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UNITED STATES
NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF: **DOCKET NO:**

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE ON BRAIDWOOD STATION, UNITS 1 AND 2

LOCATION: WASHINGTON, D. C.

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171 - 218

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Pages 138 - 170,
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DATE: TUESDAY, JANUARY 29, 1985

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COMMONWEALTH EDISON COMPANY
PRESENTATIONS TO THE ACRS
SUB-COMMITTEE ON BRAIDWOOD
STATION UNITS 1 AND 2 ON

JANUARY 29, 1985

COMMONWEALTH EDISON COMPANY

PRESENTATION TO THE ACRS

SUB-COMMITTEE ON BRAIDWOOD

STATION UNITS 1 AND 2 ON

JANUARY 29, 1985

TENTATIVE SCHEDULE
ACRS BRAIDWOOD SUBCOMMITTEE MEETING ON
BRAIDWOOD STATION UNITS 1 AND 2
JANUARY 29, 1985
WASHINGTON, D.C.

January 29, 1985 (8:30 a.m. to end of business)

Topic	Presenter	Time
I. Opening Statement	C. Mark, Chairman	8:30 a.m.
II. Report by NRC Staff		8:40 a.m.
A. NRR Discussion		
B. Region III Discussion		
****** BREAK (15 Min.) ******		
C. I&E Discussion of Construction Appraisal Team (CAT) Inspection Results		11:15 a.m.
1. CECO Comments	Wallace	
****** LUNCH (1 Hour) ******		
III. Presentations by Commonwealth Edison		
A. Principal Design Differences Between Braidwood and Zion	Klopp	1:00 p.m.
B. Braidwood Project Update		
1. Overview of Plant and Startup Schedule	Wallace	1:10 p.m.
2. Management Changes	Wallace	1:20 p.m.
3. Quality Assurance	Fitzpatrick	1:30 p.m.
C. Issues Remaining Open		
1. Braidwood Construction Assessment Program	Maiman	2:00 p.m.

	(BCAP)	Kaushal	
	****** BREAK (15 Min.) ******		
D.	Physical Plant Security (closed session)	Willaford	3:15 p.m.
E.	ACRS Comments on Issues of Interest		3:30 p.m.
1.	Leak-Before-Break*	Ainger	
2.	Elimination of Intermediate Pipe Break*	Ainger	
F.	ACRS Comments on Issues Resolved		3:45 p.m.
1.	Byron ASLB Supplemetal Initial Decision*	Delgeorge	
2.	Circumstances Surrounding Braidwood Civil Penalty*	Wallace	
3.	Effects of Cooling Lake Dike Failure*	McDonough	
G.	Supplement the Record*	Wallace	4:15 p.m.
IV.	Public Presentations, if any		4:20 p.m.
V.	ACRS Subcommittee Caucus		4:30 p.m.
VI.	Development of Agenda for ACRS Full Committee on February 7 or 8, 1985		
VII.	Adjournment		

* Commonwealth Edison will be prepared to address comments (if any) from ACRS on material submitted in advance of meeting.

NOTE: GUIDELINES FOR JANUARY 29, 1985
BRAIDWOOD ACRS SUBCOMMITTEE MEETING

1. Presentation material items III.E., III.F. and III.G will be sent to ACRS in advance of meeting.

   a. For Items III.E., III.F. and III.G no formal presentations by CECO are anticipated. Presenters will be prepared to address ACRS comment.

2. Approximately 50% of the presentation time for each presentation topic is to accommodate ACRS subcommittee member comments, questions, and discussions.

3. Topics previously presented by CECO during the March 8 and 9, 1984 meeting, and not on this agenda, are assumed to be resolved for the subcommittee.

COMMONWEALTH EDISON COMPANY

PRESENTATION

II.C.1. COMMONWEALTH EDISON COMPANY COMMENTS ON I & E DISCUSSION OF CONSTRUCTION APPRAISAL TEAM (CAT) INSPECTION RESULTS

COMMONWEALTH EDISON COMPANY COMMENTS ON I & E DISCUSSION OF CONSTRUCTION APPRAISAL TEAM (CAT) INSPECTION RESULTS

MY NAME IS MIKE WALLACE. I AM EMPLOYED BY COMMONWEALTH EDISON COMPANY AS THE ASSISTANT MANAGER OF PROJECTS. FOR THE PAST TWO (2) YEARS I HAVE ALSO BEEN ASSIGNED AS THE FULL TIME ON-SITE PROJECT MANAGER FOR BRAIDWOOD.

ALTHOUGH THE NRC CONSTRUCTION APPRAISAL TEAM (CAT) INSPECTION REPORT IS NOT YET ISSUED, WE HAVE ALREADY TAKEN A NUMBER OF ACTIONS IN RESPONSE TO THEIR PRELIMINARY OBSERVATIONS. TO ASSURE OUR COMPLETE UNDERSTANDING OF ANY OBSERVATIONS MADE BY THE CAT, BEFORE THE INSPECTION BEGAN WE MOBILIZED A TASK FORCE WITH REPRESENTATIVES FROM EVERY EDISON PROJECT ORGANIZATION, FROM QUALITY ASSURANCE, AND FROM EVERY MAJOR CONTRACTOR ON-SITE. TASK FORCE MEMBERS INTERACTED WITH THE CAT DAILY THROUGHOUT THEIR INSPECTION, AND MET COLLECTIVELY SEVERAL TIMES A WEEK TO REVIEW IN PROCESS NRC OBSERVATIONS. OBSERVATIONS WHICH WERE JUDGED TO REPRESENT DISCREPANT CONDITIONS WERE DOCUMENTED ON NON-CONFORMANCE REPORTS, AND ARE THEREBY ALREADY PROCEEDING THROUGH THE EVALUATION AND CORRECTIVE ACTION STAGES. IN SEVERAL INSTANCES OUR OWN QUALITY ASSURANCE ORGANIZATION PERFORMED ON SITE SURVEILLANCES OF CERTAIN AREAS WHICH WERE THE OBJECT OF NRC CONCERN IN ORDER TO EVALUATE THE NATURE OF ANY EXISTING PROBLEMS SO THAT CORRECTIVE ACTION COULD PROCEED. EVERY OBSERVATION MADE BY THE CAT WHICH WE ARE AWARE OF, HAS BEEN DOCUMENTED IN OUR SITE TRACKING SYSTEM TO ASSURE SATISFACTORY CLOSEOUT. FURTHER, SUBSEQUENT TO THE CAT EXIT MEETING, PROJECT PERSONNEL AND QUALITY ASSURANCE HAVE MET TO FURTHER DISCUSS OBSERVATIONS AND IDENTIFY ADDITIONAL ACTIONS WHICH ARE EITHER PRUDENT OR REQUIRED.

IT IS OUR FULL INTENTION TO CONTINUE TO AGGRESSIVELY PURSUE THE ISSUES, AS WE UNDERSTAND THEM, AND ASSURE SATISFACTORY CLOSEOUT. MOREOVER, WHEN THE CAT INSPECTION REPORT IS ISSUED, WE WILL COMPARE THAT TO OUR PRESENT LISTING OF THEIR PRELIMINARY OBSERVATIONS, IDENTIFY ANY AREAS NOT PRESENTLY ADDRESSED, AND ALSO AGGRESSIVELY PURSUE EVALUATION AND DISPOSITION OF THOSE ITEMS.

THE MANNER IN WHICH WE RESPONDED DURING AND SUBSEQUENT TO THE CAT INSPECTION IS SIMILIAR TO THE PROCESS WE FOLLOWED WHEN THE INSTITUTE OF NUCLEAR POWER OPERATIONS (INPO) CONDUCTED AN EVALUATION OF THE BRAIDWOOD PROJECT DURING THE WEEKS OF JUNE 4, 11 AND 25, 1984.

II.C.1.-1

THE INPO EVALUATION TEAM, CONSISTING OF 24 EXPERIENCED INDIVIDUALS, EXAMINED ORGANIZATION AND ADMINISTRATION, DESIGN CONTROL, CONSTRUCTION CONTROL, PROJECT SUPPORT, TRAINING, QUALITY, AND TEST CONTROL. THE TEAM OBSERVED ACTUAL WORK PERFORMANCE AND TEST PERFORMANCE. A PORTION OF THE EVALUATION FOCUSED ON A DETAILED VERTICAL PATH EXAMINATION THROUGH THE DESIGN AND CONSTRUCTION OF THE PROJECT, COMBINED WITH A HORIZONTAL PATH EXAMINATION AT SEVERAL POINTS.

WITHIN THE SCOPE OF THIS EVALUATION, THE TEAM FOUND, EXCEPT AS INDICATED BY SPECIFIC FINDINGS, THAT THE SYSTEMS IN PLACE TO CONTROL THE QUALITY OF DESIGN AND CONSTRUCTION WERE BEING IMPLEMENTED EFFECTIVELY.

II.C.1.-2

DURING THE EVALUATION, THE INPO TEAM NOTED MANY BENEFICIAL PRACTICES AND ACCOMPLISHMENTS. THE MOST IMPORTANT PROJECT STRENGTH NOTED BY THE INPO EVALUATION TEAM WAS THE POSITIVE ATTITUDE OF THE PROJECT PERSONNEL.

OTHER STRENGTHS NOTED BY THE INPO TEAM INCLUDE THE FOLLOWING:

- USE OF PIPING FEATURES TO DETERMINE HANGER LOCATIONS AVOIDING SOME TOLERANCE ACCUMULATION PROBLEMS AND FACILITATES AS-BUILT DETERMINATION.

- THE PIPING CONTRACTOR'S WELDER QUALIFICATION PROGRAM ENFORCES HIGH STANDARDS FOR PERFORMANCE CAPABILITY.

- A PRACTICAL APPROACH BEING TAKEN TO NF CODE BOUNDARY DEFINITIONS; THUS, CODE COMPLIANCE IS EASIER TO OBTAIN.

- RUBBER-STAMPED INFORMATION BLOCKS ON THE BACK OF WORKING DRAWINGS PROVIDING AN EFFECTIVE METHOD FOR SPECIFYING THE APPLICABLE CHANGE DOCUMENTS SUCH AS FCR'S AND ECN'S.

AS YOU ARE AWARE, INPO EVALUATIONS ARE BASED ON A STANDARD WHICH GOES WELL BEYOND REGULATORY REQUIREMENTS. THE INPO TEAM MADE RECOMMENDATIONS IN CERTAIN AREAS OF THE BRAIDWOOD CONSTRUCTION PROJECT TO AID THE PROJECT IN ACHIEVING THE HIGHEST STANDARDS OF EXCELLENCE. THESE RECOMMENDATIONS DO NOT NECESSARILY INDICATE UNSATISFACTORY PERFORMANCE BUT ENSURE THAT PLANT CONSTRUCTION EMPLOYS THE BEST INDUSTRIAL PRACTICES.

II.C.1.-3

THE INPO TEAM MADE RECOMMENDATIONS FOR IMPROVEMENT IN A NUMBER OF AREAS. THE FOLLOWING RECOMMENDATIONS WERE CONSIDERED TO BE THE MOST IMPORTANT BY INPO:

1. UTILITY AND CONTRACTOR MANAGERS AND SUPERVISORS NEED TO BE MORE INVOLVED IN AND KNOWLEDGEABLE OF DAY-TO-DAY WORK ACTIVITIES TO IDENTIFY PROBLEMS AND OBTAIN PROMPT SOLUTIONS.

2. ACTIONS TO CORRECT IDENTIFIED PROBLEMS NEED TO BE MORE THOROUGH AND TIMELY.

3. SOME INSTALLED EQUIPMENT IS NOT BEING SUFFICIENTLY PROTECTED TO PRECLUDE DAMAGE AND DEGRADATION.

4. THE PERFORMANCE OF CRAFTSMEN, OPERATORS, AND TEST ENGINEERS SHOWS THE NEED FOR MORE EFFECTIVE TRAINING.

5. THE INDUSTRIAL SAFETY PROGRAM NEEDS CONSIDERABLE UPGRADING. SITE PERFORMANCE DOES NOT COMPARE FAVORABLY WITH OTHER POWER REACTOR CONSTRUCTION SITES.

COMMONWEALTH EDISON HAS ALREADY INITIATED POSITIVE ACTIONS ON ALL THE INPO RECOMMENDATIONS AND IS COMMITTED TO THE TIMELY COMPLETION OF ALL ACTIONS.

INPO EVALUATION TEAM

PERFORMED BY:

24 EXPERIENCED INDIVIDUALS

EVALUATED:

ORGANIZATION AND ADMINISTRATION

DESIGN CONTROL

CONSTRUCTION CONTROL

PROJECT SUPPORT

TRAINING

QUALITY

TEST CONTROL

BRAIDWOOD BENEFICIAL PRACTICES

POSITIVE ATTITUDE OF PROJECT PERSONNEL.

USE OF PIPING FEATURES TO DETERMINE HANGER LOCATIONS TO AVOID TOLERANCE ACCUMULATION AND FACILITATE AS-BUILT DETERMINATION.

PIPING CONTRACTORS WELDER QUALIFICATION PROGRAM ENFORCES HIGH STANDARDS OF PERFORMANCE.

PRACTICAL APPROACH TAKEN FOR NF CODE BOUNDARY DEFINITIONS.

RUBBER-STAMPED INFORMATION BLOCKS ON BACK OF WORKING DRAWINGS TO SPECIFY CHANGES TO DRAWINGS SUCH AS FCR'S AND ECN'S.

INPO'S IMPORTANT RECOMMENDATIONS

UTILITY AND CONTRACTOR'S MANAGERS AND SUPERVISORS NEED TO BE MORE INVOLVED IN THE DAY-TO-DAY WORK ACTIVITIES TO IDENTIFY PROBLEMS.

CORRECT PROBLEMS IN A MORE TIMELY MANNER.

SOME INSTALLED EQUIPMENT IS NOT BEING SUFFICIENTLY PROTECTED TO PRECLUDE DAMAGE.

PERFORMANCE OF CRAFTSMEN, OPERATORS AND TEST ENGINEERS SHOWS THE NEED FOR MORE EFFECTIVE TRAINING.

INDUSTRIAL SAFETY PROGRAM NEEDS CONSIDERABLE UPGRADING.

(1178D)

COMMONWEALTH EDISON COMPANY

PRESENTATION

III.A. PRINCIPAL DESIGN DIFFERENCES BETWEEN BRAIDWOOD AND ZION

PRINCIPAL DESIGN DIFFERENCES BETWEEN BRAIDWOOD AND ZION

THE DESIGN OF BRAIDWOOD STATION IS CONCEPTUALLY SIMILAR TO ZION STATION. EACH POWER PLANT CONSISTS OF TWO IDENTICAL GENERATING UNITS COMPRISED OF A PRESSURIZED WATER REACTOR NUCLEAR STEAM SUPPLY SYSTEM AND TURBINE-GENERATOR SET FURNISHED BY WESTINGHOUSE ELECTRIC CORPORATION. SARGENT & LUNDY IS THE ARCHITECT-ENGINEER FOR BOTH STATIONS. MANY OF THE PEOPLE FROM WESTINGHOUSE, S&L, AND COMMONWEALTH EDISON WHO WERE INVOLVED IN THE DEVELOPMENT OF THE DESIGN FOR ZION STATION WERE ALSO INVOLVED WITH DESIGNING BRAIDWOOD STATION. AS A RESULT, THE DESIGN DIFFERENCES BETWEEN THE TWO STATIONS DO NOT REPRESENT A MAJOR DEPARTURE FROM THE ZION DESIGN, BUT RATHER AN ENHANCEMENT OF WHAT WE CONSIDER TO BE AN EXISTING SAFE DESIGN.

III.A.1.

I WILL HIGHLIGHT SOME OF THE PRINCIPAL DIFFERENCES IN THE AREAS OF SITE SPECIFIC CHARACTERISTICS, PLANT LAYOUT AND STRUCTURES, NSSS DESIGN, AND SOME DIFFERENCES IN AUXILIARY SYSTEMS. THERE ARE OTHER DESIGN FEATURES UNIQUE TO ZION DUE TO ITS CLOSE PROXIMITY TO POPULATION CENTERS; HOWEVER, THESE ARE NOT RELEVANT TO BRAIDWOOD'S SITE LOCATION.

III.A.2.

SITE SPECIFIC CHARACTERISTICS HAVE DICTATED SOME OF THE DESIGN DIFFERENCES BETWEEN THE TWO STATIONS. ZION STATION IS LOCATED AT THE NORTHEAST CORNER OF ILLINOIS ON THE SHORE OF LAKE MICHIGAN. ZION USES LAKE WATER IN A ONCE-THROUGH COOLING CYCLE FOR HEAT REJECTION. BRAIDWOOD STATION IS LOCATED IN NORTHEASTERN ILLINOIS NEAR THE KANKAKEE RIVER. COOLING FOR THIS PLANT IS PROVIDED BY A LARGE MAN-MADE COOLING POND CONSTRUCTED OVER A PREVIOUSLY STRIP-MINED AREA. ESSENTIAL SERVICE COOLING IS PROVIDED BY AN AUXILIARY COOLING POND WHICH IS INTEGRAL WITH THE MAIN POND.

OTHER SITE SPECIFIC CHARACTERISTICS INCLUDE EXTRA CLEANUP AND FILTRATION EQUIPMENT TO DEAL WITH THE KANKAKEE RIVER WATER FOR BRAIDWOOD, AND, THE FACT THAT ZION WAS DESIGNED FOR A 0.17g SSE VS. A 0.20g DESIGN AT BRAIDWOOD.

III.A.3.

THE PLANT LAYOUT IS BASICALLY THE SAME AT BOTH STATIONS. THE MAJOR STRUCTURES, SUCH AS TWO CONTAINMENT BUILDINGS, COMMON AUXILIARY BUILDING, COMMON TURBINE BUILDING, AND COMMON FUEL HANDLING BUILDING, ARE ARRANGED THE SAME AT EACH STATION. HOWEVER, THERE ARE SOME DIFFERENCES WITHIN THESE BUILDINGS.

III.A.4.

THE CONCRETE, STEEL LINED REACTOR CONTAINMENTS AT BRAIDWOOD ARE BUILT OF THE SAME MATERIALS AND ARE ONLY SLIGHTLY LARGER THAN THEIR COUNTERPARTS AT ZION, BUT THERE ARE DIFFERENCES IN THE NUMBER OF BUTTRESSES AND TENDONS IN THE CONTAINMENT DESIGNS. THE POLAR CRANE INSIDE EACH CONTAINMENT AT BRAIDWOOD IS MOUNTED ON THE CONTAINMENT WALL, RATHER THAN ON THE MISSILE BARRIER AS AT ZION. THERE ARE ALSO MINOR DIFFERENCES IN THE CONTAINMENT HEAT REMOVAL SYSTEMS FOR EACH STATION.

THE AUXILIARY BUILDING AT BRAIDWOOD IS OF GREATER VOLUME AND CONTAINS MORE USEABLE SPACE THAN ZION'S. THE ARRANGEMENT OF EQUIPMENT ALLOWS FOR GREATER PHYSICAL SEPARATION OF REDUNDANT SYSTEMS, PIPING, AND CABLES THAN WAS POSSIBLE AT ZION. THE REFUELING WATER STORAGE TANKS AT BRAIDWOOD HAVE BEEN LOCATED OUTDOORS, ALSO CREATING MORE USEABLE SPACE IN THE AUXILIARY BUILDING. IN ADDITION, THE LAYOUT IN THE AUXILIARY BUILDING AT BRAIDWOOD HAS BEEN ENHANCED WITH RESPECT TO RADIATION SHIELDING BASED ON ALARA LESSONS LEARNED FROM ZION.

THE REMAINING MAJOR SITE LAYOUT DIFFERENCES CONSIST OF THE RIVER SCREEN HOUSE AND LAKE SCREEN HOUSE STRUCTURES AT BRAIDWOOD DUE TO ITS COOLING WATER ARRANGEMENT. AT ZION, THE LAKE CRIBHOUSE CONTAINS THE COMPARABLE EQUIPMENT.

WITH RESPECT TO THE NUCLEAR STEAM SUPPLY SYSTEM, BOTH STATIONS UTILIZE A 4 LOOP WESTINGHOUSE PWR. THE POWER RATING OF THE BRAIDWOOD UNITS IS SLIGHTLY HIGHER THAN ZION'S. MOST OF THE DESIGN DIFFERENCES IN THIS AREA WERE DUE TO THE DEVELOPMENT OF THE NEXT GENERATION OF WESTINGHOUSE NSSS. THE BRAIDWOOD NSSS DESIGN IS IDENTICAL TO BYRON'S.

THE FUEL ASSEMBLY DESIGN CHANGED FROM A 15 X 15 ARRAY TO A 17 X 17 OPTIMIZED FUEL DESIGN. DUE TO THE UNCERTAINTY IN THE AVAILABILITY OF SILVER, THE CONTROL ROD MATERIAL AT BRAIDWOOD WAS CHANGED TO HALFNIUM RATHER THAN THE AG-IN-CD COMPOSITION OF THE CONTROL RODS AT ZION. THE CONVENTIONAL REACTOR HEAD ASSEMBLY AT ZION REQUIRES PARTIAL DISASSEMBLY PRIOR TO BEING REMOVED FOR A REFUELING. THE BRAIDWOOD REACTORS HAVE AN INTEGRATED HEAD PACKAGE THAT CAN BE REMOVED AS A UNIT.

THE STEAM GENERATOR DESIGN WAS CHANGED FROM A FEEDRING TYPE TO A PREHEATER TYPE, RESULTING IN INCREASED EFFICIENCY. MATERIALS AND MANUFACTURING PROCESSES WERE IMPROVED TO ENHANCE THE CORROSION RESISTANCE OF THE STEAM GENERATORS AT BRAIDWOOD.

THE REACTOR COOLANT PUMPS (RCP) AT BRAIDWOOD ARE OF GREATER CAPACITY THAN ZION'S. THE NUMBER THREE SEAL DESIGN HAS BEEN IMPROVED AND A COMPLETE SEAL REFURBISHMENT CAN BE ACCOMPLISHED WITHOUT REMOVING A RCP MOTOR AT BRAIDWOOD.

THE REACTOR PROTECTION SYSTEM AND SAFEGUARDS ACTUATION SYSTEM WERE UPGRADED FROM RELAY SYSTEMS AT ZION TO SOLID STATE SYSTEMS AT BRAIDWOOD.

III.A.6.

AUXILIARY SYSTEMS FOR THE PLANTS ARE ALSO DIFFERENT IN VARIOUS AREAS. THE SAFETY RELATED EQUIPMENT AT ZION STATION IS DISTRIBUTED ACROSS THREE ELECTRICAL DIVISIONS PER UNIT THAT ARE BACKED UP BY TWO DIESEL GENERATORS PER UNIT AND ONE COMMON DIESEL GENERATOR THAT CAN SERVE EITHER UNIT. AT BRAIDWOOD, THERE ARE TWO ELECTRICAL DIVISIONS PER UNIT AND TWO DIESEL GENERATORS PER UNIT. THE QUANTITY AND CAPACITY OF UNIT AND SYSTEM AUXILIARY TRANSFORMERS ALSO DIFFERS BETWEEN THE TWO STATIONS.

IN THE AREA OF BORON RECOVERY, BRAIDWOOD'S DESIGN INCLUDES A BORON THERMAL REGENERATION SYSTEM (BTRS) IN ADDITION TO BORIC ACID EVAPORATORS. THIS SYSTEM PROVIDES AN ALTERNATE MEANS FOR ADJUSTING BORON CONCENTRATION DURING PLANT OPERATION WHEREAS ZION DOES NOT HAVE THIS FEATURE.

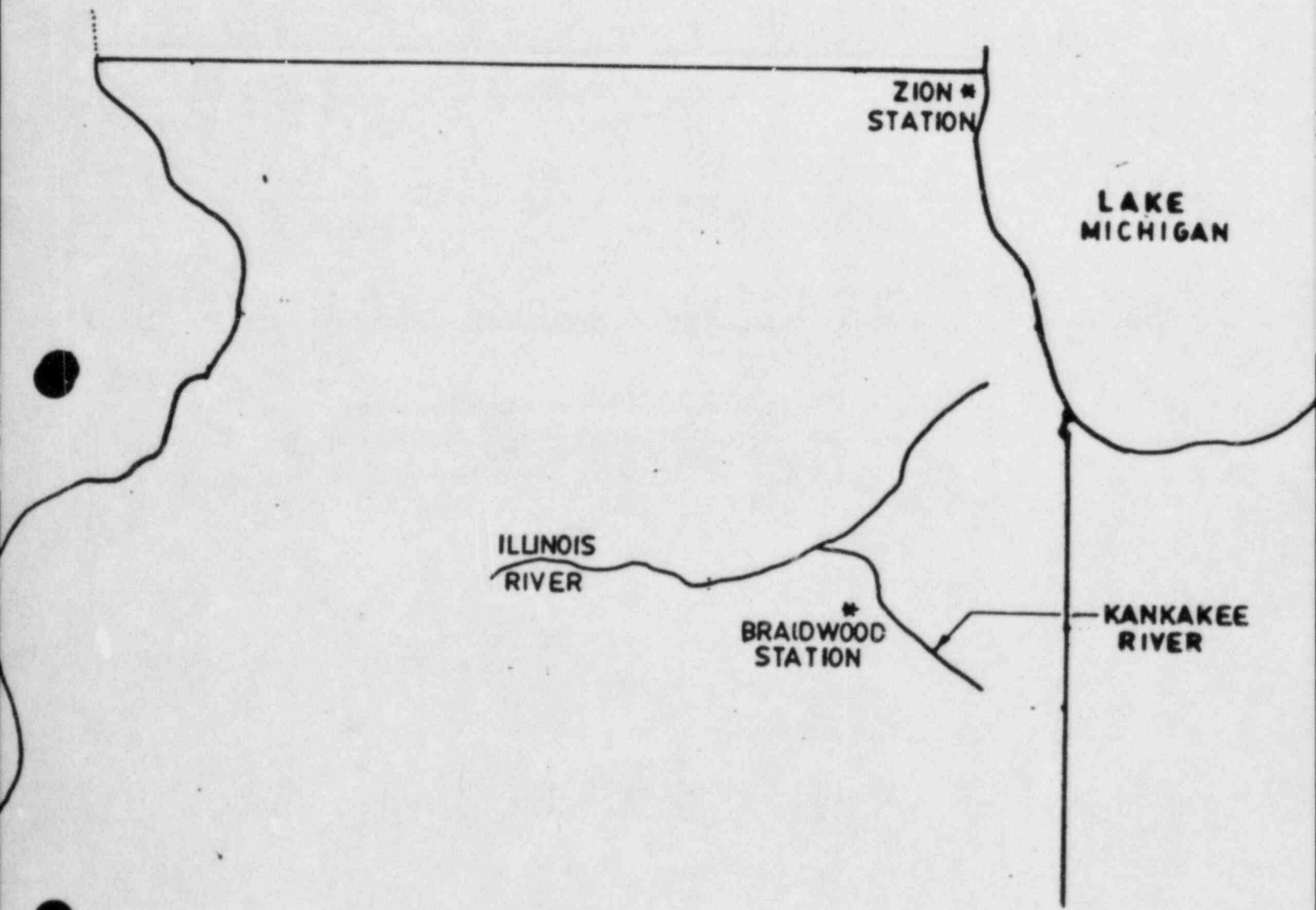
THE RADWASTE SYSTEMS AT BRAIDWOOD HAVE BEEN DESIGNED WITH A GREATER CAPACITY AND GENERAL IMPROVEMENTS OVER THE SYSTEMS AT ZION. IN ADDITION, BRAIDWOOD'S DESIGN INCLUDES A VOLUME REDUCTION SYSTEM WHICH PROVIDES FOR ALTERNATE MEANS OF WASTE DISPOSAL.

III.A.7.

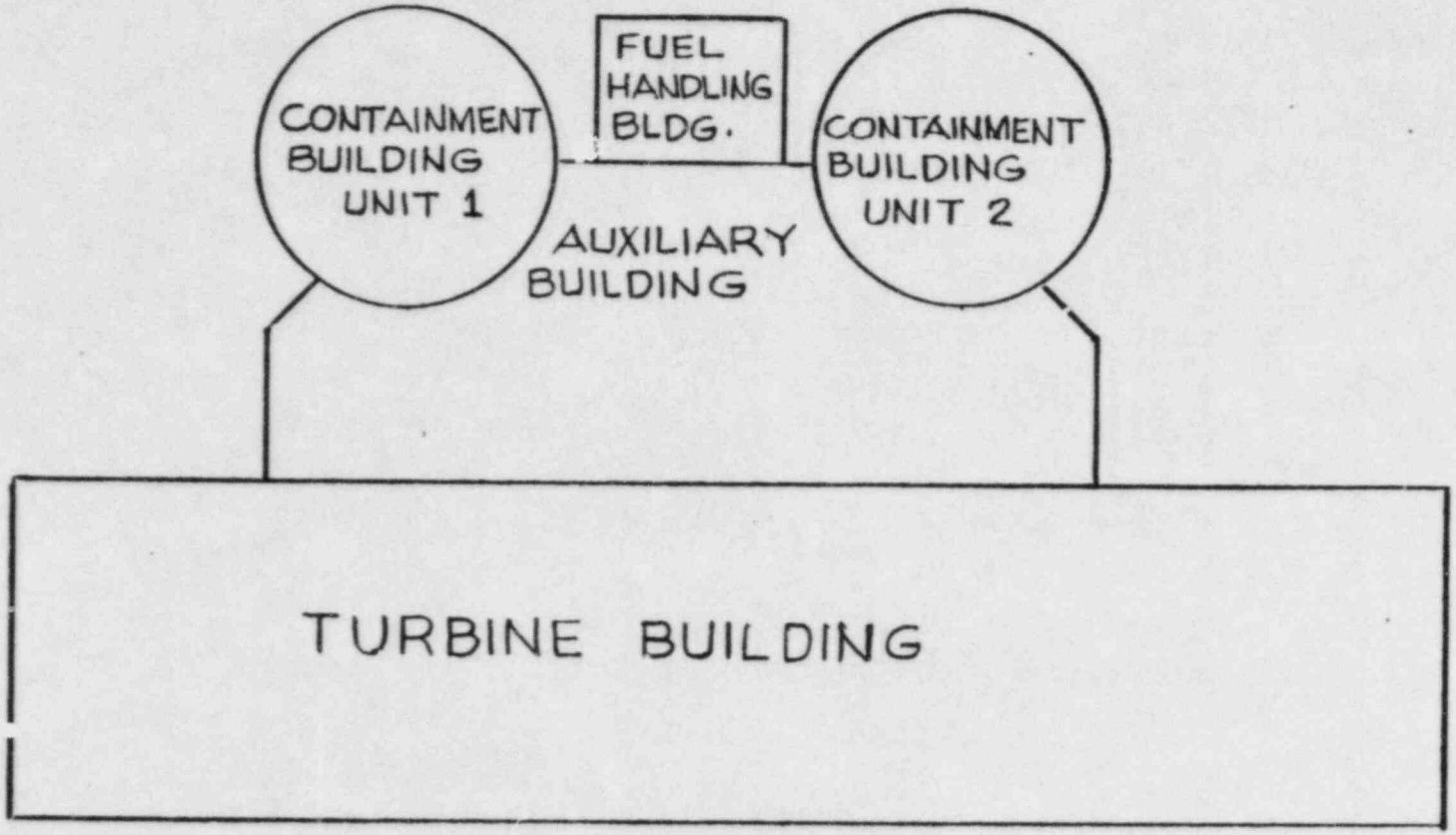
OTHER THAN THE SITE SPECIFIC CHARACTERISTICS THAT DICTATED CHANGES, THE DESIGN DIFFERENCES BETWEEN BRAIDWOOD AND ZION STATIONS CAN BE GENERALLY CHARACTERIZED AS IMPROVEMENTS TO A PROVEN, WELL-ENGINEERED DESIGN.

PRINCIPAL DESIGN DIFFERENCES

- SITE SPECIFIC CHARACTERISTICS
- PLANT LAYOUT AND STRUCTURES
- NUCLEAR STEAM SUPPLY SYSTEM DESIGN
- AUXILIARY SYSTEMS


ZION *
STATION
LAKE
MICHIGAN
ILLINOIS
RIVER
*
BRAIDWOOD
STATION
KANKAKEE
RIVER

SLIDE III.A.2


CONTAINMENT BUILDING UNIT 1
FUEL HANDLING BLDG.
CONTAINMENT BUILDING UNIT 2
AUXILIARY BUILDING
TURBINE BUILDING

SLIDE III·A·3

DIFFERENCES IN STRUCTURES

- CONTAINMENT
- AUXILIARY BUILDING
- RIVER SCREENHOUSE/LAKE SCREENHOUSE

NUCLEAR STEAM SUPPLY SYSTEM DESIGN

- REACTOR AND FUEL
- STEAM GENERATORS
- REACTOR COOLANT PUMPS
- REACTOR PROTECTION AND SAFEGUARDS ACTUATION

AUXILIARY SYSTEMS

- ELECTRICAL DIVISIONS/DIESEL GENERATORS
- BORON RECOVERY
- RADWASTE

SUMMARY

DESIGN DIFFERENCES BETWEEN BRAIDWOOD AND ZION CAN BE GENERALLY CHARACTERIZED AS IMPROVEMENTS TO A PROVEN, WELL-ENGINEERED DESIGN

SLIDE III.A.7

COMMONWEALTH EDISON COMPANY

PRESENTATION

III.B.1. OVERVIEW OF PLANT CONSTRUCTION AND STARTUP SCHEDULE

OVERVIEW OF PLANT CONSTRUCTION AND STARTUP SCHEDULE

GOOD AFTERNOON.

BEFORE UPDATING THE CONSTRUCTION PROGRESS SINCE OUR MEETING LAST MARCH, I WOULD LIKE TO QUICKLY REVIEW A COUPLE OF SIGNIFICANT PROJECT MILESTONES WHICH I DISCUSSED AT THAT TIME.

THE BRAIDWOOD PROJECT WAS AUTHORIZED IN SEPTEMBER, 1972.

A CONSTRUCTION PERMIT WAS ISSUED, AND THE FIRST SAFETY-RELATED CONCRETE WAS SUBSEQUENTLY POURED IN MARCH, 1976

ELECTRICAL BACKFEED FOR UNIT 1 WAS COMPLETED AND THE SWITCHYARD WAS LIVENED IN NOVEMBER, 1981.

THE START OF SYSTEM COMPLETION, OR TURNOVER FOR TESTING, BEGAN IN FEBRUARY, 1983.

COLD HYDRO OF THE UNIT 1 REACTOR VESSEL WAS COMPLETED IN AUGUST, 1983.

WITH THAT BACKGROUND, LET ME NOW REVIEW THE INSTALLATION PERCENTAGE COMPLETION FOR THE MAJOR CONSTRUCTION BULK QUANTITIES OF UNIT 1. THIS BAR CHART INDICATES OUR PROGRESS ON UNIT 1 FOR THE INSTALLATION OF MAJOR COMMODITIES IN THE MECHANICAL AREA. THE LIGHT CROSS HATCH AREA SPECIFICALLY INDICATES OUR PROGRESS IN THE LAST TEN (10) MONTHS.

