Budgeted Cost	1997 A 825 1 SEP 8 15 22 29 OCT 6 13 20 27 NOV 3 10 17 24 DEC 1 8 15 22 29 1998 JAN 5 12 19 26 FEB 2 9 16 23 MAR 2 9 16 23 30 APR 6 13 20 27 MAY 4 11 18 25
Decommissioning Project Management - M Ferri								
97-0042 SPENT FUEL POOL ISLAND - Steve Dahlgren								
EDCR								
Steve Dahlgren - 4908								
SFPI-000	0	0	13AUG97 07:00A			0.00	0.00	
SFPI-002	0	0	18AUG97 07:00A			0.00	0.00	Project Team Initiation
SFPI-001	0	0	26AUG97 07:00			0.00	0.00	Initiate Preliminary Engineering PAR
SFPI-045	40	40	30SEP97 07:00	06OCT97 16:59	SD	20.00	1,400.00	Approve CPA
SFPI-003	0	0	07OCT97 07:00*			0.00	0.00	CPA's Approved
SFPI-004	0	0	09OCT97 07:00*			0.00	0.00	Full Scope PAR Initiated
Bill Henries - 2338/4510								
SFPI-019	240*	110*	04AUG97 00:00A	15SEP97 16:59	BH	100.00	7,000.00	Develop Conceptual Design Licensing Basis
SFPI-049	200	170	18AUG97 07:00A	24SEP97 16:59	MM+	170.00	11,900.00	Review Existing Piping Analysis For Higher Temp
SFPI-061	100*	80*	21AUG97 07:00A	09SEP97 16:59	DM	25.00	1,750.00	Define Scope of Load Shedding/Equipment Rmvl
SFPI-053	100	100	21AUG97 07:00A	11SEP97 16:59	DM	60.00	4,200.00	Analyze Fuel Pool & Liner for Effects of Boiling
SFPI-057	80*	70*	25AUG97 07:00A	08SEP97 16:59	BO	40.00	2,400.00	Develop TE/WO for Rmvl of Boric Acid Waste Tank
SFPI-058	80*	70*	25AUG97 07:00A	08SEP97 16:59	BO	40.00	2,400.00	Dvlp TE/WO for Rmvl of New Fuel Cvr & Misc Items
SFPI-050	200	200	25AUG97 07:00A	30SEP97 16:59	MM	100.00	7,000.00	Perform Vehicle Threat Analysis
SFPI-054	0	0	02SEP97 07:00		DM	0.00	0.00	Issue PO for Calc of Effects of SFP Boiling
SFPI-055	160	160	02SEP97 07:00	29SEP97 16:59		0.00	0.00	Vendor Calc of Effects of SFP Boiling

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Project Start	05AUG97 00:00
Project Finish	16JUN03 16:59
Data Date	26AUG97 07:00
Run Date	28AUG97 14:00

Early Bar
Progress Bar
Critical Activity

DCM1

Maine Yankee Atomic Power Company
Spent Fuel Pool Island Schedule

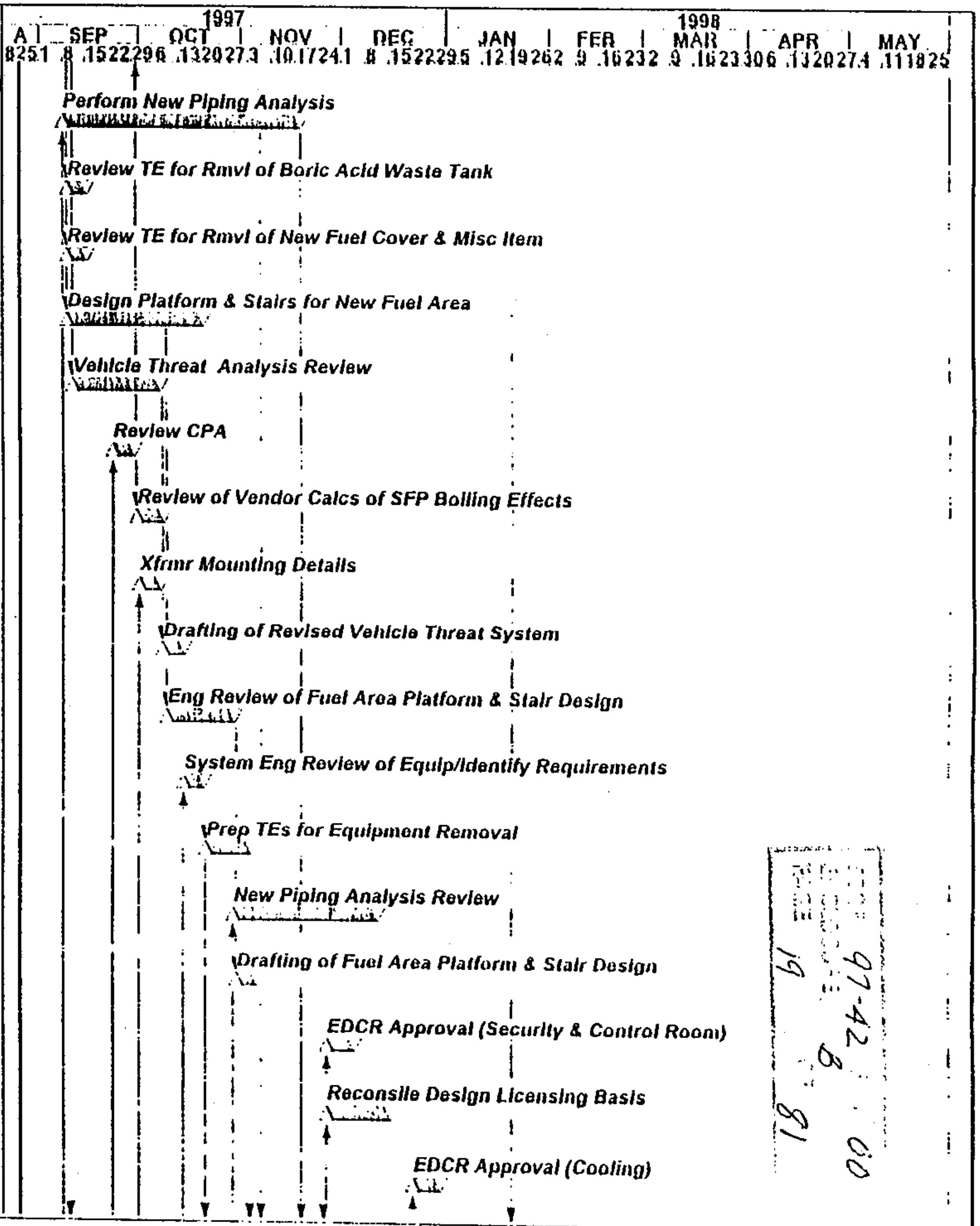
Sheet 1 of 10

Date	Revision	Checked	Approved

Prepared By: J Kats @ ext 1942

Bill Henries - 2338/4510

Activity ID	Orig Dur	Rem Dur	Early Start	Early Finish	Resource ID	Budg M/Hrs	Budgeted Cost
SFPI-052	420*	420*	08SEP97 07:00	18NOV97 16:59	DO	200.00	14,000.00
SFPI-057	40	40	09SEP97 07:00	15SEP97 16:59	DF	20.00	1,400.00
SFPI-058	40	40	09SEP97 07:00	15SEP97 16:59	DF	20.00	1,400.00
SFPI-059	240	240	09SEP97 07:00	20OCT97 16:59	BO	120.00	7,200.00
SFPI-051	150	150	11SEP97 07:00*	07OCT97 16:59	JW	50.00	3,500.00
SFPI-021	40	40	23SEP97 07:00	29SEP97 16:59	BH	20.00	1,400.00
SFPI-056	60	60	30SEP97 07:00	08OCT97 16:59	DM	30.00	2,100.00
SFPI-133	40	40	01OCT97 07:00	07OCT97 16:59	DM+	60.00	4,000.00
SFPI-051	40	40	08OCT97 07:00*	14OCT97 16:59	DRF	40.00	1,600.00
SFPI-059	120	120	09OCT97 07:00	29OCT97 16:59	DM	60.00	4,200.00
SFPI-089	40	40	14OCT97 07:00*	20OCT97 16:59	SE1	40.00	0.00
SFPI-089	80	80	21OCT97 07:00*	03NOV97 16:59	SE1	80.00	0.00
SFPI-052	250	250	29OCT97 07:00	11DEC97 16:59	MM	100.00	7,000.00
SFPI-059	40	40	30OCT97 07:00	05NOV97 16:59	DRF	40.00	1,600.00
SFPI-043	50	50	26NOV97 07:00	04DEC97 16:59	BH	20.00	1,400.00
SFPI-019	100	100	26NOV97 07:00	15DEC97 16:59	BH	50.00	3,500.00
SFPI-042	50	50	22DEC97 07:00	30DEC97 16:59	BH	20.00	1,400.00



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Project Start	03AUG97 00:00
Project Finish	16JUN03 16:59
Data Date	28AUG97 07:00
Run Date	28AUG97 14:00

Early Bar
Progress Bar
Critical Activity

DCM1

Maine Yankee Atomic Power Company

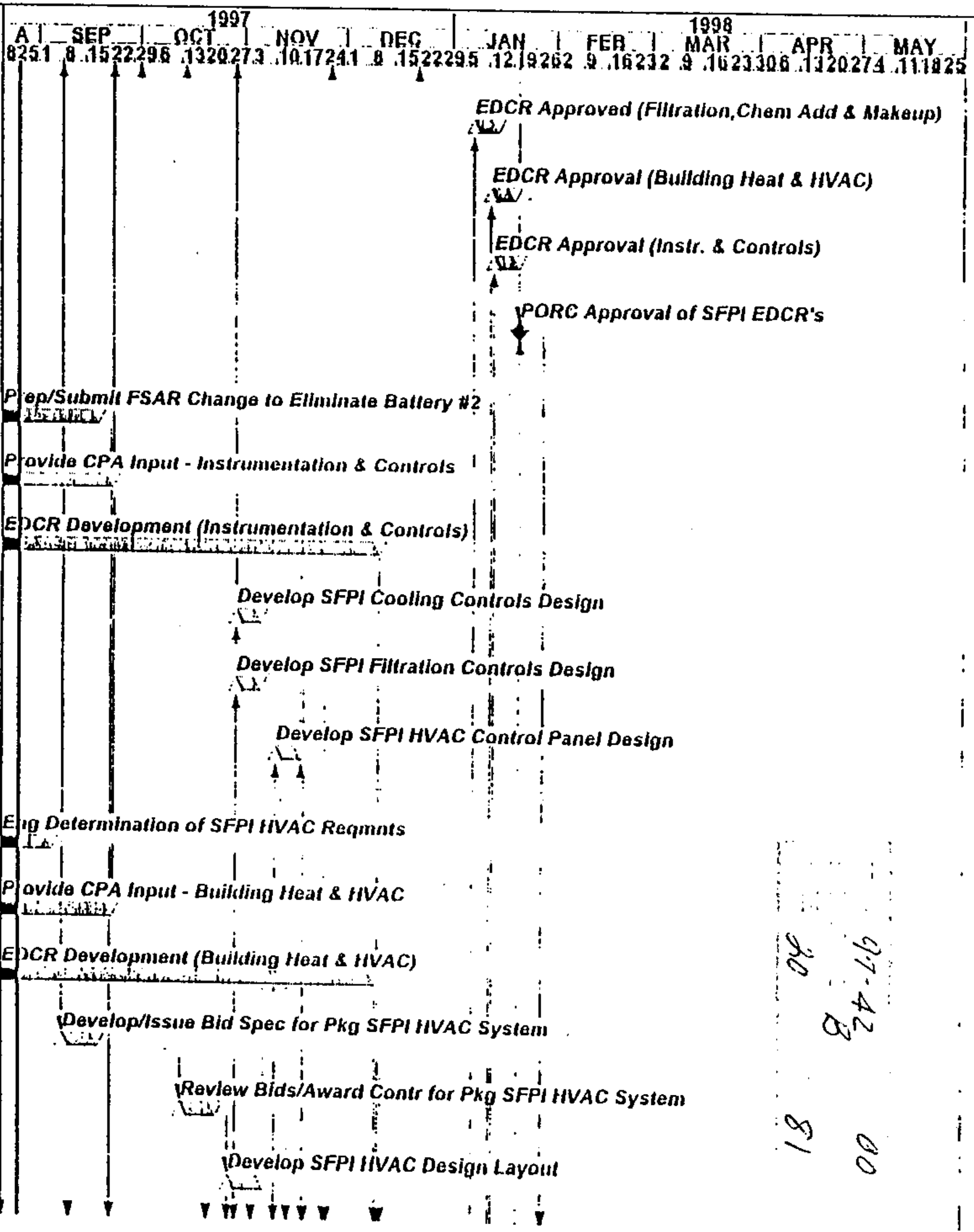
Spent Fuel Pool Island Schedule

Sheet 2 of 10

Prepared By: J Kato @ ext 4547

Date	Revision	Checked	Approved

Activity ID	Orig Dur	Rem Dur	Early Start	Early Finish	Resource ID	Budg M/Hrs	Budgeted Cost
Bill Henries , 2338/4510							
SFPI-039	50	50	07JAN98 07:00	14JAN98 16:59	BH	20.00	1,400.00
SFPI-041	50	50	12JAN98 07:00	19JAN98 16:59	BH	20.00	1,400.00
SFPI-044	50	50	13JAN98 07:00	20JAN98 16:59	BH	20.00	1,400.00
SFPI-007	0	0		20JAN98 16:59		0.00	0.00
Dan Bourgoin - 4268							
SFPI-065	160*	140*	21AUG97 07:00A	18SEP97 16:59	JT	80.00	0.00
SFPI-026	170*	150*	21AUG97 07:00A	22SEP97 16:59	JT	80.00	4,800.00
SFPI-032	620*	600*	21AUG97 07:00A	10DEC97 16:59	JT	300.00	18,000.00
SFPI-106	50	50	29OCT97 07:00	05NOV97 16:59	JT	50.00	3,000.00
SFPI-123	50	50	29OCT97 07:00	05NOV97 16:59	JT	50.00	3,000.00
SFPI-102	50	50	10NOV97 07:00	17NOV97 16:59	JT	50.00	3,000.00
Dom Fucito - 4582							
SFPI-096	80*	60*	21AUG97 07:00A	04SEP97 16:59	DF	80.00	5,600.00
SFPI-023	170*	150*	21AUG97 07:00A	22SEP97 16:59	DF	80.00	5,600.00
SFPI-029	610*	590*	21AUG97 07:00A	09DEC97 16:59	DF	150.00	10,500.00
SFPI-098	80	80	08SEP97 07:00	18SEP97 16:59	DF	40.00	2,800.00
SFPI-100	80	80	13OCT97 07:00	23OCT97 16:59	DF	40.00	2,800.00
SFPI-101	80	80	27OCT97 07:00	06NOV97 16:59	DF	40.00	2,800.00



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Project Start 03AUG97 00:00
Project Finish 16JUN03 16:59
Data Date 26AUG97 07:00
Run Date 28AUG97 14:00

Early Bar
Progress Bar
Critical Activity

DCM1

Maine Yankee Atomic Power Company

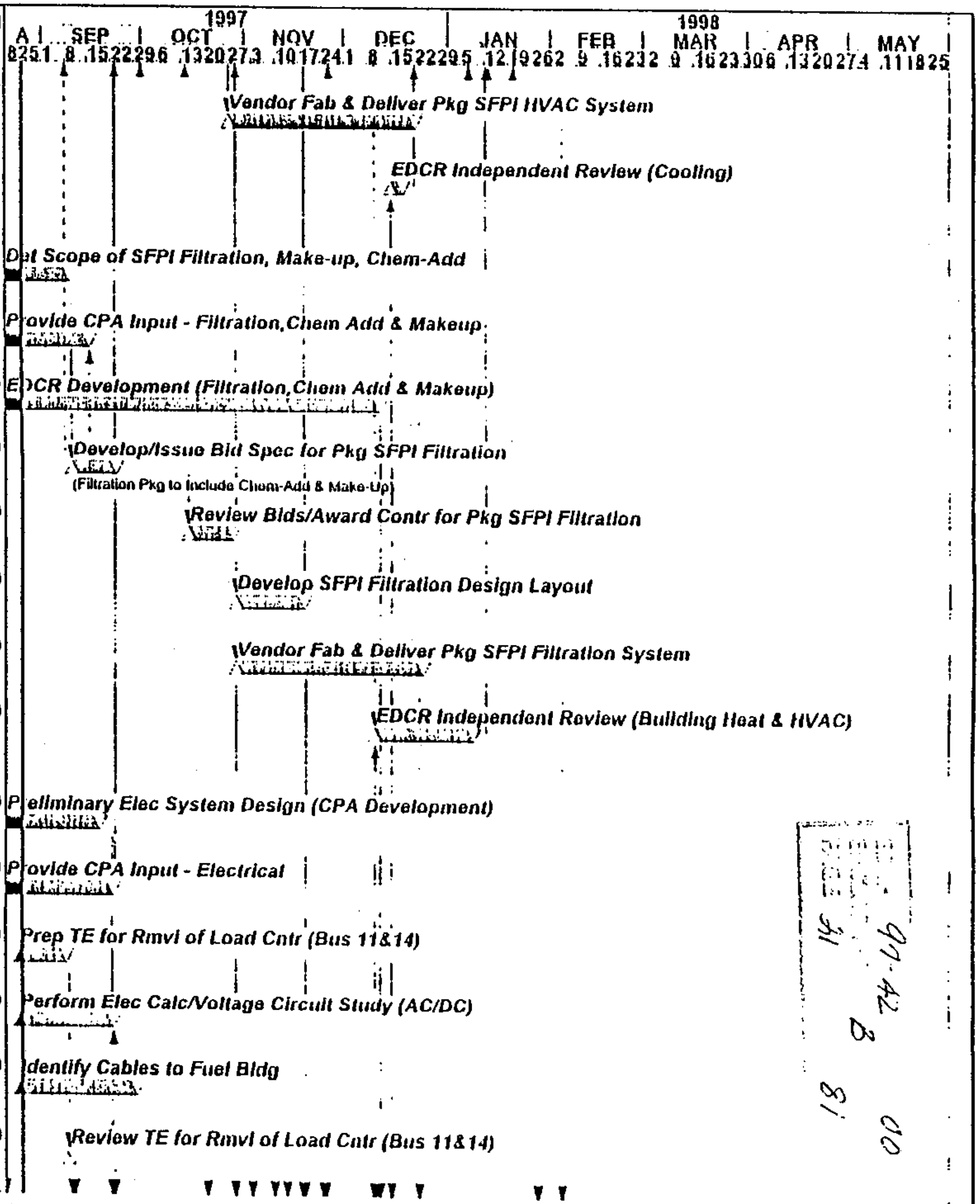
Spent Fuel Pool Island Schedule

Sheet 3 of 10

Prepared By: J Keto @ ext 4842

Date	Revision	Checked	Approved

Activity ID	Orig Dur	Rem Dur	Early Start	Early Finish	Resource ID	Budg M/Hrs	Budgeted Cost
Dom Fucilo - 4582							
SFPI-108	320	320	27OCT97 07:00	22DEC97 16:59	DF+	17.00	01,120.00
SFPI-036	40	40	15DEC97 07:00	18DEC97 16:59	DF	20.00	1,400.00
John Dufner - 5886							
SFPI-118	100*	80*	21AUG97 07:00A	09SEP97 16:59	JD	80.00	5,600.00
SFPI-020	130*	110*	21AUG97 07:00A	15SEP97 16:59	JD	40.00	2,800.00
SFPI-027	630*	610*	21AUG97 07:00A	11DEC97 16:59	JD	280.00	19,600.00
SFPI-119	80	80	10SEP97 07:00	23SEP97 16:59	JD	40.00	2,800.00
SFPI-120	80	80	15OCT97 07:00	28OCT97 16:59	JD	40.00	2,800.00
SFPI-122	120	120	29OCT97 07:00	18NOV97 16:59	JD	60.00	4,200.00
SFPI-121	320	320	29OCT97 07:00	24DEC97 16:59	JD+	17.00	01,120.00
SFPI-035	160	160	10DEC97 07:00	08JAN98 16:59	JD	80.00	5,600.00
John Bonner - 2261							
SFPI-128	160*	140*	21AUG97 07:00A	18SEP97 16:59	SU	80.00	5,600.00
SFPI-022	170*	150*	21AUG97 07:00A	22SEP97 16:59	JB	17.00	1,190.00
SFPI-063	80*	70*	25AUG97 07:00A	08SEP97 16:59	EE1	60.00	4,200.00
SFPI-081	160*	150*	25AUG97 07:00A	22SEP97 16:59	JB	60.00	4,200.00
SFPI-087	200*	190*	25AUG97 07:00A	29SEP97 16:59	EE2	200.00	4,200.00
SFPI-071	20	20	09SEP97 07:00*	10SEP97 16:59	DB1	20.00	1,400.00



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Project Start	01AUG97 00:00
Project Finish	16JUN03 16:59
Data Date	26AUG97 07:00
Run Date	26AUG97 14:00

Early Bar
Progress Bar
Critical Activity

DCM1

Sheet 4 of 10

Maine Yankee Atomic Power Company

Spent Fuel Pool [illegible]

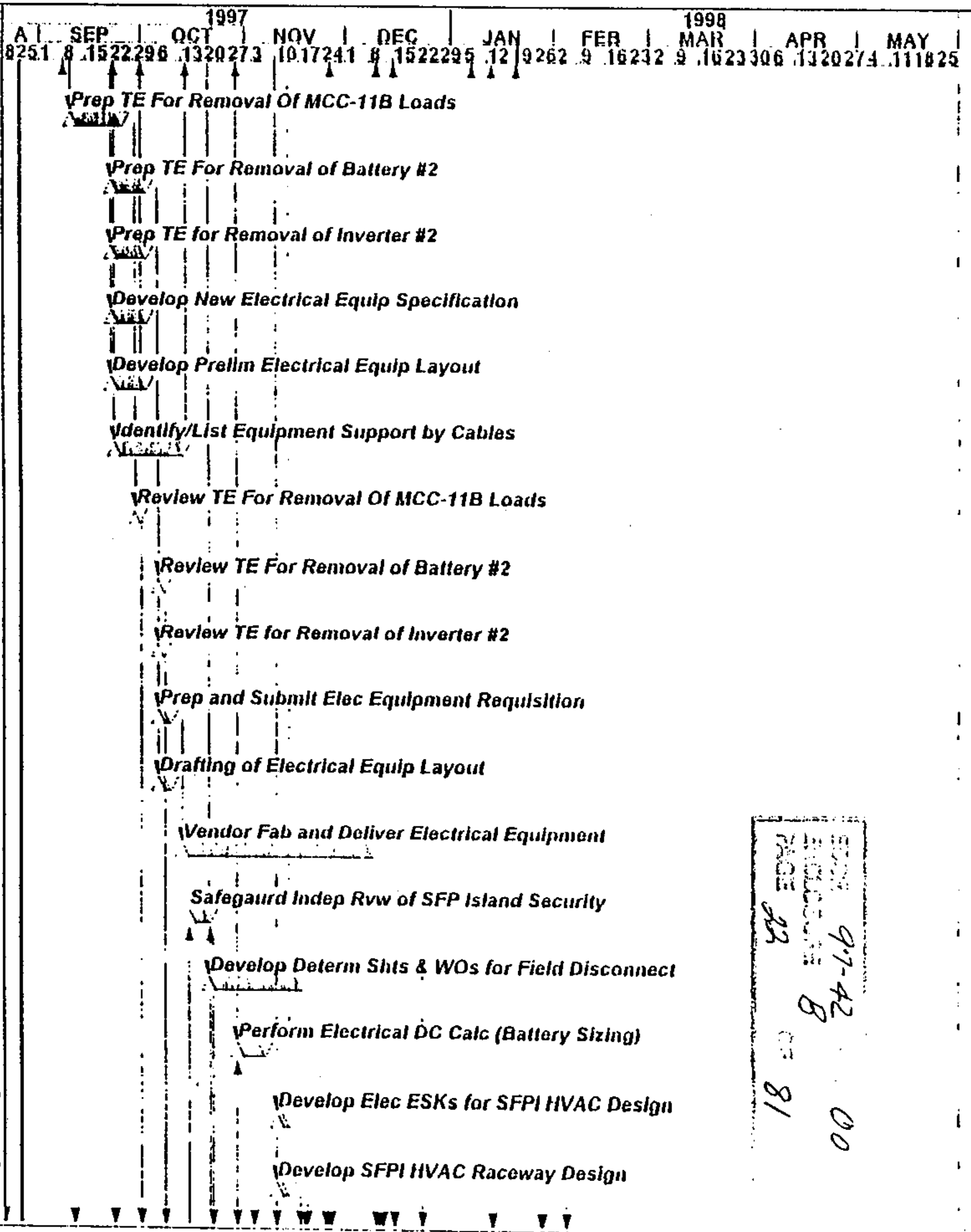
Date

Revision

Prepared By: J Kelo @ ext 4942

Checked Approved

Activity ID	Orig Dur	Rem Dur	Early Start	Early Finish	Resource ID	Budg M/Hrs	Budgeted Cost
John Bonner - 2281							
SFPI-064	100	100	10SEP97 07:00*	25SEP97 16:59	EE1	60.00	4,200.00
SFPI-067	80	80	22SEP97 07:00	02OCT97 16:59	EE1	40.00	2,800.00
SFPI-069	80	80	22SEP97 07:00	02OCT97 16:59	EE1	30.00	2,100.00
SFPI-129	80	80	22SEP97 07:00	02OCT97 16:59	SU	60.00	4,200.00
SFPI-132	80	80	22SEP97 07:00	02OCT97 16:59	JB	60.00	4,200.00
SFPI-088	120	120	23SEP97 07:00*	13OCT97 16:59	EE2	120.00	4,200.00
SFPI-072	20	20	29SEP97 07:00*	30SEP97 16:59	DB1	20.00	1,400.00
SFPI-068	20	20	06OCT97 07:00	07OCT97 16:59	DB1	20.00	1,400.00
SFPI-070	20	20	06OCT97 07:00	07OCT97 16:59	DB1	15.00	1,050.00
SFPI-131	40	40	06OCT97 07:00	09OCT97 16:59	SU	40.00	2,800.00
SFPI-134	40	40	06OCT97 07:00	09OCT97 16:59	DRF	20.00	800.00
SFPI-130	320	320	13OCT97 07:00	08DEC97 16:59	SU+	41.00	02,800.00
SFPI-095	40	40	15OCT97 07:00	21OCT97 16:59	JB	25.00	1,750.00
SFPI-090	160	160	21OCT97 07:00*	17NOV97 16:59	EE2	160.00	4,200.00
SFPI-082	60	60	29OCT97 07:00*	06NOV97 16:59	DB1	40.00	2,800.00
SFPI-109	40	40	10NOV97 07:00	13NOV97 16:59	JB	20.00	1,400.00
SFPI-124	40	40	10NOV97 07:00	13NOV97 16:59	JB	20.00	1,400.00



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Project Start	05AUG97 00:00
Project Finish	16JUN03 16:59
Data Date	26AUG97 07:00
Run Date	28AUG97 14:00

Early Bar
Progress Bar
Critical Activity

DCMI

Sheet 5 of 10

Maine Yankee Atomic Power Company

Spent Fuel Pool Island Schedule

Date

Prepared By: J Kalo @ ext 4442

Revision

Checked

Approved

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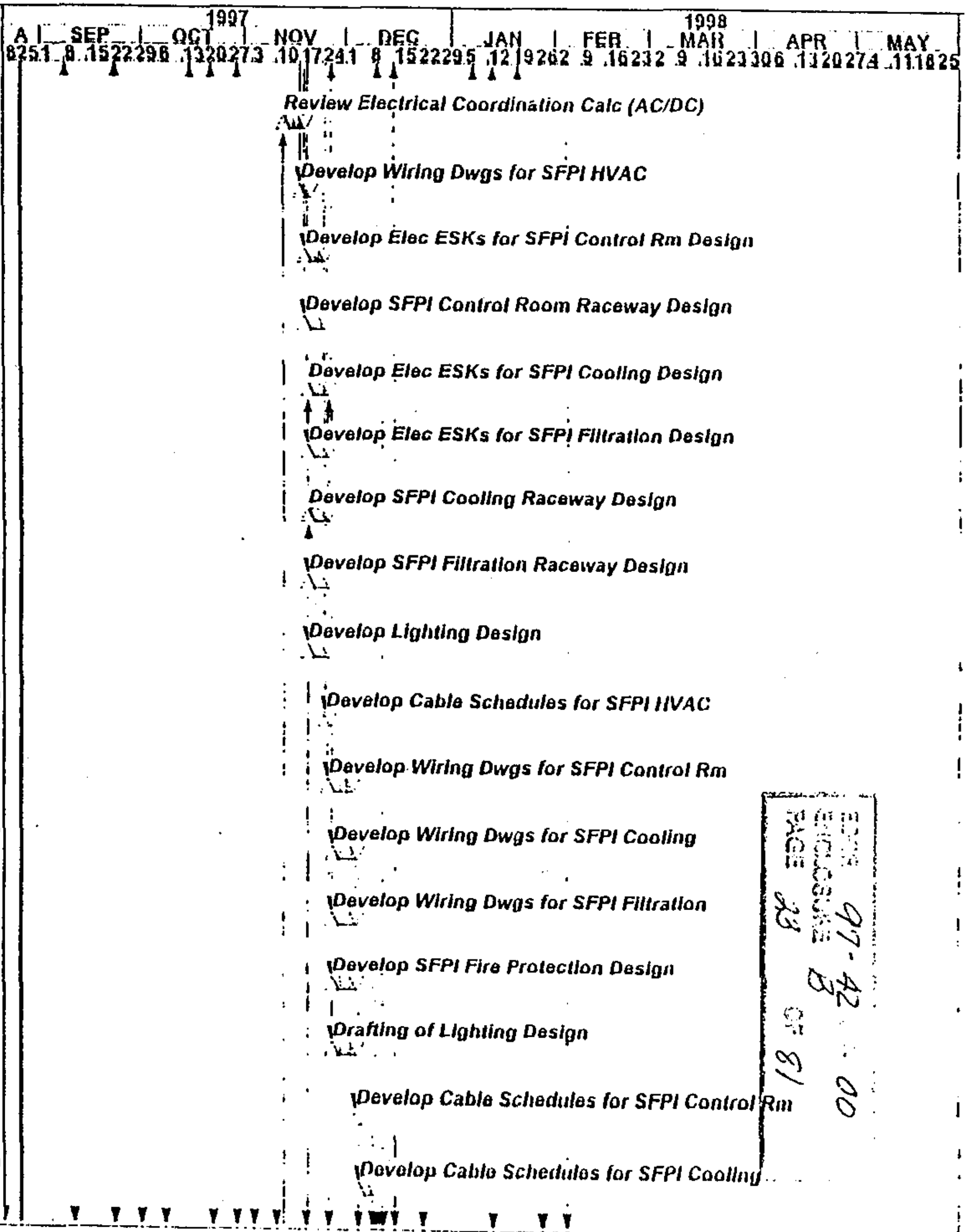
Activity ID	Orig Dur	Rem Dur	Early Start	Early Finish	Resource ID	Budg M/Hrs	Budgeted Cost
John Bonner - 2261							
SFPI-086	40	40	12NOV97 07:00*	18NOV97 16:59	JB	30.00	2,100.00
SFPI-110	40	40	17NOV97 07:00	20NOV97 16:59	JB	20.00	1,400.00
SFPI-109	40	40	18NOV97 07:00	24NOV97 16:59	JB	20.00	1,400.00
SFPI-124	40	40	18NOV97 07:00	24NOV97 16:59	JB	20.00	1,400.00
SFPI-109	40	40	19NOV97 07:00	25NOV97 16:59	JB	20.00	1,400.00
SFPI-109	40	40	19NOV97 07:00	25NOV97 16:59	JB	20.00	1,400.00
SFPI-124	40	40	19NOV97 07:00	25NOV97 16:59	JB	20.00	1,400.00
SFPI-124	40	40	19NOV97 07:00	25NOV97 16:59	JB	20.00	1,400.00
SFPI-125	40	40	19NOV97 07:00	25NOV97 16:59	DB1	20.00	1,400.00
SFPI-111	20	20	24NOV97 07:00	25NOV97 16:59	JB	10.00	700.00
SFPI-110	40	40	25NOV97 07:00	02DEC97 16:59	JB	20.00	1,400.00
SFPI-110	40	40	26NOV97 07:00	03DEC97 16:59	JB	20.00	1,400.00
SFPI-110	40	40	26NOV97 07:00	03DEC97 16:59	JB	20.00	1,400.00
SFPI-126	40	40	26NOV97 07:00	03DEC97 16:59	DB1	20.00	1,400.00
SFPI-127	40	40	26NOV97 07:00	03DEC97 16:59	DRF	30.00	1,200.00
SFPI-111	20	20	03DEC97 07:00	04DEC97 16:59	JB	10.00	700.00
SFPI-111	20	20	04DEC97 07:00	08DEC97 16:59	JB	10.00	700.00



Project Start	05AUG97 00:00
Project Finish	16JUN03 15:30
Data Date	26AUG97 07:00
Run Date	26AUG97 14:00