AS YOU CAN SEE, THE INSTALLATION OF SPOOLS, OR LARGE BORE PIPE IS NOW COMPLETE. THE INSTALLATION OF LARGE HANGERS, SMALL PIPE, AND SMALL HANGERS HAS SEEN SIGNIFICANT PROGRESS AS WE INCREASED OUR INSTALLATION PERCENTAGES FROM 54%, 71% AND 7%, RESPECTIVELY. INSTRUMENTATION WORK IS 82% COMPLETE TODAY, WITH THE APPARENT SMALL INCREASE REFLECTING THE FACT THAT WE NOW ANTICIPATE A LARGER NUMBER OF MANHOURS INVOLVED IN THIS WORK, BASED ON OUR BYRON EXPERIENCE, THAN WE DID WHEN WE REPORTED OUR COMPLETION PERCENTAGE LAST MARCH.

III.B.1.-3

THE NEXT CHART SHOWS OUR PROGRESS FOR SEVERAL OTHER COMMODITIES. CONCRETE AND CABLE PAN INSTALLATION FOR UNIT 1 IS COMPLETE. CONDUIT AND CABLE INSTALLATION HAVE INCREASED FROM 66% AND 62%, RESPECTIVELY, TO WHERE THEY ARE TODAY. THE INSTALLATION OF CABLES FOLLOWS CONDUIT AND IS A CRITICAL PATH ACTIVITY FOR US. SINCE WE HAVE MOVED AHEAD WITH CONDUIT, WE ARE NOW CONCENTRATING OUR EFFORTS ON CABLE INSTALLATION.

CLEARLY THE "BULK CONSTRUCTION" PHASE OF THE PROJECT IS NOW GETTING BEHIND US, AS WE ARE WELL INTO THE SECOND PHASE OF THE PROJECT "SYSTEM COMPLETION".

III.B.1.-4

AS I INDICATED LAST MARCH, OUR PLANS FOR SYSTEM COMPLETION AND PREOPERATIONAL TESTING ARE BASED ON DUPLICATING THE APPROACH USED ON IDENTICAL SYSTEMS AT BYRON. WE ARE CONTINUING TO DO THIS IN ORDER TO REALIZE THE MAXIMUM BENEFIT FROM OUR EXPERIENCES GAINED AT BYRON. UNIT 1 IS DIVIDED INTO 224 "SYSTEMS", FOR CONSTRUCTION COMPLETION AND TESTING PURPOSES. IN THE PAST TEN MONTHS OUR PERCENTAGE COMPLETION FOR SYSTEM TURNOVERS HAS INCREASED FROM 22% TO 58%. EVEN MORE SIGNIFICANTLY, OUR PERCENTAGE FOR TESTING COMPLETION HAS INCREASED FROM 7% TO 32%. IN GENERAL, SYSTEM TURNOVER AND TESTING ALSO CONTINUES TO BE A CRITICAL PATH ON OUR SCHEDULE. HOWEVER, PROGRESS THIS PAST YEAR GIVES US CONFIDENCE THAT OUR MANAGEMENT CONTROL SYSTEMS WILL ASSURE THE TIMELY COMPLETION OF ALL SYSTEMS, AS WELL AS THE QUALITY OF THE COMPLETED SYSTEM.

OVERALL UNIT 1 IS NOW 80% COMPLETE, AS CONSTRUCTION ACTIVITES CONTINUE WITH OUR CONSTRUCTION WORK FORCE OF OVER 3200, WHICH IS THE PEAK FORCE LEVEL EXPERIENCED TO DATE ON THE BRAIDWOOD PROJECT.

III.B.1.-5

FINALLY LET ME SUMMARIZE OUR SCHEDULE FOR COMPLETION OF THE BRAIDWOOD PROJECT. LAST MONTH WE COMPLETED AN EXTENSIVE REVIEW AND EVALUATION OF PROJECT STATUS, WITH PARTICULAR ATTENTION TO VERY RECENT CONSTRUCTION COMPLETION AND TESTING EXPERIENCES AT BYRON, OUR SISTER PLANT. AS A RESULT OF THAT REVIEW WE HAVE REPLANNED OUR PROJECT SCHEDULE, AND IDENTIFIED NEW MILESTONE DATES FOR CRITICAL PROJECT ACTIVITIES PRIOR TO FUEL LOAD. OUR NEXT KEY MILESTONE IS THE START OF THE EMERGENCY CORE COOLING SYSTEM TESTING BY MARCH 17, 1985. CURRENTLY, WE ARE PROJECTING THE START OF THAT TEST BY FEBRUARY 25, 1985, AN IMPROVEMENT OF ALMOST ONE MONTH. WE THEN PLAN TO BEGIN OUR INTEGRATED HOT FUNCTIONAL TESTING IN JULY OF THIS YEAR. THAT WILL BE FOLLOWED BY COMPLETION OF THE INTEGRATED LEAK RATE TEST IN SEPTEMBER. THOSE MILESTONES ARE FULLY IN SUPPORT OF OUR FUEL LOAD DATE FOR UNIT 1, WHICH IS MARCH 31, 1986 AND OUR PLANT IN SERVICE DATE OF OCTOBER 30, 1986.

FOR THE SAKE OF COMPLETENESS, I HAVE ALSO INDICATED KEY MILESTONE DATES FOR UNIT 2. THAT CONCLUDES MY PRESENTATION ON THIS AGENDA ITEM.

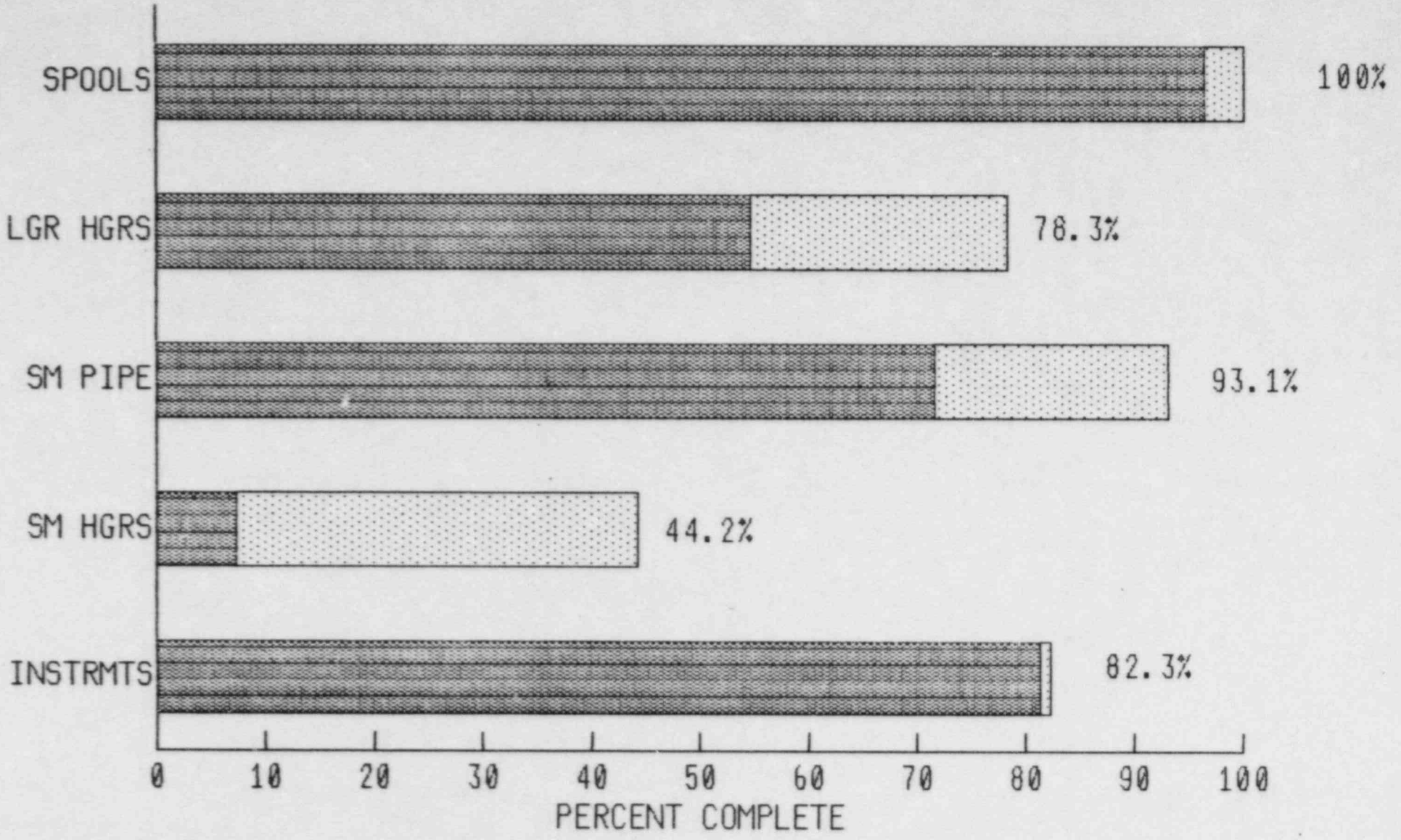
BRAIDWOOD PROJECT

OVERVIEW -- CONSTRUCTION PROGRESS

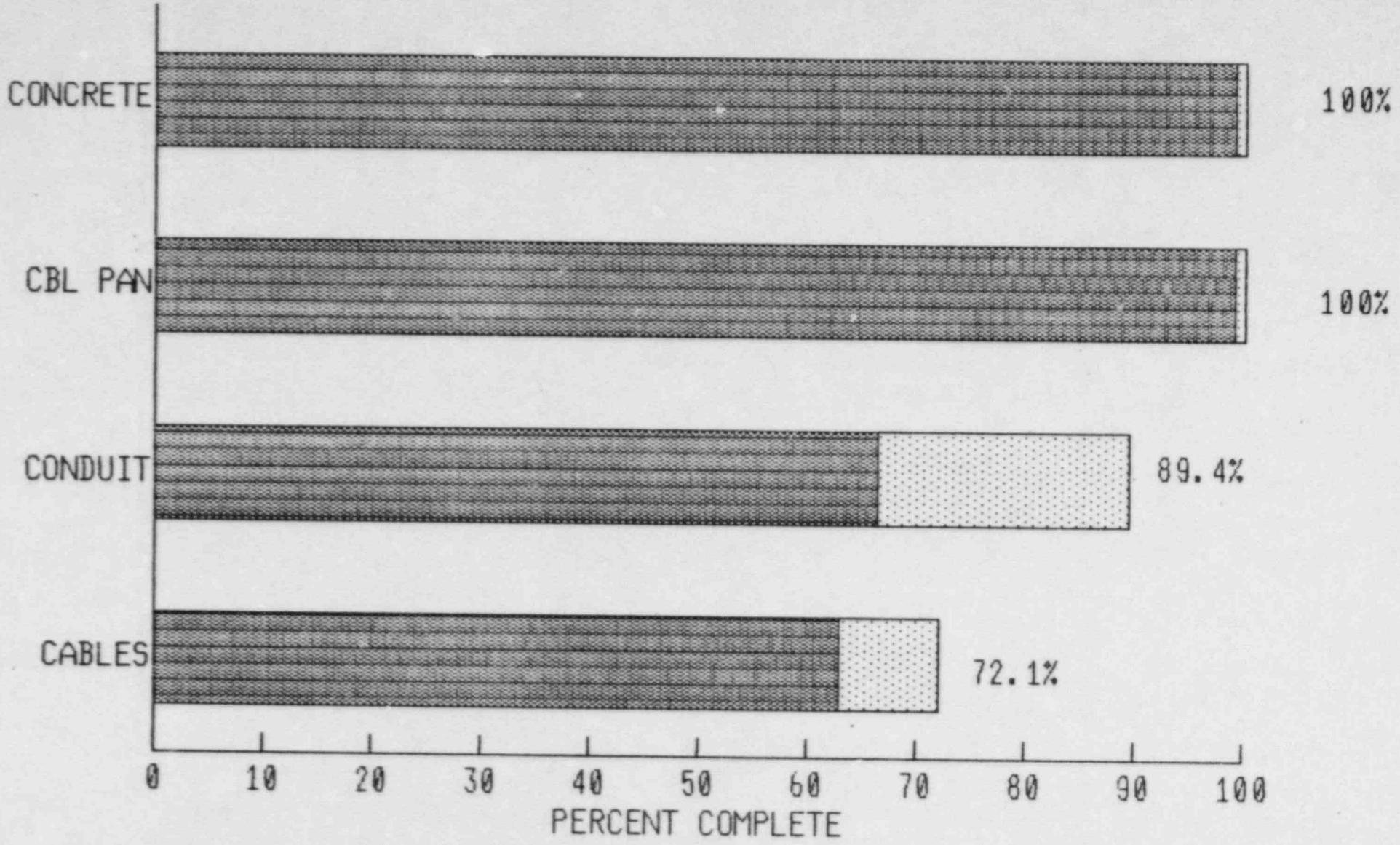
- PROJECT AUTHORIZED -- SEPTEMBER, 1972
- FIRST CONCRETE POURED -- MARCH, 1976
- UNIT I BACKFEED AND SWITCHYARD LIVENED -- NOVEMBER, 1981
- START OF SYSTEM TURNOVERS FOR TESTING -- FEBRUARY, 1983
- COLD HYDRO OF THE REACTOR VESSEL -- AUGUST, 1983

(1210D)

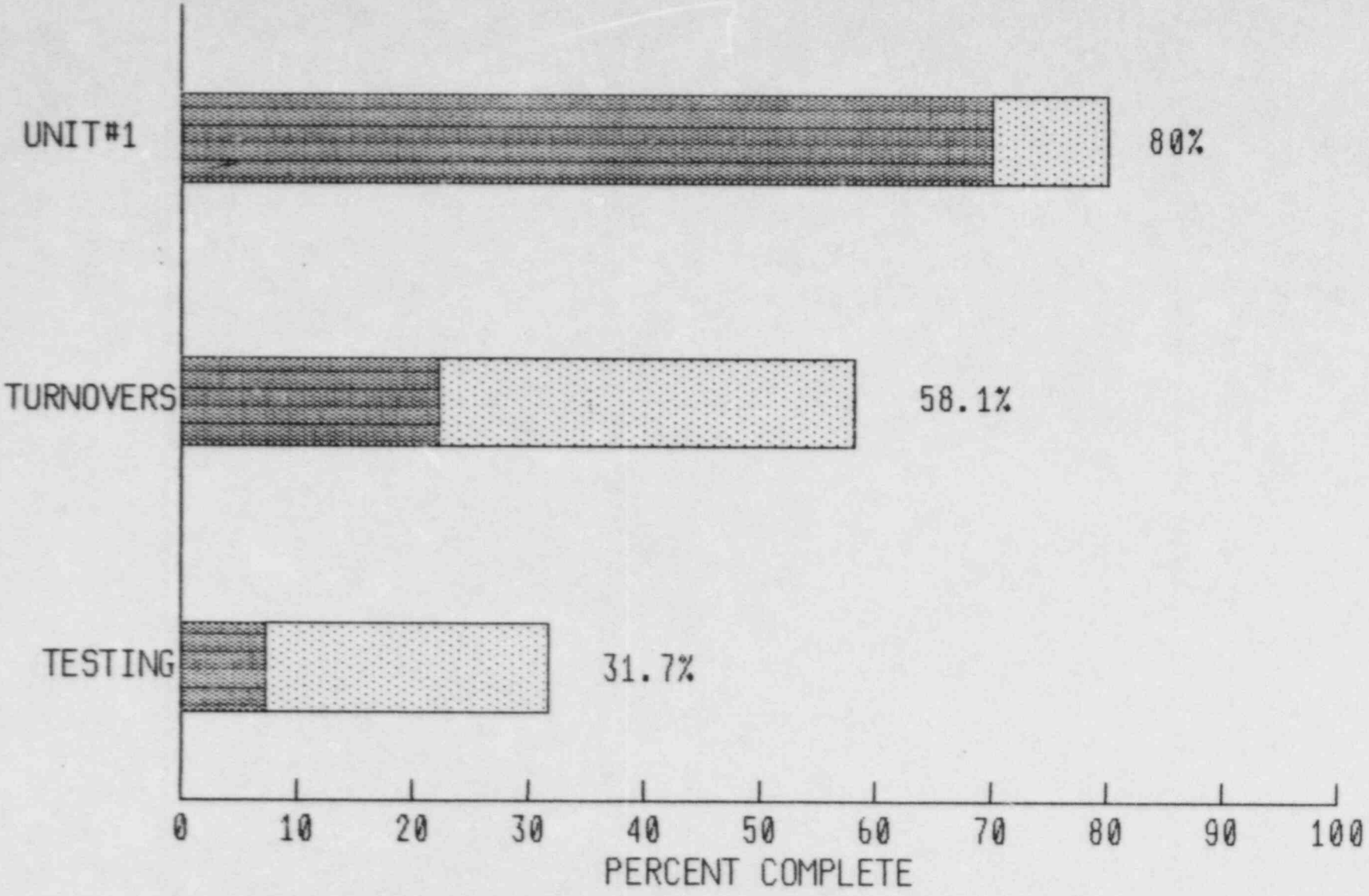
BRAIDWOOD UNIT#1
BULK PERCENT COMPLETE
AS OF 12/31/84



BRAIDWOOD UNIT#1
BULK PERCENT COMPLETE
AS OF 12/31/84



BRAIDWOOD UNIT#1
BULK PERCENT COMPLETE
AS OF 12/31/84



PROJECT SCHEDULE

UNIT 1

EMERGENCY CORE COOLING SYSTEM TESTING	--	MARCH 17, 1985
INTEGRATED HOT FUNCTIONAL TESTING	--	JULY 15, 1985
INTEGRATED LEAK RATE TEST	--	SEPTEMBER 15, 1985
BEGIN FUEL LOADING	--	MARCH 31, 1986
PLANT IN SERVICE	--	OCTOBER 30, 1986

UNIT 2

COLD HYDRO OF REACTOR VESSEL	--	APRIL 30, 1986
BEGIN FUEL LOADING	--	JUNE 30, 1987
PLANT IN SERVICE	--	DECEMBER 31, 1987

COMMONWEALTH EDISON COMPANY

PRESENTATION

III.B.2. MANAGEMENT CHANGES

MANAGEMENT CHANGES

AT THE ACRS SUB-COMMITTEE MEETING IN MARCH, 1984, WE PRESENTED OUR CORPORATE ORGANIZATION, AS IT RELATES TO THE BRAIDWOOD PROJECT. MOST OF THAT REMAINS THE SAME. AS PROJECT MANAGER, I REPORT TO TOM MAIMAN, THE MANAGER OF PROJECTS, WHO IN TURN REPORTS TO JIM O'CONNOR, CHAIRMAN AND PRESIDENT OF COMMONWEALTH EDISON COMPANY. AT THE PROJECT LEVEL, HOWEVER, WE HAVE MADE A FEW ADDITIONAL CHANGES WHICH I WOULD LIKE TO SUMMARIZE.

FOUR OF THE MAJOR LINE ORGANIZATIONS ARE ESSENTIALLY THE SAME, IN TERMS OF RESPONSIBILITY AND FUNCTION. HOWEVER, THE LICENSING AND COMPLIANCE GROUP IS A NEW ADDITION. THIS GROUP SERVES AS THE PRIMARY INTERFACE BETWEEN THE PROJECT SITE ORGANIZATION, AND THE NRC RESIDENT INSPECTORS, AS WELL AS ALL OTHER REGULATORY AND INSPECTION PERSONNEL WHO VISIT THE SITE, INCLUDING THE RECENT NRC CONSTRUCTION ASSESSMENT TEAM AND THE INPO CONSTRUCTION PROJECT EVALUATION TEAM. IT IS THEIR RESPONSIBILITY TO ASSURE TIMELY AND COMPLETE RESPONSES TO ANY CONCERNS WHICH ARE RAISED AND TO TRACK THE STATUS OF NRC ISSUES UNTIL THEY ARE SATISFACTORILY CLOSED. THIS GROUP IS HEADED BY CHUCK SCHROEDER. CHUCK BRINGS TO BRAIDWOOD EXTENSIVE LASALLE COUNTY EXPERIENCE WHERE HE HELD A SENIOR REACTOR OPERATOR'S LICENSE AND LATER SERVED AS THE NUCLEAR LICENSING ADMINISTRATOR DURING THE 5% AND FULL POWER LICENSE PROCESS FOR BOTH LASALLE COUNTY UNITS.

TWO OF THE OTHER LINE ORGANIZATIONS HAVE EXPERIENCED PERSONNEL CHANGES SINCE LAST MARCH. IN THE CONSTRUCTION GROUP, DAN SHAMBLIN HAS ASSUMED RESPONSIBILITIES AS PROJECT CONSTRUCTION SUPERINTENDENT. DAN WAS FORMERLY THE PROJECT FIELD ENGINEERING MANAGER, AND PRIOR TO THAT CONSTRUCTION SUPERINTENDENT THROUGH FUEL LOAD OF UNIT 2 AT OUR LASALLE COUNTY STATION. WARREN VAHLE HAS ASSUMED RESPONSIBILITIES AS PROJECT FIELD ENGINEERING MANAGER. PRIOR TO ASSIGNMENT TO THE BRAIDWOOD PROJECT, WARREN WAS SUPERVISING MECHANICAL FIELD ENGINEER FOR CONSTRUCTION AT LASALLE COUNTY.

THE THREE OTHER GROUPS SHOWN ON THIS CHART ARE NEWLY FORMED SINCE LAST MARCH. AS DIRECTOR OF THE BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM, BCAP, NINU KAUSHAL HAS RESPONSIBILITY FOR IMPLEMENTATION OF THAT EFFORT. NINU AND TOM MAIMAN WILL BE DESCRIBING THE BCAP PROGRAM IN SOME DETAIL IN A FEW MINUTES.

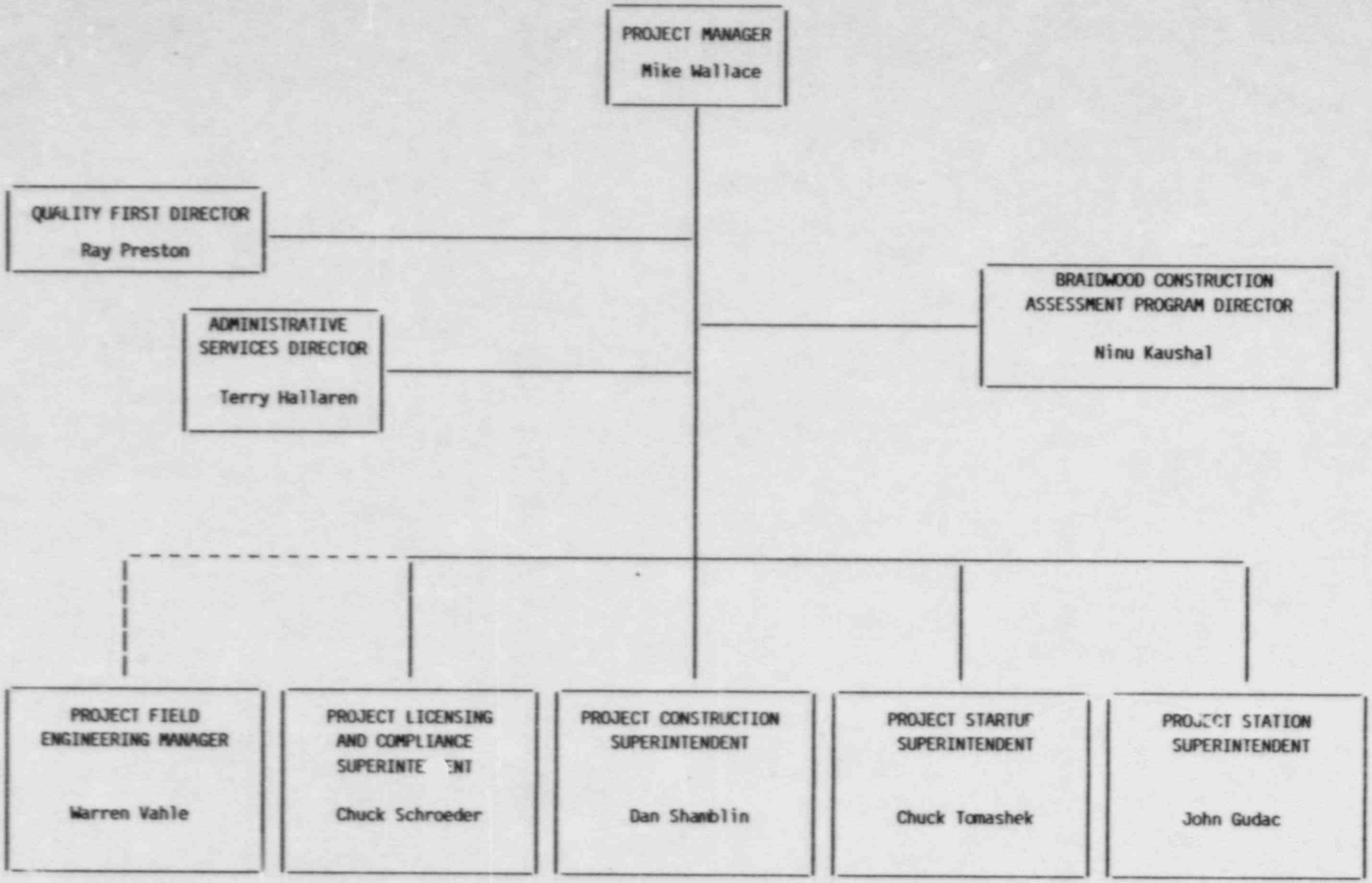
COMMONWEALTH EDISON MAINTAINS A STRONG COMMITMENT TO THE QUALITY OF CONSTRUCTION AT BRAIDWOOD. TO EMPHASIZE AND CLEARLY COMMUNICATE THAT COMMITMENT, WE HAVE ESTABLISHED A QUALITY FIRST PROGRAM HEADED BY RAY PRESTON. THE QUALITY FIRST PROGRAM PROMOTES THE COMPANY'S STRONG, POSITIVE ATTITUDE REGARDING QUALITY AMONG THE ENTIRE WORK FORCE AT BRAIDWOOD, AND, MOST IMPORTANTLY PROVIDES AN OPPORTUNITY FOR INDIVIDUALS TO EXPRESS ANY CONCERNS THEY MAY HAVE REGARDING THE QUALITY OF CONSTRUCTION. THROUGH THE QUALITY FIRST PROGRAM, INDIVIDUALS ON THE SITE CAN RAISE CONCERNS, HAVE THEM REVIEWED WITH ANONYMITY, AND RECEIVE A PERSONAL FOLLOWUP RESPONSE.

IN ORDER TO ASSURE PROPER COORDINATION OF ALL SUPPORT SERVICES WITHIN THE ORGANIZATION, INCLUDING DATA MANAGEMENT, TRAINING, AND CLERICAL SUPPORT, WE HAVE ESTABLISHED AN ADMINISTRATIVE SERVICES GROUP HEADED BY TERRY HALLAREN.

IN MAKING THESE AS WELL AS OTHER CHANGES IN THE PROJECT ORGANIZATION AT BRAIDWOOD, WE HAVE CONTINUED TO DRAW ON OUR BROAD CORPORATE BASE OF EXPERIENCE BY REASSIGNING PERSONNEL FROM OUR BYRON AND LASALLE COUNTY NUCLEAR STATIONS TO BRAIDWOOD, AS THEY BECOME AVAILABLE. THE CORPORATE COMMITMENT TO PROVIDE THE MOST CAPABLE AND EXPERIENCED PERSONNEL AVAILABLE REMAINS STRONG, AND IS EVIDENCED THROUGH THE DEPTH OF EXPERIENCE EXISTING THROUGHOUT THE COMMONWEALTH EDISON BRAIDWOOD PROJECT ORGANIZATION. FURTHER, WHEN NEEDED, WE HAVE DRAWN OUTSIDE EXPERTISE INTO OUR ORGANIZATION, AUGMENTING COMMONWEALTH EDISON PERSONNEL.

AS WE MOVE TOWARD COMPLETION AT BRAIDWOOD, WE INTEND TO CONTINUE EVALUATING THE EFFECTIVENESS OF OUR PROJECT ORGANIZATION. THIS ASSURES THAT OUR EFFORTS PRODUCE A QUALITY PLANT MEETING ALL DESIGN AND LICENSING REQUIREMENTS.

FINALLY, DURING OUR MARCH MEETING, LOU DELGEORGE DISCUSSED SEVERAL CORPORATE ORGANIZATIONAL CHANGES AND RE-ALIGNMENTS WHICH WERE IN PROGRESS. IN GENERAL, THOSE CHANGES HAVE NOW BEEN IMPLEMENTED.


PROJECT MANAGER
Mike Wallace
QUALITY FIRST DIRECTOR
Ray Preston
ADMINISTRATIVE SERVICES DIRECTOR
Terry Hallaren
BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM DIRECTOR
Ninu Kaushal
PROJECT FIELD ENGINEERING MANAGER
Warren Vahle
PROJECT LICENSING AND COMPLIANCE SUPERINTENDENT
Chuck Schroeder
PROJECT CONSTRUCTION SUPERINTENDENT
Dan Shamblin
PROJECT STARTUP SUPERINTENDENT
Chuck Tomashek
PROJECT STATION SUPERINTENDENT
John Gudac

COMMONWEALTH EDISON COMPANY

PRESENTATION

III.B.3. QUALITY ASSURANCE

(2569A)

QUALITY ASSURANCE

I'M GENE FITZPATRICK, ASSISTANT MANAGER OF QUALITY ASSURANCE. I WAS ASSIGNED TO THIS POSITION IN MARCH 1984. PRIOR TO THIS ASSIGNMENT I WAS PRODUCTION TRAINING MANAGER AND MADE A PRESENTATION IN THAT ROLE AT THE MARCH 1984 ACRS SUB-COMMITTEE MEETING.

I WILL COVER OUR QUALITY ASSURANCE EFFORTS AT BRAIDWOOD, CONCENTRATING ON THE CHANGES AND DEVELOPMENTS OCCURRING SINCE MARCH 1984.

SLIDE III.B.3-1

THIS IS THE ORGANIZATION CHART FOR THE QUALITY ASSURANCE DEPARTMENT. NOTE THAT THE MANAGER OF QUALITY ASSURANCE REPORTS TO THE CHAIRMAN AND PRESIDENT, WHICH PROVIDES FOR INDEPENDENCE FROM THE ENGINEERING, CONSTRUCTION, AND OPERATIONS FUNCTIONS.

AS THE ASSISTANT MANAGER OF QUALITY ASSURANCE I REPORT TO THE MANAGER OF QUALITY ASSURANCE AND SPEND PRACTICALLY ALL OF MY TIME AT BRAIDWOOD, WHERE I HAVE DIRECT CONTROL OF THE BRAIDWOOD GENERAL SUPERVISOR OF QUALITY ASSURANCE, WHO IS RESPONSIBLE FOR THE QUALITY ASSURANCE OVERVIEW OF THE BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM -BCAP- AND OF THE SITE DESIGN ACTIVITIES, AND THE BRAIDWOOD SITE QUALITY ASSURANCE SUPERINTENDENT, WHO IS RESPONSIBLE FOR ALL OTHER SITE QUALITY ASSURANCE MATTERS.

SLIDE III.B.3-2

THIS CHART SHOWS MORE DETAIL ON THE SITE QUALITY ASSURANCE ORGANIZATION, WHICH HAS BEEN EXPANDED OVER THE PAST YEAR. THE SITE QUALITY ASSURANCE GROUP IS TOTALLY INDEPENDENT OF THE BRAIDWOOD PROJECT, INCLUDING CONSTRUCTION, ALTHOUGH WE WORK CLOSELY WITH THE PROJECT IN RESOLVING QUALITY ISSUES. WE HAVE FIVE SUPERVISORS, INCLUDING OUR BCAP Q.A. SUPERVISOR. FOUR OF THESE SUPERVISORS, PLUS THE AUDIT COORDINATOR, REPORT TO THE SITE QUALITY ASSURANCE SUPERINTENDENT. ONE SUPERVISOR IS RESPONSIBLE FOR COORDINATION OF THE INDEPENDENT TESTING AGENCY ACTIVITIES AND PROCUREMENT ACTIVITIES; THEN WE HAVE A SUPERVISOR IN CHARGE OF OUR QUALITY ASSURANCE EFFORTS RELATED TO EACH OF THE MAJOR WORK CATEGORIES AT THE SITE. THE NUMBERS BELOW THE BOXES INDICATE THE NUMBER OF PERSONNEL ASSIGNED IN EACH AREA.

SLIDE III.B.3-3

THIS NEXT CHART COMPARES OUR CURRENT MANNING WITH THE JANUARY 1984 MANNING LEVELS. THE TOTAL FOR JANUARY 1985 REPRESENTS AN INCREASE OF MORE THAN 160 PERCENT OVER JANUARY 1984. INCLUDED IN THE CURRENT NUMBERS ARE PERSONNEL HOLDING 33 BACHELOR's DEGREES AND 10 ADVANCED DEGREES. IN ADDITION, WE PLAN ON ADDING A FEW MORE PERSONNEL EARLY THIS YEAR. THESE STAFF CHANGES HAVE BEEN NECESSITATED TO KEEP PACE WITH INCREASED AUDIT AND SURVEILLANCE ACTIVITIES; INCREASED INTERFACES WITH AN EXPANDED PROJECT ORGANIZATION, INCLUDING BCAP; INCREASED DOCUMENTATION REVIEW

ACTIVITIES, INCREASING SUPPORT OF PRE-OPERATIONAL TESTING AND SYSTEM TURNOVER; EXTENSIVE INVOLVEMENT BY QUALITY ASSURANCE IN FOLLOWING CORRECTIVE ACTION PROGRAMS; AND OVERALL TO PROVIDE ENHANCED QUALITY ASSURANCE EMPHASIS TOWARD SITE ACTIVITIES. WE FEEL THE CURRENT ORGANIZATION IS STRUCTURED BETTER FROM A WORKLOAD STANDPOINT AND IS BOTH MORE EFFECTIVE AND EFFICIENT THAN THE PREVIOUS ORGANIZATION.

SLIDE III.B.3-4

OBVIOUSLY NUMBERS DON'T TELL THE WHOLE STORY. MANY OF THE ADDITIONS WE ARE TALKING ABOUT ARE EXPERIENCED PEOPLE BROUGHT IN FROM OUR LASALLE CONSTRUCTION QUALITY ASSURANCE OPERATION, FROM OTHER PARTS OF THE COMPANY QUALITY ASSURANCE DEPARTMENT, AND FROM OUTSIDE THE COMPANY. FOR EXAMPLE, IN MARCH 1984 THE SITE Q.A. SUPERINTENDENT FROM LASALLE WAS RE-ASSIGNED TO BRAIDWOOD. IN ADDITION, SEVERAL Q.A. ENGINEERS AND INSPECTORS WITH LASALLE CONSTRUCTION QUALITY ASSURANCE EXPERIENCE WERE RE-ASSIGNED TO BRAIDWOOD. THESE CHANGES HAVE INCREASED OUR EXPERIENCE LEVELS AS SHOWN ON THIS CHART.

ALL OF THESE CHANGES HAVE BEEN INSTRUMENTAL IN INCREASING OUR EFFECTIVENESS, AND IN INCREASING THE QUALITY ASSURANCE PRESENCE ON SITE.

THE SITE QUALITY ASSURANCE ORGANIZATION IS RESPONSIBLE FOR ASSURING THAT CONTRACTORS MEET ALL REQUIREMENTS AND THAT THEY FULLY IMPLEMENT THEIR QUALITY ASSURANCE PROGRAMS.

WE DO THIS PRIMARILY THROUGH AUDITS AND SURVEILLANCES OF THE CONTRACTORS' ACTIVITIES, AND THROUGH OVERVIEWS OF COMPLETED AND IN-PROCESS WORK.

SLIDE III.B.3-5

AUDITS AND SURVEILLANCES LOOK AT IN-PROCESS ACTIVITIES, ON-SITE DESIGN EFFORTS CONDUCTED BY THE ARCHITECT ENGINEER, AND PLANT CONSTRUCTION AND TESTING ACTIVITIES, COVERING ALL APPLICABLE 10CFR50, APPENDIX B CRITERIA. TO DATE AT BRAIDWOOD OUR QUALITY ASSURANCE PEOPLE HAVE CONDUCTED OVER 400 AUDITS AND ALMOST 4000 SURVEILLANCES. IN 1984 ALONE WE PERFORMED 81 AUDITS AND 828 SURVEILLANCES. AUDITS AND SURVEILLANCES ARE CONDUCTED TO SCHEDULES APPROVED BY THE MANAGER OF QUALITY ASSURANCE. WE PURSUE TIMELY CORRECTIVE ACTION FOR DEFICIENCIES FOUND IN THESE AUDITS AND SURVEILLANCES AND ENSURE THAT CORRECTIVE ACTIONS FOR AUDIT DEFICIENCIES ARE IMPLEMENTED BEFORE CLOSING THE ITEM. WE ALSO DO THIS FOR SURVEILLANCES, UNLESS THE ITEM IS BEING TRACKED IN THE NON-CONFORMANCE SYSTEM. IN ADDITION, SURVEILLANCE ITEMS NOT CORRECTED IN A TIMELY MANNER BECOME AUDIT DEFICIENCIES. FURTHERMORE, WE FOLLOW-UP IN EITHER CASE TO ENSURE THE CORRECTIVE ACTION HAS FIXED THE ORIGINAL CONCERN.

SLIDE III.B.3-6

WE FOCUSED A GREAT DEAL OF ATTENTION IN 1984 ON IMPROVING THE DEPTH AND THOROUGHNESS OF OUR SITE AUDIT PROGRAM. EARLY IN 1984 WE ASSIGNED AN EXPERIENCED INDIVIDUAL WITH SOLE RESPONSIBILITY FOR AUDIT COORDINATION. ALSO AS EXAMPLES OF AUDIT PROGRAM IMPROVEMENTS, WE HAVE ENHANCED OUR PRE-AUDIT PREPARATION, RESULTING IN A MORE THOROUGH UNDERSTANDING BY THE AUDIT TEAM OF THE FOCUS OF THE AUDIT. WE HAVE TAKEN STEPS TO INVOLVE OUR AUDIT COORDINATOR AND OUR LEAD AUDITORS MORE DEEPLY IN THE AUDITS, WE HAVE IMPROVED OUR AUDIT TEAM DEBRIEFINGS PRIOR TO THE AUDIT EXIT MEETINGS, AND WE HAVE PLACED ADDITIONAL EMPHASIS ON REVIEW OF AUDIT RESPONSES AND CORRECTIVE ACTIONS, AND ON PROMPT RESOLUTION OF ANY DEFICIENT RESPONSES.

THESE STEPS HAVE CONTRIBUTED TO A SIGNIFICANT IMPROVEMENT IN OUR AUDIT PROGRAM. IN ADDITION, AN INCREASED AWARENESS ON THE PART OF PROJECT AND CORPORATE MANAGEMENT HAVE MADE RESOLUTION OF OPEN DEFICIENCIES A MATTER OF KEY PRIORITY. AS A RESULT, THE TIMELINESS OF RESOLUTION OF DEFICIENCIES IS IMPROVING.

SOME OF OUR OVERVIEW PROGRAMS ARE PERFORMED BY THE ON-SITE TESTING AGENCY - THE PITTSBURGH TESTING LABORATORY - PTL - UNDER THE DIRECTION OF SITE QUALITY ASSURANCE. THESE PROGRAMS PROVIDE US WITH ADDITIONAL ASSURANCE THAT THE CONTRACTORS' INSPECTORS ARE DOING A GOOD JOB AND THAT THE PLANT IS BEING BUILT RIGHT. OUR Q.A. ORGANIZATION PROVIDES FOR A SUPERVISOR OVERSEEING THESE FUNCTIONS, WITH THREE ADDITIONAL SITE Q.A. PERSONNEL BEING DIRECTLY INVOLVED.

THESE OVERVIEW PROGRAMS ARE OF TWO TYPES AND WE BELIEVE THEY ARE SOUNDLY STRUCTURED.

SLIDE III.B.3-7

FIRST, WE HAVE AN OVERINSPECTION PROGRAM, WHERE QUALIFIED PTL INSPECTORS PERFORM INSPECTIONS IN SELECTED AREAS THAT HAVE PREVIOUSLY BEEN INSPECTED. IN SOME AREAS THE OVERINSPECTIONS HAVE BEEN INCREASED THIS YEAR FROM 10% TO 25 %. AS THE SITUATION WARRANTS, OVERINSPECTIONS MAY BE TEMPORARILY INCREASED BEYOND THESE FIGURES. LIKEWISE, OVERINSPECTION ACTIVITY MAY DECREASE IN SELECTED AREAS, IF WARRANTED.

SLIDE III.B.3-8

OUR SECOND OVERVIEW PROGRAM IS CALLED THE UNIT CONCEPT INSPECTION WHERE A PORTION OF THE PLANT IS SELECTED FOR INSPECTION TO VERIFY THAT THE PLANT IS BUILT ACCORDING TO DESIGN REQUIREMENTS. SO FAR THESE INSPECTIONS HAVE COVERED ABOUT 85% OF UNIT 1 AND 10% OF UNIT 2.

DEFICIENCIES IDENTIFIED AS A RESULT OF THESE PROGRAMS ARE DISPOSITIONED AND TRENDED AS ANY OTHER INSPECTION DEFICIENCY WOULD BE.

ANOTHER MAJOR QUALITY ASSURANCE EFFORT AT BRAIDWOOD IS THE QUALITY ASSURANCE OVERVIEW OF THE BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM - BCAP. BCAP ITSELF WILL BE INTRODUCED BY THE MANAGER OF PROJECTS, MR. MAIMAN, AND WILL BE DISCUSSED BY THE PROGRAM DIRECTOR, MR. KAUSHAL, WHO FOLLOW ME ON THE AGENDA. I WANT TO TALK FOR A FEW MINUTES ABOUT Q.A.'S ROLE IN BCAP.

SLIDE III.B.3-9

BCAP IS BEING IMPLEMENTED UNDER THE APPLICABLE REQUIREMENTS OF THE COMMONWEALTH EDISON QUALITY ASSURANCE PROGRAM.

SLIDE III.B.3-10

QUALITY ASSURANCE PROVISIONS THAT APPLY TO BCAP INCLUDE THE USE OF APPROVED PLANS, PROCEDURES, AND CHECKLISTS.

INSPECTION PERSONNEL ARE BEING TRAINED, QUALIFIED AND CERTIFIED IN ACCORDANCE WITH CURRENT COMMITMENTS. PERSONNEL PERFORMING OTHER BCAP ACTIVITIES ARE BEING TRAINED, QUALIFIED AND CERTIFIED, AS APPLICABLE, TO THE PARTICULAR ACTIVITY THAT THEY ARE PERFORMING.

BCAP INSPECTIONS, REVIEWS AND RESULTS ARE BEING DOCUMENTED WITH OBJECTIVE EVIDENCE FOR TRACEABILITY AND REPRODUCIBILITY PURPOSES AND WILL BE RETAINED AS QUALITY RECORDS.

NONCONFORMANCES ARE BEING IDENTIFIED, PROCESSED IN ACCORDANCE WITH EXISTING SYSTEMS, AND TRENDED.

SCHEDULED AND UNSCHEDULED AUDITS AND SURVEILLANCES ARE BEING PERFORMED AND FOLLOWED-UP.

AND FINALLY PERIODIC REPORTS ARE BEING PREPARED SO THAT SENIOR MANAGEMENT IS AWARE PROMPTLY OF ANY PROBLEMS IN THE IMPLEMENTATION OF BCAP OR MAJOR DISCREPANCIES FOUND IN THE CONDUCT OF BCAP.

SLIDE III.B.3-11

TO ASSURE THE QUALITY AND PROGRAMMATIC REQUIREMENTS OF BCAP ARE MET, WE HAVE ESTABLISHED A DEDICATED BCAP QUALITY ASSURANCE OVERVIEW GROUP UNDER OUR GENERAL SUPERVISOR OF QUALITY ASSURANCE, WHO REPORTS TO ME. THIS GROUP CONSISTS OF EIGHTEEN (18) INDIVIDUALS AND IS ORGANIZED, AS SHOWN HERE; INTO FOUR SUBGROUPS - ONE FOR EACH OF THE THREE ELEMENTS OF THE BCAP PROGRAM AND AN OVERINSPECTION GROUP.

SLIDE III.B.3-12

FOLLOWING THE DEVELOPMENT AND SUBMITTAL OF THE BCAP PROGRAM DOCUMENT TO THE NRC, THE BCAP QUALITY ASSURANCE OVERVIEW GROUP DEVELOPED A BCAP QUALITY ASSURANCE PLAN AND IMPLEMENTING PROCEDURES TO REFLECT THE QUALITY ASSURANCE COMMITMENTS IN THE PROGRAM DOCUMENT AND TO SUPPORT THE OVERVIEW EFFORT.

SLIDE III.B.3-13

THE BCAP QUALITY ASSURANCE OVERVIEW GROUP REVIEWS AND CONCURS WITH ALL BCAP PROCEDURES; REVIEWS THE TRAINING, QUALIFICATIONS AND CERTIFICATIONS, AS APPLICABLE, OF PERSONNEL PERFORMING BCAP ACTIVITIES; REVIEWS THE PROCESSING OF OBSERVATIONS AND DISCREPANCIES FOUND AS A RESULT OF BCAP AND WILL REVIEW THE VARIOUS COMPLETED PROGRAM ELEMENTS, INCLUDING AN OVERALL ASSESSMENT OF THE RESULTS.

SLIDE III.B.3-14

THIS GROUP ALSO VERIFIES VARIOUS BCAP ACTIVITIES BY A VARIETY OF SAMPLING METHODS. SOME ACTIVITIES ARE VERIFIED BY ESTABLISHING AND PERFORMING IN-PROCESS WITNESS AND HOLD POINTS. FIELD ACTIVITIES ARE VERIFIED BY PERFORMING OVERINSPECTIONS, USING CERTIFIED INSPECTORS, OF ABOUT TEN PERCENT OF THE COMPLETED FIELD WORK INSPECTED AS A PART OF BCAP. OTHER ACTIVITIES ARE SAMPLED THROUGH AN EXTENSIVE AUDIT AND SURVEILLANCE PROGRAM. IN THE LAST 4 MONTHS OF 1984 WE CONDUCTED 7 BCAP AUDITS AND OVER 100 SURVEILLANCES.

SLIDE III.B.3-15

THIS CHART GIVES YOU AN IDEA OF THE EXPERIENCE LEVEL OF OUR BCAP QUALITY ASSURANCE OVERVIEW GROUP, INCLUDING OUR INSPECTORS.

OVERALL FROM A QUALITY ASSURANCE STANDPOINT, WE BELIEVE BCAP IS WELL STRUCTURED, WELL DOCUMENTED, AND IS BEING CONDUCTED IN ACCORDANCE WITH THE APPROVED PLANS AND PROCEDURES.

SLIDE III.B.3-16

TWO OTHER POINTS RELATED TO 1984 ACTIVITIES AT BRAIDWOOD ARE NOTEWORTHY.

FIRST, IN 1984 WE IMPROVED OUR TRACKING OF OPEN ITEMS AND DEFICIENCIES SO THAT MANAGEMENT IS MORE AWARE OF TRENDS AND CAN DIRECT ATTENTION TOWARD RESOLVING ANY ADVERSE TRENDS. AS IN THE AREA OF OPEN AUDIT DEFICIENCIES, WE HAVE SEEN AN IMPROVEMENT IN THE TIMELINESS OF RESOLUTION OF OTHER KEY OPEN DEFICIENCIES, SUCH AS NRC ITEMS AND NON-CONFORMANCE REPORTS. THE BRAIDWOOD PROJECT MANAGER HAS ESTABLISHED GOALS TO CONTINUE TO DECREASE THE OVERALL NUMBER OF OPEN ITEMS.

SECOND, AS IS STANDARD IN QUALITY ASSURANCE PROGRAMS, THE AUTHORITY EXISTS TO STOP WORK OR INSTITUTE WITNESS AND HOLD POINTS ON WORK ACTIVITIES AS THE SITUATION REQUIRES. IN 1984 THERE WERE ELEVEN (11) STOP WORKS, TEN (10) OF WHICH HAVE BEEN RESOLVED AND LIFTED. MOST OF THESE STOP WORKS WERE IMPOSED BECAUSE OF PROCEDURE OR DOCUMENTATION DEFICIENCIES. NINE (9) OF THESE STOP WORKS WERE IMPLEMENTED BY THE CONTRACTORS UNDER THEIR QUALITY ASSURANCE PROGRAMS, SEVERAL THROUGH THEIR OWN INITIATIVE. ADDITIONALLY IN 1984, COMMONWEALTH EDISON SITE QUALITY ASSURANCE PLACED 34 WITNESS AND MANDATORY HOLD POINTS ON VARIOUS WORK ACTIVITIES - SOME BECAUSE WE HAD CONCERNS AND SOME BECAUSE WE WANTED TO MONITOR ACTIVITIES EARLY IN THEIR LIFE OR THAT ARE ONLY PERFORMED PERIODICALLY. THESE WITNESS AND HOLD POINTS ARE KEPT IN PLACE UNTIL WE ASSURE OURSELVES THAT THE SPECIFIC ACTIVITIES ARE BEING DONE RIGHT. WE BELIEVE THIS IS AN EFFECTIVE MEANS OF ASSESSING VARIOUS AREAS AND CORRECTING DEFICIENT AREAS BEFORE THEY BECOME PROBLEMS REQUIRING STOP WORK ACTION.

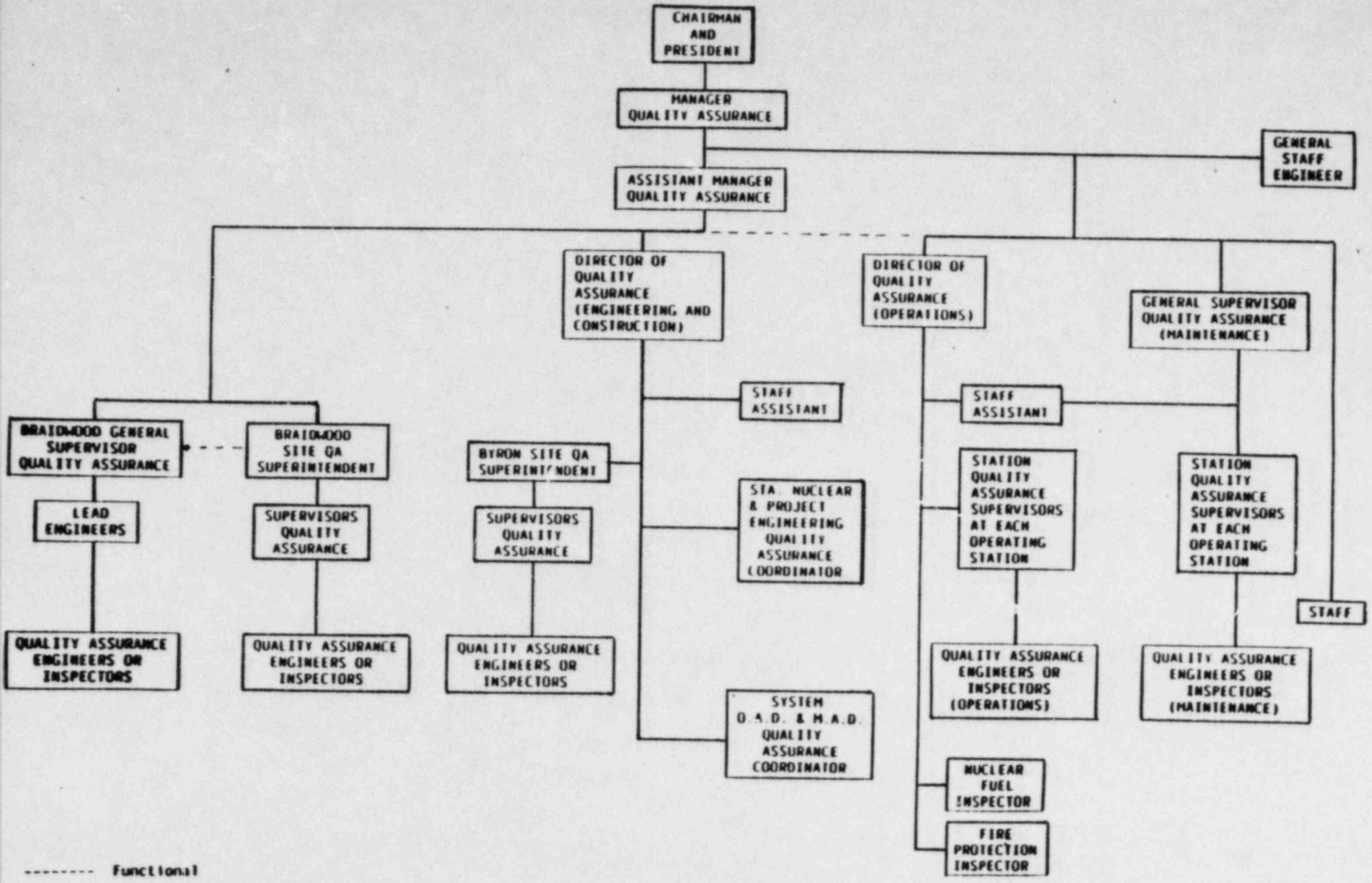
SLIDE III.B.3-17

IN SUMMARY, WE BELIEVE THERE HAS BEEN SIGNIFICANT IMPROVEMENT IN THE PAST YEAR IN THE BRAIDWOOD SITE QUALITY ASSURANCE PERFORMANCE. I'VE DISCUSSED SOME OF THE SIGNIFICANT CHANGES IN OUR SITE QUALITY ASSURANCE EFFORTS WHICH ARE INDICATIVE OF THIS IMPROVEMENT, INCLUDING THE SITE QUALITY ASSURANCE ORGANIZATION CHANGES, THE SUBSTANTIAL INCREASE IN THE NUMBER OF SITE QUALITY ASSURANCE PERSONNEL, THE SUBSTANTIAL IMPROVEMENT IN EXPERIENCE LEVEL OF OUR CURRENT STAFF, THE IMPROVEMENTS MADE IN OUR AUDITING PROGRAM, THE SOUNDNESS OF OUR OVERVIEW PROGRAMS, THE BCAP EFFORTS, THE IMPROVED TRACKING SYSTEMS, AND OUR MANDATORY WITNESS AND HOLD POINT SYSTEM THAT HELPS PREVENT PROBLEMS FROM BECOMING SIGNIFICANT ENOUGH TO REQUIRE STOP WORK ACTION.

SLIDE III.B.3-18

FROM A QUALITY STANDPOINT, WE ALSO BELIEVE THERE HAS BEEN SIGNIFICANT BRAIDWOOD PROJECT IMPROVEMENT. THE PROJECT MANAGEMENT ORGANIZATIONAL CHANGES DISCUSSED PREVIOUSLY HAVE RESULTED IN IMPROVEMENT IN THE AWARENESS TO QUALITY ISSUES AND IN BEING RESPONSIVE WITH GOOD CORRECTIVE ACTION PROGRAMS ONCE A PROBLEM IS IDENTIFIED. THIS ENHANCED AWARENESS IS ALSO EVIDENT IN THE INCREASED ATTENTION BEING PAID TOWARD CORRECTING AND CLOSING ALL TYPES OF DEFICIENCIES, BUT ESPECIALLY OPEN NRC ITEMS, NON-CONFORMANCE REPORTS, AND OPEN AUDIT ITEMS.

WE'VE HAD SOME PROBLEMS, MAINLY INVOLVING INSPECTION AND DOCUMENTATION COMPLETENESS, BUT THEY ARE BEING SOLVED. REALISTICALLY WE WILL PROBABLY ENCOUNTER MORE AS WE PROCEED, BUT BOTH THE PROJECT ORGANIZATION AND QUALITY ASSURANCE ARE STRUCTURED AND STAFFED TO DETECT THEM AND ENSURE THEIR CORRECTION. IN SHORT, WE BELIEVE OUR QUALITY ASSURANCE PROGRAM IS WORKING PROPERLY AND WE ARE PREPARED TO ENSURE THAT IT CONTINUES IN THIS MANNER AS WE MOVE THROUGH THE REMAINING CONSTRUCTION AND PRE-OPERATIONAL TESTING INTO THE START-UP AND OPERATING PHASES.



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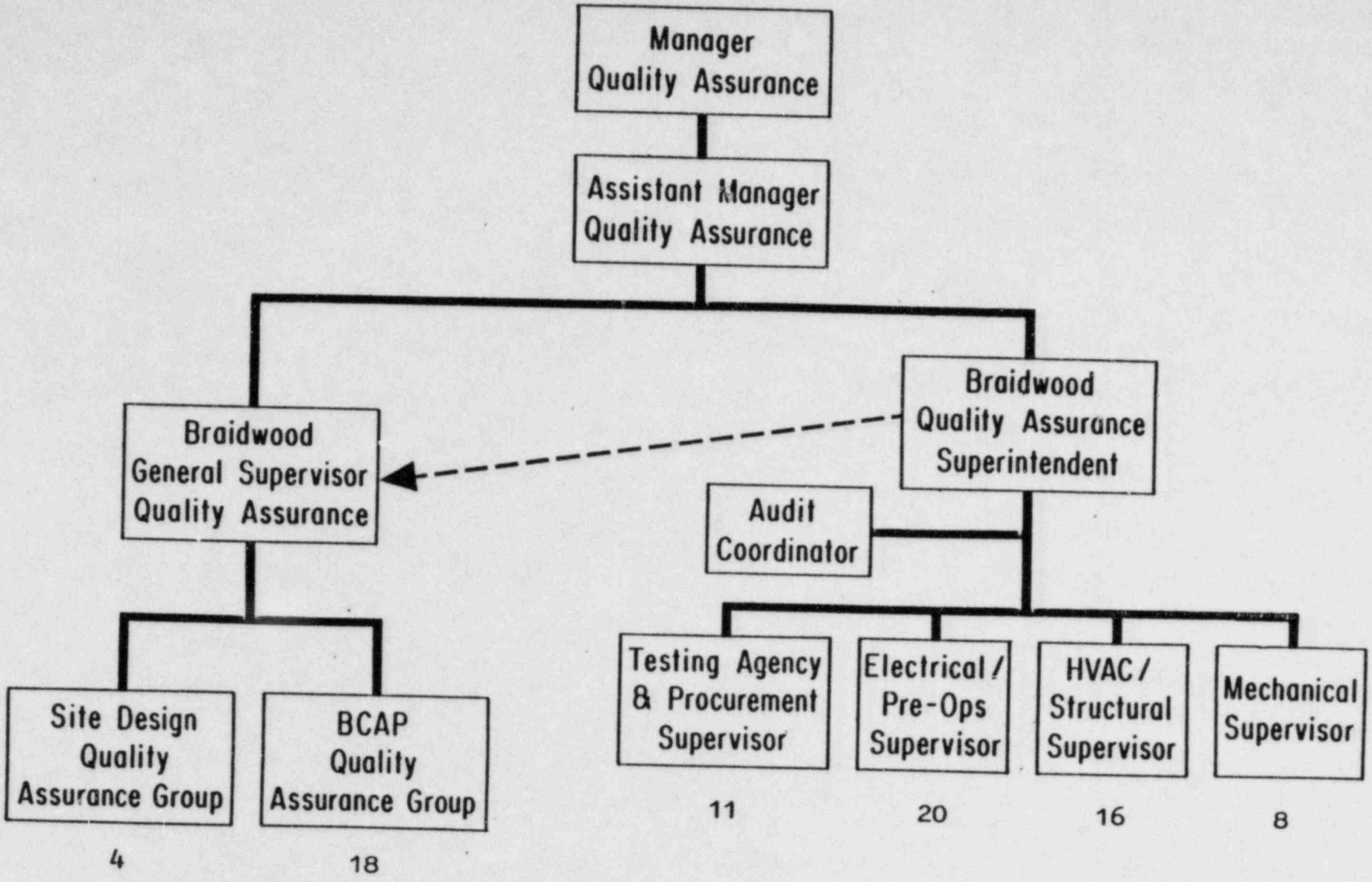
SLIDE III.B.3-1

BRAIDWOOD QUALITY ASSURANCE REPORTING RELATIONSHIPS



SLIDE III.B.3-2

BRAIDWOOD QUALITY ASSURANCE
MANNING COMPARISON

	JANUARY 1984	JANUARY 1985
ASSISTANT MANAGER	0	1
SITE QUALITY ASSURANCE SUPERINTENDENT	1	1
SITE QUALITY ASSURANCE GENERAL SUPERVISOR	0	1
AUDIT COORDINATOR	0	1
QUALITY ASSURANCE SUPERVISORS	2	4
QUALITY ASSURANCE ENGINEERS/ INSPECTORS	19	38
QUALITY ASSURANCE SUPPORT PERSONNEL	10	39
TOTAL	32	85

SLIDE III.B.3-3

(2569A)

BRAIDWOOD QUALITY ASSURANCE

EXPERIENCE COMPARISON (AVERAGE YRS. PER PERSON)

	JANUARY 1984	JANUARY 1985	PERCENT INCREASE
TOTAL EXPERIENCE	8.3	13.1	58
NUCLEAR EXPERIENCE	4.2	7.5	79
QUALITY ASSURANCE/QUALITY CONTROL EXPERIENCE	2.7	5.1	89

(2569A)

AUDITS/SURVEILLANCES

COVER:

- IN-PROCESS ACTIVITIES
- ON-SITE DESIGN EFFORTS
- PLANT CONSTRUCTION/TESTING

TO DATE:

- OVER 400 AUDITS
  - 81 IN 1984
- 3916 SURVEILLANCES
  - 828 IN 1984

(2569A)

AUDIT PROGRAM IMPROVEMENTS

- ASSIGNED PERMANENT AUDIT COORDINATOR
- PRE-AUDIT PREPARATION
- MORE INVOLVEMENT OF AUDIT COORDINATOR/LEAD AUDITORS IN AUDIT
- AUDIT TEAM DEBRIEFINGS
- ADDITIONAL EMPHASIS ON AUDIT RESPONSES, CORRECTIVE ACTIONS, AND PROMPT RESOLUTION

(2569A)

OVERINSPECTIONS

# INSPECTIONS TO DATE	16,308
HOURS TO DATE	32,616
# 1984 INSPECTIONS	8,634
1984 HOURS	18,994

SLIDE III.B.3-7

(2569A)

UNIT CONCEPT INSPECTIONS

% UNIT 1 TO DATE	85%
% UNIT 2 TO DATE	10%
# INSPECTIONS TO DATE	119
HOURS TO DATE	20,296
# 1984 INSPECTIONS	53
1984 HOURS	8,916

SLIDE III.B.3-8

(2569A)

BCAP QUALITY ASSURANCE

IMPLEMENTED UNDER APPLICABLE REQUIREMENTS OF

COMMONWEALTH EDISON QUALITY ASSURANCE PROGRAM

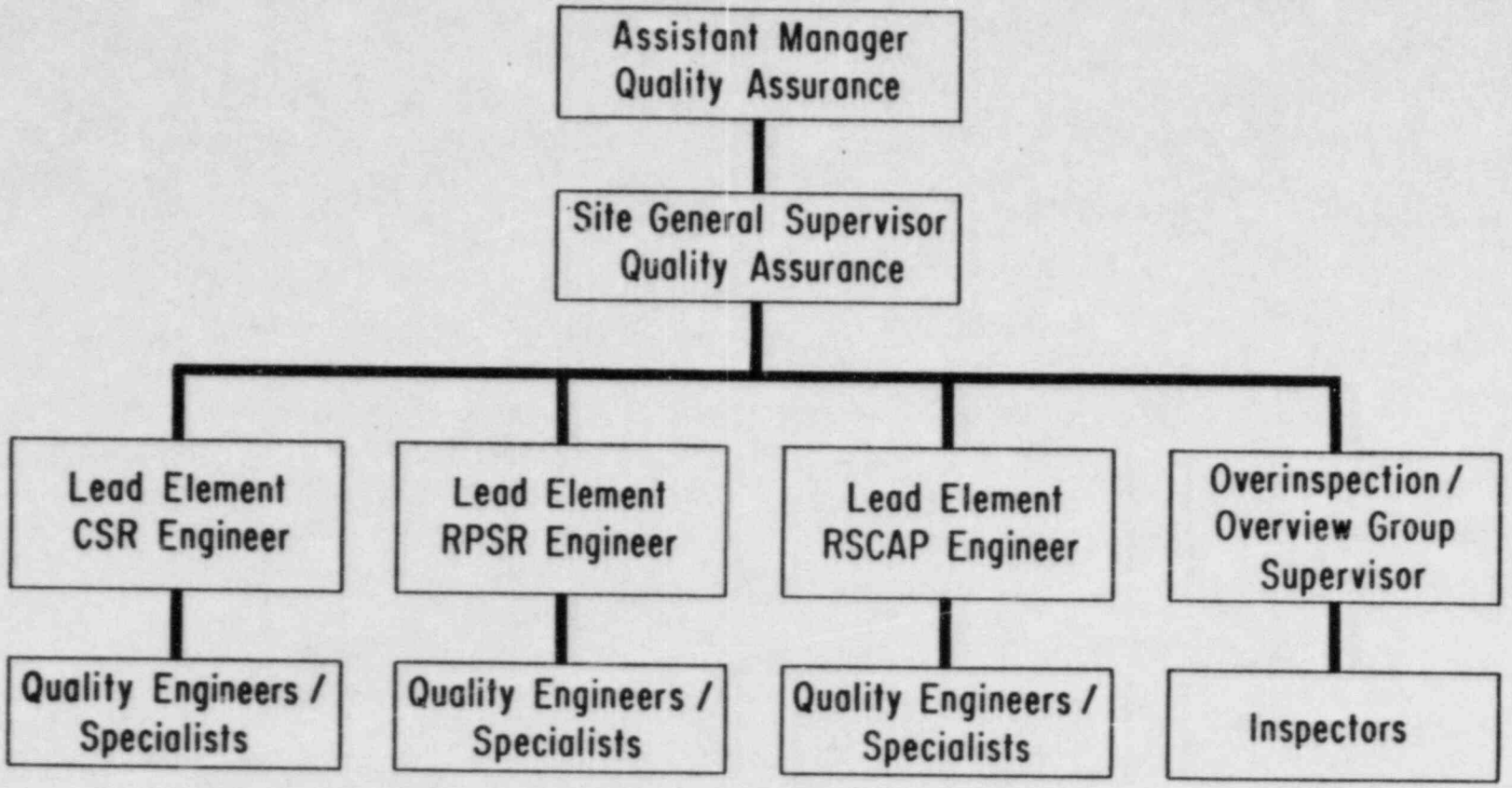
(2569A)

EXAMPLES OF Q.A. PROVISIONS

- APPROVED PLANS, PROCEDURES, CHECKLISTS
- TRAINING/QUALIFICATION/CERTIFICATION OF INSPECTION PERSONNEL
- DOCUMENTATION WITH OBJECTIVE EVIDENCE
- NONCONFORMANCE PROCESSING
- AUDITS/SURVEILLANCES
- REPORTS TO MANAGEMENT

(2569A)

BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM
SITE QUALITY ASSURANCE OVERVIEW GROUP



CSR - Construction Sample Reinspection

RPSR - Reverification of Procedures to Specification Requirements

RSCAP - Review of Significant Corrective Action Programs

DEVELOPMENT

- Q.A. BCAP PLAN/Q.A. PROCEDURES

SLIDE III.B.3-12

(2569A)

REVIEW

- ALL BCAP PROCEDURES
- PERSONNEL TRAINING, QUALIFICATIONS, CERTIFICATIONS
- PROCESSING OBSERVATIONS/DISCREPANCIES
- AUDITS/SURVEILLANCES
- COMPLETED PROGRAM ELEMENTS

(2569A)

VERIFY

- BCAP ACTIVITIES
  - IN PROCESS WITNESS/HOLD POINTS
  - COMPLETED WORK OVERINSPECTION
  - AUDITS/SURVEILLANCES

BCAP QUALITY ASSURANCE

EXPERIENCE LEVELS (AVERAGE YRS. PER PERSON)

	ENGINEERS/SPECIALISTS	INSPECIORS
TOTAL EXPERIENCE	21.5	14.9
NUCLEAR EXPERIENCE	14.2	6.7
QUALITY ASSURANCE/QUALITY CONTROL EXPERIENCE	5.6	12.1

(2569A)

- IMPROVED TRACKING OF OPEN ITEMS
- STRONG MANDATORY WITNESS/HOLD POINT SYSTEM

SLIDE III.B.3-16

(2569A)

SUMMARY OF 1984

SITE QUALITY ASSURANCE IMPROVEMENTS

- ORGANIZATION CHANGES
- INCREASED NUMBER PERSONNEL
- INCREASED EXPERIENCE LEVEL
- AUDITING PROGRAM
- SOUND OVERINSPECTION PROGRAMS
- BCAP EFFORTS
- TRACKING SYSTEMS
- MANDATORY WITNESS/HOLD POINT SYSTEM

(2569A)

SUMMARY OF 1984

PROJECT IMPROVEMENTS FROM

QUALITY VIEWPOINT

- ORGANIZATION CHANGES
- INCREASED Q.A. AWARENESS
- RESPONSIVE CORRECTIVE ACTION PROGRAMS
- INCREASED ATTENTION TOWARD CLOSING OPEN ITEMS

(2569A)

COMMONWEALTH EDISON COMPANY

PRESENTATION

III.C.1.A. BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM (BCAP)

BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM (BCAP)

MY NAME IS TOM MAIMAN. I AM COMMONWEALTH EDISON'S MANAGER OF PROJECTS RESPONSIBLE FOR THE ENGINEERING, CONSTRUCTION AND START-UP OF THE BYRON AND BRAIDWOOD NUCLEAR STATIONS. I WOULD LIKE TO DISCUSS A NEW PROGRAM WHICH COMMONWEALTH EDISON HAS UNDERTAKEN AS A MEANS TO PROVIDE AN ADDITIONAL LEVEL OF CONFIDENCE IN THE QUALITY OF CONSTRUCTION AT BRAIDWOOD.