Early Bar
Progress Bar
Critical Activity

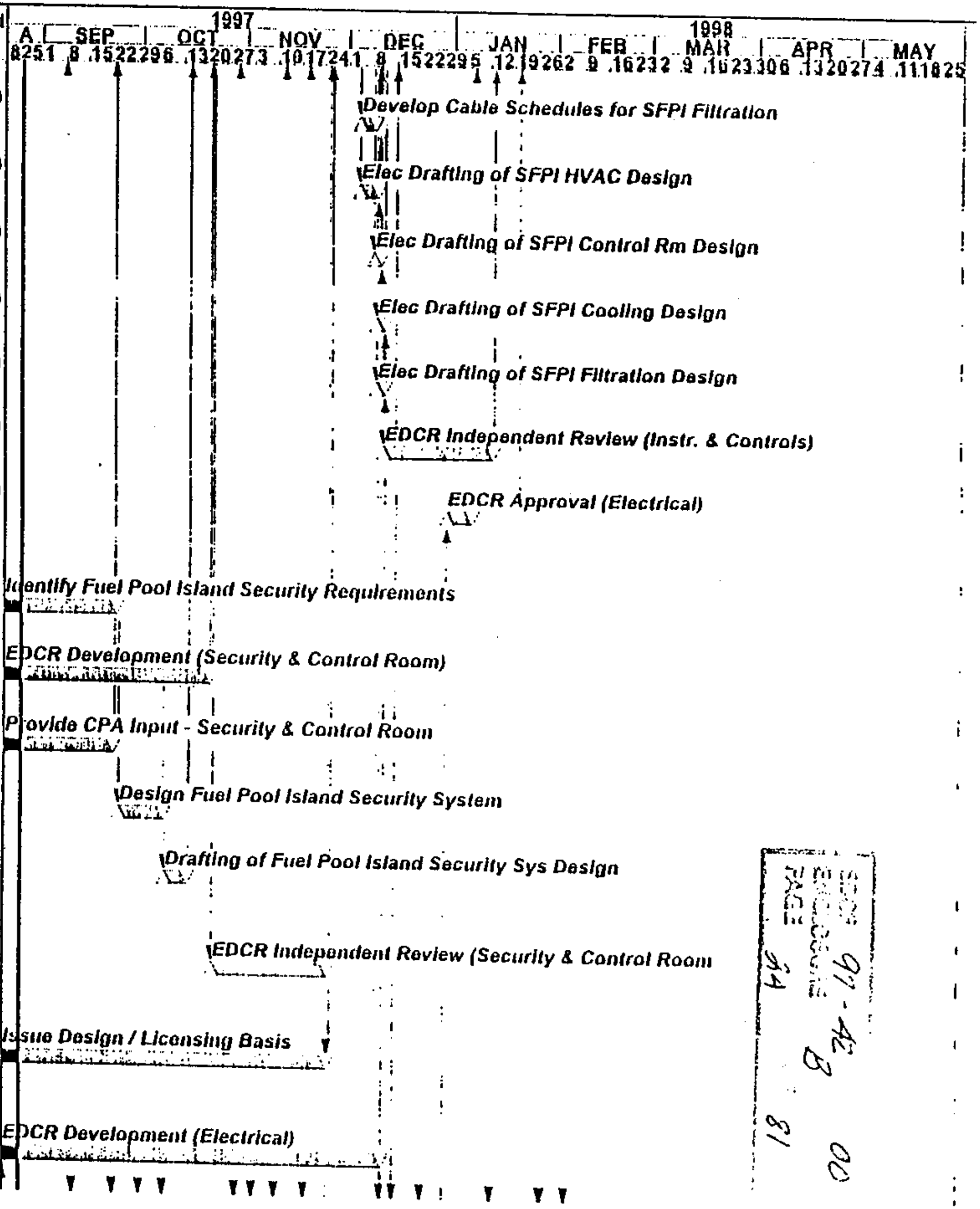
DCMI

Sheet 6 of 10

Maine Yankee Atomic Power Company

Prepared By: J Kelo @ ext 4842
Date
Revision
Checked
Approved

Activity ID	Orig Dur	Rem Dur	Early Start	Early Finish	Resource ID	Budg M/Hrs	Budgeted Cost
John Bonner - 2261							
SFPI-111	20	20	04DEC97 07:00	08DEC97 16:59	JB	10.00	700.00
SFPI-112	30	30	04DEC97 07:00	09DEC97 16:59	DRF	30.00	1,200.00
SFPI-112	30	30	08DEC97 07:00	10DEC97 16:59	DRF	30.00	1,200.00
SFPI-112	30	30	09DEC97 07:00	11DEC97 16:59	DRF	30.00	1,200.00
SFPI-112	30	30	09DEC97 07:00	11DEC97 16:59	DRF	30.00	1,200.00
SFPI-038	160	160	11DEC97 07:00	12JAN98 16:59	JB	80.00	5,600.00
SFPI-040	40	40	30DEC97 07:00	06JAN98 16:59	SU	40.00	2,800.00
Jerry Wojcik - 2348							
SFPI-092	220	160	12AUG97 07:00A	23SEP97 16:59	HT	220.00	13,200.00
SFPI-031	400*	320*	12AUG97 07:00A	21OCT97 16:59	JW	300.00	21,000.00
SFPI-025	170*	150*	21AUG97 07:00A	22SEP97 16:59	JW	21.10	1,477.00
SFPI-093	80	80	24SEP97 07:00	07OCT97 16:59	DB1	60.00	4,200.00
SFPI-094	40	40	08OCT97 07:00	14OCT97 16:59	DRF	40.00	1,600.00
Mike Mattox - 2142							
SFPI-037	200*	200*	22OCT97 07:00	25NOV97 16:59	MM	240.00	16,800.00
Bob Jordan - 4243							
SFPI-019	650*	520*	04AUG97 00:00A	25NOV97 16:59	BJ	650.00	39,000.00
Stan Urbanowski - 2360							
SFPI-028	630*	610*	21AUG97 07:00A	11DEC97 16:59	SU	60.00	4,200.00



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Project Start	05AUG97 00:00
Project Finish	16JUN03 16:59
Data Date	26AUG97 07:00
Run Date	28AUG97 14:00

Early Bar
Progress Bar
Critical Activity

DCMI

Sheet 7 of 10

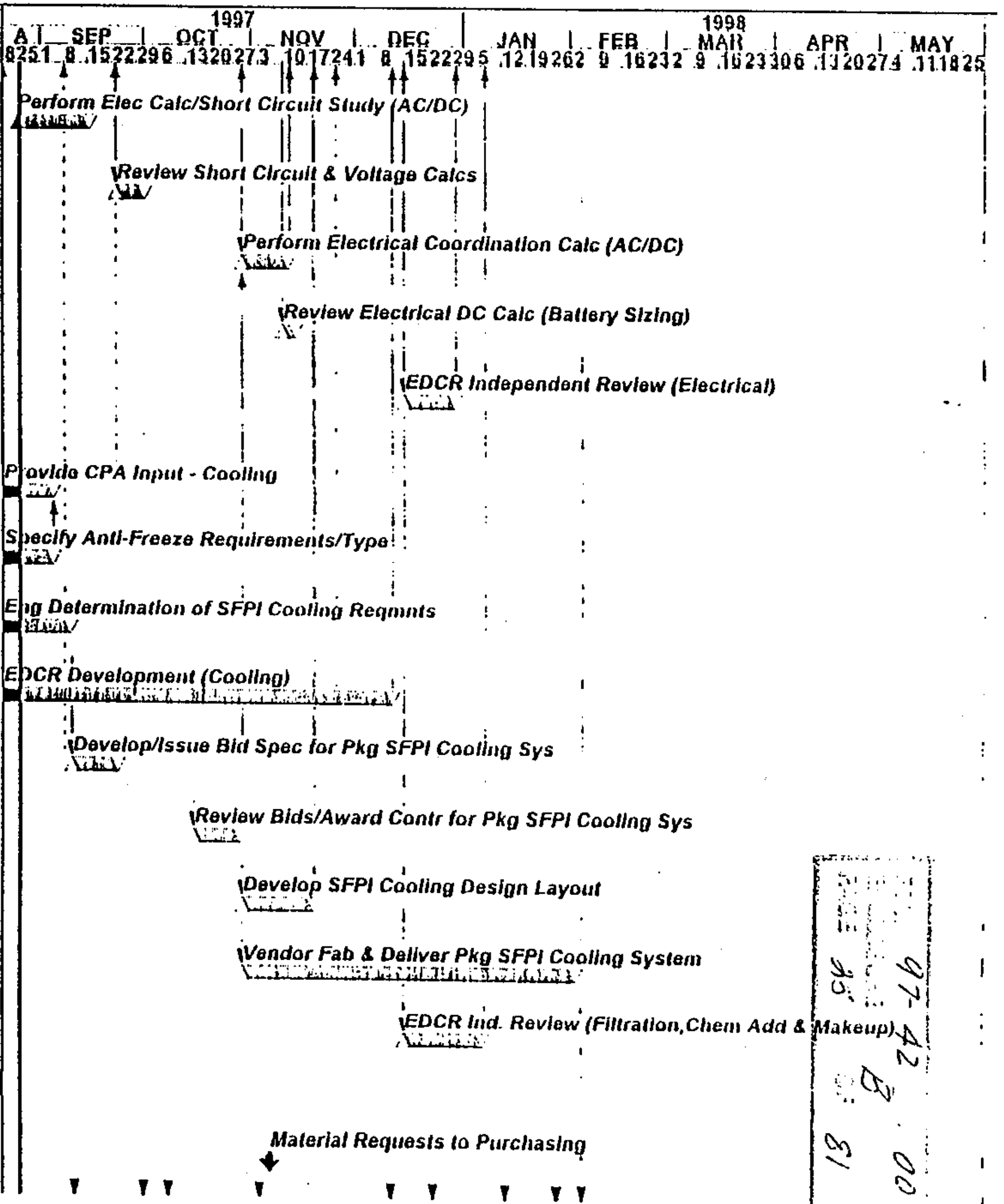
Maine Yankee Atomic Power Company

Spent Fuel Pool Island Schedule

Date | Revision | Checked | Approved

Prepared By: J Kelo @ ext 4942

Activity ID	Orig Dur	Rem Dur	Early Start	Early Finish	Resource ID	Budg M/Hrs	Budgeted Cost
Stan Urbanowski - 2360							
SFPI-060	120*	110*	25AUG97 07:00A	15SEP97 16:59	SU	50.00	3,500.00
SFPI-085	60	60	23SEP97 07:00*	01OCT97 16:59	JB+	80.00	5,600.00
SFPI-084	80	80	29OCT97 07:00*	11NOV97 16:59	SU	60.00	4,200.00
SFPI-083	40	40	10NOV97 07:00*	13NOV97 16:59	SU	20.00	1,400.00
SFPI-034	80	80	15DEC97 07:00	29DEC97 16:59	SU	80.00	5,600.00
Tom Marstaller - 5183							
SFPI-024	80*	60*	21AUG97 07:00A	04SEP97 16:59	TM	40.00	2,400.00
SFPI-136	80*	60*	21AUG97 07:00A	04SEP97 16:59	TM	40.00	2,400.00
SFPI-097	100*	80*	21AUG97 07:00A	09SEP97 16:59	TM	75.00	4,500.00
SFPI-030	630*	610*	21AUG97 07:00A	11DEC97 16:59	TM	250.00	15,000.00
SFPI-103	80	80	10SEP97 07:00	23SEP97 16:59	TM	40.00	2,400.00
SFPI-104	80	80	15OCT97 07:00	28OCT97 16:59	TM	40.00	2,400.00
SFPI-105	120	120	26OCT97 07:00	18NOV97 16:59	TM	60.00	3,600.00
SFPI-107	520	520	29OCT97 07:00	02FEB98 16:59	TM+	17.00	00,960.00
SFPI-033	120	120	15DEC97 07:00	06JAN98 16:59	TM	60.00	3,600.00
PROCUREMENT							
Steve Dahlgren - 4906							
SFPI-014	0	0	06NOV97 07:00*			0.00	0.00



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Project Start	05AUG97 00:00	Early Bar	DCMI
Project Finish	16JUN03 16:59	Progress Bar	
Data Date	26AUG97 07:00	Critical Activity	

Maine Yankee Atomic Power Company

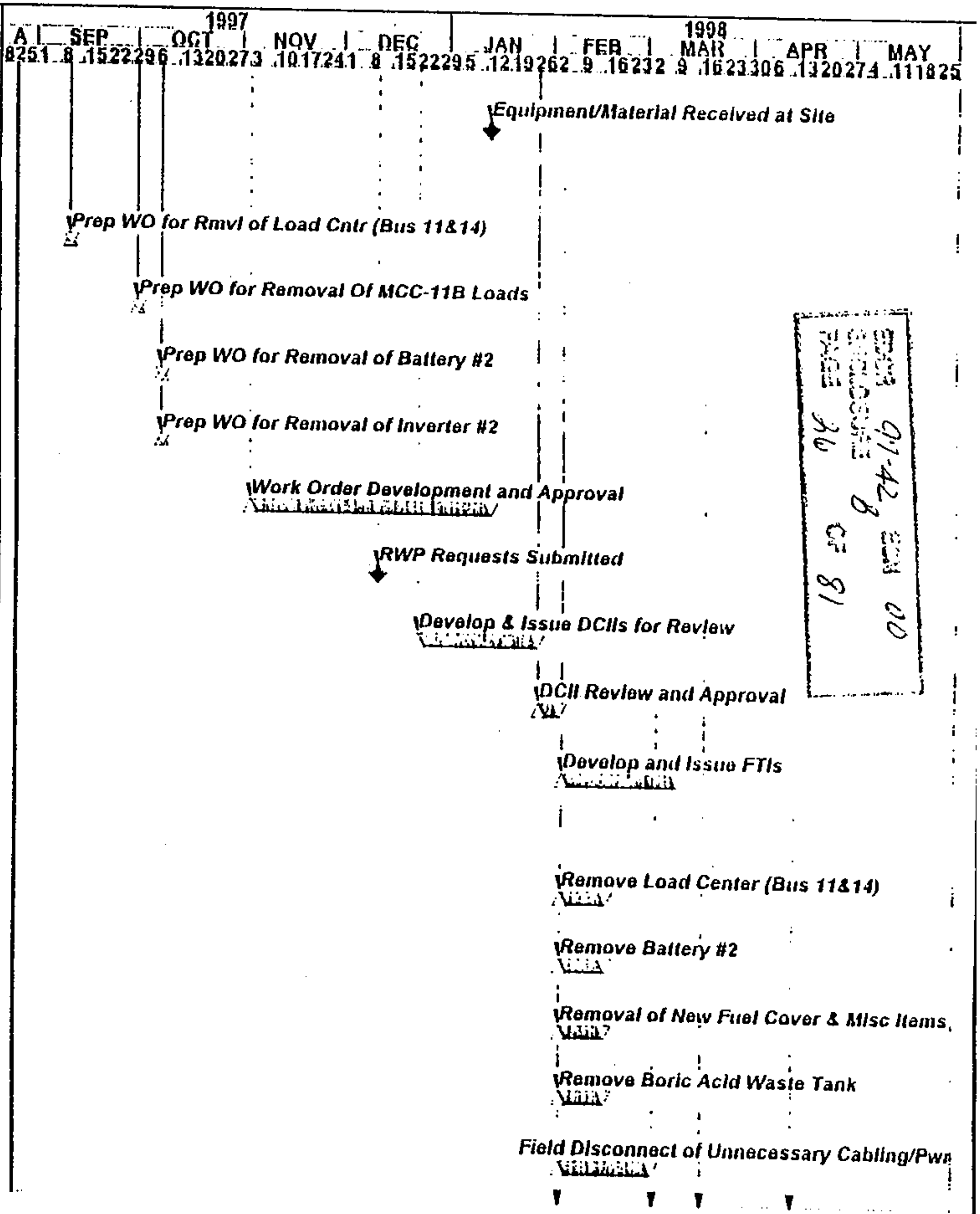
Sheet 8 of 10

Date | Revision

Prepared By: J Kelo @ ext 4942

Checked | Approved

Activity ID	Orig Dur	Rem Dur	Early Start	Early Finish	Resource ID	Budg M/Hrs	Budgeted Cost
Steve Dahlgren - 4906							
SFPI-015	0	0	13JAN98 07:00*			0.00	0.00
FIELD ENGINEERING (DCII, FTI & WO)							
Steve Dahlgren - 4906							
SFPI-077	10	10	11SEP97 07:00*	11SEP97 16:59	SD	10.00	700.00
SFPI-075	10	10	01OCT97 07:00*	01OCT97 16:59	SD	10.00	700.00
SFPI-074	10	10	08OCT97 07:00	08OCT97 16:59	SD	10.00	700.00
SFPI-076	10	10	08OCT97 07:00	08OCT97 16:59	SD	10.00	700.00
SFPI-009	390	390	03NOV97 07:00*	13JAN98 16:59	SD	195.00	13,650.00
SFPI-011	0	0	11DEC97 07:00*			0.00	0.00
SFPI-010	190	190	23DEC97 07:00	27JAN98 16:59	SD	95.00	6,650.00
SFPI-012	40	40	28JAN98 07:00	03FEB98 16:59	SD	20.00	1,400.00
SFPI-013	200	200	04FEB98 07:00	10MAR98 16:59	SD	100.00	7,000.00
FIELD CONSTRUCTION							
Steve Dahlgren - 4906							
SFPI-073	80	80	04FEB98 07:00*	17FEB98 16:59	SD	8.00	560.00
SFPI-078	80	80	04FEB98 07:00	17FEB98 16:59	SD	8.00	560.00
SFPI-137	80	80	04FEB98 07:00	17FEB98 16:59	SD	0.00	0.00
SFPI-139	80	80	04FEB98 07:00	17FEB98 16:59	SD	0.00	0.00
SFPI-091	160	160	04FEB98 07:00*	03MAR98 16:59	SD	16.00	1,120.00



Project Start	03AUG97 00:00
Project Finish	16JUN03 16:59
Data Date	26AUG97 07:00
Run Date	26AUG97 14:00

Early Bar
Progress Bar
Critical Activity

DCMI

Maine Yankee Atomic Power Company

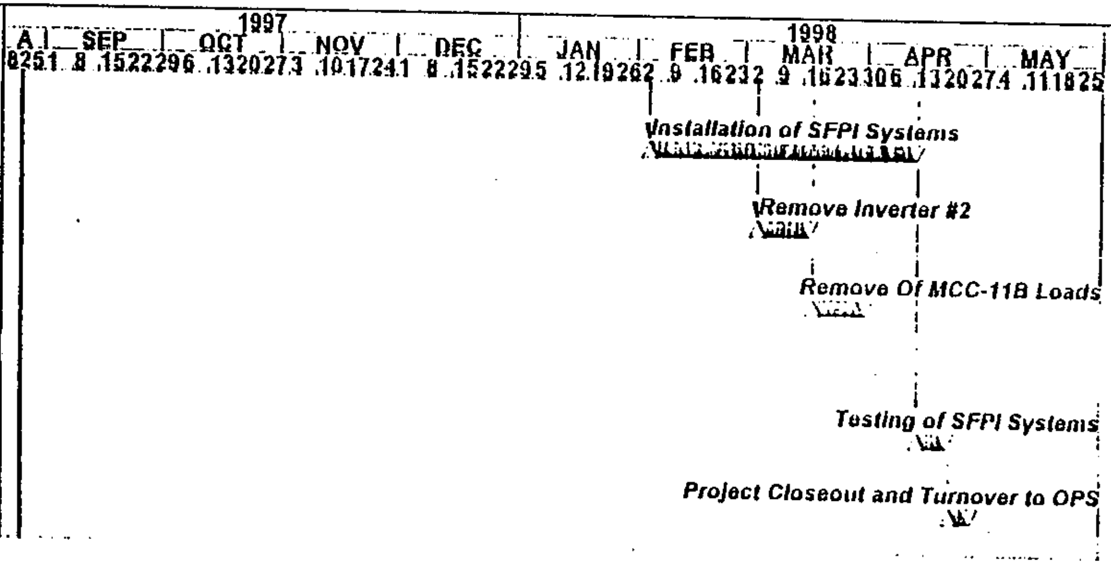
Spent Fuel Pool Island Schedule

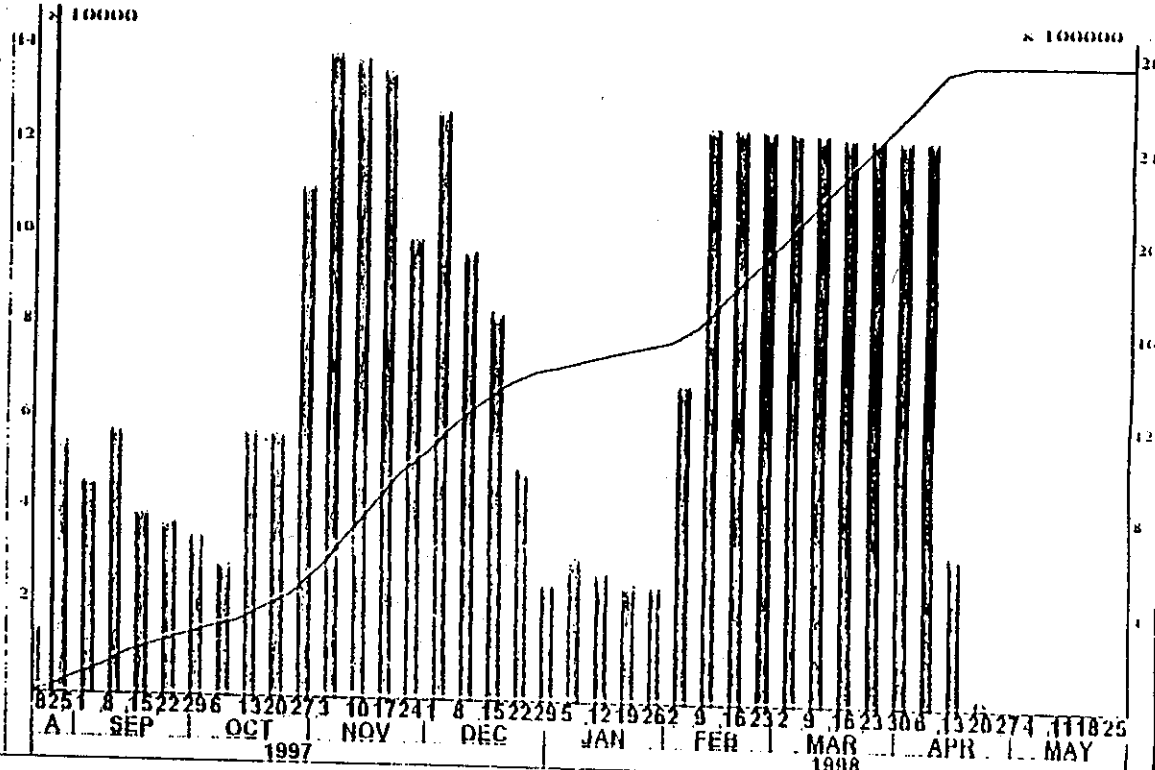
Sheet 9 of 10

Date | Revision | Checked | Approved

Prepared By: J Kelo @ ext 4942

Activity ID	Orig Dur	Rem Dur	Early Start	Early Finish	Resource ID	Budg M/Hrs	Budgeted Cost
Steve Dahlgren - 4906							
SFPI-016	390	390	04FEB98 07:00	13APR98 16:59	SD+	196.00	88,650.00
SFPI-079	80	80	04MAR98 07:00	17MAR98 16:59	SD	8.00	560.00
SFPI-080	80	80	18MAR98 07:00*	31MAR98 16:59	SD	8.00	560.00
TESTING & TURNOVER							
Steve Dahlgren - 4906							
SFPI-017	50	50	14APR98 07:00	21APR98 16:59	SD	50.00	3,500.00
SFPI-018	30	30	22APR98 07:00	27APR98 16:59	SD	30.00	2,100.00