AT THE LAST ACRS SUB-COMMITTEE MEETING ON BRAIDWOOD, EDISON STATED THAT A NEW PROGRAM CALLED THE QUALITY REVIEW AND VERIFICATION PROGRAM (QRVP) WAS BEING FORMULATED. THE PROGRAM WAS CONCERNED WITH SPECIFIC CONSTRUCTION RELATED CORRECTIVE ACTION EFFORTS THAT HAD BEEN IMPLEMENTED AT THE BRAIDWOOD PROJECT. SOME OF THOSE EFFORTS WERE THE RESULT OF CONCERNS RAISED BY THE NRC, OTHERS WERE BASED ON CONCERNS IDENTIFIED BY EDISON.

SUBSEQUENT TO THAT MEETING, WE HAD SIGNIFICANT IN HOUSE DISCUSSIONS AND INTERACTIONS WITH THE NRC. WE CONCLUDED THAT A SOMEWHAT DIFFERENT FORMAT OF REVIEWS WAS WARRANTED THAN WAS ORIGINALLY ENVISIONED FOR THE QRVP. THIS LED TO THE CREATION OF THE BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM (BCAP).

BCAP IS A PROGRAM OF SAMPLE REINSPECTIONS AND REVIEWS COVERING SAFETY-RELATED CONSTRUCTION ACTIVITIES AT THE BRAIDWOOD NUCLEAR STATION. IT HAS BEEN UNDERTAKEN AS A PRUDENT MEASURE TO ANSWER LEGITIMATE QUESTIONS CONCERNING QUALITY OF CONSTRUCTION. BCAP IS IN ADDITION TO THE ONGOING VIGILANT IMPLEMENTATION OF CONTRACTORS' QUALITY CONTROL AND EDISON'S QUALITY ASSURANCE PROGRAMS.

III.C.1.A.-3

THE BASIC OBJECTIVES OF BCAP ARE THREEFOLD. THESE ARE TO ASSURE:

1. THAT THERE ARE NO PROGRAMMATIC DESIGN SIGNIFICANT PROBLEMS IN THE CONSTRUCTION OF BRAIDWOOD WHICH HAVE NOT BEEN IDENTIFIED AND ADDRESSED.

2. THAT THE ON-SITE CONTRACTORS' PROCEDURES GOVERNING THE ONGOING SAFETY RELATED CONSTRUCTION AND QUALITY ASSURANCE ACTIVITIES ADDRESS ALL APPLICABLE DESIGN AND REGULATORY REQUIREMENTS.

3. THAT WHERE PAST CONSTRUCTION PROBLEMS HAVE BEEN IDENTIFIED WHICH RESULTED IN SIGNIFICANT CORRECTIVE ACTIONS, SUCH CORRECTIVE ACTIONS HAVE BEEN ADEQUATELY IMPLEMENTED AND DOCUMENTED.

III.C.1.A.-4

TO ACHIEVE THESE THREE OBJECTIVES THERE ARE THREE ELEMENTS TO THE BCAP.

1. THE FIRST ELEMENT IS THE CSR OR "CONSTRUCTION SAMPLE REINSPECTION". UNDER THIS ELEMENT, A SAMPLE OF THE CONSTRUCTION WORK COMPLETED PRIOR TO JUNE 30, 1984 IS REINSPECTED AND THE ASSOCIATED QUALITY DOCUMENTATION IS REVIEWED FOR COMPLETENESS AND ACCURACY.

2. THE SECOND ELEMENT IS THE RPSR OR "REVERIFICATION OF PROCEDURES TO SPECIFICATION REQUIREMENTS". UNDER THIS ELEMENT ALL ON-SITE CONTRACTOR PROCEDURES IN EXISTENCE ON JUNE 30, 1984 AND GOVERNING ON-GOING SAFETY RELATED CONSTRUCTION AND QUALITY ASSURANCE ACTIVITIES ARE REVIEWED TO ASSURE THAT THESE PROCEDURES ADDRESS ALL APPLICABLE DESIGN AND REGULATORY REQUIREMENTS.

3. THE THIRD ELEMENT IS THE RSCAP OR "REVIEW OF SIGNIFICANT CORRECTIVE ACTION PROGRAMS". IT IS COMPOSED OF A REVIEW OF THE IMPLEMENTATION, METHODOLOGIES AND RESULTING DOCUMENTATION ASSOCIATED WITH SPECIFIC SIGNIFICANT CORRECTIVE ACTION PROGRAMS IDENTIFIED PRIOR TO JUNE 30, 1984. THE COMPLETION OF THIS ELEMENT WILL ASSURE THAT THESE SPECIFIC AREAS OF CONSTRUCTION ARE OF ACCEPTABLE QUALITY.

III.C.1.A.-5

THE BCAP ACTIVITIES ARE CARRIED OUT BY A TASK FORCE ORGANIZED IN JUNE 1984. IT IS AN INTEGRATED ORGANIZATION INCLUDING PERSONNEL FROM COMMONWEALTH EDISON, SARGENT & LUNDY, STONE & WEBSTER ENGINEERING CORPORATION, DANIEL CONSTRUCTION CORPORATION AND VARIOUS OTHER CONSULTANTS. THE PERSONNEL FROM SARGENT & LUNDY PROVIDE THE BACKGROUND INFORMATION ON DESIGN AND DOCUMENTATION PRACTICES AND ALSO THEIR KNOWLEDGE OF THE EDISON SYSTEM. MOST OF THE PROCEDURE AND REVIEW WORK IS PERFORMED BY THE STONE & WEBSTER PEOPLE WHILE THE FIELD INSPECTIONS ARE PERFORMED BY INSPECTORS FROM DANIEL CONSTRUCTION CORPORATION. ALL THESE PERSONNEL ARE DEDICATED TOTALLY TO BCAP AND HAVE HAD NO PRIOR INVOLVEMENT IN THE CONSTRUCTION ACTIVITIES BEING VERIFIED UNDER BCAP.

III.C.1.A.-6

THE BCAP TASK FORCE IS HEADED BY A DIRECTOR WHO IS A COMMONWEALTH EDISON EMPLOYEE. THIS DIRECTOR REPORTS TO THE BRAIDWOOD PROJECT MANAGER WHO IN TURN REPORTS TO ME. I REPORT TO THE CHAIRMAN AND PRESIDENT OF THE COMMONWEALTH EDISON COMPANY.

THE ACTIVITIES OF THE BCAP TASK FORCE ARE MONITORED BY A SPECIAL GROUP WITHIN THE QUALITY ASSURANCE DEPARTMENT. THIS BCAP QA GROUP IS HEADED BY THE SITE QUALITY ASSURANCE GENERAL SUPERVISOR WHO REPORTS TO THE ASSISTANT MANAGER OF QA WHO IN TURN REPORTS TO THE MANAGER OF QA. THE MANAGER OF QUALITY ASSURANCE REPORTS DIRECTLY TO THE CHAIRMAN AND PRESIDENT OF THE COMPANY. THUS, A QUALITY ASSURANCE OVERVIEW OF THE BCAP TASK FORCE ACTIVITIES IS PROVIDED BY A SEPARATE AND DEDICATED GROUP REPORTING THROUGH THE QA CHAIN DIRECTLY TO THE CHAIRMAN.

III.C.1.A.-7

IN ADDITON TO THE OVERVIEW BY THE QUALITY ASSURANCE DEPARTMENT, COMMONWEALTH EDISON HAS RETAINED THE SERVICES OF JOHN HANSEL TO PROVIDE AN INDEPENDENT EXPERT OVERVIEW OF BCAP. FOR THIS PURPOSE MR. HANSEL HAS ASSEMBLED A TEAM OF SENIOR EXPERTS AND ASSISTED BY AN ON-SITE STAFF. MR. HANSEL IS A NATIONALLY RECOGNIZED EXPERT IN QUALITY ASSURANCE AND QUALITY CONTROL. HE IS CURRENTLY THE PRESIDENT OF THE AMERICAN SOCIETY FOR QUALITY CONTROL.

THE CHARTER OF THE EXPERT OVERVIEW GROUP IS TO PROVIDE ANOTHER LAYER OF INDEPENDENT OVERVIEW BY CARRYING OUT WHATEVER ACTIVITIES IT DEEMS APPROPRIATE TO ASSURE THAT THE BCAP EFFORT WILL MEET ITS OBJECTIVES. IN PARTICULAR, THE INDEPENDENT EXPERT OVERVIEW GROUP HAS REVIEWED THE OVERALL PROGRAM DOCUMENT, THAT WAS SUBMITTED TO THE NRC, TO CONFIRM THAT THE PROGRAM AS COMMITTED WILL FULFILL ITS OBJECTIVES. THE INDEPENDENT OVERVIEW GROUP AND ITS STAFF

MONITORS THE ACTIVITIES OF THE BCAP TASK FORCE TO ASSURE THAT THE WORK IS PROPERLY FOCUSED AND THAT THE BCAP GOALS ARE BEING FULFILLED. THE GROUP ALSO PERFORMS AUDITS AND SURVEILLANCES AS IT DEEMS NECESSARY AS WELL AS OVERVIEW INSPECTIONS OF THE BCAP FIELD INSPECTIONS.

THE INDEPENDENT EXPERT OVERVIEW GROUP ALSO PERFORMS A REVIEW OF BCAP INDENTIFIED DISCREPANCIES TO ASSURE THAT THE ENGINEERING EVALUATIONS HAVE BEEN ADEQUATELY PERFORMED AND DOCUMENTED. FINALLY, THE GROUP PREPARES MONTHLY REPORTS OF ITS ACTIVITIES WHICH ARE PROVIDED SIMULTANEOUSLY TO THE NRC AND TO COMMONWEALTH EDISON MANAGEMENT. ON AN ORGANIZATIONAL BASIS THE GROUP REPORTS DIRECTLY TO THE MANAGER OF PROJECTS, THAT IS MYSELF, AND IS INDEPENDENT OF THE BCAP TASK FORCE AND THE BRAIDWOOD PROJECT MANAGER.

III.C.1.A.-8

COMMONWEALTH EDISON HAS TAKEN MANY STEPS TO ASSURE CONFIDENCE IN THE QUALITY OF THE BCAP EFFORT. THE BCAP ACTIVITIES ARE BEING CARRIED OUT BY HIGHLY EXPERIENCED PERSONNEL, MOSTLY FROM OUTSIDE OF COMMONWEALTH EDISON. THE INDIVIDUALS PERFORMING BCAP ACTIVITIES HAVE NOT BEEN ASSOCIATED WITH THE CONSTRUCTION WORK BEING REVIEWED OR REINSPECTED. THE BCAP EFFORT IS HIGHLY STRUCTURED AND ALL QUALITY RELATED WORK IS CONTROLLED THROUGH WRITTEN PLANS, PROCEDURES, CHECKLISTS AND INSTRUCTIONS.

THE BCAP WORK IS BEING PERFORMED UNDER THE COMMONWEALTH EDISON QUALITY ASSURANCE PROGRAM AND IS MONITORED BY A DEDICATED GROUP WITHIN THE COMMONWEALTH EDISON COMPANY QUALITY ASSURANCE DEPARTMENT. ALL BCAP PLANS, PROCEDURES, CHECKLISTS AND INSTRUCTIONS ARE REVIEWED AND CONCURRED IN BY THIS QUALITY ASSURANCE GROUP. FURTHERMORE, THE INDEPENDENT EXPERT OVERVIEW GROUP PROVIDES AN EXTENSIVE OVERVIEW OF ALL BCAP ACTIVITIES.

IN ADDITION, THE NRC HAS ASSIGNED A RESIDENT INSPECTOR AT THE BRAIDWOOD SITE WITH A FULL TIME AND INCLUSIVE RESPONSIBILITY FOR MONITORING THE BCAP ACTIVITIES. THIS INSPECTOR HAS ACCESS TO ALL BCAP PROGRESS INFORMATION ON SITE. PROGRESS ON BCAP ACTIVITIES IS REPORTED MONTHLY TO THE NRC IN A MEETING OPEN TO THE PUBLIC. THUS, THE BCAP ACTIVITIES AND BCAP PROGRESS ARE OPEN TO CONTINUAL SCRUTINY IN A PUBLIC FORUM. ALL THESE FACTORS AND THE DEDICATION OF THE TASK FORCE PERSONNEL PROVIDE A HIGH LEVEL OF CONFIDENCE IN THE QUALITY OF THE BCAP EFFORT.

III.C.1.A.-9

IN SUMMARY, BCAP IS A COMPREHENSIVE PROGRAM OF REVIEWS AND REINSPECTIONS. HEAVY EMPHASIS HAS BEEN PLACED ON THE QUALITY OF THE BCAP EFFORT WITH MANY BUILT-IN CHECKS. IT WILL PROVIDE CONFIDENCE IN THE QUALITY OF ONGOING CONSTRUCTION ACTIVITIES THROUGH A REVIEW OF CONSTRUCTION PROCEDURES. IT WILL PROVIDE CONFIDENCE THAT THE SPECIFIC CORRECTIVE ACTION PROGRAMS

HAVE BEEN OR WILL BE IMPLEMENTED PROPERLY AND WILL SATISFY OUR COMMITMENTS. THUS THE COMPLETION OF THE BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM WILL PROVIDE AN ADDITIONAL LEVEL OF CONFIDENCE THAT THE CONSTRUCTION AT THE BRAIDWOOD NUCLEAR PLANT IS OF ACCEPTABLE QUALITY.

NINU KAUSHAL WILL NOW DISCUSS IN MORE DETAIL THE ACTIVITIES AND PROGRESS OF BCAP.

MARCH 1984

- QUALITY REVIEW AND VERIFICATION PROGRAM (QRVP) WAS INTRODUCED

- A RESPONSE TO CONSTRUCTION RELATED CONCERNS

- QRVP EVOLVED INTO A REFORMATTED PROGRAM NOW CALLED THE BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM (BCAP)

BCAP DEFINITION

- PROGRAM OF INSPECTIONS AND REVIEWS UNDERTAKEN AS A PRUDENT MEASURE TO ANSWER ANY LEGITIMATE QUESTIONS CONCERNING THE OVERALL QUALITY OF CONSTRUCTION AT THE BRAIDWOOD STATION

- BCAP IS IN ADDITION TO THE VIGILANT IMPLEMENTATION OF EXISTING QUALITY CONTROL AND QUALITY ASSURANCE PROGRAMS

OBJECTIVES OF BCAP

TO ASSURE THAT:

- THERE ARE NO PROGRAMMATIC DESIGN SIGNIFICANT PROBLEMS IN THE CONSTRUCTION OF BRAIDWOOD WHICH HAVE NOT BEEN IDENTIFIED AND ADDRESSED

- THE ON-SITE CONTRACTORS' PROCEDURES GOVERNING THE ONGOING SAFETY-RELATED CONSTRUCTION AND QUALITY ASSURANCE ACTIVITIES ADDRESS ALL APPLICABLE DESIGN AND REGULATORY REQUIREMENTS

- WHERE PAST CONSTRUCTION PROBLEMS HAVE BEEN IDENTIFIED WHICH RESULTED IN SIGNIFICANT CORRECTIVE ACTIONS, SUCH CORRECTIVE ACTIONS HAVE BEEN ADEQUATELY IMPLEMENTED AND DOCUMENTED

PROGRAM ELEMENTS

CSR - CONSTRUCTION SAMPLE REINSPECTION

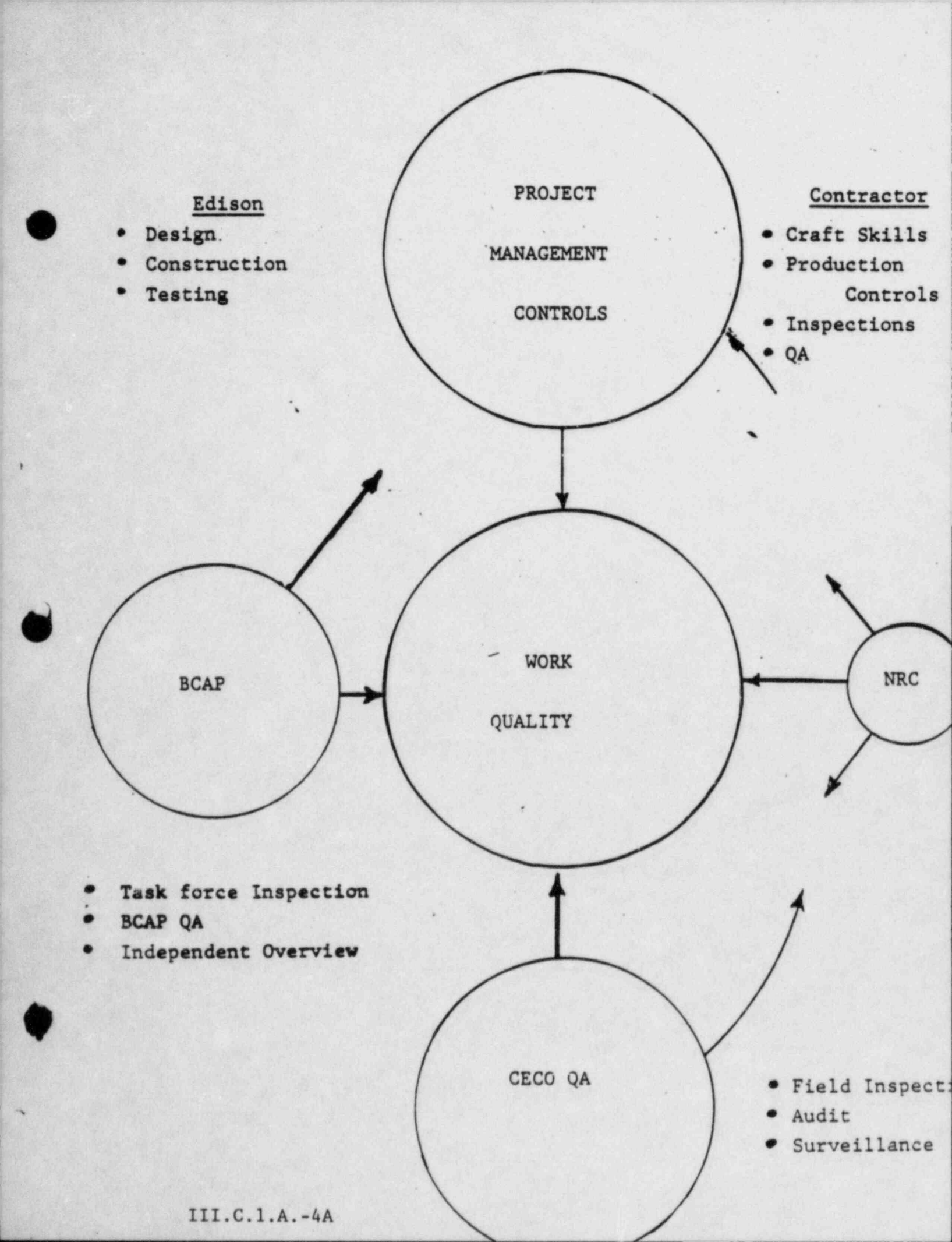
A SAMPLE OF THE CONSTRUCTION WORK COMPLETED PRIOR TO JUNE 30, 1984 IS REINSPECTED AND THE ASSOCIATED QUALITY DOCUMENTATION IS REVIEWED FOR COMPLETENESS AND ACCURACY

RPSR - REVERIFICATION OF PROCEDURES TO SPECIFICATION REQUIREMENTS

CONTRACTOR PROCEDURES IN EXISTENCE ON JUNE 30, 1984 AND GOVERNING ON-GOING SAFETY RELATED CONSTRUCTION AND QUALITY ASSURANCE ACTIVITIES ARE REVIEWED TO ASSURE THAT THESE PROCEDURES ADDRESS ALL APPLICABLE DESIGN AND REGULATORY REQUIREMENTS

RSCAP - REVIEW OF SIGNIFICANT CORRECTIVE ACTION PROGRAMS

THE IMPLEMENTATION, METHODOLOGIES, AND RESULTING DOCUMENTATION ASSOCIATED WITH SPECIFIC SIGNIFICANT CORRECTIVE ACTION PROGRAMS IDENTIFIED PRIOR TO JUNE 30, 1984 ARE REVIEWED TO ASSURE THAT THESE SPECIFIC AREAS OF CONSTRUCTION ARE OF ACCEPTABLE QUALITY


PROJECT
MANAGEMENT
CONTROLS
Edison
• Design
• Construction
• Testing
Contractor
• Craft Skills
• Production Controls
• Inspections
• QA
BCAP
WORK
QUALITY
NRC
• Task force Inspection
• BCAP QA
• Independent Overview
CECO QA
• Field Inspecti
• Audit
• Surveillance

BCAP TASK FORCE

- BCAP TASK FORCE SPECIFICALLY ORGANIZED IN JUNE, 1984, TO IMPLEMENT BCAP ACTIVITIES.

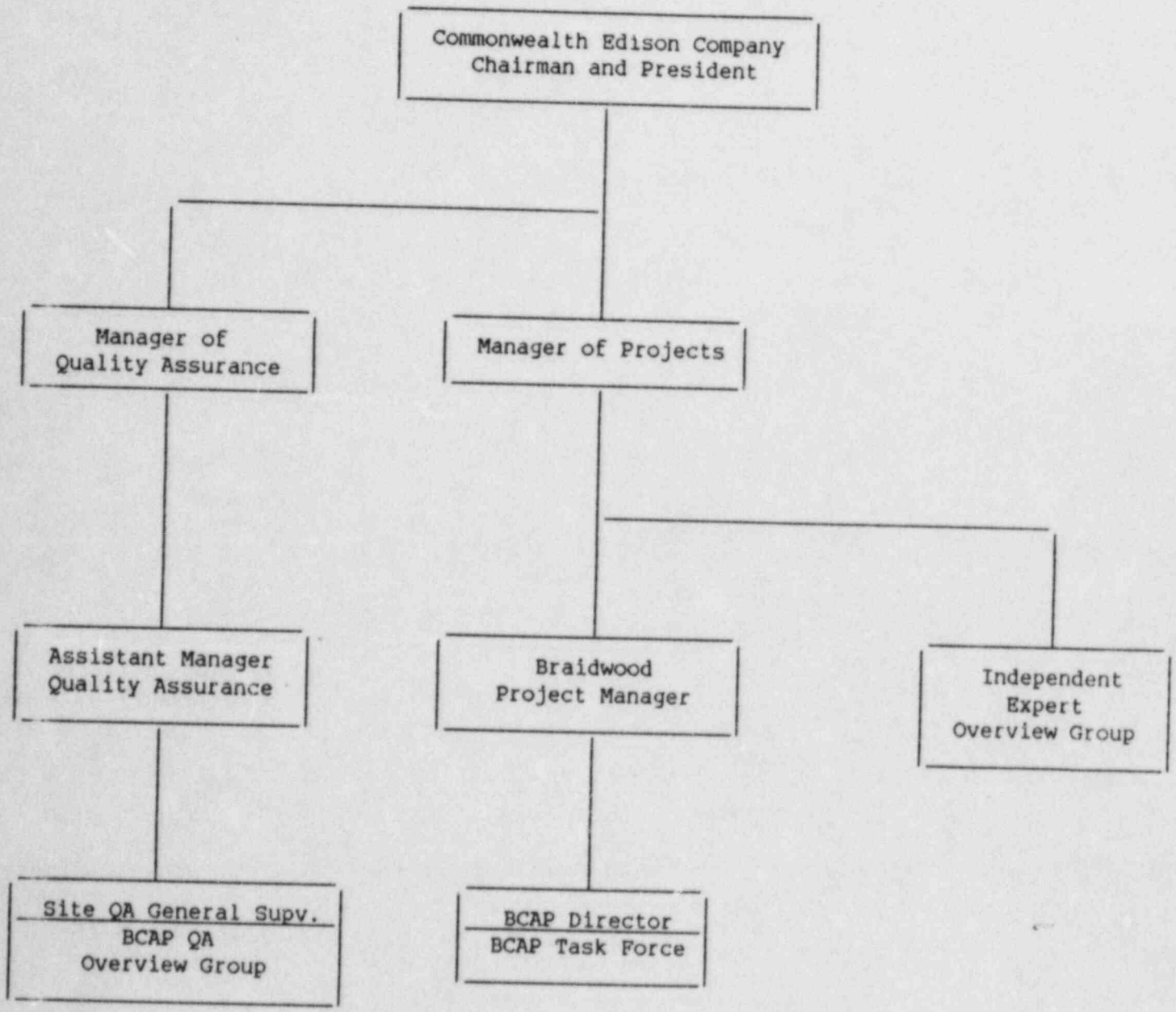
- HEADED BY CECO. AND SUPPORTED BY SARGENT AND LUNDY ALONG WITH OTHER CONSULTANTS.

- STONE AND WEBSTER AND DANIEL CONSTRUCTION COMPRISE MAJORITY OF THE TASK FORCE.

- ALL BCAP PERSONNEL DEDICATED TOTALLY TO BCAP.

- BCAP PERSONNEL HAVE HAD NO PRIOR RESPONSIBILITY FOR THE CONSTRUCTION ACTIVITIES BEING VERIFIED.

BCAP ORGANIZATIONAL CHART



(1238d)

INDEPENDENT EXPERT OVERVIEW GROUP

- COMMONWEALTH EDISON COMPANY HAS RETAINED JOHN HANSEL TO HEAD A TEAM OF EXPERTS TO PROVIDE AN INDEPENDENT OVERVIEW OF BCAP.

- THE INDEPENDENT EXPERT OVERVIEW GROUP IS ASSISTED BY ON-SITE STAFF.

- THE INDEPENDENT EXPERT OVERVIEW GROUP OVERVIEWS ALL BCAP ACTIVITIES TO ASSURE THAT BCAP IS MEETING ITS OBJECTIVES BY:

  - REVIEWING OVERALL PLANS, PROCEDURES AND IMPLEMENTING INSTRUCTIONS

  - REVIEWING AND MONITORING BCAP QUALITY ASSURANCE PROGRAM

  - CONDUCTING AUDITS, SURVEILLANCES AND OVERINSPECTIONS

  - MONITORING BCAP PROGRESS AND REVIEWING RESULTS ON AN ONGOING BASIS.

QUALITY OF BCAP EFFORT

- BCAP ACTIVITIES ARE BEING CARRIED OUT BY EXPERIENCED PERSONNEL NOT ASSOCIATED WITH THE CONSTRUCTION WORK BEING REVIEWED OR REINSPECTED.

- BCAP EFFORT IS HIGHLY STRUCTURED USING DETAILED PLANS, PROCEDURES, CHECKLISTS AND INSTRUCTIONS.

- BCAP WORK IS BEING PERFORMED UNDER COMMONWEALTH EDISON COMPANY QUALITY ASSURANCE PROGRAM AND IS MONITORED BY A DEDICATED GROUP WITHIN COMMONWEALTH EDISON COMPANY QUALITY ASSURANCE DEPARTMENT.

- ADDITIONALLY AN INDEPENDENT EXPERT OVERVIEW GROUP OVERVIEWS ALL BCAP ACTIVITIES.

- ALL BCAP PROGRESS INFORMATION IS AVAILABLE TO NRC ON-SITE RESIDENT INSPECTOR

- BCAP PROGRESS IS REPORTED MONTHLY TO NRC IN A MEETING OPEN TO THE PUBLIC.

SUMMARY

- BCAP IS A COMPREHENSIVE PROGRAM OF REVIEWS AND REINSPECTIONS.

- HEAVY EMPHASIS HAS BEEN PLACED ON THE QUALITY OF THE BCAP EFFORT WITH MANY BUILT-IN CHECKS.

- UPON COMPLETION, BCAP WILL PROVIDE CONFIDENCE IN:

  - THE QUALITY OF PAST CONSTRUCTION THROUGH REINSPECTION AND DOCUMENTION REVIEWS

  - THE QUALITY OF ONGOING CONSTRUCTION THROUGH PROCEDURE REVIEWS

  - THE SATISFACTORY COMPLETION OF SPECIFIC COMMITTED CORRECTIVE ACTIONS

- THUS BCAP WILL PROVIDE AN ADDITIONAL LEVEL OF CONFIDENCE IN THE CONSTRUCTION QUALITY AT BRAIDWOOD

(1230D)

COMMONWEALTH EDISON COMPANY

PRESENTATION

III.C.1.B. BRAIDWOOD CONSTRUCTION
ASSESSMENT PROGRAM
(BCAP)

BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM (BCAP)

GOOD AFTERNOON,

III.C.1.B.-1

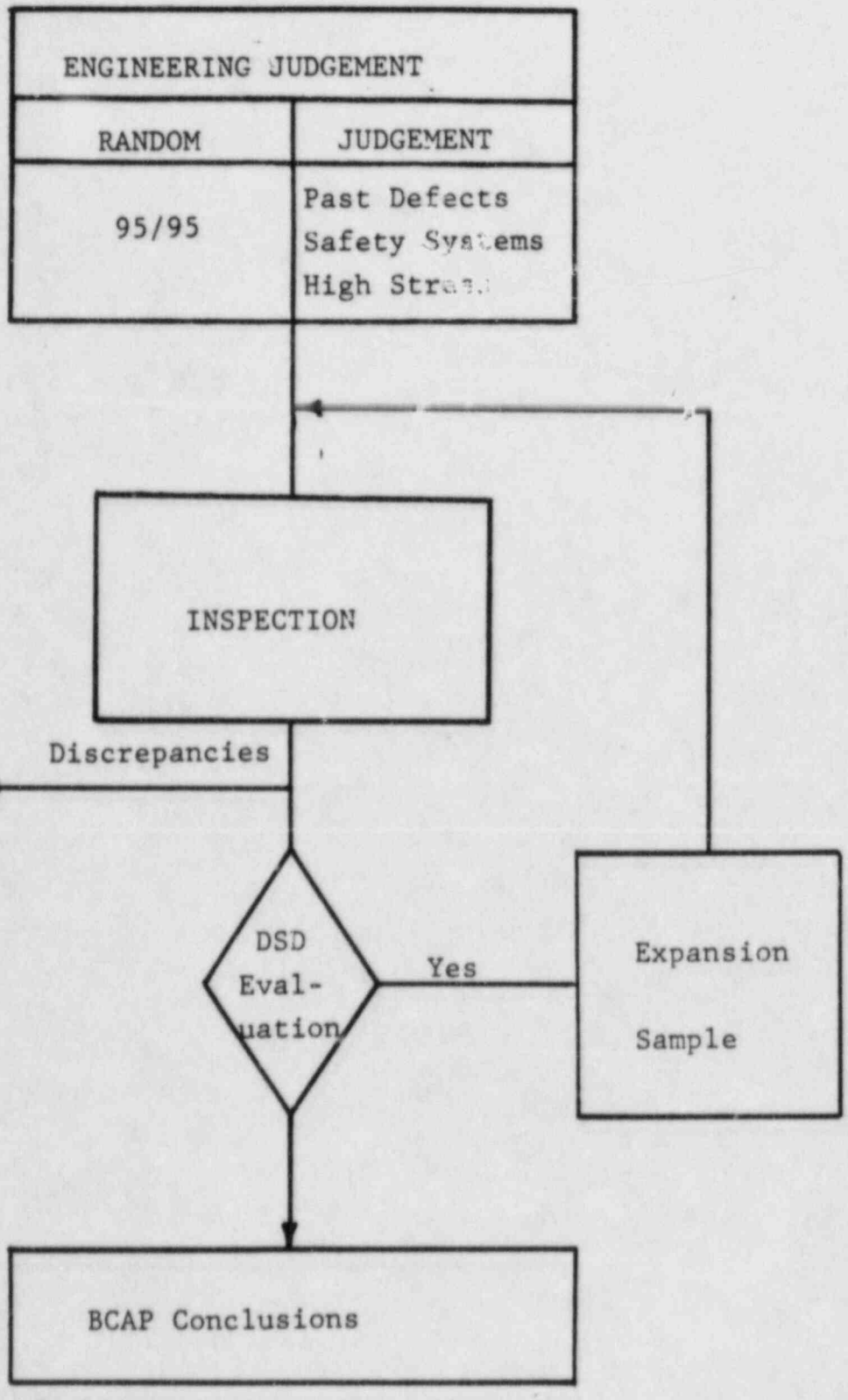
MY NAME IS NARINDER KAUSHAL, MORE EASILY REFERRED TO AS NINU. I AM THE DIRECTOR OF THE BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM OR BCAP BEING IMPLEMENTED BY THE COMMONWEALTH EDISON COMPANY. AS TOM MAIMAN INDICATED, I WILL BE DESCRIBING THE VARIOUS ELEMENTS OF THE BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM AND WILL ALSO DISCUSS THE CURRENT STATUS OF THE PROGRAM.

III.C.1.B.-2

AS TOM MAIMAN INDICATED, THE BCAP CONSISTS OF THREE PRINCIPAL ELEMENTS: 1) CONSTRUCTION SAMPLE REINSPECTION OR CSR; 2) REVERIFICATION OF PROCEDURES TO SPECIFICATION REQUIREMENT OR RPSR; AND 3) REVIEW OF SIGNIFICANT CORRECTIVE ACTION PROGRAMS OR RSCAP. IN MY PRESENTATION I WILL BE DESCRIBING THE ACTIVITIES BEING UNDERTAKEN UNDER EACH BCAP ELEMENT. FOLLOWING THE DESCRIPTION OF THE PROGRAM, I WILL INDICATE THE STATUS OF EACH ELEMENT OF THE BCAP AND CONCLUDE WITH A SUMMARY.

III.C.1.B.-3

BCAP SAMPLE


ENGINEERING JUDGEMENT
RANDOM
JUDGEMENT
95/95
Past Defects
Safety Systems
High Stra
INSPECTION
Project
NCR
Disposition
1) Individually
2) Collectively
Discrepancies
DSD
Eval-
uation
Yes
Expansion
Sample
BCAP Conclusions

I WILL START WITH THE FIRST ELEMENT, CONSTRUCTION SAMPLE REINSPECTION OR CSR. THE OBJECTIVE OF THE CSR ELEMENT IS TO ASSURE THAT THERE ARE NO PROGRAMMATIC DESIGN SIGNIFICANT PROBLEMS IN THE CONSTRUCTION OF THE BRAIDWOOD NUCLEAR PLANT, WHICH HAVE NOT BEEN IDENTIFIED AND ADDRESSED. THE PURPOSE OF THE CSR ELEMENT IS TO IDENTIFY THROUGH REINSPECTIONS AND DOCUMENTATION REVIEWS ANY DESIGN-SIGNIFICANT DISCREPANCIES THAT MIGHT BE PRESENT IN THE CONSTRUCTION OF THE BRAIDWOOD NUCLEAR PLANT SO THAT THESE DESIGN-SIGNIFICANT DISCREPANCIES CAN BE ADDRESSED.

III.C.1.B.-4

IN ORDER TO ACCOMPLISH THIS OBJECTIVE, THE OVERALL CSR EFFORT CONSISTS OF THE FOLLOWING PRINCIPAL STEPS. THESE ARE: ESTABLISHMENT OF CONSTRUCTION CATEGORIES, PREPARATION OF REINSPECTION OR DOCUMENTATION REVIEW CHECKLISTS AND INSTRUCTIONS, SELECTION OF THE REINSPECTION OR DOCUMENTATION REVIEW SAMPLES, CARRYING OUT THE REINSPECTIONS AND REVIEWS ON THE SAMPLE AND FINALLY, THE PROCESSING OF ANY OBSERVATIONS OR DISCREPANCIES THAT ARE IDENTIFIED IN THE COURSE OF THESE INSPECTIONS OR REVIEWS. IN THE FOLLOWING FEW MINUTES I WILL BE DESCRIBING IN A LITTLE MORE DETAIL EACH ONE OF THESE STEPS IN THE CSR ELEMENT.