EDCR 97-42 00
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PAGE 27 81

Resource/Cost Profile Legend

Detail scale (left): X 10000

Cumulative scale (right): X 100000

Total of All Resources

Total early cost per Week (Current Estimate)

Current estimate curve

Scheduled budget curve

Project Start	05AUG97 00:00
Project Finish	16JUN98 16:59
Data Date	26AUG97 07:00
Run Date	28AUG97 14:00

Early Bar

Progress Bar

Critical Activity

DCM1

Maine Yankee Atomic Power Company

Sheet 10 of 10

Date | Revision | Checked | Approved

Prepared By: J Kato @ ext 4942

CPA 97-42
ATTACHMENT 4

DOSE ESTIMATE FOR CPA 97-042			
Work Activity/Location	Estimated Man-Hrs	Est. Levels (mR/HR)	Est. Exposure (Man Rem)
HVAC			
FB El. 21' (Truck Bay Area) and Roof	1048	0.1	0.105
SFP Cooling			
FB El. 21' (Truck Bay Area) and Roof	862	0.2	0.172
Primary Make-up			
FB El. 44'	692	0.4	0.277
Ion Exchange Skid			
In SFP (Work from El. 44')	427	0.4	0.171
Electrical[1]			
FB El. 21' (Truck Bay Area) & in Yard	4451	0.2	0.890
I&C			
FB El. 21' & 44'	2466	0.3	0.740
Security			
FB/PAB El. 21' & 36'	950	0.2	0.190
FB Pipe Tunnel	320	5.0	1.600
VBS bollards (Yard Area)	1257	0.1	0.126
TOTAL	12473		4.271

[1] Assumes that only 33% of 13,487 total electrical work hours will be on the hotside.

CPA 97-42
ATTACHMENT 3

DOSE ESTIMATE FOR CPA 97-042

Work Activity/Location	Estimated Man-Hrs	Est. Levels (mR/HR)	Est. Exposure (Man Rem)
HVAC			
FB El. 21' (Truck Bay Area) and Roof	1048	0.1	0.105
SFP Cooling			
FB El. 21' (Truck Bay Area) and Roof	862	0.2	0.172
Primary Make-up			
FB El. 44'	692	0.4	0.277
Ion Exchange Skid			
In SFP (Work from El. 44')	427	0.4	0.171
Electrical[1]			
FB El. 21' (Truck Bay Area) & in Yard	4451	0.2	0.890
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FB El. 21' & 44'	2466	0.3	0.740
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FB/PAB El. 21' & 36'	950	0.2	0.190
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VBS bollards (Yard Area)	1257	0.1	0.126
TOTAL	12473		4.271

[1] Assumes that only 33% of 13,487 total electrical work hours will be on the hotside.

SFP ISLAND COOLING SYSTEM DESCRIPTION

I. GENERAL

The Spent Fuel Pool Island (SFPI) cooling system removes the decay heat from the spent fuel stored in the fuel pool by circulating the borated pool water through a heat exchanger to a secondary loop where fan coils disperse the heat to the outside atmosphere. The system maintains the temperature of the Spent Fuel Pool (SFP) temperature within acceptable limits.

II. SYSTEM DESIGN PARAMETERS

A. The SFPI cooling system is designed to meet the following performance criteria:

1. Maintain the SFP bulk water temperature less than or equal to 80°F with an outside air temperature 68°F (FSAR 2.2.2 highest mean temperature per year) with a duty of 4.31 Million BTUs per hour (Memo RPJ-97-80).

2. Maintain the SFP bulk water temperature less than or equal to 120°F with an outside air temperature of 87°F (ASHRAE 1% summer value for Portland, ME) with a duty of 3.21 million BTUs per hour (Memo RPJ-97-80).

3. Normally maintain the SFP bulk temperature between 75°F and 85°F year round.

4. Provide adequate surge capacity for cooling system temperature variations.

5. Provide redundant (installed spares) cooling pumps for maintenance activities.

6. The SFP secondary cooling system will be protected from freezing to -9°F (slightly below the ASHRAE 1% winter value for Portland, Me (-6°F)) by the addition of inhibited ethylene glycol to give a 40%(by volume) solution. This solution will provide burst protection to below -60°F.

7. Cooling system able to recover from an incident of a boiling pool where the water in the primary and secondary system may reach 212°F..

8. Maintain SFP bulk temperature above 68°F. This is the lower temperature assumed for the criticality analysis. Note: discussions with YNSD (R. Cacciapouti) confirmed that temperatures as low as 40°F could be shown to be acceptable, however, a formal analysis has not been performed at this time

9. The secondary system is protected from overpressure by the use of a surge tank and a thermal relief valve on the E-25 heat exchanger.

10. Normal make up of coolant is provided by the PWST. This will maintain pool level and secondary side inventory as needed.

B. Assumptions governing the establishment of system design basis parameters are as follows: (Draft Tech Specs).

1. Secondary cooling system pressure is normally maintained above Primary system pressure to avoid introduction of radioactive water into the secondary cooling loop.

2. Cooling system is seismically installed.

3. Spent fuel pool water borated to at least 1000 ppm.

4. Pool level maintained between 37.5 FT (high level alarm) and 35.5 FT (low level alarm).

5. Maximum operating temperature for pool is 140°F. (Note: The pool liner and concrete walls are being evaluated at the elevated accident temperature of 212°F.)

III. SYSTEM COMPONENTS

A. The SFP primary cooling system is comprised of the following equipment: (* Indicates existing plant equipment to be used.)

1. Fuel Pool Heat Exchanger, E-25*

   The fuel pool heat exchanger is a cross-flow heat exchanger of the shell-and tube design. The fuel pool heat exchanger is designed for 150 psi gage and 225°F on the shell side and 150 psi gage and 225°F on the tube side. The tubes are 304 stainless steel, and the shell is of carbon steel.

2. Fuel Pool cooling Pumps, P-17A&B*

   There are two fuel pool cooling pumps delivering a nominal flow of 1200 G.P.M. per pump. One pump is in service and the other is an installed spare. The internal wetted surfaces of the pumps are stainless steel.

3. Fuel Pool System Valves, FM-97A*

   All valves in the primary fuel pool system are stainless steel.

4. Fuel Pool System Piping, FM-97A*

   All the piping used in the fuel pool system is Type 304 stainless steel with welded connections throughout, except for flanged connections at the pumps, coolers and heat exchanger.

5. Instrumentation

The fuel pool has level and temperature alarms which provide high and low-level alarms and a high/low temperature alarm in the new control room. There is a pressure gage on the discharge of each pump. The fuel pool heat exchanger has temperature indicators on the fuel pool cooling inlet and outlet lines. More details of the overall I&C design is provided in Attachment A.6.

6. Water Chemistry

The fuel pool is demineralized water with boron added to greater than 1000 ppm.

7. Code Requirements

The Fuel Pool Heat exchanger was designed and built to: Tube side ASME Section III Class C (Paragraph UW-2(a) of Section VIII applies). Shell side ASME Section VIII. The fuel pool piping was designed to ANSI B31.1-1967.

B. The Spent Fuel Pool System Secondary System is composed of the following equipment

1. Water-to-Air Coolers

The multiple independently fan-cooled assemblies are of the finned coil type. Water mixed with ethylene glycol is in the tube side and air is blown across the coil to remove heat. The units are designed to 300 psig and 350°F. The normal operating parameters are anticipated to be 70 psig and 75°F. The tubes are stainless steel and the fins are aluminum.

2. Secondary Cooling Pumps

There are two secondary cooling pumps delivering a nominal flow of 1000 gallons per minute per pump. One pump is in service and the other is an installed spare. The internal wetted surfaces are stainless steel.

3. Surge Tank

The surge tank is sized to accommodate fluid expansion and contraction resulting from temperature variations in the secondary cooling loop. The tank is made from stainless steel and located on the pump skid.

4. Air Separator

The air separator, which is located on the pump skid, mechanically removes entrained air in the secondary coolant.

5. Secondary System Valves

All valves in the secondary system are stainless steel.

6. Secondary System Piping

All the piping used in the secondary system is Type 304 stainless steel, except for flexible steel guarded hoses at equipment connections

7. Instrumentation

There is a pressure gage on the discharge of each pump. The secondary system has temperature indicators on the inlet and outlet (which also indicate in the new control room) of the fuel pool heat exchanger. The primary and secondary loops have flow indicators that indicate total system flows. (See section IV.7 for more discussion).

8. Water Chemistry

The secondary system is demineralized water with inhibited ethylene glycol added to prevent freezing and corrosion. A program for chemistry monitoring is being developed.

9. Code Requirements

The secondary system piping is designed and built in accordance with the requirements of ANSI B31.1-1980, and Maine Yankee Piping Specification MYS-442 Rev. C, Class 152. The coolers, air separator, and surge tanks are designed/provided by the vendor. Pressure boundary design will be consistent with commercial industrial consensus standards (i.e. ASME, API, etc.) In accordance with the requirements of ANSI B31.1 and subject to Maine Yankee review and approval.

IV. SYSTEM ARRANGEMENT

1. Fuel Pool Cooling Pumps

The fuel pool cooling pumps are arranged in parallel, drawing a suction from the pool discharge line. The pumps then discharge the water to the inlet tube side of the Fuel Pool Heat Exchanger. One pump is normally operating and the other is an installed spare.

2. Fuel Pool Heat Exchanger

The fuel pool heat exchanger transfers heat from the primary system(pool cooling water in the tube side) to the secondary system(water in shell side).

3. Secondary Side Cooling Pumps

Circulates water from the fuel pool heat exchanger to the water-to-air coolers and back to the shell side of the fuel pool heat exchanger. The pumps are located in the Fuel Building at elevation 21 ft. One pump is normally operating and one is an installed spare

4. Secondary Side Cooling Surge Tank

The secondary side cooling surge tank provides system overpressure protection, volume for expansion and inventory for contraction of the secondary side cooling system during normal and abnormal operating conditions. The surge tank is located on the secondary side cooling pump skid.

5. Water-to-Air Coolers

The water-to-air coolers reject heat from the secondary system into the surrounding atmosphere by the use of finned tubes and forced air. The coolers are located in a diked area north of the current BWST dikes. The cooler fans are staggered to operate as the heat rejection rate changes with air temperature. Flow is provided to all the coolers whether or not the fans are operating. A cooler may be permanently removed from service once the cooling load (spent fuel decay heat) has decreased.

6. Emergency Connections

The currently yellow tagged hose connections (both fire water and SCCW) to the secondary side of E-25 heat exchanger will be maintained and made permanent as part of this design change. In addition to the existing diesel pump backed fire main connections inside and outside the Fuel Building, an existing fire hydrant adjacent to the fire pump house is connected to the Wiscasset water supply. This provides an additional means of cooling the spent fuel pool heat exchanger in the event normal cooling is interrupted.

V. SYSTEM OPERATION

1. General

The pumps are provided with local controls. These controls have a "stop-run" control switch, and running indication lights. One pump on each the primary and secondary cooling loops will initially run continuously year round. As the decay heat of the spent fuel decreases, periodic isolation of the cooling system may be required.

The water-to-air cooler fans are controlled from two temperature indicators on the primary system. Each temperature indicator will control nine fans on three units. This allows for the failure or maintenance of one control circuit without system shut down. Normally, the fans will start as the temperature in the system increases and will shut down as the system cools.

If the pool temperature rises above 90°F or falls below 70°F, an alarm is made in the control room.

Manual valves at each cooler will allow balancing of cooler water flow, and allow the coolers to be removed for maintenance. The coils can be drained locally.

In the event that a fuel handling or cask handling accident occurs, the heat load of the system is not effected.

Flanged connections are provided on the heat exchanger cooling (shell) side to allow the alignment of emergency cooling supplies, if needed.

If the running pump trips (primary or secondary) an alarm will annunciate in the new control room.

The secondary coolant is formulated with a corrosion inhibitor. If monitoring indicates the necessity, addition of corrosion inhibitor (dipotassium phosphate) to the secondary coolant can be accomplished using the "bleed and feed" method. No chemical addition tank or special valving arrangement is required.

2. Summer Operation

During summer operation with day temperatures in the 80s and evening temperatures in the 70s the secondary cooling system fans will cycle with air temperature. The secondary side cycling will affect the bulk pool temperature to some degree, however the mass of the pool acts as a thermal flywheel that will dampen any air side air temperature variations.

As the spent fuel decays, the heat load will decrease. At some point it will be possible to remove coolers from the system without affecting the original cooling margin. These coolers can be bypassed with a pressure reducing bypass to maintain system flow balance.

3. Winter Operation

During winter, most or all of the fans will be in standby and radiant and convective flow will remove heat from the coils.

If necessary because of maintenance, lack of heat load or loss of power, the secondary coolant can be shut down. The coolant is water mixed with ethylene glycol for protection from freezing.

VI. OTHER

The spent fuel island design team was charged with making the spent fuel pool and its auxiliary systems independent from the existing plant systems. The directive also was to make the systems:

1. Cool the spent fuel pool safely,
2. Low/no maintenance,
3. Minimal operator involvement during normal and abnormal conditions,
4. Cost effective.

Various options for cooling the spent fuel pool during decommissioning were examined. The options not chosen and the reasons why are discussed here.

1. Use the Existing System

Currently the Spent Fuel Pool is cooled by circulating the pool water through the Spent Fuel Pool Heat Exchanger where the heat is exchanged to the Primary Component Cooling water, the PCC is circulated through the Service Water Heat Exchangers where the heat is exchanged to Service Water and the SW carries the heat into the bay.

This system could cool the Spent Fuel Pool for the foreseeable future with little modification to the existing hardware. However, the continued use of this system is not proposed for these reasons:

A. Use of seawater requires measures be taken on a periodic basis to clean the intake, pipe and heat exchanger surfaces of the service water system, this is maintenance intensive.

B. The PCC system is large and would leave sizable portion of this system intact and pressurized.

C. To operate the SW and PCC systems requires the Circ. Water Pump House, the turbine building, the PAB and other structures be maintained and heated.

D. Site demolition around these operating systems would be difficult and costly.

2. Install a Smaller System Cooled by Seawater, Firewater or Wiscasset Town Water

This system could be installed but was rejected for the some of the same reasons stated for leaving the Existing Systems, namely:

A. The high maintenance required by using a once through, non chemically controlled water, i.e., macro fouling by mussels, seaweed, leaves etc., micro fouling by algae, biological growth, corrosion attack by impurities and biological growth.

B. The Spent Fuel Pool Heat exchanger would require replacement (since cooling is on the shell side which cannot be cleaned) or a loop similar to PCC would be required.

SFP ISLAND COOLING SYSTEM DESCRIPTION

C. The use of firewater or town water as the primary source eliminates its availability as a emergency backup source.

D. Cost of town water @ $1000.00 per GPM per year equals approx. $1,000,000.00 per year in water costs alone.

3. Cooling tower similar to the existing one installed for the staff building.

   This system which uses the evaporation of a portion of the heated fluid to cool the fluid could be installed but was rejected for the following reasons:

   A. The system removes heat by evaporation, this requires the use of water which can freeze if the system is shut down or trips.

   B. Chemically treated makeup water is required to prevent significant biological/organic growth.

   C. Consequences of the secondary side becoming contaminated are greater because of the potential for an unmonitored radiological release. The proposed closed cooling system would only result in a release if both the coolant became contaminated and had a leak outside the Fuel Building.

4. Water Spray cooling of Secondary Loop Cooling Coils.

   This system which is similar to the fan driven air cooled proposal except the coils are cooled by a water spray to increase heat transfer and reduce cooler size. A system similar to Connecticut Yankee's current proposal, could be installed but was rejected because:

   A. Adds a third loop to the system without reducing overall system size and increases complexity.

   B. The system removes heat by evaporation, this requires the use of water which can freeze if the system is shut down or trips.