III.C.1.B.-5

FIRST, THE ESTABLISHMENT OF CONSTRUCTION CATEGORIES. THE OVERALL PLANT CONSTRUCTION WORK IS DIVIDED INTO GROUPS OF SIMILAR COMPONENTS OR ACTIVITIES HAVING COMMON ATTRIBUTES THAT ARE VERIFIABLE BY SIMILAR REINSPECTION AND DOCUMENTATION REVIEW ACTIVITIES. THE INTENT HERE IS TO GROUP VARIOUS PARTS OF PLANT CONSTRUCTION SUCH THAT COMMON CRITERIA AND INSTRUCTIONS CAN BE DEVELOPED FOR INSPECTORS OR DOCUMENTATION REVIEWERS TO CARRY OUT THESE INSPECTIONS OR DOCUMENTATION REVIEWS.

THE NEXT STEP IS THE PREPARATION OF DETAILED CHECKLISTS AND INSTRUCTIONS THAT IDENTIFY THE CRITERIA TO WHICH THE FIELD INSPECTIONS OR DOCUMENTATION REVIEWS ARE TO BE PERFORMED. FOR EACH CONSTRUCTION CATEGORY, ONE CHECKLIST IS PREPARED FOR REINSPECTIONS AND ANOTHER CHECKLIST IS PREPARED FOR DOCUMENTATION REVIEWS.

III.C.1.B.-6

IN PARALLEL WITH THE CHECKLIST PREPARATION, A REINSPECTION SAMPLE IS IDENTIFIED FROM EACH CONSTRUCTION CATEGORY FROM THE PORTION OF THE POPULATION WHICH SATISFIES THE FOLLOWING CRITERIA. THE ITEM MUST BE COMPLETED AS OF JUNE 30, 1984. THE ITEM MUST BE SAFETY RELATED, THE ITEM MUST BE INSPECTED, THE ITEM MUST BE Q.C. ACCEPTED AND THE ITEM MUST BE ACCESSIBLE. FURTHERMORE, THE ATTRIBUTES WHICH ARE TO BE INSPECTED ON A GIVEN ITEM MUST BE RECREATABLE.

III.C.1.B.-7

A PORTION OF THIS SAMPLE IS CHOSEN IN A STATISTICALLY RANDOM MANNER. THAT IS, EACH ITEM IN THAT CONSTRUCTION CATEGORY HAS AN EQUAL CHANCE OF BEING SELECTED IN THE RANDOM PORTION OF THE SAMPLE. THIS RANDOM PORTION OF THE SAMPLE IS CHOSEN TO BE OF SUFFICIENT MAGNITUDE SUCH THAT, BASED ON THE RESULTS, ONE CAN DEVELOP CONFIDENCE THAT THE POPULATION IS FREE OF DESIGN SIGNIFICANT DEFECTS.

AN ADDITIONAL PORTION OF THE SAMPLE IS CHOSEN BASED ON ENGINEERING JUDGMENT. THE ENGINEERING JUDGMENT PORTION OF THE SAMPLE IS SELECTED FROM AREAS OF PLANT CONSTRUCTION WHICH MAY HAVE PREVIOUSLY EXHIBITED DISCREPANCIES, AS WELL AS FROM SYSTEMS RELATED TO SAFE SHUTDOWN. FOR IDENTIFYING AREAS OF PLANT CONSTRUCTION WHICH MAY HAVE PREVIOUSLY EXHIBITED DISCREPANCIES, WE REVIEW 10CFR50.55(E) CONSTRUCTION DEFICIENCIES ON THE BRAIDWOOD PLANT, NRC INSPECTION REPORTS AND OTHER NRC FINDINGS, AND ALSO, IN SOME CASES, FINDINGS FROM THE COMMONWEALTH EDISON INTERNAL AUDITS. IN THE CASE OF SYSTEMS RELATED TO SAFE SHUTDOWN, WE HAVE IDENTIFIED A LIST OF SIX SUCH SYSTEMS. FOR EACH POPULATION, A FEW ITEMS ARE CHOSEN FROM ONE OR MORE OF THESE SYSTEMS. FOR THE POPULATIONS WHERE STRESS IS A MAJOR CONSIDERATION IN DESIGN, ITEMS FOR THE ENGINEERING JUDGMENT PORTION ARE SELECTED FROM AMONGST THE HIGHLY STRESSED ITEMS WHERE PRACTICAL. FOR CONSTRUCTION CATEGORIES WHERE STRESS IS A MAJOR CONSIDERATION AND WHICH ALSO HAVE LARGE POPULATIONS, ADDITIONAL ITEMS ARE CHOSEN FROM AMONGST THE HIGHLY STRESSED PORTION OF THE CONSTRUCTION CATEGORY. THESE ADDITIONAL HIGHLY STRESSED ITEMS ARE INSPECTED FOR

THE MOST HIGHLY STRESSED CONNECTIONS TO DETERMINE IF THERE ARE ANY DESIGN SIGNIFICANT DISCREPANCIES IN THESE PORTIONS OF THE ITEM.

III.C.1.B.-8

PRIOR TO CARRYING OUT THE REINSPECTIONS OR REVIEWS, DETAILED CHECKLISTS, INSTRUCTIONS FOR THEIR USE, AND OTHER NECESSARY DESIGN OR CONSTRUCTION DOCUMENTATION ARE ASSEMBLED INTO AN INSPECTION OR DOCUMENTATION REVIEW PACKAGE FOR USE BY THE INSPECTORS IN THE FIELD. THE INSPECTIONS OR REVIEWS ARE PERFORMED BY CERTIFIED LEVEL II INSPECTORS USING THE CRITERIA AND INSTRUCTIONS IDENTIFIED IN THE PACKAGE. ANY DEVIATIONS FROM DESIGN OR CONSTRUCTION REQUIREMENTS NOTED BY THE INSPECTORS IN THE FIELD, ARE RECORDED ON AN OBSERVATION REPORT BY THE INSPECTORS.

III.C.1.B.-9

THESE OBSERVATIONS ARE REVIEWED BY THE BCAP ENGINEERING GROUP FOR VALIDITY. OBSERVATIONS DETERMINED TO BE VALID ARE THEN TERMED AS DISCREPANCIES. ALL DISCREPANCIES ARE PROCESSED BY THE COMMONWEALTH EDISON COMPANY ON NON-CONFORMANCE REPORTS (NCRS) UNDER OUR NORMAL QUALITY ASSURANCE PROGRAM. THE DISCREPANCIES IDENTIFIED BY THE BCAP ARE ALSO EVALUATED BY THE ARCHITECT ENGINEER (SARGENT & LUNDY) FOR DESIGN SIGNIFICANCE. THIS EVALUATION BY THE ARCHITECT ENGINEER IS TO DETERMINE WHETHER THE ITEM WILL PERFORM ITS INTENDED SAFETY

FUNCTION EVEN IN THE PRESENCE OF THE DISCREPANCY. IF THE ITEM CAN PERFORM ITS SAFETY FUNCTION WITH THE DISCREPANCY PRESENT, THE DISCREPANCY IS TERMED AS NOT DESIGN SIGNIFICANT.

III.C.1.B.-10

THE RESULTS OF THE ARCHITECT ENGINEER EVALUATION ARE COMMUNICATED BACK TO THE BCAP. IF NO DESIGN SIGNIFICANT DISCREPANCIES ARE IDENTIFIED IN A GIVEN CONSTRUCTION CATEGORY, THEN THE INSPECTIONS UNDER CSR IN THAT CATEGORY ARE CONSIDERED COMPLETE AND NO FURTHER ACTIONS, INSPECTIONS, OR REVIEWS ARE CONSIDERED NECESSARY WITHIN THE BCAP. IF, HOWEVER, ONE OR MORE DESIGN SIGNIFICANT DISCREPANCIES ARE IDENTIFIED, ADDITIONAL INSPECTIONS WILL BE CARRIED OUT TO DETERMINE IF ADDITIONAL SIMILAR DESIGN SIGNIFICANT DISCREPANCIES MIGHT EXIST IN THAT CONSTRUCTION CATEGORY. THESE ADDITIONAL INSPECTIONS WILL BE PERFORMED IN ACCORDANCE WITH PRE-ESTABLISHED SAMPLE EXPANSION CRITERIA. AT THE COMPLETION OF ALL INSPECTIONS AND DOCUMENTATION REVIEWS IN ALL CONSTRUCTION CATEGORIES, AN EVALUATION OF THE RESULTS IS MADE AND A CONCLUSION IS DRAWN AS TO THE QUALITY OF CONSTRUCTION AT THE BRAIDWOOD NUCLEAR POWER PLANT THUS CONCLUDING WORK UNDER THE CSR ELEMENT OF THE BCAP.

III.C.1.B.-11

THE SECOND ELEMENT OF THE BCAP IS REVIEW OF PROCEDURES TO SPECIFICATION REQUIREMENTS OR RPSR. THE OBJECTIVE OF RPSR IS TO ASSURE THAT ON SITE CONTRACTOR'S PROCEDURES GOVERNING ONGOING SAFETY RELATED CONSTRUCTION AND QUALITY ASSURANCE ACTIVITIES ADDRESS ALL APPLICABLE DESIGN AND REGULATORY REQUIREMENTS.

III.C.1.B.-12

OVERALL, THE RPSR EFFORT CONSISTS OF THREE PRINCIPAL STEPS: 1) IDENTIFICATION OF ALL APPLICABLE SARGENT AND LUNDY SPECIFICATIONS AND CONTRACTOR PROCEDURES; 2) PREPARATION OF CHECKLISTS TO INCLUDE CONSTRUCTION REQUIREMENTS FROM THESE SPECIFICATIONS AND THE FSAR, AND PERSONNEL QUALIFICATION AND CERTIFICATION REQUIREMENTS; AND 3) REVIEW OF CONTRACTOR PROCEDURES AGAINST THE CHECKLIST REQUIREMENTS. ANY OBSERVATIONS OR DISCREPANCIES NOTED IN THE COURSE OF THE PROCEDURE REVIEW UNDER THE RPSR ELEMENT ARE PROCESSED ON NCR'S UNDER THE NORMAL COMMONWEALTH EDISON COMPANY QUALITY ASSURANCE PROGRAM.

III.C.1.B.-13

THE THIRD ELEMENT OF BCAP IS REVIEW OF SIGNIFICANT CORRECTIVE ACTION PROGRAMS OR RSCAP. THE OBJECTIVE OF RSCAP IS TO ASSURE THAT WHERE PAST CONSTRUCTION PROBLEMS HAVE BEEN IDENTIFIED WHICH RESULTED IN SIGNIFICANT CORRECTIVE ACTIONS, THAT SUCH CORRECTIVE ACTIONS HAVE BEEN ADEQUATELY IMPLEMENTED AND DOCUMENTED.

III.C.1.B.-14

THE OVERALL RSCAP EFFORT CONSISTS OF THE FOLLOWING PRINCIPAL STEPS FOR EACH CORRECTIVE ACTION PROGRAM: 1) REVIEW OF THE PROGRAM PROCEDURES, IMPLEMENTATION OF THE PROCEDURES, AND THE RESULTING DOCUMENTATION; 2) EVALUATION AND DOCUMENTATION OF ANY OBSERVED DISCREPANCIES; AND 3) PREPARATION OF A REPORT. ALL DISCREPANCIES OBSERVED IN THE COURSE OF THE PROGRAM REVIEW ARE DOCUMENTED AND PROCESSED AS NCR'S UNDER THE COMMONWEALTH EDISON QUALITY ASSURANCE PROGRAM. THE RSCAP ELEMENT OF BCAP IS INTENDED TO INCLUDE SPECIFICALLY IDENTIFIED CORRECTIVE ACTION PROGRAMS WHICH WERE INITIATED OR WERE COMMITTED TO BE INITIATED PRIOR TO JUNE 30, 1984.

III.C.1.B.-15

THIS DESCRIPTION OF THE THREE ELEMENTS OF THE BCAP, NAMELY CSR, RPSR AND RSCAP COMPLETES MY DESCRIPTION OF THE BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM. THE BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM WAS PRESENTED TO THE NRC IN A PUBLIC MEETING AT THE REGION III OFFICES AND WAS FORMALLY SUBMITTED ON THE BRAIDWOOD DOCKET IN JUNE, 1984. AT THE SAME TIME, A TASK FORCE WAS ASSEMBLED TO IMPLEMENT THE PROGRAM. AS OF TODAY, THERE ARE CLOSE TO 120 INDIVIDUALS DIRECTLY ASSIGNED TO THE TASK FORCE TO CARRY OUT THE IMPLEMENTATION OF THE BCAP.

OF THESE 120 INDIVIDUALS, 29 ARE CERTIFIED LEVEL II OR LEVEL III INSPECTORS. AN ADDITIONAL 7 INSPECTORS ARE ABOUT TO BE CERTIFIED.

III.C.1.B.-16

THE OVERALL EFFORT FOR PREPARATION OF VERIFICATION PACKAGES AND HARDWARE INSPECTIONS IS APPROXIMATELY 25% COMPLETE. THE DOCUMENTATION REVIEWS WHICH REQUIRE SOMEWHAT LESS TIME TO EXECUTE HAVE ALSO BEEN INITIATED. THE OVERALL CSR INSPECTION EFFORT IS EXPECTED TO BE COMPLETED BY THE END OF APRIL, 1985. VALIDATION OF THE OBSERVATIONS, EVALUATION OF THE DISCREPANCIES FOR DESIGN SIGNIFICANCE, AND COMPILATION OF THE RESULTS INTO A REPORT IS EXPECTED TO TAKE ANOTHER TWO OR TWO AND ONE HALF MONTHS. THUS, THE OVERALL CSR EFFORT IS PLANNED TO BE COMPLETED IN JULY, 1985.

III.C.1.B.-17

SIMILARLY IN THE AREA OF RPSR, MOST OF THE WORK LEADING UP TO THE ACTUAL REVIEW OF THE PROCEDURES HAS BEEN COMPLETED, AND THIS REPRESENTS A MAJOR FRACTION OF THE TOTAL WORK. THE PROCEDURE REVIEW WAS INITIATED RECENTLY AND THE OVERALL RPSR EFFORT WITH THE EXCEPTION OF INCLUSION OF THE RESULTS IN THE FINAL REPORT, IS EXPECTED TO BE COMPLETED BY MID-MARCH, 1985.

III.C.1.B.-18

ON THE RSCAP ELEMENT, ALL SIGNIFICANT CORRECTIVE ACTION PROGRAMS ARE UNDER REVIEW. REVIEW ON THREE CORRECTIVE ACTION PROGRAMS HAS ESSENTIALLY BEEN COMPLETED. THE MAIN RSCAP EFFORT IS EXPECTED TO BE COMPLETED BY THE END OF MARCH, 1985.

III.C.1.B.-19

IN SUMMARY, THE COMMONWEALTH EDISON COMPANY RECOGNIZED THAT IT WAS PRUDENT TO FURTHER DEMONSTRATE THE QUALITY OF CONSTRUCTION AT BRAIDWOOD, IN LIGHT OF OUR LICENSING EXPERIENCE AT BYRON. AS A RESULT, THE BCAP WAS INITIATED TO REVIEW THE CONSTRUCTION AT BRAIDWOOD AND TO PROVIDE AN ADDITIONAL VERIFICATION OF ITS QUALITY. WE BELIEVE THAT THE PROGRAM WITH THE THREE ELEMENTS AS I HAVE DESCRIBED WILL MEET OUR GOAL OF PROVIDING THIS ADDITIONAL VERIFICATION.

BCAP HAS MADE SIGNIFICANT PROGRESS AND IS EXPECTED TO BE COMPLETED IN ADVANCE OF THE BRAIDWOOD LICENSING PROCEEDINGS. THUS, THE BCAP RESULTS SHOULD PRECLUDE LAST MINUTE LICENSING UNCERTAINTY.

BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM (BCAP)

- PROGRAM DESCRIPTION AND STATUS

BRAIDWOOD CONSTRUCTION ASSESSMENT PROGRAM (BCAP)

ELEMENTS OF BCAP

A. CONSTRUCTION SAMPLE REINSPECTION (CSR)

B. REVERIFICATION OF PROCEDURES TO SPECIFICATION REQUIREMENTS (RPSR)

C. REVIEW OF SIGNIFICANT CORRECTIVE ACTION PROGRAMS (RSCAP)

CONSTRUCTION SAMPLE REINSPECTION (CSR)

OBJECTIVE

TO ASSURE THAT THERE ARE NO PROGRAMMATIC DESIGN-SIGNIFICANT PROBLEMS IN CONSTRUCTION WHICH HAVE NOT BEEN IDENTIFIED AND ADDRESSED.

CONSTRUCTION SAMPLE REINSPECTION (CSR)

MAJOR ACTIVITIES

OVERALL CSR EFFORT CONSISTS OF THE FOLLOWING PRINCIPAL STEPS:

- ESTABLISHMENT OF CONSTRUCTION CATEGORIES
- PREPARATION OF REINSPECTION/DOCUMENTATION REVIEW CHECKLISTS
- SELECTION OF THE REINSPECTION/REVIEW SAMPLE
- REINSPECTIONS/REVIEWS
- PROCESSING OF OBSERVATIONS/DISCREPANCIES

CONSTRUCTION SAMPLE REINSPECTION (CSR)

MAJOR ACTIVITIES - CONT'D

ESTABLISHMENT OF CONSTRUCTION CATEGORIES

PLANT CONSTRUCTION WORK IS DIVIDED INTO GROUPS OF SIMILAR COMPONENTS OR ACTIVITIES HAVING COMMON ATTRIBUTES THAT ARE VERIFIABLE BY SIMILAR REINSPECTION AND DOCUMENT REVIEW ACTIVITIES.

PREPARATION OF CHECKLISTS AND INSTRUCTIONS

FOR EACH CONSTRUCTION CATEGORY, DETAILED CHECKLISTS AND INSTRUCTIONS ARE PREPARED FOR CONDUCTING INSPECTIONS/REVIEWS.

CONSTRUCTION SAMPLE REINSPECTION (CSR)

MAJOR ACTIVITIES - CONT'D

SELECTION OF SAMPLE

- FOR EACH CONSTRUCTION CATEGORY A SAMPLE IS CHOSEN FOR REINSPECTION/DOCUMENT REVIEW

- SAMPLE IS SELECTED FROM THE TOTAL POPULATION IN A CONSTRUCTION CATEGORY, SATISFYING FOLLOWING CRITERIA:

  - COMPLETED (AS OF JUNE 30, 1984)
  - SAFETY-RELATED
  - INSPECTED
  - QUALITY-CONTROL ACCEPTED
  - ACCESSIBLE
  - RECREATABLE

CONSTRUCTION SAMPLE REINSPECTION (CSR)

MAJOR ACTIVITIES - CONT'D

SAMPLE SELECTION

- PORTION OF THE SAMPLE IS CHOSEN IN A STATISTICALLY RANDOM MANNER. THIS RANDOM PORTION OF THE SAMPLE IS SUFFICIENT TO DEVELOP CONFIDENCE THAT THE POPULATION IS FREE OF DESIGN SIGNIFICANT DEFECTS.

- AN ADDITIONAL PORTION IS CHOSEN BASED ON ENGINEERING JUDGEMENT. ENGINEERING JUDGEMENT PORTION OF THE SAMPLE IS CHOSEN TO INCLUDE ITEMS FROM:

  - AREAS OF PLANT CONSTRUCTION WHICH MAY HAVE PREVIOUSLY EXHIBITED DISCREPANCIES

  - SYSTEMS RELATED TO SAFE SHUTDOWN

  - AMONGST HIGHLY STRESSED ITEMS WHERE STRESS IS A MAJOR CONSIDERATION IN DESIGN

CONSTRUCTION SAMPLE REINSPECTION (CSR)

MAJOR ACTIVITIES - CONT'D

REINSPECTIONS/REVIEWS

- FOR EACH CONSTRUCTION CATEGORY, DETAILED CHECKLISTS, INSTRUCTIONS FOR USE OF CHECKLISTS AND OTHER NECESSARY DESIGN/CONSTRUCTION DOCUMENTATION IS ASSEMBLED INTO AN INSPECTION/REVIEW PACKAGE

- INSPECTIONS AND REVIEWS ARE PERFORMED BY CERTIFIED LEVEL II INSPECTORS USING INSPECTION/REVIEW PACKAGES

- ANY DEVIATIONS NOTED BY INSPECTORS ARE RECORDED AS OBSERVATIONS.

CONSTRUCTION SAMPLE REINSPECTION (CSR)

MAJOR ACTIVITIES - CONT'D

PROCESSING OF OBSERVATIONS/DISCREPANCEIS

- OBSERVATIONS ARE REVIEWED BY THE ENGINEERING GROUP FOR VALIDITY. VALID OBSERVATIONS ARE TERMED DISCREPANCIES.

- ALL DISCREPANCIES ARE ALSO PROCESSED BY COMMONWEALTH EDISON COMPANY ON NCRs UNDER ITS NORMAL QUALITY ASSURANCE PROGRAM.

- ALL DISCREPANCIES ARE EVALUATED BY ARCHITECT/ENGINEERS FOR DESIGN SIGNIFICANCE.

CONSTRUCTION SAMPLE REINSPECTION

SAMPLE EXPANSION CRITERIA

- NO FURTHER INSPECTIONS IN A CATEGORY IF NO DESIGN SIGNIFICANT DISCREPANCIES (DSD'S) ARE IDENTIFIED IN THE INITIAL SAMPLE (RANDOM & EJ)

- IF ONE OR MORE DSD IS IDENTIFIED, ADDITIONAL INSPECTIONS ARE MADE.

REVIEW OF PROCEDURES TO SPECIFICATION REQUIREMENTS (RPSR)

OBJECTIVE

TO ASSURE THAT ON-SITE CONTRACTORS' PROCEDURES GOVERNING ONGOING SAFETY-RELATED CONSTRUCTION AND QUALITY ASSURANCE ACTIVITIES ADDRESS ALL APPLICABLE DESIGN AND REGULATORY REQUIREMENTS.

REVIEW OF PROCEDURES TO SPECIFICATION REQUIREMENTS (RPSR)

MAJOR ACTIVITIES

OVERALL RPSR EFFORT CONSISTS OF THREE PRINCIPAL STEPS:

- IDENTIFICATION OF APPLICABLE SARGENT AND LUNDY SPECIFICATIONS AND CONTRACTOR PROCEDURES.

- PREPARATION OF CHECKLISTS INCLUDING:

  - CONSTRUCTION REQUIREMENTS FROM FSAR AND SPECIFICATIONS

  - PERSONNEL QUALIFICATION/CERTIFICATION REQUIREMENTS

- REVIEW OF CONTRACTOR PROCEDURES AGAINST CHECKLIST REQUIREMENTS

OBSERVATIONS/DISCREPANCIES ARE PROCESSED VIA NORMAL NCR PROCESS

REVIEW OF SIGNIFICANT CORRECTIVE ACTION PROGRAMS (RSCAP)

OBJECTIVE

TO ASSURE THAT WHERE PAST CONSTRUCTION PROBLEMS HAVE BEEN IDENTIFIED WHICH RESULTED IN SIGNIFICANT CORRECTIVE ACTIONS, SUCH CORRECTIVE ACTIONS HAVE BEEN ADEQUATELY IMPLEMENTED AND DOCUMENTED.

REVIEW OF SIGNIFICANT CORRECTIVE ACTION PROGRAMS (RSCAP)

MAJOR ACTIVITIES

OVERALL RSCAP EFFORT CONSISTS OF THE FOLLOWING PRINCIPAL STEPS:

- FOR EACH CORRECTIVE ACTION PROGRAM, REVIEW PROGRAM PROCEDURES, IMPLEMENTATION OF THE PROCEDURES AND RESULTING DOCUMENTATION
- EVALUATE AND DOCUMENT ANY OBSERVED DISCREPANCIES
- PREPARE A REPORT FOR EACH PROGRAM REVIEWED.

DISCREPANCIES ARE PROCESSED AND APPROPRIATE CORRECTIVE ACTIONS ARE IMPLEMENTED VIA NORMAL COMMONWEALTH EDISON COMPANY NCR PROCESS.

BCAP PROGRESS STATUS

- TASK FORCE ESTABLISHED IN JUNE, 1984
- PERSONS CURRENTLY ON THE TASK FORCE -- 120
- NUMBER OF CERTIFIED INSPECTORS -- 29
- ANOTHER 7 INSPECTORS EXPECTED TO BE CERTIFIED SHORTLY

BCAP PROGRESS STATUS - CONT'D

CSR STATUS

- COMPLETION OF PACKAGE PREPARATION EXPECTED BY MID-APRIL, 1985

- COMPLETION OF INSPECTIONS EXPECTED BY END OF APRIL, 1985

- OVERALL EFFORT PLANNED TO BE COMPLETED IN JULY, 1985

- CURRENT STATUS:

	COMPLETED	TOTAL
VERIFICATION PACKAGES	1164	2860
REINSPECTIONS	723	2860
DOCUMENTATION REVIEW PACKAGES	429	3180
DOCUMENTATION REVIEWS	190	3180

BCAP PROGRESS STATUS - CONT'D

RPSR STATUS

- IDENTIFICATION OF CONTRACTOR PROCEDURES IS COMPLETE, TOTAL OF 500 PROCEDURES IDENTIFIED.

- IDENTIFICATION OF CONSTRUCTION REQUIREMENTS IN FSAR COMPLETED

- IDENTIFICATION OF PERSONNEL QUALIFICATION AND CERTIFICATION REQUIREMENTS COMPLETED

- IDENTIFICATION OF CONSTRUCTION REQUIREMENTS IN APPLICABLE SPECIFICATIONS COMPLETED

- PROCEDURE REVIEW HAS BEEN INITIATED.

- OVERALL RPSR EFFORT EXPECTED TO BE COMPLETED BY MID-MARCH, 1985.

BCAP PROGRESS STATUS - CONT'D

RSCAP STATUS

- ALL SCAPS ARE UNDER REVIEW
- REVIEW OF THREE SCAPS ESSENTIALLY COMPLETE
- MAIN EFFORT EXPECTED TO BE COMPLETED BY END OF MARCH, 1985

SUMMARY/CONCLUSION

- IN LIGHT OF BYRON EXPERIENCE, COMMONWEALTH EDISON RECOGNIZED THAT IT IS PRUDENT TO FURTHER DEMONSTRATE CONSTRUCTION QUALITY AT BRAIDWOOD

- BCAP INITIATED TO PROVIDE THIS ADDITIONAL VERIFICATION

- BCAP HAS MADE SIGNIFICANT PROGRESS. COMPLETION EXPECTED IN ADVANCE OF BRAIDWOOD LICENSING PROCEEDINGS.

- BCAP SHOULD PRECLUDE LAST MINUTE LICENSING UNCERTAINTY.

COMMONWEALTH EDISON COMPANY

PRESENTATION

III.D. PHYSICAL PLANT SECURITY
(CLOSED SESSION)

COMMONWEALTH EDISON COMPANY

PRESENTATION

III.E.1. LEAK BEFORE BREAK

LEAK BEFORE BREAK

THE LEAK BEFORE BREAK CONCEPT IS BASED ON THE PREMISE THAT THERE IS NO MECHANISM FOR DEVELOPING A LARGE PIPE BREAK WITHOUT GOING THROUGH AN EXTENDED PERIOD DURING WHICH A CRACK OR FLAW IN THE PIPE WOULD LEAK COPIOUSLY. THE SIZE OF A FLAW WHICH WOULD RESULT IN DETECTABLE LEAKAGE IS MUCH SMALLER THAN THE SIZE OF A FLAW WHICH WOULD LEAD TO PIPING FAILURE. FRACTURE MECHANICS ANALYSIS ON PWR PRIMARY PIPING HAS CLEARLY SHOWN THAT A SUBSTANTIAL RANGE OF STABLE CRACK SIZES EXIST BETWEEN THOSE WHICH GIVE DETECTABLE LEAKS AND THE MUCH LARGER SIZE CRACK THAT WOULD RESULT IN A SUDDEN PIPE BREAK.

EXTENSIVE ANALYSIS AND TESTING HAS BEEN CONDUCTED BY WESTINGHOUSE OVER THE LAST DECADE TO ADVANCE THE LEAK BEFORE BREAK CONCEPT AND TO DEMONSTRATE THAT A SAFE SHUTDOWN EARTHQUAKE WOULD NOT CAUSE A PRIMARY COOLANT PIPE BREAK. THE NRC HAS ALSO SPONSORED RESEARCH ON THIS ISSUE WHICH RESULTED IN THE SAME CONCLUSION AS THE WESTINGHOUSE WORK. THESE ANALYSES DEMONSTRATE THAT THE WESTINGHOUSE PWR PRIMARY COOLANT PIPE BREAK IS AN UNLIKELY EVENT AND SHOULD NO LONGER BE CONSIDERED PART OF THE PLANT DESIGN BASIS. THE RESULTS OF THESE EFFORTS HAVE BEEN REVIEWED AND ENDORSED BY THE NRC STAFF, NRC MANAGEMENT, AND THE ACRS.

IN ADDITION, NUREG 1061 VOLUME 3 CONTAINS RECOMMENDATIONS ON HOW TO EMPLOY THE LEAK BEFORE BREAK CONCEPT. THE METHODOLOGY EMPLOYED BY WESTINGHOUSE IS GENERALLY COMPATIBLE WITH THE METHODS AND CRITERIA EXPRESSED IN THIS DOCUMENT.

THE LEAK BEFORE BREAK CONCEPT HAS BEEN USED TO ADDRESS THE UNRESOLVED SAFETY ISSUE CONCERNING ASYMMETRIC BLOWDOWN LOADS. THE GENERIC WESTINGHOUSE STUDIES REGARDING THIS ISSUE HAVE RECENTLY BEEN SHOWN TO ENVELOPE THE PLANT-SPECIFIC PARAMETERS FOR OUR BYRON AND BRAIDWOOD STATIONS. THIS IS BASED UPON A COMPARISON OF LOADS, MATERIAL PROPERTIES, TRANSIENTS, AND GEOMETRY. IN ADDITION, STRESS CORROSION CRACKING, WATER HAMMER, AND FATIGUE EFFECTS HAVE BEEN CONSIDERED. THE WESTINGHOUSE EVALUATION FOR BYRON AND BRAIDWOOD HAS SHOWN THAT THE PREDICTED REFERENCE FLAW WILL BE STABLE THROUGHOUT REACTOR LIFE AND WILL LEAK AT A DETECTABLE RATE WHICH WOULD ALLOW A SAFE PLANT SHUTDOWN. BYRON AND BRAIDWOOD HAVE AN RCS PRESSURE BOUNDARY LEAK DETECTION SYSTEM WHICH IS CONSISTENT WITH THE GUIDELINES OF REGULATORY GUIDE 1.45 OF DETECTING LEAKAGE OF ONE GPM IN ONE HOUR.

BYRON AND BRAIDWOOD ARE CURRENTLY DESIGNED TO WITHSTAND THE DYNAMIC EFFECTS ASSOCIATED WITH A LARGE BREAK IN THE PRIMARY LOOP PIPING. IF IT IS NO LONGER NECESSARY TO CONSIDER THIS TYPE OF BREAK, THE MAJORITY OF THE DESIGN FEATURES THAT ADDRESS A LARGE PRIMARY LOOP BREAK WILL STILL REMAIN THE SAME. THE PHYSICAL ASPECTS OF THE CONTAINMENT DESIGN THAT HAVE BEEN ANALYZED FOR REACTOR CAVITY PRESSURIZATION, ASYMMETRIC LOADINGS, AND SUBCOMPARTMENT PRESSURIZATION WILL NOT CHANGE. THE DESIGN CRITERIA FOR THE COMPONENTS AND SUPPORTS OF THE REACTOR COOLANT SYSTEM WILL NOT CHANGE. THE DESIGN OF THE EMERGENCY CORE COOLING SYSTEM, CONTAINMENT SYSTEM, AND ENVIRONMENTAL QUALIFICATION WILL STILL BE BASED UPON A DOUBLE-ENDED PIPE BREAK OF A PRIMARY LOOP.

HOWEVER, WHAT WILL CHANGE IS THE DESIGN REQUIREMENT FOR PRIMARY LOOP PIPE WHIP RESTRAINTS AND ASSOCIATED JET DEFLECTORS. THESE DEVICES WILL NO LONGER BE NECESSARY BECAUSE THEIR ONLY FUNCTION IS TO MITIGATE THE EFFECTS OF A LOOP PIPE BREAK. IN ADDITION, ANY FUTURE QUESTIONS REGARDING THE ADEQUACY OF THE CURRENT PLANT DESIGN WILL BE EVALUATED WITHOUT CONSIDERING THE DYNAMIC EFFECTS DUE TO A PRIMARY LOOP PIPE BREAK.

WITH RESPECT TO THE LICENSING STATUS OF THIS ISSUE, COMMONWEALTH EDISON SUBMITTED A REQUEST FOR AN EXEMPTION FROM THE REQUIREMENTS OF GENERAL DESIGN CRITERION 4 THAT APPLY TO THIS MATTER. THIS REQUEST, DOCKETED IN SEPTEMBER, 1984, WAS ACCOMPANIED BY A REPORT FROM WESTINGHOUSE THAT PROVIDED THE TECHNICAL BASIS FOR THIS EXEMPTION. IT IS OUR UNDERSTANDING THAT THE TECHNICAL ASPECTS OF OUR SUBMITTAL HAVE BEEN APPROVED BY THE NRC STAFF. HOWEVER, WE ARE STILL WORKING WITH THE NRC TO ADDRESS THE LEGAL AND ADMINISTRATIVE REQUIREMENTS THAT MUST BE SATISFIED PRIOR TO GRANTING AN EXEMPTION.

COMMONWEALTH EDISON FORESEES SUBSTANTIAL OPERATIONAL AND ECONOMIC BENEFITS TO BE GAINED BY THE NRC STAFF'S EXPEDITIOUS APPROVAL OF ELIMINATING LARGE PRIMARY LOOP PIPE BREAKS FROM THE DESIGN BASIS OF BYRON AND BRAIDWOOD. COST SAVINGS ATTRIBUTABLE TO CONSTRUCTION WILL RESULT WHERE PIPE WHIP RESTRAINTS OR JET DEFLECTORS HAVE NOT YET BEEN INSTALLED, OR WHERE SHIMMING FOR HOT GAPS AT THE WHIP RESTRAINTS CAN BE ELIMINATED BY THEIR REMOVAL. ENGINEERING COSTS CAN BE SAVED BY ELIMINATING THE NEED TO PERFORM A FINAL VERIFICATION OF DESIGN ADEQUACY FOR JET IMPINGEMENT EFFECTS IN THE AS-BUILT

CONDITION. REMOVAL OF WHIP RESTRAINTS WOULD ALLOW FOR BETTER INSULATION OF THE REACTOR COOLANT PIPING THUS REDUCING CONTAINMENT HEAT LOADS. THE POTENTIAL FOR RESTRICTING PIPES DUE TO UNANTICIPATED THERMAL MOVEMENT OR SEISMIC MOTION WOULD ALSO BE ELIMINATED WITH THE REMOVAL OF THE RESTRAINTS. FURTHER, RESTRAINT REMOVAL WILL BENEFIT ALARA CONSIDERATIONS IN TERMS OF REDUCING PERSONNEL EXPOSURE DUE TO FUTURE PLANT INSPECTIONS AND MAINTENANCE ACTIVITIES.

IN SUMMARY, THE APPLICATION OF THE LEAK BEFORE BREAK CONCEPT TO THE PRIMARY LOOP PIPING AT BRAIDWOOD AND BYRON STATIONS HAS BEEN TECHNICALLY PROVEN AND WILL ALSO BENEFIT THE STATIONS FROM ECONOMIC AND OPERATIONAL VIEWPOINTS. COMMONEALTH EDISON INTENDS TO PURSUE THE APPLICATION OF THE LEAK BEFORE BREAK CONCEPT ON OTHER PIPING SYSTEMS AFTER OBTAINING SUCCESSFUL IMPLEMENTATION ON THE PRIMARY LOOP PIPING.

COMMONWEALTH EDISON COMPANY

PRESENTATION

III.E.2. ELIMINATION OF ARBITRARY INTERMEDIATE PIPE BREAK

ELIMINATION OF ARBITRARY INTERMEDIATE PIPE BREAKS

ARBITRARY INTERMEDIATE PIPE BREAKS ARE THOSE BREAK LOCATIONS SELECTED AT THE TWO HIGHEST STRESS POINTS BETWEEN THE TERMINAL ENDS OF A PIPING SYSTEM. THEIR SELECTION IS REQUIRED BY NRC BRANCH TECHNICAL POSITION (BTP) MEB 3-1 EVEN THOUGH THE PIPING STRESS ANALYSIS SHOWS THEM TO BE BELOW THE STRESS AND FATIGUE LIMITS SPECIFIED IN THE BTP. IT HAS BECOME APPARENT BOTH TO THE NRC STAFF AND THE NUCLEAR INDUSTRY THAT REQUIRING THE POSTULATION OF ARBITRARY INTERMEDIATE PIPE BREAKS HAS BEEN OVERLY RESTRICTIVE AND RESULTED IN AN EXCESSIVE NUMBER OF PIPE RUPTURE PROTECTION DEVICES WHICH DO NOT PROVIDE A COMPENSATING LEVEL OF SAFETY. FOR THIS REASON, COMMONWEALTH EDISON PURSUED THE APPLICATION OF ALTERNATIVE PIPE BREAK CRITERIA IN THE DESIGN OF OUR BRAIDWOOD AND BYRON STATIONS.

THE REVISED PIPE BREAK CRITERIA THAT WILL NOW BE EMPLOYED DOES NOT INCLUDE ARBITRARY INTERMEDIATE BREAKS WHEN THE STRESS AND/OR FATIGUE LIMITS ARE NOT EXCEEDED. PIPING SYSTEMS WILL BE DESIGNED TO ACCOMODATE PIPE BREAKS ONLY AT TERMINAL ENDS AND LOCATIONS WHERE THE STRESS OR FATIGUE LIMITS OF MEB 3-1 ARE EXCEEDED. FOR BREAKS THAT MUST BE POSTULATED, THE DESIGN WILL ACCOMODATE PIPE WHIP, JET IMPINGEMENT, AND COMPARTMENT PRESSURIZATION RESULTING FROM MECHANISTIC TREATMENT OF THE BREAK. ELIMINATION OF THE ARBITRARY INTERMEDIATE BREAKS WILL NOT IMPACT THE FLOODING EVALUATION, ENVIRONMENTAL QUALIFICATION PROGRAM, OR PLANT STRUCTURAL DESIGN.

ARBITRARY INTERMEDIATE BREAKS WERE ONLY POSTULATED TO PROVIDE ADDITIONAL CONSERVATISM IN THE DESIGN. THERE IS NO TECHNICAL JUSTIFICATION FOR POSTULATING THESE BREAKS. PIPE BREAKS ARE POSTULATED TO OCCUR AT LOCATIONS WHERE STRESSES ARE ONLY 80% OF CODE ALLOWABLES (CLASS 2 AND 3) OR WHERE THE CUMULATIVE USAGE FACTOR IS ONLY 10% OF THE ALLOWABLE 1.0. THE ARBITRARY BREAKS BEING ELIMINATED ALL EXHIBIT STRESSES AND USAGE FACTORS BELOW THESE CONSERVATIVE THRESHOLDS. OPERATING PROCEDURES AND PIPING AND SYSTEM DESIGNS MINIMIZE THE POSSIBILITY OF STRESS CORROSION CRACKING, THERMAL AND VIBRATION INDUCED FATIGUE, AND WATER HAMMER IN THESE LINES IN WHICH ARBITRARY PIPE BREAKS WERE POSTULATED. WELDED ATTACHMENTS ARE NOT LOCATED IN CLOSE PROXIMITY TO THE BREAKS BEING ELIMINATED. CONSEQUENTLY, LOCAL BENDING STRESSES RESULTING FROM THESE ATTACHMENTS WILL NOT SIGNIFICANTLY AFFECT THE STRESS LEVELS AT THE BREAK LOCATIONS. THE REMAINING POSTULATED PIPE BREAKS AND WHIP RESTRAINTS PROVIDE AN ADEQUATE LEVEL OF PROTECTION IN AREAS CONTAINING HIGH ENERGY LINES.

IN NOVEMBER 1984, COMMONWEALTH EDISON SUBMITTED A REQUEST TO THE NRC TO ELIMINATE ARBITRARY INTERMEDIATE BREAKS FROM THE DESIGN OF BYRON AND BRAIDWOOD. THIS SUBMITTAL WAS BASED UPON THE TECHNICAL REASONS OUTLINED ABOVE AND OFFERED ALTERNATIVE BREAK CRITERIA THAT EXCLUDED ARBITRARY INTERMEDIATE BREAKS. THE NRC STAFF APPROVED OUR REQUEST AS DOCUMENTED IN THEIR SAFETY EVALUATION REPORT OF JANUARY, 1985.

AS A RESULT OF THIS RECENT NRC APPROVAL TO APPLY REVISED PIPE BREAK CRITERIA, WE WILL BE ELIMINATING APPROXIMATELY 235 BREAK LOCATIONS AND 67 PIPE WHIP RESTRAINTS IN CLASS 1, 2, AND 3 PIPING ON EACH UNIT.

WE EXPECT TO GAIN SUBSTANTIAL BENEFITS FROM THE ELIMINATION OF THESE ARBITRARY INTERMEDIATE BREAKS. OPERATIONAL BENEFITS AND IMPROVEMENTS IN PLANT SAFETY INCLUDE THE ELIMINATION OF THE POTENTIAL FOR RESTRAINING PIPES DUE TO UNANTICIPATED THERMAL MOVEMENT OR SEISMIC MOTION. PIPING INSULATION WILL FIT CLOSER RESULTING IN LESS HEAT LOAD IN THE CONTAINMENT. ACCESS DURING PLANT OPERATION FOR SUCH ACTIVITIES AS MAINTENANCE AND INSERVICE INSPECTION WILL BE IMPROVED DUE TO THE ELIMINATION OF CONGESTION CREATED BY THE WHIP RESTRAINTS AND SUPPORTING STRUCTURAL STEEL. IN ADDITION TO THE DECREASE IN MAINTENANCE EFFORT, A SIGNIFICANT REDUCTION IN MAN-REM EXPOSURE WILL BE REALIZED THROUGH FEWER MANHOURS SPENT IN RADIATION AREAS. CONSTRUCTION COSTS WILL BE SAVED WHERE PIPE WHIP RESTRAINTS WILL NOT BE INSTALLED. THE COSTS ATTRIBUTABLE TO FINAL ENGINEERING ANALYSES AND PLANT WALKDOWNS FOR THE ARBITRARY BREAK LOCATIONS WILL NOT BE NEEDED.

AT BYRON UNIT 1, DESIGN CHANGES HAVE BEEN ISSUED TO THE FIELD TO REMOVE THE SHIMS FROM THE PIPE WHIP RESTRAINTS AT ARBITRARY BREAK LOCATIONS. AN EVALUATION WILL BE PERFORMED TO DETERMINE WHICH PIPE WHIP RESTRAINTS WILL BE PARTIALLY OR COMPLETELY REMOVED AT THE FIRST REFUELING OUTAGE. ALARA, PIPING INSULATION, AND GENERAL ACCESS AND INSPECTION RESTRICTIONS WILL BE CONSIDERATIONS IN THIS EVALUATION.

FOR THE THREE UNITS STILL UNDER CONSTRUCTION, A PROGRAM IS BEING DEVELOPED TO ELIMINATE THE WHIP RESTRAINTS ASSOCIATED WITH THE ARBITRARY BREAK LOCATIONS IDENTIFIED UP TO THIS POINT IN THE DESIGN. PIPING DESIGN PROCEDURES WILL BE MODIFIED TO REFLECT THIS REVISED BREAK CRITERIA TO ENSURE THAT NO NEW ARBITRARY BREAKS ARE INCLUDED AS THE PIPING DESIGN IS FINALIZED. THE HIGH ENERGY LINE PIPING SYSTEMS FOR THE OTHER THREE UNITS ARE ESSENTIALLY IDENTICAL TO THEIR COUNTERPARTS AT BYRON UNIT 1 AND THEREFORE WE HAVE A HIGH LEVEL OF CONFIDENCE THAT THE TERMINAL END AND MANDATORY INTERMEDIATE BREAKS HAVE BEEN PROPERLY IDENTIFIED.

COMMONWEALTH EDISON COMPANY

PRESENTATION

III.F.1. REPORT ON BYRON ASLB SUPPLEMENTAL INITIAL DECISION

BRAIDWOOD ACRS SUBCOMMITTEE MEETING
(JANUARY 29, 1985)

ITEM III. F.1

REPORT ON
BYRON ASLB SUPPLEMENTAL INITIAL DECISION

MY NAME IS LOUIS OWEN DELGEORGE. I AM EMPLOYED BY COMMONWEALTH EDISON IN ITS CORPORATE OFFICES IN CHICAGO, ILLINOIS. I AM AN ASSISTANT VICE-PRESIDENT, RESPONSIBLE FOR LICENSING AND ENGINEERING ACTIVITIES RELATED TO THE OPERATING NUCLEAR REACTORS WITHIN COMMONWEALTH EDISON'S NUCLEAR OPERATIONS DIVISION. I AM ALSO RESPONSIBLE FOR LICENSING ACTIVITIES RELATED TO THE BYRON AND BRAIDWOOD FACILITIES WHICH COMMONWEALTH EDISON IS CURRENTLY CONSTRUCTING.

I DIRECTED THE DEVELOPMENT OF THE BYRON REINSPECTION PROGRAM, WHICH I WILL DISCUSS FURTHER IN THIS REPORT. SINCE JANUARY, 1983 I HAVE ACTED AS THE SENIOR COMPANY MANAGER OVERSEEING THE BYRON OPERATING LICENSE HEARINGS BEFORE THE ATOMIC SAFETY AND LICENSING BOARD (ASLB) OF THE UNITED STATES NUCLEAR REGULATORY COMMISSION (NRC). I GAVE TESTIMONY TO THAT BOARD IN MARCH, 1983 AND JULY, 1984 ON MATTERS RELATED TO COMMONWEALTH EDISON NUCLEAR LICENSING ACTIVITIES AND THE BYRON REINSPECTION PROGRAM.

THE PURPOSE OF THIS REPORT IS TO EXPLAIN THE NUCLEAR REGULATORY COMMISSION (NRC) REGULATORY REQUIREMENTS WHICH LED TO THE BYRON REINSPECTION PROGRAM AS WELL AS TO

DISCUSS THE RESULTS OF THAT PROGRAM. IN ADDITION, I WILL DESCRIBE HOW THE RESULTS OF THE REINSPECTION PROGRAM RELATE TO BOTH THE INITIAL DECISION OF THE BYRON LICENSING BOARD IN JANUARY, 1984 AND THE SUPPLEMENTAL DECISION OF THAT BOARD IN OCTOBER, 1984. FINALLY, I WILL DISCUSS THE SUPPLEMENTAL INITIAL DECISION OF THAT BOARD WHICH SUPPORTED THE LICENSING OF BYRON STATION, AS WELL AS, THE AFFIRMING DECISION ON THIS MATTER BY THE ATOMIC SAFETY AND LICENSING APPEALS BOARD.

I. THE BYRON REINSPECTION PROGRAM

BY WAY OF BACKGROUND, THE QUALITY ASSURANCE (QA) PROGRAM IMPLEMENTED BY COMMONWEALTH EDISON AT BYRON STATION IS COMPRISED, IN ACCORDANCE WITH THE COMMISSION'S REGULATIONS, OF THOSE PLANNED AND SYSTEMATIC ACTIONS IMPLEMENTED TO PROVIDE ADEQUATE CONFIDENCE THAT STRUCTURES, SYSTEMS OR COMPONENTS WILL PERFORM SATISFACTORILY WHEN PLACED IN SERVICE. SUCH A PROGRAM HAS BEEN IMPLEMENTED AT EACH OF THE COMMONWEALTH EDISON NUCLEAR FACILITIES. IMPLEMENTATION OF PORTIONS OF THE QA PROGRAM MAY BE AND WAS DELEGATED BY COMMONWEALTH EDISON TO ITS CONTRACTORS, BUT COMMONWEALTH EDISON REMAINED RESPONSIBLE TO THE NRC FOR THE ACTIVITIES OF ITS CONTRACTORS AND ACTIVELY REVIEWED AND AUDITED THE CONTRACTORS' QA PROGRAMS. ONE SYSTEMATIC ACTION IMPLEMENTED BY THE QA PROGRAM IS THE INSPECTION OF COMPLETED CONSTRUCTION WORK TO VERIFY ITS CONFORMANCE WITH DESIGN REQUIREMENTS. SUCH INSPECTIONS ARE PERFORMED BY INDIVIDUALS REFERRED TO AS QUALITY CONTROL (QC) INSPECTORS. AT BYRON,

THESE QC INSPECTORS WERE EMPLOYED BY THE INDIVIDUAL SITE CONTRACTORS. THE STANDARD AGAINST WHICH THE QUALIFICATIONS OF THESE PERSONNEL ARE EVALUATED IS THE AMERICAN NATIONAL STANDARD INSTITUTE (ANSI) STANDARD N45.2.6. THAT STANDARD DEALS GENERALLY WITH SUCH MATTERS AS THE EDUCATION AND EXPERIENCE REQUIREMENTS FOR QC INSPECTORS. ALTHOUGH COMMONWEALTH EDISON DID NOT MAKE A SPECIFIC COMMITMENT TO THE NRC TO ADOPT ANSI N45.2.6 UNTIL 1981, ALL SITE CONTRACTORS DEVELOPED INSPECTOR QUALIFICATION PROGRAMS IMPLEMENTING THE INTENT OF ANSI N45.2.6 BEGINNING IN 1974.

IN THE SPRING OF 1982, THE NRC STAFF CONDUCTED WHAT IT CHARACTERIZED AS A CONSTRUCTION ASSESSMENT TEAM (CAT) INSPECTION. ALL OF THE NUCLEAR SITES IN THE MIDWEST WITH ONGOING CONSTRUCTION PROGRAMS WERE SUBJECTED TO THIS INSPECTION BY THE REGIONAL NRC STAFF REPORTING TO MR. J. G. KEPPLER. ONE OF THE FINDINGS OF THE BYRON CAT QUESTIONED THE ADEQUACY OF ON-SITE CONTRACTOR PROGRAMS FOR QUALIFYING INSPECTORS. THERE WAS NO FINDING THAT THESE DEFICIENCIES HAD COMPROMISED THE QUALITY OF CONSTRUCTION. HOWEVER, THE NRC STAFF DIRECTED THAT THE QUALIFICATION PROGRAMS IN PLACE BE UPGRADED PROSPECTIVELY, AND THAT THE WORK OF PREVIOUSLY QUALIFIED INSPECTORS BE VALIDATED. THE BYRON REINSPECTION PROGRAM WAS UNDERTAKEN TO VERIFY THE EFFECTIVENESS OF INSPECTOR QUALIFICATION AND CERTIFICATION PRACTICES UTILIZED AT THE BYRON SITE.

COMMONWEALTH EDISON INITIALLY CHALLENGED THE FINDING AS TO CERTAIN CONTRACTORS INASMUCH AS THE PROGRAMS CONTROLLING THEIR INSPECTOR'S CERTIFICATION HAD PREVIOUSLY BEEN REVIEWED BY THE NRC STAFF IN 1980 AND FOUND ACCEPTABLE. IN FACT, THE NRC INSPECTION IN 1980 FOUND THAT ALL HATFIELD (THE SITE CONTRACTOR ABOUT WHOM THE ASLB EXPRESSED THE GREATEST CONCERN) INSPECTORS HAD BEEN PROPERLY CERTIFIED TO THAT POINT IN TIME. HOWEVER, THE QUALIFICATION OF THOSE SAME INSPECTORS WOULD NOT HAVE SATISFIED THE REQUIREMENTS BEING IMPOSED TO RESOLVE THE NRC REGIONAL STAFF CONCERN RAISED BY THE CAT IN 1982. IN THE INITIAL HEARING BEFORE THE ASLB IN AUGUST, 1983, AN NRC STAFF WITNESS STATED: "THE WHOLE STORY SURROUNDING THE ANSI STANDARD N45.2.6 IS KIND OF LIKE A MOVING TARGET. THE INTERPRETATIONS AND APPLICATIONS HAVE BEEN CHANGING OVER TIME STARTING IN 1973."

COMMONWEALTH EDISON ACCEDED TO THE NRC STAFF POSITION TO PREVENT A DELAY IN PLANT LICENSING. TO HAVE DONE OTHERWISE COULD HAVE RESULTED IN A STOPPAGE OF WORK BY THE NRC UNTIL THE DIFFERENCES WERE RESOLVED OR CAUSED ESCALATED ENFORCEMENT ACTION. THE BYRON REINSPECTION PROGRAM WAS INITIATED IN MARCH, 1983. THE PROGRAM OF REINSPECTION WAS NOT COMPLETED UNTIL THE END OF 1983. AN INTERIM REPORT DOCUMENTING THE METHODOLOGY EMPLOYED IN THE PROGRAM AND PRELIMINARY RESULTS WERE SUBMITTED TO THE NRC STAFF IN OCTOBER, 1983. THE FINAL PROGRAM RESULTS WERE

SUBMITTED ON JANUARY 12, 1984, AND A FINAL REPORT ON THE PROGRAM, ITS RESULTS, AND THE CONCLUSIONS REACHED BY COMMONWEALTH EDISON RELATIVE TO INSPECTOR QUALIFICATION AND CONSTRUCTION WORK QUALITY WAS SUBMITTED TO THE NRC STAFF IN FEBRUARY, 1984.

HAVING REVIEWED THE BASIS FOR UNDERTAKING THE BYRON REINSPECTION PROGRAM, I WILL NOW REVIEW THE RESULTS OF THAT PROGRAM. OF GREATEST SIGNIFICANCE IS THE FACT THAT OVER 200,000 REINSPECTIONS WERE PERFORMED TO RESOLVE THE NRC STAFF QUESTIONS RELATIVE TO THE QUALIFICATION OF INSPECTORS. AS MIGHT BE EXPECTED FOR A PROGRAM OF THIS SIZE, A VERY SMALL PERCENTAGE OF THE REINSPECTIONS DID IDENTIFY MINOR DIFFERENCES WITH THE ORIGINAL INSPECTION RESULTS. HOWEVER, FEWER THAN 2% OF THE RE-INSPECTIONS RESULTED IN THE IDENTIFICATION OF VALID DISCREPANT CONDITIONS WHEN COMPARED AGAINST THE APPLICABLE CRITERIA. IN SOME CASES THESE MINOR DISCREPANCIES WERE REPAIRED EVEN THOUGH NOT REQUIRED TO MEET DESIGN SPECIFICATIONS. THESE ISOLATED REPAIRS RESTORED ADDITIONAL MARGIN AND PREVENTED POSSIBLE FUTURE QUESTIONS ON THE INTEGRITY OF THE WORK. NOT ONE OF THOSE REINSPECTIONS IDENTIFIED A DISCREPANCY THAT HAD DESIGN SIGNIFICANCE. IN OTHER WORDS, THE CONSTRUCTION OF BYRON (INCLUDING THE ACTIVITIES OF QC INSPECTORS) MET ALL SAFETY COMMITMENTS AND REGULATORY REQUIREMENTS AND NO CONSTRUCTION REWORK WAS REQUIRED AS A RESULT OF THIS PROGRAM.

AS I DISCUSS LATER IN THIS REPORT, THERE WERE TWO SITE CONTRACTORS WHOSE APPARENT DEFICIENCIES IN QUALITY ASSURANCE IMPLEMENTATION LED THE BYRON LICENSING BOARD TO DENY THE APPLICATION FOR AN OPERATING LICENSE. THOSE TWO CONTRACTORS WERE HATFIELD ELECTRIC COMPANY AND HUNTER CORPORATION, BOTH OF WHOM WERE SUBJECT TO THE REINSPECTION PROGRAM. REINSPECTIONS FOR THESE TWO CONTRACTORS INVOLVED OVER 160,000 ITEMS INCLUDING OVER 40,000 DOCUMENT REVIEWS. NO DISCREPANCIES WERE FOUND WITH DESIGN SIGNIFICANCE. AS A COROLLARY TO THESE FINDINGS, IT SHOULD BE NOTED THAT THE QUALIFICATIONS OF ALL HATFIELD ELECTRIC AND HUNTER INSPECTORS FOR WHOM SUFFICIENT WORK COULD BE REINSPECTED TO ASSESS THEIR QUALIFICATIONS MET THE PROGRAM ACCEPTANCE CRITERIA. ON THE BASIS OF THESE FACTS ARISING FROM THE REINSPECTION PROGRAM, COMMONWEALTH EDISON WAS ABLE TO DEMONSTRATE THAT THE HATFIELD ELECTRIC AND HUNTER INSPECTOR QUALIFICATION PROGRAMS WERE EFFECTIVE.

THE NRC STAFF STRONGLY ENDORSED THE ADEQUACY OF WORK PERFORMED BY THESE AND OTHER CONTRACTORS AT THE BYRON SITE. ONE STAFF WITNESS, WHOSE VIEW REFLECTED THAT OF THE STAFF WITNESSES GENERALLY, WENT ON TO SAY THAT HE FELT THE "INFORMATION PROVIDED BY THE REINSPECTION PROGRAM DID, IN FACT, PROVIDE A VERY LARGE DATA BASE TO <u>CONFIRM</u> REGION III'S POSITION THAT THE QUALITY OF THE BYRON SITE IS ACCEPTABLE."

II. THE BYRON ASLB INITIAL DECISION OF JANUARY 13, 1984

AS I PREVIOUSLY INDICATED, THE REINSPECTION PROGRAM BEGAN IN MARCH, 1983 AND ITS RESULTS WERE NOT FULLY KNOWN

UNTIL THE END OF 1983. THE LICENSING BOARD FIRST CONDUCTED HEARINGS ON GENERAL QUALITY ASSURANCE ISSUES AT BYRON IN MARCH AND APRIL, 1983. EVIDENCE REGARDING BOTH THE GENERAL STRUCTURE OF THE COMPANY'S QUALITY ASSURANCE PROGRAM AND A NUMBER OF ITEMS OF NONCOMPLIANCE INVOLVING THE QUALITY ASSURANCE ACTIVITIES OF SITE CONTRACTORS, INCLUDING HATFIELD ELECTRIC AND HUNTER, WERE INTRODUCED. EACH OF THESE ITEMS OF NONCOMPLIANCE WAS SHOWN TO HAVE BEEN RESOLVED TO THE SATISFACTION OF COMMONWEALTH EDISON'S QA DEPARTMENT AND THE NRC STAFF.

IN PART AT THE REQUEST OF INTERVENORS IN THAT PROCEEDING, AND IN PART BECAUSE THE LICENSING BOARD WISHED TO BECOME MORE FULLY INFORMED REGARDING THE QUALITY CONTROL INSPECTOR QUALIFICATION ISSUE, THE LICENSING BOARD REVIEWED THE REINSPECTION PROGRAM, THEN IN PROGRESS, AT ADDITIONAL HEARINGS CONDUCTED IN AUGUST, 1983. AT THOSE HEARINGS THE NRC STAFF, WHILE TESTIFYING THAT NO SIGNIFICANT CONSTRUCTION DEFECTS HAD BEEN FOUND AT BYRON, STATED THAT IT EXPECTED THE REINSPECTION PROGRAM TO UNCOVER ANY CONSTRUCTION DEFECTS WHICH DID EXIST, BUT SOMEWHAT EQUIVOCALLY ENDORSED THE REINSPECTION PROGRAM BY ASSERTING THAT THE STAFF HAD ACCEPTED THE "BASIC PREMISE" OF THE PROGRAM BUT HAD NOT MADE A FINAL DETERMINATION THAT THE REINSPECTION PROGRAM WOULD BE SUCCESSFUL IN RESOLVING THE RELATED FINDING MADE DURING THE CAT INSPECTION CONCERNING INSPECTOR COMPETENCE.

NOTWITHSTANDING THESE RESERVATIONS REGARDING THE REINSPECTION PROGRAM, IN ITS TESTIMONY BEFORE THE BOARD, THE NRC STAFF -- THE SOLE PARTICIPANT IN THE PROCEEDING WITH INDEPENDENT, IN-DEPTH, AND FIRST-HAND KNOWLEDGE OF THE FULL SPECTRUM OF QUALITY ASSURANCE ACTIVITIES AT THE BYRON SITE -- ENDORSED THE ADEQUACY OF COMMONWEALTH EDISON'S QUALITY ASSURANCE PROGRAM, AND RECOMMENDED THAT OPERATING LICENSES BE ISSUED. THE ASLB CLOSED THE RECORD OF THE OPERATING LICENSE PROCEEDING ON AUGUST 11, 1983.

THE INITIAL DECISION OF THE ASLB WAS ISSUED ON JANUARY 13, 1984 AND DID NOT CONSIDER THE RESULTS OF THE REINSPECTION PROGRAM. IN ITS INITIAL DECISION, THE ASLB MADE FAVORABLE FINDINGS REGARDING THE STRUCTURE AND INDEPENDENCE OF THE COMMONWEALTH EDISON QA ORGANIZATION, AND ACKNOWLEDGED THAT THE LIMITED INFORMATION IT WAS ABLE TO CONSIDER DID NOT REFLECT THE EXISTENCE OF WIDESPREAD HARDWARE OR CONSTRUCTION PROBLEMS AT BYRON. IN FACT, THE LICENSING BOARD TOOK PAINS TO STRESS THAT DESPITE ITS DENIAL OF THE OPERATING LICENSE APPLICATION, IT HAD NOT CONCLUDED THAT COMMONWEALTH EDISON WAS "INSTITUTIONALLY UNABLE OR UNWILLING TO MAINTAIN A RELIABLE QUALITY ASSURANCE PROGRAM." IN THE CASE OF HATFIELD, THE BOARD REGARDED DEFICIENCIES INVOLVING INSPECTOR CAPABILITY AND DOCUMENT CONTROL TO BE THE MOST SIGNIFICANT, THE LATTER BEING A CONCERN INASMUCH AS IT MIGHT PRECLUDE GENERATION OF THE APPROPRIATE RECORDS TO ALLOW FOR THE IDENTIFICATION OF

DEFECTIVE INSPECTIONS, THEREBY POTENTIALLY UNDERMINING REMEDIAL ACTION PROGRAMS. SIMILAR DEFICIENCIES WERE THE FOCUS OF CONCERN FOR HUNTER, ALTHOUGH THE SAME DEGREE OF CONCERN DID NOT EXIST. THE BOARD ASSERTED IN ITS INITIAL DECISION THAT A PROPERLY STRUCTURED REINSPECTION PROGRAM COULD ELIMINATE ITS CONCERNS REGARDING HATFIELD ELECTRIC COMPANY AND HUNTER CORPORATION, BUT EXPRESSED CONCERNS REGARDING THE ADEQUACY OF THE STRUCTURE OF THE BYRON REINSPECTION PROGRAM WHICH WAS THEN BEING IMPLEMENTED. THE LICENSING BOARD DECLINED TO RELY ON THE REINSPECTION PROGRAM AS A DEMONSTRATION OF THE ADEQUACY OF HATFIELD'S WORK, BECAUSE THE NRC STAFF TESTIMONY REGARDING THE REINSPECTION PROGRAM WAS CAUTIOUS IN ITS ENDORSEMENT OF THAT PROGRAM. ACCORDINGLY, THE ASLB DENIED COMMONWEALTH EDISON'S APPLICATION FOR AN OPERATING LICENSE FOR BYRON, THE FIRST SUCH DENIAL IN NRC HISTORY.

THE ASLB FAILED TO HOLD THE RECORD OPEN FOR CONSIDERATION OF THE RESULTS OF THE BYRON REINSPECTION PROGRAM, EVEN THOUGH IT HAD ACKNOWLEDGED THAT THE REINSPECTION PROGRAM COULD PROVIDE AN EMPIRICAL DEMONSTRATION THAT THE WORK IN QUESTION WAS SATISFACTORY. THE ASLB IN ITS INITIAL ORDER INDICATED THAT IT COULD HAVE INFORMED THE PARTIES OF THE SUBSTANCE OF ITS VIEWS ON THE QA ISSUES, RETAINING JURISDICTION OVER THE ISSUE AND PROVIDING FOR FURTHER PROCEEDINGS WHEN THE VARIOUS INSPECTIONS, INVESTIGATIONS AND REMEDIAL ACTIONS HAD BEEN COMPLETED.

HOWEVER, THE ASLB OPINED THAT "THE REMEDY MOST RESPONSIVE TO THE CIRCUMSTANCES OF THIS CASE, AND THE REMEDY LEAST HARSH TO THE APPLICANT YET STILL APPROPRIATE, IS TO DECIDE THE ISSUE NOW (JANUARY 13, 1984)". THE ASLB WENT ON TO OBSERVE THAT THIS WAS THE LEAST HARSH APPROPRIATE REMEDY, AS COMPARED TO RESERVING JURISDICTION, BECAUSE IT PERMITTED THE PARTIES TO TEST IMMEDIATELY ON APPEAL THE QUALITY OF THE DECISION. THIS WAS PARTICULARLY ONEROUS IN THAT THE DOUBTS HARBORED BY THE ASLB COULD HAVE BEEN RESOLVED BY A DETAILED EXAMINATION OF THE RESULTS OF THE BYRON REINSPECTION PROGRAM, WHICH WERE PUBLISHED ON JANUARY 12, 1984 AFTER THE NRC STAFF HAD ALREADY REVIEWED AN INITIAL DRAFT REPORT ON THIS SUBJECT SUBMITTED BY COMMONWEALTH EDISON IN OCTOBER, 1983.

THE ATOMIC SAFETY AND LICENSING APPEAL BOARD (ASLAB) WHICH HEARD THE APPEAL ON THIS MATTER HELD THAT THE UNCERTAINTY REGARDING THE QUALIFICATION OF QC INSPECTORS CREATED A "CLOUD" OVERHANGING THE ADEQUACY OF CONSTRUCTION, BUT ORDERED THAT THE MATTER BE REMANDED TO THE ASLB. THE ASLAB CONCLUDED THAT THE LICENSING BOARD'S DETERMINATION NOT TO AWAIT AND REVIEW THE REINSPECTION PROGRAM RESULTS BEFORE ISSUING ITS FINAL DECISION WAS UNJUSTIFIED AND REMANDED THE RECORD TO THE ASLB TO CONDUCT FURTHER HEARINGS ON THE REINSPECTION PROGRAM.

AT THE REMANDED LICENSING HEARINGS CONDUCTED IN AUGUST, 1984, MR. JAMES G. KEPPLER, THE REGIONAL

ADMINISTRATOR OF THE NRC, CONCEDED THAT THE STAFF TESTIMONY IN AUGUST, 1983, WHICH PROVIDED ONE OF THE BASES FOR THE ASLB'S DENIAL OF THE BYRON OPERATING LICENSE, DID NOT ACCURATELY REFLECT THE STAFF POSITION. TO QUOTE MR. KEPPLER:

> "I WANT TO TAKE THIS OPPORTUNITY TO EMPHASIZE TO THE BOARD THAT, DESPITE THE IDENTIFICATION OF CERTAIN QUALITY ASSURANCE PROBLEMS AT THE BYRON SITE, MY STAFF AND I HAD, AND CONTINUE TO HAVE, CONFIDENCE IN THE QUALITY OF COMPLETED CONSTRUCTION AT BYRON. THIS CONFIDENCE IS BASED ON OUR OVERALL INSPECTION EFFORT AND WAS REINFORCED BY THE SPECIAL TEAM INSPECTION IN EARLY 1982. THE APPLICANT'S REINSPECTION PROGRAM FURTHER REINFORCED OUR CONFIDENCE. UNFORTUNATELY, I BELIEVE THAT IN THE AUGUST, 1983 HEARING WE MAY HAVE FAILED TO CONVEY TO THIS BOARD OUR DEGREE OF CONFIDENCE."

MOREOVER, IN THE REMANDED HEARINGS, THE NRC STAFF WITNESSES (INCLUDING THE INDIVIDUALS WHO TESTIFIED IN AUGUST, 1983) STATED UNEQUIVOCALLY THAT THE QUALITY OF CONSTRUCTION AT BYRON WAS GOOD. THE INITIAL DECISION OF THE LICENSING BOARD HAD FOCUSED IN SOME DETAIL ON ALLEGED SHORTCOMINGS IN THE HATFIELD WELDING AND WELDING INSPECTIONS. AT THE REMANDED HEARINGS, AN NRC STAFF WELDING SPECIALIST DECLARED THAT WITH RESPECT TO WELDING, BYRON IS PROBABLY THE SAFEST PLANT EVER BUILT. THIS CONCLUSION FOLLOWED AN NRC INSPECTION EFFORT IN CONNECTION WITH THE BYRON REINSPECTION PROGRAM WHICH WAS CHARACTERIZED BY THE NRC STAFF AS UNUSUALLY CRITICAL IN SCOPE AND INTENSITY.

THE LICENSING BOARD ACKNOWLEDGED IN ITS INITIAL DECISION, AND THE INTERVENORS CONCEDED AT ORAL ARGUMENT WHEN

THE APPEAL WAS HEARD, THAT NO EVIDENCE WAS PRESENTED ESTABLISHING THE ACTUAL EXISTENCE OF UNCORRECTED CONSTRUCTION DEFICIENCIES OF POTENTIAL SAFETY SIGNIFICANCE AT BYRON. A CONFIRMATION OF CONSTRUCTION ADEQUACY THROUGH THE BYRON REINSPECTION PROGRAM NOT ONLY REMOVES THE UNCERTAINTY EXPRESSED BY THE LICENSING BOARD BUT AFFIRMS THE POSITION HELD BY COMMONWEALTH EDISON AND SUPPORTED BY THE NRC STAFF THAT CONSTRUCTION ACTIVITIES AT BYRON WERE ACCEPTABLE.