   C. Chemically treated makeup water is required. (See discussion above)

5. Directly cool the pool water with the coils.

   The system would use the pool water on the tube side of the air cooled coils.

   This design would require piping modifications and new pumps on the existing Class 3 system and was rejected because:

   A. Add volume and locations of circulating radioactive water.

   B. Require new pumps making the change over to the new system difficult.

C. The circulating fluid could freeze when shut down on loss of power.

D. Consequences of leakage in cooling loop are sever.

E. Coolers may need security protection to prevent sabotage/draining of the SFP.

6. Place the air coils inside.

This system would place the air cooled coils inside to prevent the water from freezing. Duct work may be required to maneuver the air.

This system was strongly considered but rejected because:

A. The physical size of the coils, 12 by 5 foot print per unit (six total units) and ductwork.

B. The air flow requirements of 50,000 cubic feet per minute per unit, 300,000 CFM total.

C. Duct work, wall penetrations and fans required to move the air are large and expensive.

7. Place the air coils as proposed without Ethylene Glycol

This system is the current proposal without Ethylene Glycol as freeze protection to the secondary cooling water

This proposal was rejected because:

A. Reduced staffing affects the ability to drain the coolers to prevent freezing if the system trips.

B. As heat load reduces, the secondary can be shut down. Without freeze protection, the system must remain running or be drained.

C. Misadjustment of valve lineups could cause low/no flow to some areas increasing the danger of freezing.

8. Chiller System

This system involves the use of a chiller (air conditioner) to remove heat. The system was rejected because:

A. High initial cost.

B. Still requires water or air cooled condenser.

C. Complex equipment and controls to maintain.

9. Summary of design choice

The fan cooled closed loop coil system with Ethylene Glycol was chosen because:

A. Simple system with as few moving parts as practical.

B. Forgiving to operational error and equipment failure.

C. Low maintenance and cost effective.

SFP ISLAND PURIFICATION & MAKE-UP SYSTEMS DESCRIPTION

I. GENERAL

The Spent Fuel Pool (SFP) Island purification system maintains the water chemistry of the SFP within acceptable limits. The SFP make-up water system provides make-up water to the primary and secondary SFP island systems.

II. SYSTEM DESIGN PARAMETERS

A. The SFPI purification system is designed to meet the following performance criteria:

1. The SFP island purification system will maintain the boron concentration in the SFP greater than the 1000 ppm, based on anticipated Technical Specification reductions in boron concentration requirements.

2. The SFP island purification system will maintain the following water chemistry in the SFP in accordance with the revised technical specifications and the IASD:

   Boron > 1000 ppm
   pH 4.5 - 10.5 @ 77°F
   Chlorides < .1 ppm
   Halogens < .25 ppm

B. The SFPI make-up water system is designed to meet the following performance criteria:

1. The maximum boil-off rate of the SFP is assumed to be 60 gpm per the current FSAR. The SFP make-up system will be capable of providing the emergency design basis make-up flow to the SFP by taking suction from the PWST, fire pond, or Wiscasset town water system.

2. The SFP make-up system will provide the normal make-up water to the primary and secondary systems. Make-up requirements are estimated to be approximately 100,000 gallons per year for the primary system, based on an anticipated fuel pool evaporation rate of .2 gpm, and 1000 gallons per year for the secondary system.

III. SYSTEM COMPONENTS, ARRANGEMENT, AND OPERATION

A. The SFPI purification system, which consists of filtration, ion exchange, surface skimmers, and boron addition, is described below:

1. Filtration

   The filtration system will normally be out of service. The system can be started and the appropriate filters valved in as needed. The current purification system will be utilized for filtration. Pump P-85 will take suction from either the SFP surface skimmers, the SFP pump suction, or the SFP heat exchanger discharge. The pump discharge will be routed through FL-2 and/or FL-29 and will return to the spent fuel pool through the spent fuel pool cooling discharge line. The current path to the spent fuel pool ion exchanger (I-4) will be removed.

2. Boron Addition

The boron addition system will be a temporary system that can be connected as needed. The system will consist of a tank, mixer, pump, hoist and funnel. The boron can be hoisted up and dumped into the tank of water through the funnel. The mixer will be used to mix the boric acid into solution. The mixer can then be removed and the pump inserted to pump the solution into the filtration system, (discharge of P-85) and added to the SFP.

A permanent boron addition system is not considered to be a necessary addition since the current boric acid concentration of 1720 ppm is well above the new requirement of 1000 ppm and major reductions in boron concentration are not anticipated.

A permanent boric acid mixing system could be added as a second option. The zinc addition system may be used as a permanent boric acid addition system.

3. Demineralization

The ion exchange system will operate as necessary to maintain the pool water chemistry within acceptable limits (Note: Continuous operation is acceptable but probably not required). An underwater demineralizer system will be used. The system will rest on the bottom of the SFP, initially in the spent fuel cask area. The system can be easily moved to the top of a spent fuel rack or out of the pool completely, if and when a cask is going to be brought into the spent fuel pool. Suction will be taken from one side of the pool and discharge to the opposite end of the pool. All equipment will be located under water except power cords and a flow-metering device. All operations will be performed from above with the system under water. Resin replacement will be accomplished with the use of a pump and sluicing water. Removal of the resin will be performed by taking a suction on the demineralizer with the pump and replacing the volume with sluicing water provided at the sluicing connection. Resin will be transferred to a suitable High Integrity Container (HIC). Resin will be added by flooding the clean resin drum with DI water and pumping the resin slurry into the demineralizer. Replacement of the resin is dependent on water chemistry. It is anticipated that replacement of the resin will be on an infrequent basis.

An additional option which was considered involved the addition of a skid mounted demineralizer connected to the existing purification system and installed in the spare floor plug in the fuel handling building.

4. Elimination of Organics

An evaluation was performed to assess the need to install a treatment system to deal with potential organic growth concerns. Since organic growth concerns have never been identified a problem in the past, it was decided to monitor the new SFPI and postpone an organic treatment system at this time. (Note: An Ultraviolet (UV) system, similar to the one in use at Yankee Rowe, can be easily installed in the future if any organic growth concerns arise.)

SFP ISLAND PURIFICATION & MAKE-UP SYSTEMS DESCRIPTION

B. The make-up system for the primary and secondary cooling loops is described below:

1. Primary and Secondary Make-up System

The primary system will be used for normal and emergency make-up capabilities. Normal make-up is supplied from the PWST through Primary Water Pump P-24B, which will be removed from its current location in the lower level PAB and relocated to elevation 21' in the Fuel Building (FB). Suction and discharge piping at the pump's current location will be blind flanged. This pump will take suction from the existing PWST suction line located outside the FB roll-up door. Pump discharge will tie into the fuel pool filtration system at elevation 21', just downstream of the existing make-up tie-in. The discharge will also be routed to the 3" recirculation line located outside the roll-up door, and to new primary hose connections at elevation 21' and elevation 45'. The pump will have sufficient capability to provide make-up and the maximum boil-off rate of the SFP.

A hose connection will be provided on the make-up line to the spent fuel pool to provide for make-up from the domestic water and fire protection water systems. The selected hose connections are located such that boiling in the pool will not significantly limit accessibility in a steam/fog environment.

Make-up of water to the secondary system will be provided through a hose connection located on the primary make-up pump discharge through a hose to be routed to the secondary system pump suction.

The maintenance of the correct glycol concentration in the secondary system will be performed by periodic sampling of the secondary coolant to determine glycol concentration. Addition of glycol to this system, if required, will be performed manually by transferring the required quantity of glycol from drums into the system. No permanent glycol make-up system will be provided.

2. PWST

The PWST is a nominal 150,000 gallon tank located in the yard at the north end of the fuel building. This tank will be retained to provide a source of DI water for make-up to the spent fuel pool and to provide other DI water needs in the fuel building. The current tank heating system using auxiliary steam will be deleted and freeze protection will be provided by a new immersion heater in combination with new tank insulation. Existing heat tracing on the lines running to and from the tank will be retained and repowered to prevent freezing of the lines.

Fill of the tank will be accommodated by the addition of an inlet connection located on the existing pump suction line. This connection will be located on the lines outside the fuel building and will be heat traced accordingly. As an alternative, the fill connection may be located within the fuel building at the 21' elevation. Location of the fill connection on the pump suction line will allow direct fill of the tank through backflow into the tank or by operation of the new primary water make-up pump discharging through the pump recirculation line. (Note: As decommissioning proceeds, the ability to make DI water will eventually be eliminated. At that time, it is envisioned that a DI truck will simply connect to a local fire hydrant, create the DI water and pump it into the PWST.

3. Domestic and Fire Protection Water

Spent Fuel Pool make-up may also be accomplished by providing water from the domestic water system and from the fire protection water system. Water will be provided by hose connection from a hydrant located near the existing fire pond (Domestic Water) and from a hydrant located at the west side of the fuel building (Fire Protection Water). A hose will be routed from either hydrant to a hose connection provided on primary water system inside the fuel building.

SFP ISLAND VENTILATION SYSTEM DESCRIPTION

I. GENERAL

The Spent Fuel Pool Island (SFPI) ventilation system maintains the temperature and relative humidity of the Fuel Building (FB) atmosphere within acceptable limits, provides adequate fresh air for the occupants, limits introduction of particulate matter, and prevents the forced exhaust of contaminated air in the event of a radiological emergency. Instrumentation installed in the ventilation system provides the capability to monitor and/or sample radioactivity in the effluent air stream. In addition, this system establishes and maintains an acceptable environment for personnel occupying the control room (located in the security gatehouse), and for the equipment located in this space.

II. SYSTEM DESIGN PARAMETERS

A. The SFPI ventilation system is designed to meet the following performance criteria:

1. Maintain the FB bulk air temperature ≥ 60°F with an outside air temperature of -6°F (ASHRAE 1% winter value for Portland, ME).
2. Maintain the FB bulk air temperature ≤ 95°F with an outside air temperature of 87°F (ASHRAE 1% summer value for Portland, ME).
3. Maintain the temperature in the security gatehouse, including the control room, between 68°F and 75°F.
4. Maintain the relative humidity in the control room between 30% and 70%.
5. Provide adequate fresh air to support continuous occupation by at least ten people in the FB, and ten people in the security gatehouse, of which four are in the control room.
6. Provide continuous 60% efficient filtration (per ASHRAE 62-1989) of the supply air to the FB
7. Maintain the FB at a slight negative pressure relative to the outside so that the effluent air can be monitored and sampled for radioactivity.
8. The running exhaust fan, and its associated isolation damper, will automatically trip on a high radiation signal generated either by the FB building area radiation monitor, or by the radiation monitor installed in the FB exhaust duct.
9. In addition to providing a fan/damper trip function, the continuously operating monitor installed in the FB exhaust duct will ensure that any significant release of radioactive noble gases can be identified.
10. Sampling capability for radioactive particulates, noble gases, and tritium in the building effluent air will be provided by means of a sample canister(s) installed in the exhaust

duct. Access to the sample canister(s) will be provided in the common ductwork at the inlet of the exhaust fans

11. The SFPI ventilation system is not designed to meet any specific relative humidity requirements for the FB, or for the control room. It is expected that FB bulk atmosphere relative humidity will range from approximately 20% (winter) to 80% (summer) depending on the outside air conditions. Condensation on the building inside walls should be prevented by a combination of air heating and exhausting air from above the SFP.

12. Provide personnel exclusion (security) barriers for ductwork which penetrates any FB wall.

B. Assumptions governing the establishment of system design basis parameters are as follows:

1. Under no conditions is carbon filtration of the FB exhaust air required. This assumption is based on a review of FSAR Sections 5.2.4 and 9.8.1, Tech Spec 3.25.C, and discussions with John DiStefano of YNSD Radiological Engineering Group.

2. No ventilation, heating, or cooling is required for the drumming room or the new fuel room.

III. SYSTEM COMPONENTS

A. The SFPI ventilation system is comprised of the following equipment:

1. Inlet air louvers

The inlet air louvers allow passage of cooling and fresh air into the FB, while excluding rain and snow. Each louver assembly is equipped with a coarse screen to prevent birds from entering the building. They are weather-resistant, passive devices with no moving parts, and are therefore not subject to failure as a result of any forseeable operating condition or event.

2. Inlet air dampers

The inlet air dampers, installed downstream of the louvers, are manually operated and are intended to allow closure of the louver openings during winter months. Each parallel blade damper assembly is equipped with an operating handle which can be locked in any position from full closed to full open.

3. Inlet air filters

24"x24"x4" disposable air filters, which meet the ASHRAE 60% efficiency criteria for 3 micron particles, are installed downstream of the inlet air dampers. These filters will remove much of the airborne dust which would otherwise enter the FB atmosphere. They are sufficiently rigid to withstand impingement of rain and snow, and their performance characteristic is such that filter pressure drop is negligible at system design flows. Filters of this type are readily available from major suppliers. Local D/P gauges will be installed to permit easy determination of the onset of filter clogging.

4. Building exhaust fans

Two centrifugal exhaust fans are provided for the SFPI, a minimum flow fan for winter operation, and a high flow fan for summer operation. The exhaust fans are mounted on the FB roof, draw air from the exhaust duct located above the SFP, and discharge it to atmosphere. Each fan is driven by a single speed motor. Air flow is directed to the operating fan by two electrically-actuated dampers, one of which isolates flow to the idle fan. The high flow fan draws sufficient ventilation air through the building to limit bulk air temperature to the design maximum of 95°F. The low flow fan ensures that during periods of low outside temperature 1) moisture which evaporates from the pool surface will be exhausted to the outdoors, and 2) fresh air requirements are met. A gravity-operated backdraft installed at the outlet of each fan excludes weather from the fan internals.

Heavy steel grating is installed in the duct at the FB roof penetration to prevent unauthorized entry into the building via this opening.

5. Heat exchanger room ventilation fan

A platform-mounted centrifugal fan provides unconditioned FB air to the heat exchanger room on elevation 21'.

6. Unit heaters

Electric resistance unit heaters are provided to maintain the FB bulk air temperature at a minimum of 60°F, and to prevent the condensation of moisture on the building interior walls.

7. Radiation monitoring and sampling of effluent air

Later - The specific monitoring requirements are currently be developed by YNSD.

8. Security gatehouse/control room air conditioning system

The security gatehouse air conditioning system conditions the air for this building, including the SFPI control room. This system consists of a central air handler, three area exhaust fans, and two supplementary roof-mounted heat pump units. The central air handler has mixing, filter, fan, electric heating coil (74 Kw), and refrigerant cooling coil sections. A reciprocating refrigerant compressor, with a roof-mounted air-cooled condenser, supplies the unit's DX cooling coil.

IV. SYSTEM ARRANGEMENT

1. Inlet air louvers

   The inlet air louvers are installed in the Northwest corner of the West wall at elevation 44' of the FB. The louver sections are sized to provide a negligible pressure drop at design airflow conditions so that excessive negative building pressure cannot occur (the exact size of these devices will be determined later). The design of the louvers is such that no additional provisions for security barriers are required.

2. Inlet air dampers

   The inlet air dampers are attached to the downstream sides of the louvers. They are accessed by the same means as the filters - see discussion on filters below.

3. Inlet air filters

   The inlet air filters are housed within filter racks attached to the downstream side of each damper assembly. Front access will be provided to these racks using the existing steel grating walkway so that the filters can be easily changed.

4. Building exhaust fans

   These exhaust fans are mounted on the FB roof at roughly the 8½ line. In order to minimize work over the SFP, the existing exhaust duct and registers are utilized in the new system. The exhaust duct will be modified so that it no longer enters the PAB, but rather continues straight along the FB East wall, and then turns 90° up to a new roof penetration. Once through the penetration, the duct (insulated with rigid fiberglass board) runs straight toward the exhaust fans, then split into two runs, the larger of which connects to the inlet of the high flow fan. In each of the two duct runs there is a manual balancing damper, and an electrically-actuated control damper. The control damper for the low flow fan automatically opens when this fan runs, and the high flow fan control damper closes. The opposite alignment takes effect when the high flow fan runs.

5. Heat exchanger room ventilation fan

   This fan is installed on the platform at elevation 36'. It discharges unconditioned building air into existing ductwork which passes through the new fuel room and down into the heat exchanger rom.

6. Unit heaters

   The electric unit heaters are located in the North end of the FB, and just North of the SFP along the West and East walls; the number, size, and exact location of the heaters will be determined later. They are installed so that they do not interfere with crane operation or any other activities expected to take place in the FB.

7. Radiation monitoring and sampling of effluent air

Later - The specific monitoring requirements are currently be developed by YNSD.

8. Security gatehouse/control room air conditioning system

This system is unchanged from the arrangement shown on current plant drawings (see FB-29C shts. 1 & 2), with the following two exceptions. First, the water-cooled refrigerant condenser has been replaced with an air-cooled condenser mounted on the building roof. Second, minor rearrangement of the supply and return ductwork has been performed to accommodate construction of the control room.

V. SYSTEM OPERATION

1. General

The exhaust fans are provided with a local control panel. This panel has a fan control switch and running indication lights. The control switch can be selected to "High Flow-Stop-Low Flow". In the High Flow position the high flow fan will run, and airflow to the idle low flow fan will be secured, and in the Low Flow position the low flow fan will run, and airflow to the idle high flow fan will be secured. One fan will run continuously year round; at no time will both fans be running. The electric control dampers will automatically align in response to the selected operating mode. A position switch on each damper will allow its respective fan to start when the "full open" contact is made. This control scheme prevents a fan running with its control damper closed. Typically, the High Flow mode will be selected during periods of warm weather, including warm days in the Spring or Fall. The Low Flow mode will be selected during periods of cold weather, and on cooler evenings in the Spring or Fall.

Manual balancing dampers are installed in the duct at the inlet of each of the exhaust fans. These dampers are used to limit the system flow to its design maximum value (+/-10%) at the time of system startup when a test and balance of the system is performed. If the position of either of these dampers is changed after the initial system test and balance, the new airflow(s) must be measured and recorded. It is necessary to know the exact system airflows (for both high and low flow modes) so that radioactive effluent release quantities can be accurately calculated.

During the winter, wind-driven flow through the louvers is prevented by manually closing one or more of the dampers located downstream of each louver section. At least one damper set should remain at least partially open during the winter to assure an adequate air supply to the FB. If all manual dampers are closed, the building pressure may become excessively negative, making doors difficult to open.

SFP ISLAND VENTILATION SYSTEM DESCRIPTION

The heat exchanger room fan is operated using its local "Run-Stop" control switch, and runs continuously to provide ventilation to this space.

Each electric unit heater will be controlled automatically by its own manually adjustable thermostat. If desired, the thermostat control can be selected to "run", thereby bypassing thermostatic control and permitting the heater to run continuously.

In the event that a fuel handling or cask handling accident occurs, the control damper for the running exhaust fan will be tripped on a high radiation signal generated by either area or duct-mounted radiation monitors. A damper position switch will trip its associated fan when the switch is "not-full-open". An existing radiation monitor can be used to provide the area monitoring function.

Air filters will be changed when they become visibly dirty, or when building negative pressure becomes excessive, whichever occurs first. (Local D/P gauges will be installed to aid in detecting the onset of filter clogging.)

Radiation monitoring and sampling - Later

The security gatehouse/control room air conditioning system operates automatically year round by thermostatic control to heat or cool the rooms in this building.

2. Summer Operation

During summer, all louver outlet manual dampers will be fully open, and system airflow will be at its high design value. Failure to open these dampers will result in building overheating and excessive negative pressure.

The heat exchanger room fan will run continuously, supplying unconditioned air to the heat exchanger room.

If necessary, the electric unit heaters adjacent to the SFP can be run manually to prevent or eliminate condensation on the building interior walls.

3. Winter Operation

During winter, most or all of the louver outlet dampers will be closed to prevent overcooling of the FB. The system airflow will be at its low design value, and the unit heaters will be cycling off their respective thermostats.

The heat exchanger room fan will run continuously, supplying unconditioned air to the heat exchanger room.

If necessary, the electric unit heaters adjacent to the SFP can be run manually to prevent or eliminate condensation on the building interior walls.

VI. OTHER SYSTEM CONFIGURATIONS CONSIDERED

The ventilation system selected for the FB consists of once-through ventilation supplemented with stand-alone air conditioning units. Other options to condition the FB atmosphere were considered and rejected; these options are discussed below.

A. Recirculation system

A recirculating ventilation system would consist of a roof-mounted air handling unit with fan, filter, mixing box, and refrigerant cooling coil sections. The existing exhaust duct would be re-routed to the inlet of the unit and new supply duct would be run down the outside of the East wall. The supply duct would penetrate the East wall below the 5 ton crane rail and discharge downward at an angle toward the Northwest corner roll-up door. A condensing unit would be located on the roof adjacent to (or as part of) the air handling enclosure. Fresh air would be introduced into the FB through the unit's mixing box. The building would be heated using electric unit heaters since they are less expensive to purchase than a central heating coil, and they provide more operating flexibility.

Several significant disadvantages are associated with this system. First, access to the air handler and condenser is less than ideal, as this equipment would be located on the FB roof (elevation 72'-10"). Second, the FB would be at a slight positive pressure due to the introduction of outside air into the mixing box. This could be overcome by installing a system exhaust fan, either in the air handler or separate from it, to control building pressure. An additional fan, however, increases electrical demand, roof weight load, purchase and operating costs, building heat load, and system controls complexity. Third, a substantial new run of supply duct is required.

B. Use all or part of existing ventilation system

Supply air to the FB is currently provided by HV-3, an air handler located in the ventilation equipment room on elevation 44'-6". Air is exhausted by FN-48, located in a room adjacent to elevation 44'-6" of the PAB. Continued use of the existing system presents a number of problems. First, the security perimeter would increase significantly beyond the FB boundary in order to encompass this equipment. Even if just HV-3 were to remain in service, a new exhaust fan would have to be purchased. This half-new, half-old system would have a higher operating cost than the proposed system, be more complex, and require careful balancing to maintain negative building pressure when inlet airflow to HV-3 is manually reduced to support winter operation. Note that if airflow to HV-3 were not reduced during winter, the heating load would be very high.

C. Use a single variable-speed drive exhaust fan in the proposed system

The use of a single variable-speed drive exhaust fan in the proposed SFPI ventilation system was considered, but rejected due to the need to monitor the effluent air for radioactive constituents. In order to quantify radioactive releases, the exact airflow quantity must be known. To do this in a variable flow system, a flow-measuring pitot array (or other flow measuring device) must be installed in the duct. This measuring instrumentation can be complex and expensive to purchase, and it requires periodic calibration. While the variable flow design is technically a good one, in this application it was determined to be less desirable than installing two single-speed fans.

A variation of the variable-speed drive fan, a fan with a two-speed motor, was also considered and rejected. Using two single-speed fans allows greater flexibility in balancing the system airflow, and the desired low flow airflow may not be able to be achieved given the motor size and fan characteristics needed to meet the high flow requirements. In addition, the two-fan approach provides some level of redundancy, although the low flow fan is obviously not capable of maintaining design building temperature during the warmest summer days.

VII. SYSTEM INSTALLATION DETAILS

A. Hot side installation

1. Cut 6' x 24' opening in West wall in Northwest corner of FB at elevation 44'.

2. Re-frame with steel (if necessary) to allow installation of louver/damper/filter assemblies.

3. Install louvers, dampers, and filters. The four louver sections attach to the building steel framework, the dampers attach to the louvers by means of sheet metal sleeves, and the filter racks attach to the dampers by sleeves also.

4. Fabricate and install hanging supports for six electric unit heaters (heaters weigh approximately 75 lb each). These supports can hang from existing building steel in some cases, or they may mount on the walls.

5. Install six unit heaters.

6. Cut the existing supply ductwork at the transition from 22" x 20" to 10" x 12", and remove the larger supply duct (see dwg. FB-16A). Run new 10" x 12" duct to the Southwest corner of the steel platform at elevation 36'. This is approximately 20' of duct total, including two new elbows.

7. Install a new 1/2 HP fan on the 36' steel platform, and connect to the 10" x 12" duct using a flex connection. Install 11" round duct (approx 2') and screen on fan inlet.

8. Cut and frame an opening in the FB roof to allow passage of the 20" x 45" duct (see 9. below).

9. Remove the existing vertical run of 20" x 45" exhaust duct on the East wall of the FB by the spent fuel pool (see dwgs. FB-16A and B). Continue the existing horizontal run of this 20" x 45" duct (B.O.D. 64') to just before the 8¾ line, install an elbow, and run this duct up through the new opening in roof. Install security grating in roof opening.

10. Once through the roof, install a 20" x 45" elbow in the duct. Install a 20" x 20" branch duct off the main run. Install 20" x 20" and 20" x 45" manual balance and control dampers in the duct runs. Install a transition to 42" round on the larger run of duct and a transition to 17" round on the smaller duct. Install duct supports as necessary.

11. Install roof rails (2 per fan) to allow mounting of two centrifugal exhaust fans (fan housing dimensions later).

12. Install the two exhaust fans on the roof rails.

13. Connect the 17" and 42" round ducts to their respective fans using flex connections.

14. Install rigid fiberglass board insulation on the rooftop duct, and cover the insulation as appropriate.

B. Cold side installation

1. Install new air-cooled condensing unit for the security gatehouse/control room air conditioning system on roof of this building.

2. Run power to new condensing unit.

3. Cut roof and install round sleeve to allow passage of new refrigeration tubing from HVAC room to new condensing unit.

4. Tag out SCC lines to and from the existing security gatehouse water-cooled condenser in the HVAC room. Drain lines, and cut and cap them in the HVAC room.

5. Remove existing condenser from HVAC room (it may be necessary to cut the condenser in half to accomplish this).

6. Evacuate refrigeration system, cut and remove existing tubing as necessary, and install new tubing between compressor and evaporator coil in HVAC room and the new condensing unit.

7. Charge refrigeration system and place in operation.

8. Seal roof opening.

SFP ISLAND VENTILATION SYSTEM DESCRIPTION

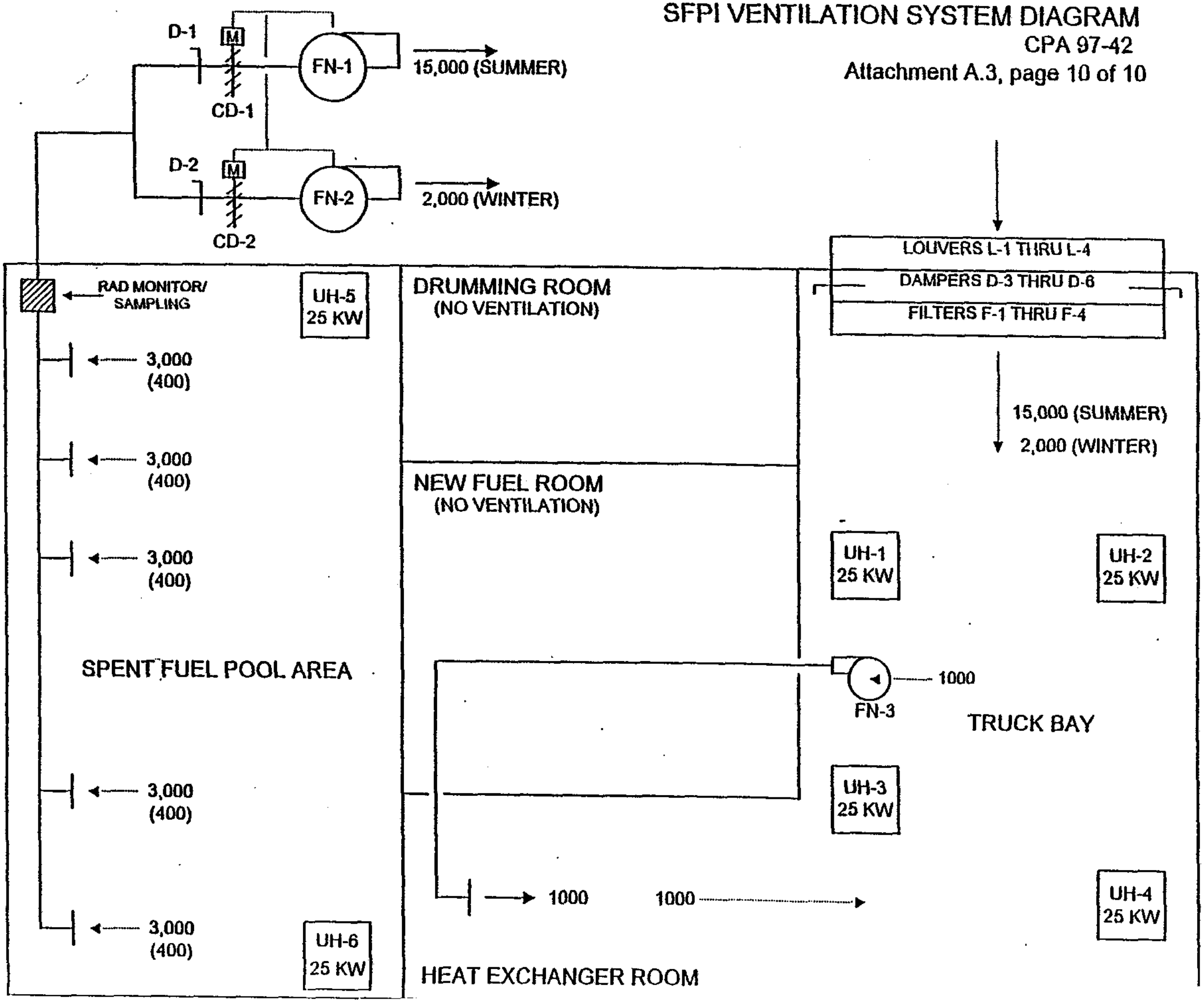
VIII. ATTACHMENT

A. SFPI Ventilation System Diagram

SFPI VENTILATION SYSTEM DIAGRAM

CPA 97-42

Attachment A.3, page 10 of 10



SFP ISLAND ELECTRICAL SYSTEM DESCRIPTION

I. <u>GENERAL</u> (Overview)

The Spent Fuel Pool (SFP) Island electrical distribution system will provide 480 V ac electrical power to support operation of the SFP Island equipment. The distribution service will be supplied by the Tertiary Winding of existing Station Service Transformer X-16 through a single off-site power connection to Central Maine Power's 115 kV System. The X-16 Tertiary voltage of 4160 volts will be transformed to an operational voltage of 480 V through a 2500/3125 kVA step-down transformer that will be installed near X-16. The transformer is part of a refurbished outdoor substation that will be purchased. (Reference Figure ELEC-1A, attached.) Power distribution will be through the outdoor (pad mounted) unit substation and two Motor Control Centers (MCCs): MCC-11B (existing) and a new MCC located within the truck bay of the Fuel Building. Local motor control will be provided by a control station located at each motor or mounted in the MCCs. Non-essential loads being powered from MCC-11B will be disconnected and removed during de-commissioning activities. Existing cables and raceways will be used where possible to reduce installation and material costs. The installation will also have capacity to support some long term plant loads which may be required during de-commissioning activities. De-commissioning loads will be provided by existing construction power transformer.

In addition, the SFP unit substation will provide a 480 V supply to the 345 kV switchyard relay house to replace one of the two supplies presently provided from Maine Yankee.

480 V ac feeds will be supplied to the remote SFP Control Room for building services, control, power and instrumentations loads. Undervoltage, loss of voltage, and ground detection alarms will be provided to the remote SFP Control Room. Additional alarm and indication signal cables will be provided as required. All cables to the new Control Room and Unit Substation will be routed outside the Fuel Building in exposed conduits or cable trays mounted to exiting structures, i.e. tank shield walls, PAB and Turbine building exterior walls, etc.

Limited backup power will be provided by a manually aligned, self-contained 250 kW, 480V Diesel Generator. Instrumentation and security power will be provided by two independent Uninterruptable Power Supplies to be located in the New Control Room.

II. SYSTEM DESIGN PARAMETERS

A. The SFP Island electrical system is designed to meet the following criteria:

1. Provide adequate 480 Volt Switchgear feeder positions to supply all necessary Motor Control Centers (MCC's) and large 480V motors.

2. Provide a switchgear bus position for connection to a 480V diesel generator.

3. Provide spare capacity to address unknown loads.

4. Power for future De-Commissioning construction activities will not be provided.

5. Provide UPS backed 120 V ac supplies for those systems requiring uninterruptible power.

6. Provide an oil berm around the unit step down transformers inside the security fence west of transformer X-16.

7. CMP will review the adequacy of the oil berm at the construction transformer and take corrective actions are required.

8. The SFP Island will provide a single 480 V supply to CMP 345 kV switchyard relay house.

B. Assumptions governing establishment of system design parameters are as follows:

1. The existing 2500 kVA Construction Power transformer X-2 is adequate to support de-commissioning construction loads.

2. Reserve Station Service Transformer X-16 will be disconnected from the plant and its 4160 V tertiary winding will be used to power the new SFP unit substation transformer. All protective relaying will be removed and transformer primary fused at 3 MVA.

3. Only one source of off-site power is required.

4. Electrical system does not have to be designed or installed safety-class 1E or seismic.

5. Battery backed AC or DC power is not required for any SFP Island loads, except for emergency lighting which will have its own batteries.

6. A manually aligned, portable diesel generator will be provided. No automatic diesel start or load transfer will be provided. The diesel will be sized to re-power all critical loads, as determined by System and I&C Engineering.

7. Security systems and process monitoring requires uninterruptable power for a period of approximately 2 hours.

8. Heat tracing panel 1AEB-A and its transformer located in the PAB outside the Fuel Building will be repowered to support SFP Island heat tracing loads. Its present location is acceptable, therefore, relocation is not required. The heat tracing panel will need to be reclassified to allow an NNS power supply to the system.

III ELECTRICAL SYSTEM COMPONENTS AND ARRANGEMENT

A. Primary Distribution System Arrangement

1. Primary Distribution Transformer

   Reserve Station Service Transformer X-16 will be disconnected at the transformer and the 4160 V winding will be used to power the new outdoor unit substation. The transformer will be fused for 3 MVA in the 115 kV switchyard by CMP.

2. Outdoor Unit Substation with Transformers

   A reconditioned outdoor 480 V unit substation with transformer will be purchased, to support the accelerated construction schedule and the short expected operating period, i.e. less than 5 years.

   A refurbished outdoor unit substation will be installed with the following equipment:

a. One 600A fused primary disconnect.

b. One 2500/3125 kVA, 4160 - 480 Volt Oil-filled Transformer.

c. One 3200A Main Circuit Breaker.

d. Seven (7) 480 V feeder positions.

e. All necessary controls, relays/protection, and accessories.

Connection between the Substation feeder breakers and loads within the Fuel Building will be by triplex cables routed in cable tray. Inside the Fuel Building, cables will be installed in rigid conduit or existing cable trays.

2. <u>Motor Control Centers (New equipment)</u>

Existing MCC-11B wil be repowered from the new SFP unit substation and a new MCC will be insatalled to support additional loads. The new MCC is presently in the Maine Yankee Brunswick warehouse. This MCC will need to be reconfigured and addtional starter and breakers purchased.

Each MCC will be fed from a feeder position in the new Outdoor Substation. New and existing loads required to support SFP Island operations will be supplied from these MCCs.

B. <u>Instrumentation, Control and Alarms</u>

1. Motor control and indication will be provided both locally and at the new Control Room. Electrical system parameters and trouble alarms will be provided to the new Control Room Central Processing Unit (CPU). Actual electrical system alarm points and indication parameters will be determined later with input from Maine Yankee Operations.

2. Two 10 to 15 KVA Uninterruptible Power Supplies (UPS) will be provided to support the new Control Room and security/communication system operations. Each UPS will be capable of operation approximately 2 hours on its internal battery system. Actual size will be developed based on system requirements.

C. Backup AC Power System

A stand alone self contained 250 kW - 480 V ac diesel generator with control panel and fuel oil tank will be provided. Provisions will be made for manually connecting the diesel generator to re-power a de-energized MCC via a spare unit substation breaker. The diesel generator unit will be provided with a 120 V ac receptacle to maintain the diesel starting battery.

The actual size of the diesel being purchased will be based on more detail load requirement which will be developed. The largest diesel loads which need to be evaluated are pool cooling and makeup requirements, building and primary water tank heating, primary water piping heat tracing. In addition, security, radiation monitioring and instrumentation loads after the initial two hour UPS operating cycle will also need to be evalautaed.