III. THE BYRON ASLB SUPPLEMENTAL INITIAL DECISION OF OCTOBER 16, 1984

IN THE REMANDED PROCEEDING, THE BASIC ISSUE BEFORE THE LICENSING BOARD WAS WHETHER THE BYRON QUALITY CONTROL INSPECTOR REINSPECTION PROGRAM (BRP) DEMONSTRATED THAT QUALITY CONTROL INSPECTORS, EMPLOYED BY HATFIELD ELECTRIC COMPANY AND HUNTER CORPORATION, WERE QUALIFIED TO PERFORM INSPECTIONS AT BYRON. AS HAS BEEN STATED, THE RESULTS OF THE BRP WERE NOT KNOWN WHEN THE LICENSING BOARD ISSUED ITS INITIAL DECISION IN JANUARY, 1984. IT WAS ON THE BASIS OF THE SUPPLEMENTED RECORD THAT THE LICENSING BOARD ULTIMATELY FOUND THAT "THE QUALITY OF HATFIELD WORK AT BYRON IS ADEQUATE AS INFERRED FROM INSPECTOR COMPETENCE, AND AS DIRECTLY INFERRED FROM EVALUATING THE (BRP) RESULTS. ALSO, CONTRARY TO (THE BOARD'S) EARLIER FINDING, CECO HAS TODAY MET ITS OVERSIGHT RESPONSIBILITIES RESPECTING HATFIELD." IN

ADDITION, THE BOARD FOUND THAT "THE REINSPECTION PROGRAM BECAME AN EFFECTIVE VERIFICATION OF HUNTER'S QUALITY ASSURANCE PROGRAM".

THE BOARD HAD BASED ITS INITIAL DECISION PRINCIPALLY UPON FINDINGS BY THE NRC STAFF THAT THERE HAD BEEN FAILURES AMONG CONTRACTORS AT BYRON TO DEMONSTRATE THAT ALL QUALITY CONTROL INSPECTORS HAD BEEN PROPERLY TRAINED, QUALIFIED AND CERTIFIED. THIS WAS SEEN AS A FAILURE ON THE PART OF COMMONWEALTH EDISON IN ITS RESPONSIBILITY TO OVERSEE THE QUALITY ASSURANCE ACTIVITIES OF ITS CONTRACTORS. AT ISSUE WAS THE EFFECTIVENESS OF COMMONWEALTH EDISON'S CORRECTIVE ACTION PROGRAMS REGARDING OBSERVED DEFICIENCIES AND TO A LESSER EXTENT, THE UNDERLYING SIGNIFICANCE OF THE DEFICIENCIES THEMSELVES.

IT IS CLEAR FROM THE ULTIMATE FINDINGS MADE IN THE SUPPLEMENTAL DECISION THAT THE LICENSING BOARD WAS ABLE TO CONCLUDE THAT COMMONWEALTH EDISON HAD MET ITS OVERSIGHT RESPONSIBILITIES. IT IS IMPORTANT TO RECALL AGAIN THAT THE BOARD HAD PREVIOUSLY FOUND IN ITS INITIAL DECISION THAT COMMONWEALTH EDISON HAD "NO ORGANIZATIONAL INABILITY OR UNWILLINGNESS TO MAINTAIN AN ADEQUATE QUALITY ASSURANCE PROGRAM". THIS WAS REITERATED IN THE SUPPLEMENTAL INITIAL DECISION, AND IS CONSISTENT WITH THE ULTIMATE CONCLUSION THAT COMMONWEALTH EDISON'S QA OVERSIGHT RESPONSIBILITIES WERE MET.

FOR THESE REASONS, THE INITIAL FINDINGS OF THE BYRON LICENSING BOARD SHOULD NOT BE CONSTRUED AS CRITICISM OF THE BRAIDWOOD QUALITY ASSURANCE PROGRAM. ADMITTEDLY, THE COMMONWEALTH EDISON QA PROGRAM AT BYRON WAS CHALLENGED. CERTAIN FAULTS WERE IDENTIFIED AND DISCUSSED AT GREAT LENGTH. HOWEVER, OF VITAL IMPORTANCE IS THE FACT THAT THOSE FAULTS DID NOT COMPROMISE THE INTEGRITY OF CONSTRUCTION ACTIVITIES. WHEN IT IS ALSO RECOGNIZED THAT: (1) THE CONSTRUCTION CONTRACTORS AT BYRON AND BRAIDWOOD ARE NOT THE SAME; AND THAT (2) THE BYRON LICENSING BOARD DID NOT QUESTION THE INTEGRITY OF THE EDISON CORPORATE QA PROGRAM BUT RATHER SPECIFIC INSTANCES OF ITS DEFICIENT IMPLEMENTATION, IT IS CLEAR THAT THE BRAIDWOOD PROJECT MUST BE JUDGED ON ITS OWN MERITS. IN THAT REGARD, COMPREHENSIVE PROGRAMS FOR ASSURING ADEQUATE CORRECTIVE ACTION INCLUDING EXTENSIVE REINSPECTION OF COMPLETED WORK HAVE BEEN UNDERTAKEN AT BRAIDWOOD. THESE PROGRAMS PROVIDE SITE SPECIFIC VALIDATION OF BRAIDWOOD CONSTRUCTION ADEQUACY.

IV. BYRON ATOMIC SAFETY AND LICENSING APPEAL BOARD DECISION OF DECEMBER 20, 1984

THE BYRON ATOMIC SAFETY AND LICENSING APPEAL BOARD (ASLAB) ISSUED ITS DECISION ON DECEMBER 20, 1984. THE APPEALS BOARD AFFIRMED, WITHOUT EXCEPTION, THE FINDINGS MADE BY THE LICENSING BOARD IN ITS SUPPLEMENTAL INITIAL DECISION OF OCTOBER 16, 1984.

COMMONWEALTH EDISON COMPANY

PRESENTATION

III.F.2. CIRCUMSTANCES SURROUNDING BRAIDWOOD CIVIL PENALTY

CIRCUMSTANCES SURROUNDING BRAIDWOOD CIVIL PENALTY

IN THE DISCUSSIONS WHICH TOOK PLACE AT THE ACRS FULL COMMITTEE MEETING OF MARCH 16, 1984, A NUMBER OF QUESTIONS AROSE RELATED TO A CIVIL PENALTY IMPOSED BY THE NRC ON COMMONWEALTH EDISON COMPANY. THE PURPOSE OF THIS PRESENTATION ITEM IS TO PROVIDE AND PLACE IN THE RECORD CLARIFYING INFORMATION RELATED TO THIS TOPIC.

A CIVIL PENALTY WAS IMPOSED ON BRAIDWOOD, BY THE NRC, ON FEBRUARY 2, 1983 (REFERENCE 1), FOLLOWING AN NRC ENFORCEMENT CONFERENCE ON AUGUST 31, 1982. IN THE ASSOCIATED INSPECTION REPORT, THE NRC CITED TWO BASES FOR THE CIVIL PENALTY. THEY DESCRIBED THE FIRST AS A BREAKDOWN OF OUR QUALITY ASSURANCE PROGRAM AS IT RELATED TO THE INSTALLATION AND INSTALLATION INSPECTION OF MECHANICAL SAFETY-RELATED EQUIPMENT; THE SECOND CONCERNED OUR FAILURE TO REPORT THIS PROGRAM DEFICIENCY IN ACCORDANCE WITH 10CFR50.55(E).

THE NRC SUPPORTED THE FIRST BASIS FOR THE CIVIL PENALTY THROUGH A DISCUSSION OF SEVEN CRITERIA OF 10CFR50 APPENDIX B WHICH WERE CONSIDERED TO HAVE BEEN VIOLATED. COMMONWEALTH EDISON DID NOT AGREE WITH THE DETAILS SUPPORTING TWO OF THOSE CRITERIA VIOLATIONS (RELATED TO FAILURE TO TAKE TIMELY CORRECTIVE ACTION ON PROBLEMS ASSOCIATED WITH STEAM GENERATOR BOLTING, AND FAILURE TO PERFORM AUDITS ON ERECTION AND INSPECTION ACTIVITIES RELATED TO SAFETY-RELATED MECHANICAL EQUIPMENT). HOWEVER, COMMONWEALTH EDISON COMPANY ACKNOWLEDGED THE BASIC DEFICIENCIES IN THE CONTROL AND DOCUMENTATION OF MECHANICAL EQUIPMENT INSTALLATION WHICH WERE IDENTIFIED

BY THE NRC INSPECTORS. THESE DEFICIENCIES HAD ALREADY BEEN IDENTIFIED BY OUR OWN INSPECTIONS AND AUDITS, AS DISCUSSED IN OUR RESPONSE TO THE CIVIL PENALTY PROVIDED ON APRIL 4, 1983 (REFERENCE 2). IN RETROSPECT, HOWEVER, IT IS APPARENT THAT TIMELY CORRECTIVE ACTION WAS NOT TAKEN IN SOME MATTERS.

IN OUR RESPONSE TO THE CIVIL PENALTY, AND AS DESCRIBED IN OUR 10CFR50.55(E) REPORT OF OCTOBER 8, 1982 (REFERENCE 3), A NUMBER OF CORRECTIVE ACTIONS WERE TAKEN TO RESOLVE ALL ISSUES RELATED TO THE ERECTION AND INSPECTION OF A NUMBER OF PIECES OF SAFETY-RELATED EQUIPMENT, INCLUDING THE INSTALLATION OF BOLTS JOINING THE STEAM GENERATORS TO THEIR VERTICAL SUPPORTS. THE ACTIONS TAKEN INCLUDED:

1. REINSPECTION OF ALL SAFETY-RELATED EQUIPMENT INSTALLED BY THE MECHANICAL ERECTION CONTRACTOR, AND GENERATION OF APPROPRIATE DOCUMENTATION TO ESTABLISH THE ADEQUACY OF THE INSTALLATION. ALTHOUGH A TOTAL OF APPROXIMATELY 700 PIECES OF EQUIPMENT WERE INSTALLED BY THE MECHANICAL CONTRACTOR, THE EFFORT INVOLVED ONLY SAFETY-RELATED EQUIPMENT -- APPROXIMATELY 210 PIECES.

2. REMOVAL AND REINSTALLATION OF THE CAP SCREWS (BOLTS) HOLDING THE VERTICAL SUPPORTS TO THE STEAM GENERATORS, IN ACCORDANCE WITH PROCEDURES WHICH PROVIDE FOR TRACEABILITY OF ALL BOLTING MATERIALS.

A DETAILED CHRONOLOGY AND A DESCRIPTION OF THE CORRECTIVE ACTION TAKEN TO ADDRESS EQUIPMENT REINSPECTION WERE DOCUMENTED IN THE 30 DAY 10CFR50.55(E) REPORT SUBMITTED

ON OCTOBER 8, 1982. IN ESSENCE, ALL OF THE SUBJECT INSTALLATION WORK HAS BEEN RECHECKED. THE DEFICIENCIES IDENTIFIED DURING THIS EFFORT WERE NOT CONSIDERED SIGNIFICANT, AND INCLUDED THE FOLLOWING TYPES OF ITEMS:

> DOCUMENTATION FOR GROUT RELEASE NOT AVAILABLE, BUT EQUIPMENT GROUTED; ANCHOR BOLT THREAD ENGAGEMENT NOT SUFFICIENT; INTERNAL CLEANLINESS NOT VERIFIED; IMPROPER OR MISSING BOLTING MATERIAL; AND, IMPROPER OR MISSING DOCUMENTATION.

ALL OF THESE DEFICIENCIES HAVE SINCE BEEN DISPOSITIONED AND CORRECTIVE ACTION COMPLETED. NO SUBSTANTIVE SAFETY PROBLEMS HAVE BEEN IDENTIFIED.

REGARDING REMOVAL AND REINSTALLATION OF STEAM GENERATOR BOLTS, NECESSARY STEPS WERE TAKEN TO ASSURE AN ACCEPTABLE INSTALLATION. THE BOLTS FROM EACH STEAM GENERATOR WERE REMOVED, EXAMINED, REPLACED WHERE NECESSARY, AND REINSTALLED BY JANUARY, 1984. ALL DEFICIENCIES IDENTIFIED WERE DISPOSITIONED AND CORRECTIVE ACTION COMPLETED.

IN SUMMARY, COMMONWEALTH EDISON FULLY UNDERSTANDS THE IMPORTANCE OF PROCEDURAL CONTROL OF CONSTRUCTION ACTIVITIES, AND PROCEEDED TO CORRECT ALL PREVIOUS DEFICIENCIES THROUGH REINSPECTION AND, WHERE NECESSARY, THROUGH REWORK. NO SUBSTANTIVE SAFETY PROBLEMS RESULTED FROM THE QUALITY ASSURANCE DEFICIENCIES IDENTIFIED.

WITH REGARD TO THE SECOND BASIS FOR THE CIVIL PENALTY, FAILURE TO FILE A REPORT IN ACCORDANCE WITH 10CFR50.55(E), WE CONCUR THAT THE PROBLEMS WITH CONTROL OF MECHANICAL EQUIPMENT INSTALLATION SHOULD HAVE BEEN REPORTED EARLIER. THE SITUATION WAS REPORTABLE IN MARCH, 1982, WHEN IT BECAME APPARENT THAT ACTIONS TAKEN TO CORRECT THE AUDIT FINDINGS WERE INEFFECTIVE. WORK WAS STOPPED THEN. ADEQUATE CORRECTIVE ACTIONS WERE TAKEN IN SPITE OF OUR REPORTING FAILURE. WHEN THE NRC POINTED OUT THE REPORTABILTIY OF THIS ISSUE DURING THE AUGUST 31, 1982 ENFORCEMENT CONFERENCE, A FULL REPORT WAS PROVIDED PROMPTLY.

REFERENCES

1. NRC LETTERS OF FEBRUARY 2, 1983, FROM J. G. KEPPLER TO J. J. O'CONNOR.

2. COMMONWEALTH EDISON COMPANY LETTER OF APRIL 4, 1983, FROM CORDELL REED TO J. G. KEPPLER.

3. COMMONWEALTH EDISON COMPANY LETTER OF OCTOBER 8, 1982, FROM T. R. TRAMM TO J. G. KEPPLER.

COMMONWEALTH EDISON COMPANY

PRESENTATION

III.F.3. EFFECTS OF COOLING LAKE DIKE FAILURE

EFFECTS OF COOLING LAKE DIKE FAILURE

DURING THE MARCH 9, 1984 MEETING OF THE ACRS SUB-COMMITTEE, MEMBERS OF THE SUB-COMMITTEE RAISED VARIOUS QUESTIONS REGARDING POTENTIAL COOLING POND DIKE FAILURE (TRANSCRIPT PAGES 237 - 247). A SUBSEQUENT QUESTION DURING THE FULL COMMITTEE MEETING OF MARCH 16, 1984 (TRANSCRIPT PAGES 196 - 199 AND 227 - 228) DEALT WITH THE POTENTIAL HAZARD TO 31 HOMES AND 12 FARMSTEADS IN BRACEVILLE BETWEEN THE DIKE AND THE MAZON RIVER.

THE EXTERIOR DIKE CONSISTS OF A COMPACTED SILTY SAND SOIL WITH AN IMPERVIOUS CLAY SEEPAGE BARRIER CONSTRUCTED THROUGH THE CENTER LINE OF THE EMBANKMENT. THE STATIC AND PSEUDOSTATIC (FOR OBE) STABILITY OF THE DIKE SLOPES WERE ANALYZED USING THE THEORY OF LIMITING EQUILIBRIUM TO ESTIMATE THE FACTOR OF SAFETY. THE RESULTS OF THESE ANALYSES ARE SHOWN BELOW WITH THE CORRESPONDING RECOMMENDED FACTORS OF SAFETY USED BY THE CORPS OF ENGINEERS WHEN DESIGNING DAMS:

CONDITION ANALYZED	BRAIDWOOD LAKE DIKE	CORPS OF ENGINEERS CRITERIA
FULL POOL STEADY STATE SEEPAGE	2.3	1.5
SUDDEN DRAWDOWN	1.8	1.2
FULL POOL EARTH-QUAKE LOADING	1.6	1.0

WHEN EXAMINING THE ANALYSES FOR SEISMIC STABILITY, CONSIDERATION SHOULD BE GIVEN TO THE VARIOUS SEISMIC COEFFICIENTS USED IN THE BRAIDWOOD COOLING POND DIKE ANALYSIS AND THOSE RECOMMENDED BY CORPS OF ENGINEERS GUIDELINES FOR DAM INSPECTION. FIGURE 1, PAGE D30 OF THE STATE OF ILLINOIS' "RULES FOR CONSTRUCTION AND MAINTENANCE OF DAMS" ADOPTS THE CORPS OF ENGINEERS SEISMIC CRITERIA AND RECOMMENDS A COEFFICIENT OF 0.025, WHEREAS THE BRAIDWOOD COOLING POND DIKE'S CRITERIA IS MORE CONSERVATIVE AT 0.10.

OUR EVALUATION INDICATES THAT THE BRAIDWOOD COOLING POND DIKE WILL SURVIVE THE OPERATIONAL BASIS EARTHQUAKE (OBE) WITH A SAFETY MARGIN OF 1.64. WHEN EVALUATING THE EFFECTS OF THE OBE SEISMIC EVENT, CERTAIN HISTORIC EARTHQUAKE RECORDS WERE EXAMINED IN ORDER TO DETERMINE THE RECURRENCE INTERVAL. THE RESULTS OF OUR EVALUATION, CONFIRMED BY THE NRC, INDICATES THE OPERATING BASIS EARTHQUAKE HAS A MODIFIED MERCALLI INTENSITY (MMI) OF VI WITH A RECURRENCE INTERVAL OF 2150 YEARS. THE BRAIDWOOD COOLING POND DIKES ARE NOT DESIGNED TO SUSTAIN AN SSE WHICH IS REPORTED TO HAVE A MODIFIED MERCALLI INTENSITY OF VIII AND RECURRENCE INTERVAL OF 10^4 YEARS. COMMONWEALTH EDISON COMPANY CONCLUDES THAT IT IS HIGHLY UNLIKELY THAT THE DIKE WILL FAIL. THIS CONCLUSION IS SUPPORTED BY THE NRC STAFF IN THE BRAIDWOOD FINAL ENVIRONMENTAL STATEMENT, SECTION 4.3.1.1.5.

THE AMOUNT OF FLOODING WHICH WOULD RESULT FROM RAPID DEWATERING WOULD BE DEPENDENT UPON THE LOCATION OF A BREACH IN THE DIKE. A POSTULATION WAS MADE OF A 100 FOOT LONG, FULL DEPTH, INSTANTANEOUS BREACH IN THE WEST DIKE

OF THE COOLING POND, IN THE AREA WHERE THE DIKE HEIGHT OVER THE GROUND LEVEL TO THE WEST IS NEAR MAXIMUM ELEVATION. THE BREACH WAS POSTULATED AT THIS LOCATION BECAUSE THE MAXIMUM NUMBER OF HOMES WOULD BE AFFECTED COMPARED TO ANY OTHER BREACH LOCATION SOUTH OF THE SPILLWAY. THE RESULTING DEPTHS OF FLOODING OVER THE GROUND ELEVATIONS WERE CALCULATED AT THREE CHOSEN LOCATIONS, I.E. AT THE POINT OF BREACH, AT ONE HALF MILE AND AT ONE MILE. THE RESULTS WERE INCLUDED IN REVISED RESPONSE TO QUESTION E240.5 IN THE BRAIDWOOD ENVIRONMENTAL REPORT - OPERATING LICENSE STAGE (ATTACHED HERETO AS APPENDIX A). TABLE QE240.5-1 INDICATES THAT THE MAXIMUM WATER DEPTH AT LOCATION 2 (ONE-HALF MILE WEST OF THE DIKE) AND NEAR THE HOUSE CLOSEST TO ITS POSTULATED BREACH WOULD BE 2.2 FEET. THE ACTUAL EFFECT ON THE HOUSES WOULD GENERALLY BE MINIMIZED BECAUSE OF THE COMMON PRACTICE OF BUILDING HOUSES ON BUILT-UP MOUNDS WITH FLOOR LEVELS ABOVE SURROUNDING GROUND LEVEL.

THE NRC STAFF ALSO PERFORMED AN ANALYSIS OF A COOLING POND DIKE BREACH IN THE BRAIDWOOD FINAL ENVIRONMENTAL STATEMENT, SECTION 4.3.1.1.5 EFFECTS OF COOLING POND DIKE FAILURE. IN THIS ANALYSIS A BREACH WAS POSTULATED ALONG THE WESTERN DIKE NORTH OF THE SPILLWAY WITH AN ANALYSIS SIMILAR TO THAT IN THE REVISED RESPONSE TO QUESTION E240.5. THE STAFF ALSO ANALYZED THE RESULTS OF A BREACH IN THE EAST-WEST DIKE JUST SOUTH OF THE TOWN OF GODLEY. THE RESULTS OF THESE POSTULATIONS SHOW THAT HOMES IN THE VILLAGES OF GODLEY AND BRACEVILLE ON THE SOUTH SIDE OF ROUTES 53 AND 129 WOULD BE AFFECTED BY THE WATER AND THAT THE FARMSTEADS BETWEEN THE COOLING POND AND THE MAZON

RIVER WOULD ALSO BE AFFECTED. HOWEVER, THE MAXIMUM DEPTHS INDICATED IN THE CENTER OF THE POTENTIAL FLOOD AREA AT GODLEY AND AT BRACEVILLE ARE 1.2 AND 1.3 FEET, RESPECTIVELY. IN BOTH CASES, THE WATER WOULD MAKE ITS WAY TO THE MAZON RIVER WHICH IS SHOWN TO BE CAPABLE OF CARRYING THE WORST CASE OUTFLOW AT AN ELEVATION OF 570.0 FEET WHICH IS AT LEAST 10 FEET BELOW THE GENERAL GROUND ELEVATIONS OF THE AREA WEST OF THE COOLING POND.

ADDITIONALLY, THE ILLINOIS DEPARTMENT OF TRANSPORTATION, DIVISION OF WATER RESOURCES, ON JULY 13, 1984 ISSUED PERMIT NO. 18012, A COPY OF WHICH IS INCLUDED, AS APPENDIX B, AUTHORIZING THE OPERATION AND MAINTENANCE OF THE BRAIDWOOD COOLING POND DAM.

QUESTION E240.5

What are the potential impacts to local population and property of a postulated failure of the dike that forms the onsite pond?

RESPONSE

The cooling pond dikes are designed to be extremely stable structures, with more conservative design criteria than those recommended in the National Dam Safety Program. Most of the exterior dike except a portion of the dike on the west, is either very low or the general ground level is at or above the top of dike elevation. The cooling pond has a spillway designed to safely pass all floods up to the probable maximum flood (PMF). Sufficient freeboard is provided to the top of the dikes over the extreme case of PMF level in the pond to prevent overtopping of the dikes due to wind waves. The upstream face of the dikes is protected with riprap. The dikes are also provided with a slurry trench cutoff. Therefore, it is highly unlikely that the dikes will fail due to heavy precipitation or due to any other natural causes.

In the unlikely event of a dike breach, it is postulated that a 100-foot wide breach will occur in the west dike, south of the spillway location. This location is selected based on the fact the dike is the highest, in relation to the ground elevation on the land side of the dike. The breach is conservatively postulated to have a depth of ten feet below the normal pool level of 595.0 feet. The postulated dike failure section is selected just south of the spillway (Figure QE240.5-1) instead of other locations in the west dike, because the environmental impact of dike failure at that location on the downstream area would be the most severe due to its proximity to the community of Braceville. 6

The peak outflow through the 100' x 10' breach section is estimated to be approximately 9800 cubic feet per second (Reference 1). The outflow will decrease with time as the water level in the pond recedes. The capacity of the cooling pond is 22,297 acre feet at the normal pool elevation of 595.0 feet. However, due to the presence of baffle dikes and the high ground at the pond bottom with elevation of approximately 589.0 feet between east and west sections of the cooling pond, only 17,700 acre feet of the pond capacity would flow out of the breach following a dike failure. 6

The area downstream of the west dike is farmland and slopes down in a westerly direction towards the Mazon River. The outflow through the postulated breach will spread out and flow as shallow overland flow to the the Mazon River (Figure QE240.5-1). Based on the topography and the slope of the area west of the dike failure section, the area was divided into i) a primary flow zone (Zone A) and ii) a backwater zone (Zone B), as shown in Figure QE240.5-1. The primary flow zone would carry the outflow from the dike failure and the backwater zone will form due to the water spreading laterally from the primary flow zone. Three locations were selected in Zone A, where the flow depths and velocities are estimated for outflows from the breach at different times after the dike failure (Table QE240.5-1). The depths and velocities of flow at a given location were estimated based on the slope of the area west of the dike and the width of primary flow zone at that location. 6

It can be seen from Figure QE240.5-1 that the community of Braceville would not be affected directly by the primary flow from the dike failure, however, the backwater zone would extend to parts of the community.

The primary flow will continue beyond Location 3, to the Mazon River with essentially the same depths as at Location 3.

A discussion of the cross-sections, flow capacity and discharge rating curves for the Mazon River between its junction with Granary Creek and the old Route 66 bridge, is given in Section 2.4 of the Braidwood FSAR. It can be seen from the rating curve (Figure 2.4-23, FSAR) for the Mazon River, that the river can carry the maximum outflow of 9800 cfs at an elevation of 570.0 feet, which is at least 10 feet below the general ground elevation of the area west of the cooling pond.

The community of Braceville lies west of the cooling pond; however, it will not be significantly affected by a dike breach since most of the town is north of the path of the outflow from the breach. In addition, the community will be protected by the embankment of Routes 53 and 129 and the Illinois Central Gulf Railroad. There is a small portion of Braceville, consisting of approximately 31 homes, located south of the railroad tracks and 11 farmsteads with homes, some with farm related structures which would be in the impact area. Of the Braceville homes only 7 are in the primary flow zone as are 7 of the farmsteads. The total population of the homes in the impact area is approximately 119, 39 of which are in the primary zone. 6

Therefore, the postulated dike breach would flood some farmland west of the cooling pond but will have very little impact on the population near the cooling pond. 6

Reference:

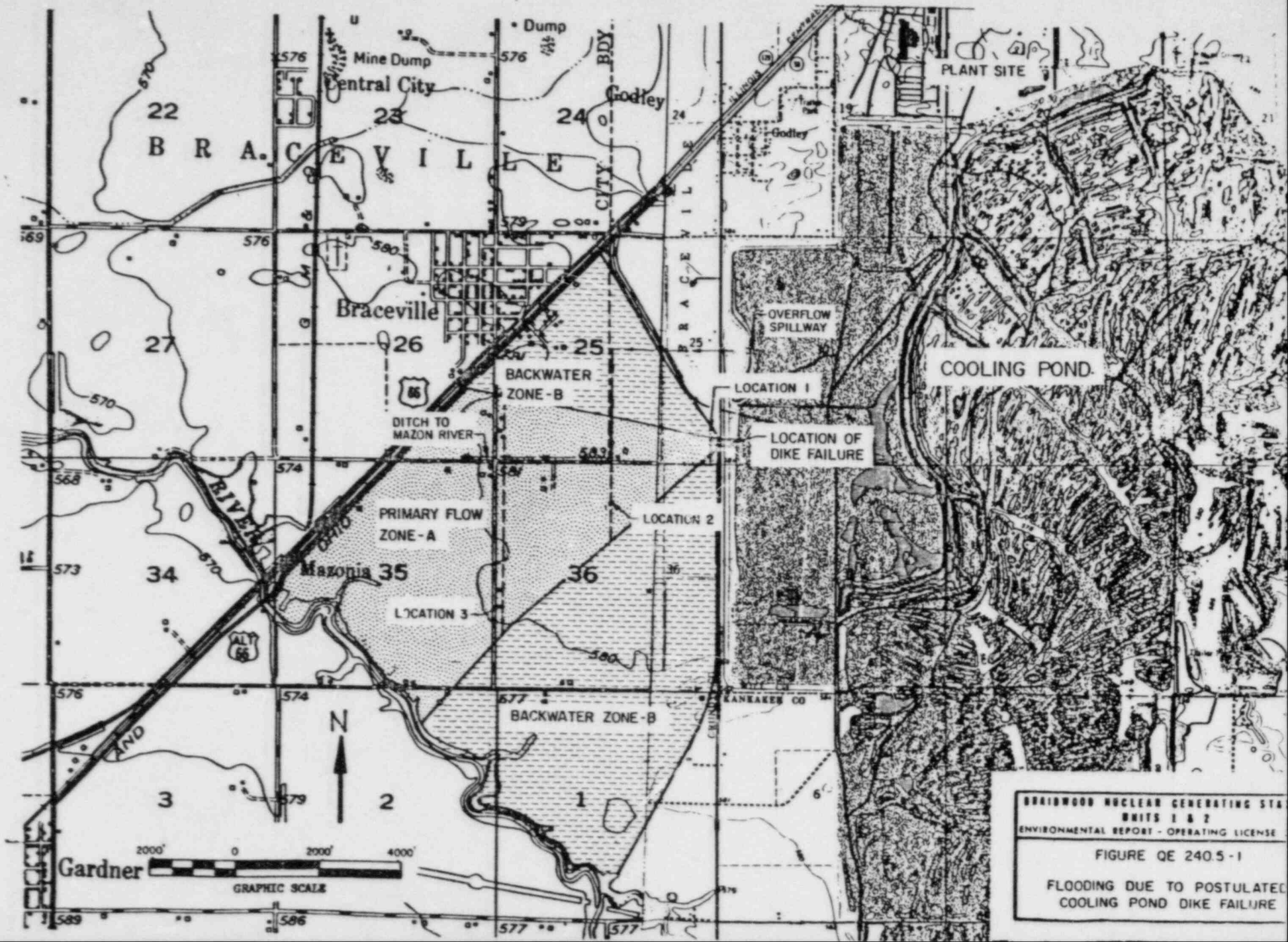
1. U.S. Army Corps of Engineers, Military Hydrology, R&D Branch, 1957, Flow Through a Breached Dam, Military Hydrology Bulletin No. 9, Washington, D.C.

TABLE QE240.5-1

Time History of Flow Downstream of Cooling Pond Dike Failure

Elapsed Time After Dike Failure (Hours)	Flow Through Breached Section (cfs)	Flow Parameters					
		Depth at Location* (ft)			Velocity at Location (ft/sec)		
		1	2	3	1	2	3
0	9800	7.1	2.2	1.5	3.5	1.6	1.2
3	8000	6.3	1.9	1.3	3.2	1.5	1.1
8	6000	5.3	1.6	1.0	2.9	1.3	1.1
15	4000	4.1	1.3	0.9	2.4	1.1	0.8
20	3180	3.6	1.1	0.7	2.2	1.0	0.8
30	2100	2.8	0.9	0.6	1.9	0.9	0.7
50	980	1.8	0.5	0.4	1.4	0.6	0.5

*Locations 1, 2, and 3 are shown in Figure QE240.5-1.



BRAIDWOOD NUCLEAR GENERATING STA
UNITS 1 & 2
ENVIRONMENTAL REPORT - OPERATING LICENSE

FIGURE QE 240.5-1

FLOODING DUE TO POSTULATED
COOLING POND DIKE FAILURE

Illinois Department of Transportation
Division of Water Resources
2300 South Dirksen Parkway/Springfield, Illinois/62764

July 13, 1984

Commonwealth Edison Company
P. O. Box 767
Chicago, Illinois 60690

RE: Permit #18012

Gentlemen:

We are enclosing Permit No. 18012 authorizing the operation and maintenance of Braidwood Cooling Pond Dam and appurtenances in Will County, Illinois.

Please acknowledge receipt of this permit by having the acceptance blank attached thereto properly executed and returned to us within sixty (60) days from the date of the permit.

Sincerely,

Martin J. Stralow

Martin J. Stralow, P.E.
Chief, Dam Safety Section

MJS:BTM:edc

STATE OF ILLINOIS

Permit
№ 18012

Department of Transportation

Division of Water Resources

2300 South Dirksen Parkway
Springfield, Illinois 62764

Permission Is Hereby Granted, this 13th day of July 19 84

To

COMMONWEALTH EDISON COMPANY
P. O. BOX 767
CHICAGO, ILLINOIS 60690

To operate and maintain Braidwood Cooling Pond Dam and appurtenances (an intermediate sized Class I structure) as a perched reservoir in all or parts of Sections 19-21 and 28-33, Township 32 North, Range 9 East of the 3rd Principal Meridian in Will County, Illinois

in accordance with an application dated March 26, 1984 , and the specifications and plans entitled

BRAIDWOOD STATION MAJOR INSPECTION OF COOLING POND DIKES, RECEIVED 3-29-84; MINOR INSPECTION PROCEDURE BRAIDWOOD COOLING LAKE, RECEIVED 3-29-84; INTERIM EMERGENCY PROCEDURE COOLING LAKE DIKE FAILURE, RECEIVED 3-29-84.

filed with the Department of Transportation and made a part hereof, and subject to the terms and special conditions contained herein:

Examined and Recommended:

Neil R. Fulton

Chief, Bureau of Resource Management.

Neil R. Fulton

Approval Recommended:

Donald R. Vonnahme

Donald R. Vonnahme — Director

APPROVED:

John D. Kramer

John D. Kramer — Secretary

THIS PERMIT is subject to the following conditions:

(a) This permit is granted in accordance with an act entitled: "AN ACT in relation to the regulation of the rivers, lakes and streams of the State of Illinois," approved June 10, 1911, as amended. (Ill. Rev. Stat., ch. 19, par. 52, et. seq.)

(b) This permit does not convey title to the permittee or recognize title of the permittee to any submerged or other lands, and furthermore, does not convey, lease or provide any right or rights of occupancy or use of the public or private property on which the project or any part thereof will be located, or otherwise grant to the permittee any right or interest in or to the property, whether the property is owned or possessed by the State of Illinois or by any private or public party or parties.

(c) This permit does not release the permittee from liability for damage to persons or property resulting from the work covered by this permit, and does not authorize any injury to private property or invasion of private rights.

(d) This permit does not relieve the permittee of the responsibility to obtain other federal, state or local authorizations required for the construction of the permitted activity; and if the permittee is required by law to obtain approval from any federal agency to do the work, this permit is not effective until the federal approval is obtained.

(e) The permittee shall, at his own expense, remove all temporary piling, cofferdams, false work, and material incidental to the construction of the project, from the floodway, river, stream or lake in which the work is done. If the permittee fails to remove such structures or materials, the state may have removal made at the expense of the permittee. If future need for public navigation or public interests of any character, by the state or federal government, necessitates changes in any part of the structure or structures, such changes shall be made by and at the expense of the permittee or his successors as required by the Department of Transportation or other properly constituted agency, within sixty (60) days from receipt of written notice of the necessity from the Department or other agency, unless a longer period of time is specifically authorized.

(f) The execution and details of the work authorized shall be subject to the supervision and approval of the Department. Department personnel shall have right of access to accomplish this purpose.

(g) The permittee shall file with the Department a properly executed acceptance of all terms and conditions of the permit within sixty (60) days of receipt of the permit; however, starting work on the construction authorized will be considered full acceptance by the permittee of the terms and conditions of the permit.

(h) The Department in issuing this permit has relied upon the statements and representations made by the permittee; if any statement or representation made by the permittee is found to be false, the permit may be revoked at the option of the Department; and when a permit is revoked all rights of the permittee under the permit are voided.