D. Miscellaneous Items

1. Lighting within the Fuel Building will be upgraded as required to support the new operational activities of the areas within the building.

2. Emergency/egress lighting will be provided using emergency battery pack lighting units.

3. The Fuel Building grounding system will be re-established by providing two new incoming 500 MCM ground wires from the 115 kV switchyard ground system. These wires will be connected into the existing Fuel Building ground system.

4. HVAC, lighting and convenience outlets for the new Control Room will be repowered from one of the SPF Island MCCs.

5. Cabling to the new Control Room and Unit Substation will be routed in exposed rigid conduit support from existing PAB and Turbine Building structures.

6. Heat tracing panel 1AEB-A and its transformer located in the PAB outside the Fuel Building will be repowered to support SFP Island heat tracing loads.

IV SYSTEM OPERATION

The electrical system requires no special operating instructions.

Operation procedures will be developed for connecting and repowering limited loads from backup diesel generator.

V OPTIONS EVALUATION SUMMARY

An evalaution by the Maine Yankee equipment classification group has determined that the Reserve Station Transformer X-16 will no llonger be required and it can be made available to support the SFP Island electrical distribution system. In additon, it was determined that the SFP Island distribution system would not provide de-commissioning construction loads. Based on this direction two options were evaluated; relocating existing primary plant equipment, or purchase new and/or refurbished equipment.

A. Use of Existing Equipment

Relocating a 480 V unit substation (Buses 9 & 10) to the New Fuel Room of the Fuel Building. This unit presently provides power to NNS loads which would be relocated to other Buses. The initial evaluation showed that this was feasible. Since the existing substation breakers would require a dc control power source, it would also be necessary to declassify and relocate battery #2 to the New Fuel Room, along with the spare battery charger and inverter.

Several concerns were identified with utilizing existing equipment design. The design will require relocating equipment into the New Fuel Area. This will increase the heat load and require a larger and more complex HVAC system, and other building modifications. The introduction of batteries raised safety concerns with hydrogen generation and the need to monitor hydrogen gas during venting.

The dc system would required periodic battery testing and maintenance would place person in potential contact with corrosive fluid, and increase personnel traffic into the Fuel Building.

The time required to develop the documentation required to justify relocating loads and removal of equipment (Technical Evaluations, Installation and

Functional Test Instructions, and Works Orders). As well as, time and personnel need to disconnect and remove the equipment did not contribute to meeting the SFP Island design and construction schedule.

The removal and repowering of equipment would place an additional burden on the plant operating personnel.

In conclusion, the lesser cost of this option (when compared to the configuration chosen) did not justify this options when safety, scheduling and design issues are considered.

B. New/Refurbished Equipment

Equipment cost were obtained for a refurbished outdoor unit substation and step-down transformer to support estimated SFP Island loads and some long term plant loads only. It was determined that overall cost associtaed with relocating an existing indoor unit substation, installing it in the Fuel Building and making the necessary equipment modifications would be more expensive than purchasing and installing the used equipment. In addition, the construction time saved by not needing to disconnect and remove plant equipment will help support the design and construction schedule.

In conclusion, the configuration shown in Figure ELEC-1A will provide the most cost effective method of supporting short and long term electrical distribution needs, and still meet the installation schedule. It must be noted that decommissioning construction power will not be available form the SFP Island.

A detailed cost benefit analysis can be developed upon request.

VI ATTACHMENTS

ELEC-1A - System configuration drawing

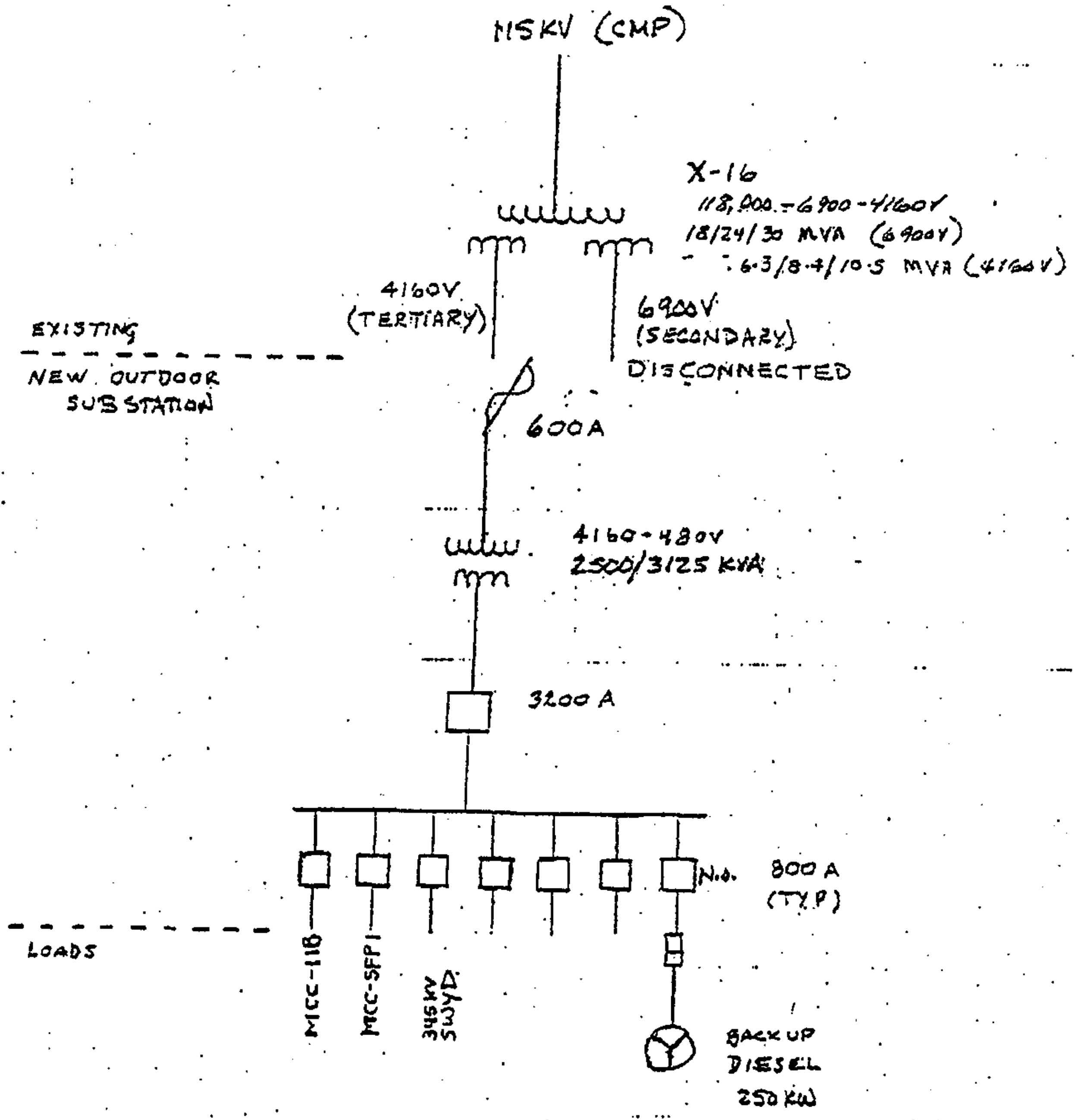
CPA 97-42
ATTACHMENT A

YANKEE ATOMIC ELECTRIC COMPANY CALCULATION NO. ______ PAGE ____ OF ____

SUBJECT: SPENT FUEL POOL ISLAND ELECTRICAL DISTRIBUTION SYSTEM

PREPARED BY ______ DATE ______ REVIEWED BY ______ DATE ______ WORK ORDER NO. ______

FIGURE ELEC-1A



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SFP ISLAND SECURITY SYSTEM DESCRIPTION

I. GENERAL

The Spent Fuel Pool Island (SFPI) security system will provide for all of the plant nuclear fuel security which is required. The SFPI will be treated as an entire complex separate from the balance of plant for all security protection. The Control room and Central Alarm System (CAS) will be relocated to the security office area of the administration building. Access to the SFPI will be thru an unmanned controlled search station located at the PAB El. 36' entrance. The SFPI will be hardened and monitors as well as motion detection equipment will be added to the security system. A Secondary Alarm System (SAS) will be installed within the SPFI area as the backup means for security functions. The vehicle threat barrier system will be modified to form a protective enclosure around the SPFI.

II. SECURITY SYSTEM DESIGN REQUIREMENTS

The SFPI security system is designed to satisfy the requirements of 10CFR73 which also includes all of the vital area access control requirements as define in Regulatory Guide 5.65 and the recommendations presented in the independent security assessment performed by Sandia Laboratories, Report No. *(later)*. *(Note: SANDIA will arrive on site on October 13, 1997 to perform their site threat matrix assessment).*

III. SECURITY SYSTEM COMPONENTS and ARRANGEMENT

A. Access

The SFPI will have normal access thru the PAB door at elevation 36'. There is a search area which will require security notification for anyone requiring access to the SFPI. Emergency egress out of the SFPI will be allowed thru the west side door at elevation 21'. Logging for identification of all visitors to the SFPI is required.

B. Physical Protection

The SPFI structure will be hardened for penetration resistance (including duct openings) in accordance with Regulatory Guide 5.65. This will include alarming of all access doors as well as restricted access thru some areas in proximity to the SFPI.

The vehicle threat barrier will be relocated so as to provide protection to the SFPI only.

C. Electronic Surveillance

Monitoring of the SFPI structure will be performed through the use of video cameras and motion detection devices.

SFP ISLAND SECURITY SYSTEM DESCRIPTION

D. Control System

The CAS will be operated in the same area as the SFPI control room.
The SAS will be located within the SFPI protected area.

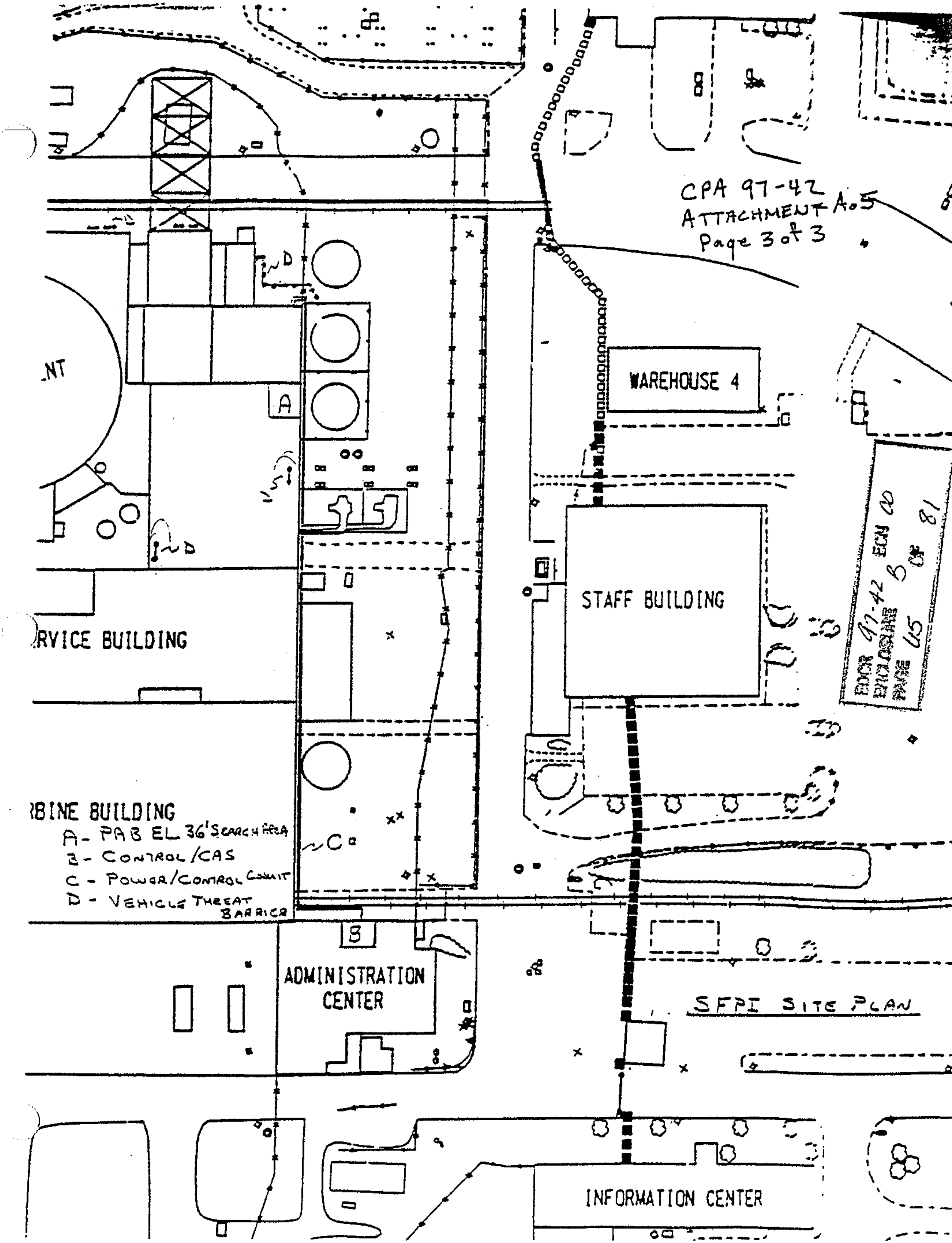
IV. SYSTEM OPERATION

A. The CAS will be continuously manned and fully functional. The SAS will only be manned in the event that the CAS is no longer able to function.

V. ATTACHMENT

A. SFPI Site Plan Location Drawing

CPA 97-42
ATTACHMENT A.5
Page 3 of 3



SFPI SITE PLAN

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ENCLOSURE B
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SFP ISLAND INSTRUMENTATION AND CONTROLS SYSTEM DESCRIPTION

I. GENERAL

The purpose of this document is to specify the instrumentation and controls scope of work as requir to provide equipment necessary for monitoring of the SFP Island equipment and other systems fro a new Control Room. A general list of the equipment and systems to be monitored includes t following:

A. SFP and SFP Island Cooling System (Primary and Secondary Processes, including PWST)
B. SFP Island Purification System
C. SFP Building Ventilation System
D. SFP Island Security System
E. Plant Meteorological Instrument System
F. Plant Fire Protection System (Fire Pumps)
G. Plant Radiation Monitoring System
H. Fuel Building Sump

II. PERTINENT DESIGN STANDARDS, GUIDELINES, AND REQUIREMENTS

A. 10CFR REQUIREMENTS:

10CFR requirements, generally affecting the Spent Fuel Pool Island Instrumentation an Controls design include, but are not limited to, the following:

Instrumentation and Control Requirements -

1. 72.122(h)(2) - Pool water level equipment must be provided to alarm in continuously manned location if the water level in the pool falls belov a predetermined value.

2. 72.122(h)(3) - Ventilation systems and off-gas systems must be provided where necessary to ensure the confinement of airborne radioactive particulate materials during normal and off-normal conditions.

3. 72.122(i) - Instrumentation and Control systems must be provided to monitor systems that are important to safety over anticipated ranges for normal operation and off-normal operation. Those instruments and control systems that must remain operational must be identified in the Safety Analysis Report.

4. 72.122(j) - A control room or control area, if appropriate for the ISFSI or MRS design, must be designed to permit occupancy and actions to be taken to monitor the ISFSI or MRS under off-normal or accident conditions.

5. 72.124(k)(3) - Provisions must be made so that, in the event of a loss of the primary electric power source or circuit, reliable and timely emergency power will be provided to instruments, utility service systems, and the central security alarm station, and operating systems, in amounts

sufficient to allow safe storage conditions to be maintained and permit continued functioning of all systems essential to safe storag

6. 72.124(c) - (In part) A criticality monitoring system shall be maintained in eac area where special nuclear material is handled, used, or stored whic will energize clearly audible alarm signals if accidental criticali occurs.

7. 72.126(b) - Radiological alarm systems must be provided in accessible work are as appropriate to warn operating personnel of radiation and airborn radioactive material concentrations above a given setpoint and c concentrations of radioactive material in effluents above control limit Radiation alarm systems must be designed with provisions fc calibration and testing their operability.

8. 72.126(c)(2) - Areas containing radioactive materials must be provided with system for measuring the direct radiation levels in and around these areas.

9. 72.164 - The licensee shall establish measures to ensure that tools, gages measuring instruments, and other measuring and testing devices usec in activities affecting quality are properly controlled, calibrated, anc adjusted at specified periods to maintain accuracy within specifiec limits.

Selected Security Requirements -

1. NUREG-1497, Nov. 1994

A. STANDARD ANSI/ANS 57.7 - 1988

NOTE: **Maine Yankee has not committed to fulfill the requirements of this document. It shall therefore be used for general guidelines only.**

1. Sect. 4.9 - Provide warning of abnormal conditions such as high radiation levels, airborne radiological contamination, or unauthorized access.

2. Sect. 5.9, - 2.1.1, 2.1.2 Monitor process system, effluent and area radiation levels for direct radiation, gaseous and airborne particulate activity for Design Events I & II. Note that examples of Design Event II's include:
(a) A single failure of an active component
(b) Spurious operation of certain active components
(c) Loss of external power supply for a limited duration
(d) Minor leakage from flanged connections
(e) A single operator error followed by proper corrective action.

Provide the instrumentation and alarm functions necessary for each process system to ensure that significant system failures can be detected and the systems can be placed in a safe condition for Desi Events I and II.

3. Sect. 6.3.4.4 - Provide instrumentation for periodic functional testing of the He Exchangers.

4. Sect. 6.3.5.2 - Provide Certifications of Compliance with applicable standards for component materials which come in contact with the pool water.

5. Sect. 6.9.1 - Commercial codes and standards apply to I&C components ar systems.

6. Sect. 6.9.1.2 - When purchasing material, use codes and standards which represer a level of capability to meet the design requirements specified i references 16, 17, 25-44, 47, and 50 of ANSI/ANS - 57.7 - 1988.

7. Sect. 6.9.2.1 - System components shall be designed and qualified to operate withi environmental limits established for their location.

8. Sect. 6.9.2.3.1 - Accuracy limits should be consistent with normal industrial instrumentation.

9. Sect. 6.9.2.3.2 - Consider human factors and ALARA in the selection and placement of indicators, recorders, and gauges.

10. Sect. 6.9.2.3.3 - Provide continuous monitoring, where required, in the installation monitoring area. If continuous monitoring is not required, but operator action may be required to correct abnormal operation, then provide alarms in the installation monitoring area, and provide the local controls and monitoring necessary to facilitate operator action.

11. Sect. 6.9.2.3.4 - Because of the nature of the installation, automatic action and immediate operator response shall not be required. Therefore local controls may be maximized with only remote monitoring provided in the installation monitoring area.

12. Sect. 6.9.2.3.5 - Provide a high radiation area monitor in the areas of high radiation potential.

B. OTHER REQUIREMENTS:

1. Radiation monitors will be required in the Fuel Building ventilation exhaust duct since it discharges directly to the outside environment.(per verbal discussions w. M. Johnson and YNSD EED engineers). The radiation monitor must include indication in the new Control Room (per Ops Dept. 9/8/97 memo). A radiation monitor will not be required in the Spent Fuel Pool cooling secondary system because its design pressure will be

higher than the primary system and adequate indication of fluid inventory/level will provided in both systems (per a meeting held between T. Marstaller, F. Smith, Bourgoin, and J. Tedeschi on 9/25/97).

2. Run time hour meters (local) must be provided for the two Fuel Building exhaust fa so that radiological releases can be quantified. (cfm flow x time, per M. Johnso 9/11/97 fax to D. Bourgoin).

3. Local room temperature indicators will be required in both the MCC area, and on th North end of the Fuel Pool, at Elev. 49' (per M. Johnson 9/11/97 fax to D. Bourgoi

4. Provide status monitoring of primary and secondary coolant pumps in the new Contr Room (per T. Marstaller 9/11/97 e-mail to D. Bourgoin).

5. Provide low suction pressure Control Room alarm and trip for secondary cooling pump (per T. Marstaller 9/11/97 e-mail to D. Bourgoin).

6. Provide local pressure indication on suction and discharge of secondary cooling pump (per T. Marstaller 9/11/97 e-mail to D. Bourgoin).

7. Provide both local and new Control Room indication of Secondary Surge Tank inventor (per T. Marstaller 9/11/97 e-mail to D. Bourgoin). High, low, and low-low alarms wi be required (per 9/11/97 project meeting).

8. Provide primary to secondary coolant differential pressure indicating switch which read out locally and alarms in the new Control Room(per T. Marstaller 9/11/97 e-mail to D Bourgoin, and subsequent 9/22/97 verbal discussion).

9. Provide a new Spent fuel Pool level transmitter for indication (in the Control Room, pe Ops Dept. 9/8/97 memo). Also create a second (redundant) low level alarm (per verba discussion between D. Bourgoin and J. Niles).

10. Provide 2 Spent Fuel Pool temperature indicators (for Control Room indication, per Ops Dept. 9/8/97 memo).

11. Provide monitoring of pertinent Electrical Distribution System parameters in the Contro Room. (per Ops Dept. 9/8/97 memo). As a minimum, a single "power available" indication will be required (per D. Bourgoin verbal discussion with J. Niles on 9/18/97).

12. Move or provide some monitoring in the new Control Room on a temporary basis for the following existing Main Control Room indications:
    a. Certain existing plant radiation monitors (per Ops Dept. 9/8/97 memo)
    b. Fire pump P-4 and P-5 status (per D. Bourgoin discussions w. J. Niles on 9/18/97)

13. Provide monitoring of the Met. Tower instruments for wind direction, speed, and ai temperature in the new Control Room (per D. Bourgoin discussions w. J. Niles o

9/18/97 and R. Jordan on 9/23/97).

14. New control room and security office will use PLC or similar technology (per 9/11/9 project meeting).

15. Provide a Fuel Building sump level alarm (signals from P-59A, B existing controls) in th new Control Room (per D. Bourgoin discussions w. J. Niles on 9/18/97).

16. Provide a PWST heat tracing failure alarm (per J. Niles in 9/25/97 engineering meeting)

C. ASSUMPTIONS:

1. The new design for the Fuel Pool Cooling and Purification System will generally be as shown on draft revision 15 of Maine Yankee Flow diagram FM-97A (as revised for EDCR 97-042).

2. The revised Maine Yankee Safety Analysis Report (not yet issued) will be consistent with the above.

3. ANSI/ANS 57.7 - 1988 is to be treated as a general guideline only. Maine Yankee has made no formal commitments to meet the requirements of this document.

SFP ISLAND INSTRUMENTATION AND CONTROLS SYSTEM DESCRIPTION

I. SYSTEM COMPONENTS INCLUDED IN THE INSTRUMENTATION AND CONTROLS GROUP SCOPE

A. The systems/equipment included in the instrumentation and controls group work scope for th Spent Fuel Pool Island will include the following:

1. Spent Fuel Pool Island Programmable Logic Control (PLC) System for Process Indicatio and Control -

   This system consists of an industrial hardened computer system which will be used fo the Spent Fuel Pool Island Control Room monitoring, displays, and operator interface The PLC will generally accept inputs from all field devices needed for Control Roo indications/alarms and will provide some outputs for secondary control of field device from the new Control Room. The PLC may also contain control logic for th development of certain permissives and interlocks. It is anticipated that local hardwire controls and indications will be the primary means of controlling the Spent Fuel Poo Island equipment. The PLC displays are intended mainly for status monitoring an alarming. Input/output signals are wired in the field to local I/O rack modules which then communicate with the PLC over a distributed control signal bus. In the new Control Room, the operator interface with the system will be via CRT monitors, keyboards, and cursor control devices such as mice or trackballs. It is likely that one or two stand-alone interfaces may also be provided in certain other areas of the plant on a permanent or temporary basis during decommissioning demolition activities.

2. Spent Fuel Pool Island Plant Security Computer -

   A new security computer system will be implemented for the SFPI project. This system may be PLC based, similar to the above, or a special system which is tailored more to security applications. An operator interface will be provided for CAS/SAS plant security functions. The sensor inputs (door switches, motion sensors, etc.) to the security system will be provided by others and wired to a centrally located junction box by others.

3. Control Room Console Furniture for the Above

4. PLC system interface with the following existing plant systems and equipment not included in Table "A" (shown below) for alarming or display in the new Control Room.
   a. Meteorological Tower instruments for wind speed, wind direction, and air temperature.
   b. Certain existing plant radiation monitors
   c. Fire pump P-4 and P-5 controls
   d. P-59A, B controls
   e. Plant electrical system

5. Provide PLC control/interlock logic for the following functions:
   a. Secondary Cooling Pump low suction pressure trips
   b. Cooling Pump STOP control

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SFP ISLAND INSTRUMENTATION AND CONTROLS SYSTEM DESCRIPTION

6. Plant Instrumentation -

Provide/modify the instruments required to monitor the spent fuel pool island as list in Table A.

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TABLE A

SPENT FUEL POOL INSTRUMENTATION

INSTRUMENT NUMBER	DESCRIPTION	LOCATION	EXISTING OR NEW?	LOCAL ONLY (L) OR WIRED TO PLC (PLC)	MFGR INFO. OR COMMENTS
FUEL POOL AREA/FUEL BUILDING SUMP INSTRUMENTS					
LC-3300	Controller for Fuel Building Sump P-59A, B	PAB Lower Level Pipe Tunnel	Existing	L	Square D Company, Model W-1
LS-3601	Fuel Pool High Level Switch	SE Corner of Fuel Pool (Middle Switch)	Existing	PLC	THIS INSTRUMENT TO BE REMOVED AFTER FUNCTIONAL TESTING OF NEW LEVELTRANSMITTERS SO THAT CONTINUOUS ALARM CAPABILITY IS PROVIDED. Jo-Bell Type KC, 0-160°F, W.P.=100, Spec. Grav. = 1.0, S/N 55046, 10 Amps, 125/250 VAC, 0.5A/120 VDC
LS-3602	Fuel Pool Low Level Switch	SE Corner of Fuel Pool (East-Most Switch)	Existing	PLC	THIS INSTRUMENT TO BE REMOVED AFTER FUNCTIONAL TESTING OF NEW LEVELTRANSMITTERS SO THAT CONTINUOUS ALARM CAPABILITY IS PROVIDED. Jo-Bell Type KC, 0-160°F, W.P.=100, Spec. Grav. = 1.0, S/N 55047, 10 Amps, 125/250 VAC, 0.5A/120 VDC

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SFP ISLAND INSTRUMENTATION AND CONTROLS SYSTEM DESCRIPTION

INSTRUMENT NUMBER	DESCRIPTION	LOCATION	EXISTING OR NEW?	LOCAL ONLY (L) OR WIRED TO PLC (PLC)	MFGR INFO. OR COMMENTS
LS-3603	Fuel Pool Redundant High Level Switch	SE Corner of Fuel Pool (West-Most Switch)	Existing	N/A	**THIS INSTRUMENT TO BE REMOVED AFTER FUNCTIONAL TESTING OF NEW LEVELTRANSMITTERS SO THAT CONTINUOUS ALARM CAPABILITY IS PROVIDED.** Jo-Bell Type KC, 0-250°F, W.P.=100, Spec. Grav. = 1.0, S/N 77695, 10 Amps, 125/250 VAC, 0.5A/120 VDC
Spent Fuel Pool Level Transmitter "A"	Control Room Indication and Hi/ low level alarms	SFP	New	PLC	TBD
Spent Fuel Pool Level Transmitter "B"	Control Room Indication and Hi/ low level alarms	SFP	New	PLC	TBD
TS-3603	Fuel Pool Temperature Switch	NW Corner of Fuel Pool	Existing	N/A	**THIS INSTRUMENT TO BE REMOVED AFTER FUNCTIONAL TESTING OF NEW TEMP TRANSMITTERS SO THAT CONTINUOUS ALARM CAPABILITY IS PROVIDED..** United Electric Company, Model 95

SFP ISLAND INSTRUMENTATION AND CONTROLS SYSTEM DESCRIPTION

INSTRUMENT NUMBER	DESCRIPTION	LOCATION	EXISTING OR NEW?	LOCAL ONLY (L) OR WIRED TO PLC (PLC)	MFGR INFO. OR COMMENTS
Spent Fuel Pool Temperature Transmitter "A"	Control Room Indication and 1st High and Low Temp Alarm	TBD	New	PLC	TBD
Spent Fuel Pool Temperature Transmitter "B"	Control Room Indication and 2nd High and Low Temp Alarm	TBD	New	PLC	TBD
Spent Fuel Pool Temperature Indicator	Local Indicator for Direct Readout of Fuel Pool Temperature	TBD	New	L	0-250 deg. F
P-59A Hour Meter (No Instrument #)	P-59A Hours	Top of MCC-11B	Existing	L	Simpson, 115 Volts, 60 Cycles
P-59B Hour Meter (No Instrument #)	P-59B Hours	Top of MCC-11B	Existing	L	Simpson, 115 Volts, 60 Cycles
PDI-3601	Fuel Pool Filter Differential Pressure Gauge	Outside Wall near Drumming Room entrance	Existing	L	Barton Instruments, 0-30 PSI (1/2" tubing)
PI-3304A	P-59A Discharge Pressure	Outside Wall near Drumming Room entrance	Existing	L	Maxisafe Co. 0-60 PSI, (½" tubing)

SFP ISLAND INSTRUMENTATION AND CONTROLS SYSTEM DESCRIPTION

INSTRUMENT NUMBER	DESCRIPTION	LOCATION	EXISTING OR NEW?	LOCAL ONLY (L) OR WIRED TO PLC (PLC)	MFGR INFO. OR COMMENTS
PI-3304B	P-59B Discharge Pressure	Outside Wall near Drumming Room entrance	Existing	L	Maxisafe Co. 0-60 PSI, (½" tubing)
RM-6107	Radiation Monitor	Fuel Pool Mobile Platform	Existing	PLC	10^1 to 10^6 CPM, Serial # C031, P.O. MY-90, Dwg # 6055D1A4G01, Date of Manuf. = 4/71, Power Inputs = Fuel Pool Platform, Westinghouse Nuclear Instrument and Control Dept.
Recorder for Spent Fuel Pool Heat-up Rate Test	TBD	TBD	New (Temp.)	Yes	Temporary recorder to be used for test only. Possibility of using Fluke Hydra Recorder in I&C Shop.
Thermocouples/ RTDs for Spent Fuel Pool Heat-up Rate Test	TBD	TBD	New (Temp.)	Yes	Temporary thermocouples/RTDs to be used for test only.
FUEL POOL COOLING PRIMARY LOOP & PURIFICATION SYSTEM INSTRUMENTS					
PI-3601A	Fuel Pool Cooling Pump P-17A Discharge Pressure Gauge	Near P-17A	Existing	L	3D Company, 0-100 PSI (½" tubing)
PI-3601B	Fuel Pool Cooling Pump P-17B Discharge Pressure	Near P-17B	Existing	L	3D Company, 0-100 PSI (½" tubing)

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SFP ISLAND INSTRUMENTATION AND CONTROLS SYSTEM DESCRIPTION

INSTRUMENT NUMBER	DESCRIPTION	LOCATION	EXISTING OR NEW?	LOCAL ONLY (L) OR WIRED TO PLC (PLC)	MFGR INFO. OR COMMENTS
PI-3602	Fuel Pool Purification Pump P-85 Discharge Pressure	Near P-85	Existing	L	3D Company 0-160 PSI (½" tubing)
TI-3601	Pri. Side E-25 Inlet Temp. Indicator	On Pipe near FP-14	Existing	L	Ashcroft Company, 0-200° F
TI-3602	Pri. Side E-25 Outlet Temp. Indicator	On Pipe near FP-15	Existing	L	Ashcroft Company, 0-200° F
LT-4001	Primary Make-up Tank (PWST) Level Transmitter	PWST	Existing	PLC	Rosemount 1151
Primary to Secondary dP Indicating Switch	Primary to Secondary Leak Detection	P-17A, B Pump Area	New	L	TBD
P-85 Discharge Pressure Transmitter	P-85 Discharge Pressure	P-85 Discharge	New	PLC	TBD
P-17A Discharge Pressure Transmitter	P-17A Discharge Pressure	P-17A Discharge	New	PLC	TBD
P-17B Discharge Pressure Transmitter	P-17B Discharge Pressure	P-17B Discharge	New	PLC	TBD

SFP ISLAND INSTRUMENTATION AND CONTROLS SYSTEM DESCRIPTION

INSTRUMENT NUMBER	DESCRIPTION	LOCATION	EXISTING OR NEW?	LOCAL ONLY (L) OR WIRED TO PLC (PLC)	MFGR INFO. OR COMMENTS
FUEL POOL COOLING SECONDARY LOOP INSTRUMENTS					
Level Indicator for new (Bladder type) Secondary Surge Tank	Pressure Indicator	Sec. Surge Tank	New	PLC	TBD
Level Transmitter for new (Bladder type) Secondary Surge Tank	Pressure Transmitter	Sec. Surge Tank	New	PLC	TBD
Sec. Side E-25 Inlet Temp. Indicator	Local Indicator	TBD	New	L	Ashcroft Company, 0-200° F (or Equiv.)
Sec. Side E-25 Outlet Temp. Indicator	Local Indicator	TBD	New	L	Ashcroft Company, 0-200° F (or Equiv.)
Secondary Coolant "A" Pump Disch Press Gauge	Local Gauge	At Pump	New	L	TBD
Secondary Coolant "B" Pump Disch Press Gauge	Local Gauge	At Pump	New	L	TBD
Secondary Coolant "A" Pump Suct Press. Sw.	Low Press Alarm in Control Room	Pump Suction Line	New	PLC	TBD
Secondary Coolant "B" Pump Suct Press. Sw.	Low Press Alarm in Control Room	Pump Suction Line	New	PLC	TBD

SFP ISLAND INSTRUMENTATION AND CONTROLS SYSTEM DESCRIPTION

INSTRUMENT NUMBER	DESCRIPTION	LOCATION	EXISTING OR NEW?	LOCAL ONLY (L) OR WIRED TO PLC (PLC)	MFGR INFO. OR COMMENTS
Secondary Coolant "A" Pump Discharge Pressure Transmitter	Control Room Indication	Pump Discharge	New	PLC	TBD
Secondary Coolant "B" Pump Discharge Pressure Transmitter	Control Room Indication	Pump Discharge	New	PLC	TBD
Spent Resin Pit Sump Level Switch	High Level Alarm	Spent Resin Pit	Existing	PLC	TBD
Secondary Coolant Radiation Monitor	Primary to Secondary Leak/ Radiation Detection	TBD	New	PLC	TBD
FUEL BUILDING VENTILATION SYSTEM INSTRUMENTS					
Radiation Monitor for Ventilation Exhaust	TBD	TBD	New	PLC	TBD
Fuel Pool Area (N. End) Temp Local Indicator	TBD	TBD	New	L	TBD
Electrical Equip Room Area Temp Local Indicator	TBD	TBD	New	L	TBD
PRI WATER STORAGE TANK (PWST) TK-16					
TS-1106	PWST Aux. Steam Temp. Control	PWST Instrument Shed	Existing	N/A	**This instrument to be Removed along with PWST Steam Heat.** UE Model 6BS, Options 1519, 0-250 deg. F

SFP ISLAND INSTRUMENTATION AND CONTROLS SYSTEM DESCRIPTION

INSTRUMENT NUMBER	DESCRIPTION	LOCATION	EXISTING OR NEW?	LOCAL ONLY (L) OR WIRED TO PLC (PLC)	MFGR INFO. OR COMMENTS
TI-4002	PWST Local Temp Gauge	PWST Instrument Shed	Existing	L	Ashcroft, 0-200 deg. F with 1.5", 304 SST RF Flange Conn.
TS-4003	PWST Hi/Lo Temperature Alarm	PWST Instrument Shed	Existing	PLC	UE Model 6BS (F-402-6BS-5101)
S-35	Local Level Gauge	PWST Instrument Shed	Existing	L	Duragauge, 0-45 Ft.
LT-4001	PWST Level	PWST Instrument Shed	Existing	PLC	Rosemount 1151DPE22

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SFP ISLAND INSTRUMENTATION AND CONTROLS SYSTEM DESCRIPTION

II. SYSTEM ARRANGEMENT

Later

III. SYSTEM OPERATION

Later

IV. OTHER

Later