(i) If the project authorized by this permit is located in or along Lake Michigan or a meandered lake, the permittee and his successors shall make no claim whatsoever to any interest in any accretions caused by the project.

(j) In issuing this permit, the Department does not approve the adequacy of the design or structural strength or the structure or improvement.

(k) Noncompliance with the conditions of this permit will be considered grounds for revocation.

(l) If the work permitted is not completed on or before xxxxxxxxxxxxxxxxxx this permit shall be void.

THIS PERMIT is subject to further special conditions as follows:

(See Attached)

COMMONWEALTH EDISON COMPANY

PRESENTATION

III.G SUPPLEMENT THE RECORD

SUPPLEMENT THE RECORD

1. THE MAJORITY OF THE COMMONWEALTH EDISON COMPANY PRESENTATION MATERIALS FROM THE MARCH 8 AND 9, 1984 MEETING WITH THE ACRS SUBCOMMITTEE ON THE BRAIDWOOD STATION HELD AT THE QUALITY LODGE IN JOLIET ILLINOIS WERE APPENDED TO THE TRANSCRIPT OF THE PROCEEDINGS BY THE ACRS, AND MADE AVAILABLE TO THE PUBLIC. HOWEVER, CERTAIN OF THE PRESENTATION MATERIALS WERE INADVERTENTLY NOT APPENDED TO THE TRANSCRIPT. THE FOLLOWING ITEMS WERE OMITTED:

   III.C.5 SUMMARY

   III.D BRAIDWOOD TRAINING PROGRAMS

   III.E HUMAN FACTORS
   - PRELIMINARY DESIGN ASSESSMENT (PDA)
   - DETAILED CONTROL ROOM DESIGN REVIEW (DCRDR)

   III.F.1 OFF-SITE EMERGENCY PLANNING
   - EMERGENCY OPERATING FACILITY (EOF)

   THE PURPOSE OF THIS PRESENTATION ITEM IS TO PROVIDE AND PLACE INTO THE PUBLIC RECORD THE ABOVE LISTED PRESENTATION MATERIALS THAT WERE INADVERTENTLY OMITTED.

MATERIALS FROM MARCH 8, 9, 1984

ACRS SUBCOMMITEE MEETING

CECO PRESENTATION

III.C.5. SUMMARY

III.C.5 SUMMARY

1. MANAGEMENT COMMITTED TO EXCELLENCE

   - 25 YEARS OF NUCLEAR EXPERIENCE
   - INDUSTRY SUPPORT AND GUIDANCE

2. ORGANIZATION STRUCTURED FOR PERFORMANCE

   - CORPORATE ORGANIZATION
     - REGULATORY PERFORMANCE IMPROVEMENT PROGRAM
   - PROJECT ORGANIZATION
     - INCREASED EMPHASIS ON QUALITY
   - STATION ORGANIZATION

3. QUALITY ASSURANCE

   - MULTIPLE INDEPENDENT LAYERS
   - EVERYONE'S BUSINESS IS QUALITY

SLIDE
III.C.5-1

BYRON ASLB DECISION

- APPLICATIONS REVIEWED SEPARATELY
- ASLB DECISION NOT BRAIDWOOD PRECEDENT
  - CECO PREVAILED ON GENERIC ISSUES
    - WILLING AND ABLE
    - PROGRAM STRUCTURE
  - SITE SPECIFIC ISSUES NOT DIRECTLY APPLICABLE TO BRAIDWOOD
    - BYRON SITE CONTRACTORS NOT EMPLOYED AT BRAIDWOOD
    - BRAIDWOOD VERIFICATION PROGRAMS WILL RESOLVE BRAIDWOOD QUESTIONS

SLIDE
III.C.5-2

MATERIAL FROM MARCH 8, 9, 1984

ACRS SUBCOMMITEE MEETING

CECO PRESENTATION

III.D BRAIDWOOD TRAINING PROGRAMS

III.D. Braidwood Training Programs

I'm Gene Fitzpatrick, Production Training Manager. I will cover our company's nuclear training philosophy and organization. Jim Harris, the head of our Operations Training Section, will follow me and cover the details of our various training programs conducted in conjunction with Braidwood Station.

The Commonwealth Edison Company nuclear training mission is to help assure the safe, economical and efficient operation of our generating stations.

We have always recognized the value of high quality training programs in meeting this mission.

For example, we were the pioneers in using full scale simulators as a part of our training programs for nuclear operators. For years, we have used the simulator at the General Electric Training Center in Morris, Illinois for training our Dresden and Quad Cities operators and the simulator at the Westinghouse Training Center in Zion, Illinois for training our Zion operators. We have also purchased two new full-scale simulators - one for our LaSalle plant and one for our Byron and Braidwood plants. This decision was based on the fact that these new plants are different enough from our earlier plants to warrant station specific simulators and in our Company's recognition that simulators are the most effective means to develop operator proficiency.

Another example of our recognition of the value of quality training programs is the commitment we made in the early 1970's to develop training programs for our station maintenance personnel using a modern instructional approach that incorporated task analysis of the jobs to be performed, behavioral objectives related to actual job performance standards, testing and follow-up evaluation.

Finally, our recognition of the value of quality training programs is manifested by our establishment in 1980 of a new Production Training Department to manage our total production training effort in conjunction with our generating stations. We have invested $21 million in our new Production Training Center as the home for this new department to develop, conduct and manage our comprehensive programs, and for the two new simulators we have purchased.

The Production Training Center, which is shown here, went into full operation in early 1983. This 95,000 ft.^{2} facility includes the following major features:

- 24 Classrooms
- 2 Full-Scale Nuclear Simulators
- Chemistry Laboratory
- High Radiation Sampling System Mock-Up
- Mechanical Maintenance Lab
- Welding Facility With 16 Welding Booths
- 2 Electrical Maintenance Labs
- 2 Instrumentation & Control Maintenance Labs and
- A Learning Resource Center

The Production Training Department is organized as shown on this transparency. The Production Training Manager, who reports to the Executive Vice President, Production, Construction and Engineering, is responsible for the management and administration of activities involved in determining the content and ensuring the quality of training in the Production Area, consistent with regulatory requirements and industry standards.

The Production Training Manager has overall responsibility for production training through direct supervision of the Production Training Department and functional control of the nuclear station Training Supervisors in each of the nuclear stations.

The 116 person Production Training Department is organized into six sections:

Technical Training,

Operations Training,

Maintenance Training,

Program Development,

Human Factors, and

Administration.

The Administration Section provides the required administrative support to the Department.

The Human Factors Section develops and directs control room review program activities, develops methods and provides training to analyze human errors and reduce recurrence, and applies procedure performance aids to reduce human error in plant activities.

The Technical Training Section is manned primarily with degreed engineers. Their primary function is to develop and conduct generic training for technical personnel as well as generic technical training for operations personnel, and support the development and administration of site specific technical training by the generating stations. In addition, this Section serves as a technical resource for all training sections and manages hardware and software development and configuration control for the Department's training simulators.

The Operations Training Section is manned primarily by operationally experienced personnel and develops and conducts generic and selected site specific training programs for nuclear station operations personnel, including training on the Department's simulators for Byron/Braidwood and LaSalle Stations, and also supports the development and administration of site specific operations training by the generating stations.

The Maintenance Training Section is manned primarily with station experienced maintenance personnel. This Section develops and conducts generic training programs for generating station maintenance personnel and supports the development and administration of site specific maintenance training by the generating stations.

The Program Development Section provides a cadre of training specialists that conduct our instructor training programs and coordinate the development and maintenance of training programs by each of the functionally oriented training sections and the generating station training departments, using a formal systematic approach, as shown here.

In fulfillment of the above responsibilities the Production Training Department works in conjunction with the Braidwood Station Training Department to provide job specific training for the station operations, maintenance, radiation chemistry and Technical staff areas. Other areas of training provided to applicable station personnel include Indoctrination Training, Management Training, Nuclear General Employe Training and Instructor Training. These programs will now be described by Jim Harris.

TRAINING MISSION

To Help Ensure the Safe, Economical,

and Efficient Operation

of our Generating Stations

by Improving Human Performance.

RECOGNIZE VALUE OF QUALITY TRAINING

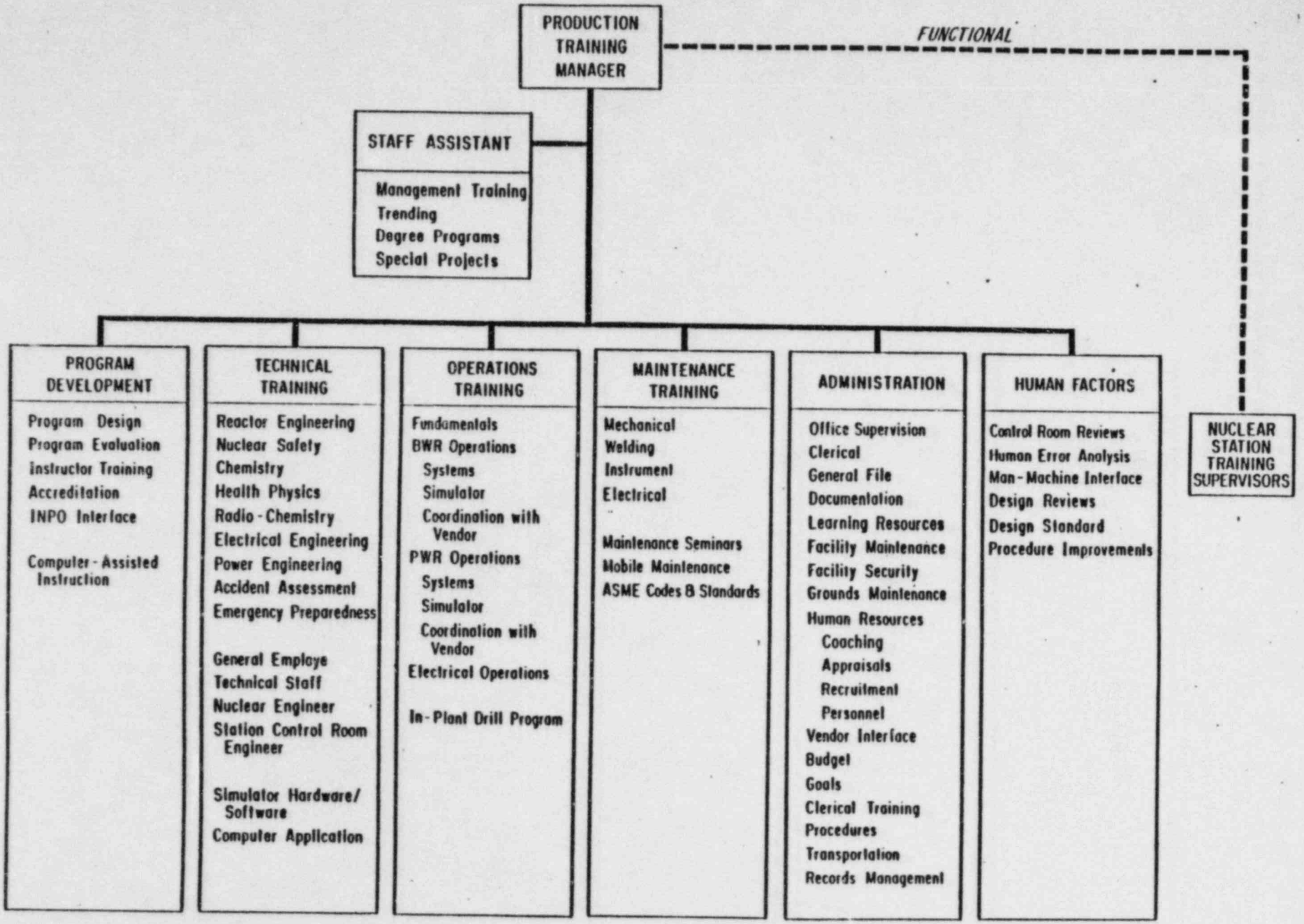
* SIMULATORS

* PERFORMANCE-BASED MAINTENANCE PROGRAMS

* NEW PRODUCTION TRAINING DEPARTMENT
  - NEW FACILITY

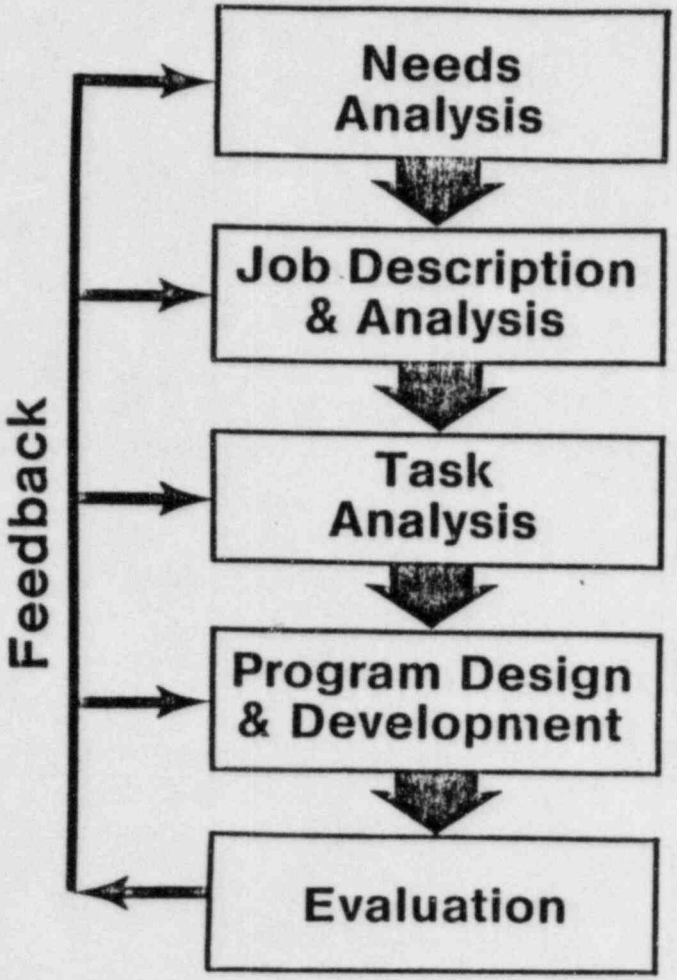
PRODUCTION TRAINING CENTER FEATURES...

* *24 CLASSROOMS*
* *2 FULL-SCALE NUCLEAR SIMULATORS*
* *CHEMISTRY LABORATORY*
* *HIGH RADIATION SAMPLING SYSTEM MOCK-UP*
* *MECHANICAL MAINTENANCE LABORATORY*
* *WELDING FACILITY WITH 16 WELDING BOOTHS*
* *2 ELECTRICAL MAINTENANCE LABS*
* *2 INSTRUMENTATION & CONTROL MAINTENANCE LABS*
* *A LEARNING RESOURCE CENTER*



PRODUCTION TRAINING DEPARTMENT

Systematic Approach to Training



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TRAINING PROGRAM

I'm Jim Harris, head of the Operations Training Section of the Production Training Department. I will now discuss Braidwood Station's Training Program.

Operations Training

The Operations training includes:

- Equipment Attendant Training;
- High Voltage Switching Training; and
- NRC License Training for Senior Reactor Operators and Reactor Operators

EA

Figure 1 The Equipment Attendant is the entry level job position for the Operations Department. The Equipment Attendant Training Program covers fundamentals of plant operation, both electrical and mechanical. The Generic Fundamental Training is provided by the Production Training Department and is followed by Braidwood Station Site Specific Systems Training. The Systems Training consists of the location, design, operation, functions and purposes of components; and the interrelations of the plant systems. Interspersed at regular intervals during the onsite training are periods of assignments to operating shifts. The shift training is provided by the Station Operations Department in order to conduct specific on-the-job training that reinforces the training provided in the classroom.

High Voltage Switching

Figure 2 The High Voltage Switching Program consists of indepth training on Electrical Distribution, Electrical Equipment, and Protective Relaying Devices. This training covers systems both inside the station and systems external to the plant. Tours of Edison Load Control and Division Load Dispatching Offices are also conducted during this training program. The High Voltage Switching Program culminates with an oral exam by a review board consisting of representatives from Edison's Corporate Staff, the Division Load Dispatcher's Office, a Braidwood Station Operating Engineer, and the Braidwood Station Training Department.

License Training

Figure 3 The License Training Program is directed toward obtaining approximately 70 licenses, with equal split of RO's and SRO's, prior to fuel load of Braidwood Unit 1. Currently our license candidates are enrolled in various phases of the licensing program. The license training program consists primarily of 3 phases: Phase 1 is Reactor Fundamentals: including Reactor Theory, Radiation Protection, Reactor Chemistry, Thermo Dynamics and Fluid Flow. The Westinghouse Nuclear Training Reactor or the test facility at the

University of Illinois is utilized at the completion of Phase 1 to provide hands-on practical reactor operation experience. Phase 2 is related to plant systems needed to provide a thorough understanding of the simulated control room used during Phase 3. Phase 3 is the actual operation of a simulated control room. Simulated operations are: Reactor Start-Ups and Shut-Downs, Normal Power Operations, Abnormal Operations, and Transient and Accident Analysis. Successful completion of this program is indicated by certification by an independent auditor provided by Westinghouse.

Figure 4 To provide our cold license candidates an opportunity to refresh themselves on plant control room operations and industry changes in philosophy, each returns to the Production Training Center annually. These programs provide our operators the opportunity to perform evolutions typical to initial training and work through scenerios that reflect current industry concerns. The culmination of all this training will be the NRC License Examinations which will be scheduled near fuel load.

SCRE

Figure 5 NUREG 0737 requires that each nuclear reactor control room have one individual available to provide technical assistance in the event of an accident. It further indicates that an individual licensed at the senior level be available to the control room. To meet these requirements, Commonwealth Edison chose to develop a job position entitled Station Control Room Engineer or SCRE. The SCRE is a technical or science graduate, will hold an SRO License, and will receive the additional training required of stations in the areas of Reactor Theory, Reactor Chemistry, Nuclear Materials, Thermal Sciences, Electrical Sciences, Instrumentation and Control, and Radiation Protection. In addition to the SRO training described earlier, this additional station training is approximately 12 weeks in duration.

Hot License

Figure 6 After initial criticality of Braidwood Unit 1, our license training program will be approximately 11 months in duration and will contain the same academic subjects as the earlier described program. In addition to the previous described academic subjects and simulator training, Braidwood will require 3 months of on-shift control room training for Reactor Operators and 3 months on-shift plant training for Senior Reactor Operators.

In addition current industry information including incidents occurring in our industry are reviewed by Edison's Operating Experience Assessment Committee in our General Office and passed on to our Operating Staff through Braidwood Station's required reading program. This program is flexible to provide timely dissemination of information. The program also provides for incorporating this information into training programs where applicable.

Maintenance

Mechanical Maintenance, Electrical Maintenance, Instrumentation and Control Maintenance and Welding Personnel from throughout Edison are provided with a high level of skills training. This training is provided in steps, from the basic skills level for an individual just beginning a maintenance career, to the more advanced skill levels required of Edison senior maintenance personnel.

Figure 7 Mechanical Maintenance Training consists of 320 hours divided into 4 discrete levels of 80 hours each. This training includes:

- Basic Maintenance Skills
- Use of Machine Shop Tools
- Bearings
- Packing
- Rigging
- Scaffolding
- Lubricants
- Gaskets
- Gears
- Valves
- Pumps and Piping

Figure 8 Electrical Maintenance Training is 760 hours in length and is divided into 3 distinct levels. This training covers:

- Basic Maintenance Skills
- Electrical Fundamentals
- Solid State Components
- Power Conversion
- Analog Components
- Regulators
- Digital Logic Fundamentals
- Grounding
- Cable Termination, and
- Trouble-Shooting and Repair

Electrical Maintenacne Training also utilizes "KIT" courses in AC and DC Electronics; Digital Electronics; and Micro-Processing Equipment.

Figure 9 Instrumentation and Control Maintenance Training is 980 hours in length and is divided into 4 distinct levels including:

- Pneumatic Equipment
- Process Instrumentation
- Westinghouse Electronic Process Instrumentation; and
- Microprocessors

Certification of completion is awarded to an individual when he successfully completes any increment of the described training course.

The Production Training Center also offers four welding courses which provide an individual the opportunity to certify in 4 different welding procedures.

Braidwood Station is extensively utilizing the services provided at the Production Training Center as a part of an integrated program. Following the training at the Production Training Center, follow-up with specialized, Braidwood Specific Training is provided. This Braidwood Specific Training consists of: plant systems; vendor conducted seminars; shop equipment training; and specialized training for new equipment received at the station.

Figure 10 The Radiation Chemistry Technician Training course is approximately 19 weeks in duration and consists of the following modules:

- First Aid and Cardiopulmonary Resuscitation
- Chemistry Fundamentals
- Chemistry Laboratory
- Health Physics Theory
- Health Physics Practical Applications

This program will be conducted in 2 phases. Phase one is classroom/lab instruction, while the second phase is on-shift training. During the on-shift portion, the trainee will be required to complete rad/chem certification guides that have been written by the Radiation Chemistry Department. This on-shift time will enable each individual to put into practice those concepts that have been introduced during the classroom/lab phase of this training.

The Radiation/Chemistry Technicians will return to training on a regularly scheduled basis. The Re-training Program will ensure that the technicians are aware of the latest Health Physics and Chemistry techniques as well as the latest considerations of ALARA philosophy.

Figure 11 The Production Training Center Simulator is also used for a five day introduction to Power Plant Operation Course. This program provides key people within the station who are not license candidates an opportunity to observe and operate a large core Reactor Control Room Simulator, thereby providing them with an appreciation of the complexities of these operations.

Systems Training for Non-License Staff

The Braidwood General Systems Training Program is 10 days in length and provides the non-licensed staff with an overview of the station. Particular emphasis is placed on the systems directly affecting the safe shutdown of the nuclear reactor. This program consists of classroom instruction and plant tours and is offered to all plant personnel not in the license program. The Braidwood Systems General Training Program is an on-going program which is offered at intervals necessary to coincide with Braidwood Station's staffing plan.

NGET

When a new employee reports to Braidwood Station, the employee is provided with an introduction and company orientation program; topics covered are a brief outline of company benefits, an overview of Braidwood Station and station organization; cardiopulminary resuscitation; an introduction to the Edison Quality Assurance Manual; training on the proper use of out-of-service and protective cards; and Nuclear General Employee Training, or N-GET. The N-GET Program's Primary emphasis is on: The Station Emergency Plan, Security, Industrial Safety, and Radiation Protection philosophy that is consistent with the "ALARA".

Fire Protection

General fire protection training is provided for all staff personnel. This training includes classroom presentations on fire protection theory as well as hands-on training with portable fire protection equipment. In addition, selected staff personnel are assigned as members to the stations fire brigade team. Member's of the brigade receive training demonstrations with their responsibility of being the primary line of defense until professional fire fighting personnel arrive at the site.

Management

All management personnel at Braidwood Station receive management training that is designed to help them progress with their careers.

This training consists of management by objectives, supervising for results, problem solving and decision making, management communication, managing the performance system, and coaching. Management personnel also receive training in the Quality Assurance Manual.

Instructor

Braidwood Station and Production Training instructor receive two levels of instructions to enhance their instructor skills.

The Basic Instructor Course is designed to provide individuals with the basic instructional skills necessary to develop and conduct relevant and effective training programs.

The Advanced Instructor Course designed to help increase an individual's knowledge of the principles of learning and their instructional skills beyond the level of the Basic Instructor Course.

Tech Staff

The members of the Braidwood Technical Staff receive the new Employee Indoctrination and Orientation Training Program; the Braidwood Systems General Training Program; Quality Assurance Manual; Blue Print Reading; Start-Up Manual Training; and Flushing Training. The Flushing Training results in certification as a Flushing Inspector for the flushing and pre-op testing program. The total length of this training is 120 hours.

Contractor

Prior to fuel load, contractor personnel working at Braidwood Unit 1 will receive the Nuclear General Employee Training Program. This program consists of Fundamentals of Radiation, Protective Clothing, Concepts of ALARA, Security and Emergency Procedures.

Conclusion

The combination of the above described training programs will provide Braidwood Staion with a continuing supply of properly trained personnel capable of performing the tasks necessary to enable safe and efficient plant operation.

FIGURE 1

Equipment Attendant

Fundamentals

Electrical

Theory

Application

Mechanical

Theory

Application

Site Specific

Systems

Shift

Systems

Shift

Review

Written Test

Plant Walk-Thru

FIGURE 2

High Voltage Switching

Switchyard

Transmission

In Plant Electrical Distribution

Auxiliary Power

Main Generation

Emergency Power

Communication/Tours

Safety

Review

Exam

Load Dispatcher Review Board

FIGURE 3

Phase I

Nuclear Reactor Theory

Large PWR Core Physics

Health Physics, Chemistry and Instrumentation

Power Plant Systems and Engineering Concepts

Westinghouse Nuclear Training Reactor

Test Reactor - University of Illinois

Phase II

Detailed Description of PWR Systems

Phase III

Reactor Startups/Shutdowns

Normal Plant Operations

Transient Response

Simulator Certifications

FIGURE 4

Refresher Training

Primary Systems

Secondary Systems

Safety Systems

Primary Support Systems

Secondary Support Systems

Operating Procedures

Administrative Procedures

Pre-License Review

NRC Examination

FIGURE 5

SCRE Training

SRO License

Management Training

Engineering Concepts

Administration

Abnormal Operating Events

FIGURE 6

Hot License Training

Nuclear Power Plant Fundamentals

Nuclear Science

Reactor Science

Radiological Science

Thermal Science

Primary Systems

Primary Systems

Secondary Systems

Safety Systems

Primary Support Systems

Secondary Support Systems

Operating Procedures

Administrative Procedures

Pre-License Review

NRC Examination

FIGURE 7

Commonwealth Edison
Mechanical Maintenance Training

1. Mechanical Maintenance I
   - A. Plant Safety and Procedures
   - B. Store Items
   - C. Labeling Storage of Parts
   - D. Math Review
   - E. Tools and Their Uses
   - F. Welding Equipment
   - G. Basic Rigging
   - H. Fork Lift Truck Operation and Safety and Operation of Trucks

2. Mechanical Maintenance II
   - A. Lathe
   - B. Drill Press
   - C. Blueprint Reading
   - D. Precision Tools
   - E. Plant Safety and Procedures

3. Mechanical Maintenance III
   - A. Rigging
   - B. Cranes
   - C. Lubrication
   - D. Bearings
   - E. Gears
   - F. Milling Machine
   - G. Shaper
   - H. Gaskets and Packing

4. Mechanical Maintenance IV
   - A. Piping and Tubing
   - B. Valve Maintenance
   - C. Pump Maintenance

5. Mechanical Maintenance VI
   - A. Beginning Welding

FIGURE 8

Commonwealth Edison
Electrical Maintenance Training

1. Electrical Maintenance I
   - A. Math Review
   - B. Introduction to Electricity and Electronics
   - C. Batteries and D.C. Circuits
   - D. Transformers and A.C. Circuits
   - E. Electrical Measuring Instruments
   - F. Electrical Protective Devices
   - G. D.C. Equipment
   - H. Single Phase Motors
   - I. Three Phase Motors
   - J. A.C. Equipment
   - K. Electrical Trouble Shooting

2. Electrical Maintenance II
   - A. Math Review
   - B. Introduction to Electricity and Electronics
   - C. Solid State I
   - D. Solid State II
   - E. Solid State III

FIGURE 9

Commonwealth Edison
Instrument Maintenance Training

1. Instrument Maintenance I
   - A. Mechanical Instruments and Mechanics
   - B. Measurement and Pneumatic Instruments
   - C. Final Control Elements and Introduction to Pneumatic Controllers
   - D. Pneumatic Controllers-Manual/Automatic Stations
   - E. Control Loops
   - F. Electrical Measuring Devices
   - G. Electronic Sub-Assemblies and Recorder Amplifiers

2. Instrument Maintenance II
   - A. Math Review
   - B. Introduction to Electronics
   - C. Analog Feedback Systems
   - D. Introduction to Blueprint Re. ''ng
   - E. Fundamental Process Control
   - F. Pressure Theory
   - G. Level Theory
   - H. Recorder Operation
   - I. Conductivity and Turbidity Theory
   - J. Loop Integration

3. Instrument Maintenance III - 7300 A
   - A. Introduction to 7300 Instrumentation
   - B. Operational Amplifier Review
   - C. Individual 7300 Card Theory
   - D. 7300 Nuclear Cabinet Power Supply and Pneumatics
   - E. Simulator Checkout

4. Instrument Maintenance IV - 7300 B
   - A. Cabinet Configuration 7300 - B
   - B. Westinghouse Symbols Explanation
   - C. Delta T/TAVE Loop
   - D. Pressurizer Loop
   - E. Steam Generator Control
   - F. 7300 Card Block Diagrams

FIGURE 10

Radiation-Chemistry Technician

Power Plant Fundamentals

First Aid/CPR

Chemistry Fundamentals

Chemistry Laboratory

Health Physics Theory

Plant Systems

Generating Station Emergency Plan

Review

Examination

FIGURE 11

Miscellaneous Training

Introduction to Power Plant Operations

General System

Nuclear General Employee

Fire Protection

Management

Instructor

Tech Staff

Contractor

MATERIAL FROM MARCH 8, 9, 1984

ACRS SUBCOMMITEE MEETING

CECO PRESENTATION

III.E. HUMAN FACTORS

- PRELIMINARY DESIGN
- ASSESSMENT PDA)

- DETAILED CONTROL ROOM
  DESIGN REVIEW (DCRDR)

Introduction

I am Richard Squires, head of the Human Factors Section of the Production Training Department. I will discuss the Human Factors review approach for the Braidwood Station control room. This approach includes the Preliminary Design Assessment and the Detailed Control Room Design Review. The human factors review approach is based on the statement in the Braidwood Safety Evaluation Report, "Braidwood is being reviewed in conformance with the Commission's Statement on Standardization of Nuclear Power Plants (1973 1978), under the duplicate plant concept for the Byron Station design."

II. Preliminary Design Assessment

The preliminary design assessment of the Byron/Braidwood Station control rooms was started in January 1981. The assessment was conducted by a multidisiplinary Task Force which included a Human Factors consultant. The displines on the Task Force included design engineering, instrument and control engineering, operations, training and human factors engineering. The assessment used the existing draft criteria of NUREG-0700 "Guidelines for Control Room Design Reviews." Three man years of human factors effort and the four techniques in Slide 1 were used to perform the assessment.

A. Operator Questionnaire

An operator questionnaire was used to obtain comments from operators to identify potential operator/control board interface problems. The objective of the review was to identify design improvements which would assist the Byron/Braidwood Stations operators in recognizing and controlling plant conditions. Changes required to correct these problems were mocked up, reviewed and implemented.

B. Control Board Review

A control board review was performed using piping and instrumentation drawings , control board drawings, operational procedures, and a review guide to evaluate and review the control boards. The Task Force also used operating and human factors experience and operating judgment to determine where design changes could improve operator task performance. The operators were asked to indicate where the operability of the boards could be improved with the addition of particular components; the elimination of unnecessary hardware; the rearrangement of selected controls, displays, indicators, and the use of mimics.

This review resulted in over 350 changes to each unit control board at Byron and Braidwood Stations. Over 200 control switches and 100 displays were rearranged on each control board. The review also added 8 mimics to the plant systems on the control board and a mimic to the remote shutdown panel.

C. Human Factors Engineering Checklist Review

A human factors engineering checklist review of the Byron Generating Station Control Boards was conducted using a draft, of NUREG-0700 Section 6 Checklist. The objective of this review was to perform a systematic comparison of the control room design features with the Section 6 checklist. The review was conducted by human factors engineers with assistance from cold certified operating personnel. The results of this review provided Human Engineering Discrepancies (HED's).

For example, control board labeling produced several HED's. These HED's required approximately 1200 labels to be changed on each unit. Several HED were also found for annunciator tiles. To correct these HED's, the 600 annunciator tiles on each unit are being changed.

The Braidwood Station control room site specific differences, including environmental items, will be evaluated prior to fuel loading.

D. Procedure Walk-Through

A simulated procedure walk-through and analysis was conducted by the Task Force to identify control board operating interface discrepancies associated with specific plant events. The purpose of the analysis was to verify the proposed 350 improvements from the control board review did not create operating problems. Personnel qualified to fill the normal operating crew positions of senior reactor operator and reactor operator were used to simulate a walk-through on existing control boards. This walk-through was videotaped for the subsequent analysis.

The changes for the preliminary design assessment will be incorporated into the Braidwood Station control room prior to fuel loading. Most of these changes have already been incorporated in the Braidwood Training Simulator.

E. Some Examples Of Improvements:

Slide 2 shows the mimic for the safety injection system at the Braidwood Station Training Simulator. Thirteen of the fifteen control switches were rearranged to form this mimic. Pump running lights and an isolation valve position indication light were added to this safety injection panel to provide the operators redundant information. This redundant information improved the operators understanding of plant conditions while at this panel.

Slide 3 shows the remote shutdown panel of the Braidwood Station Training Simulator. Here, we believe, the combination of hierical labeling, mimics, background shading, and rearrangement of controls and displays, has improved the operators capability to manage plant emergency conditions.

III. Detailed Control Room Design Review

The primary objective of the Detailed Control Room Design Review (DCRDR) is to improve the design of the control room to support the operating crews capability to recognize, mitigate and/or cope with emergency plant conditions more effectively. The DCRDR provides for data collecting, investigating, assessing and reporting of control room human engineering discrepancies found at the operating nuclear stations.

The DCRDR activities shown in Slide 4 are grouped into the four processes. The foundation process is first with three activities ongoing at the same time to collect data. The investigative process is next with the control room survey, verification and validation activities being performed one after the other. These investigation processes are where the discrepancies are identified. The third process provides a sequential series of activities for assessment of the discrepancies, selection of the corrective action to be used, and identification of the implementation schedule. The last process is the preparation and submittal of the summary report to the NRC.

The DCRDR activities are described in the DCRDR Project Program Plan and Implementing Procedures in Slide 5. This program plan describes the overall generic review plan, management and staffing, documentation and document control, review procedures, methods for assessing human engineering discrepancies, and reporting. This plan was submitted to the NRC for review and we have received documented favorable comments in return. The Implementing Procedures contain additional details on how to carry out the commitments in the Program Plan. The NRC Human Factors Engineering Branch has performed a in-process audit of the Dresden Station DCRDR last month. Again we received favorable comments at the exit meeting.

The Commonwealth Edison Company has developed this generic program plan to standardize the methodology for the DCRDR's across each of its six nuclear generating stations. The DCRDR will be performed on one unit and the results of the review will be applicable to the other unit at each station. In addition, the results of the review performed at Byron Station will be used as a basis for the Braidwood Staton, except for control room site-specific systems and environmental systems.

The schedule for conducting of the Commonwealth Edison Company DCRDR's is shown in Slide 6. The reviews for the six nuclear generating stations will be performed in series. The DCRDR team coordinator, three full time and one part time human factors engineers and the instrument and control engineer move from station to station as a review team nucleus. The nucleus is supplemented by station operating and engineering department personnel. The series approach will allow us to utilize the experience gained from the previous reviews at operating stations in the Braidwood Station review. You should notice the overall schedule for the first five plants is seven months for the review plus four additional months for the assessment and reporting. This eleven month schedule is reduced to six months for Braidwood Station by using the data from the Byron Station review.

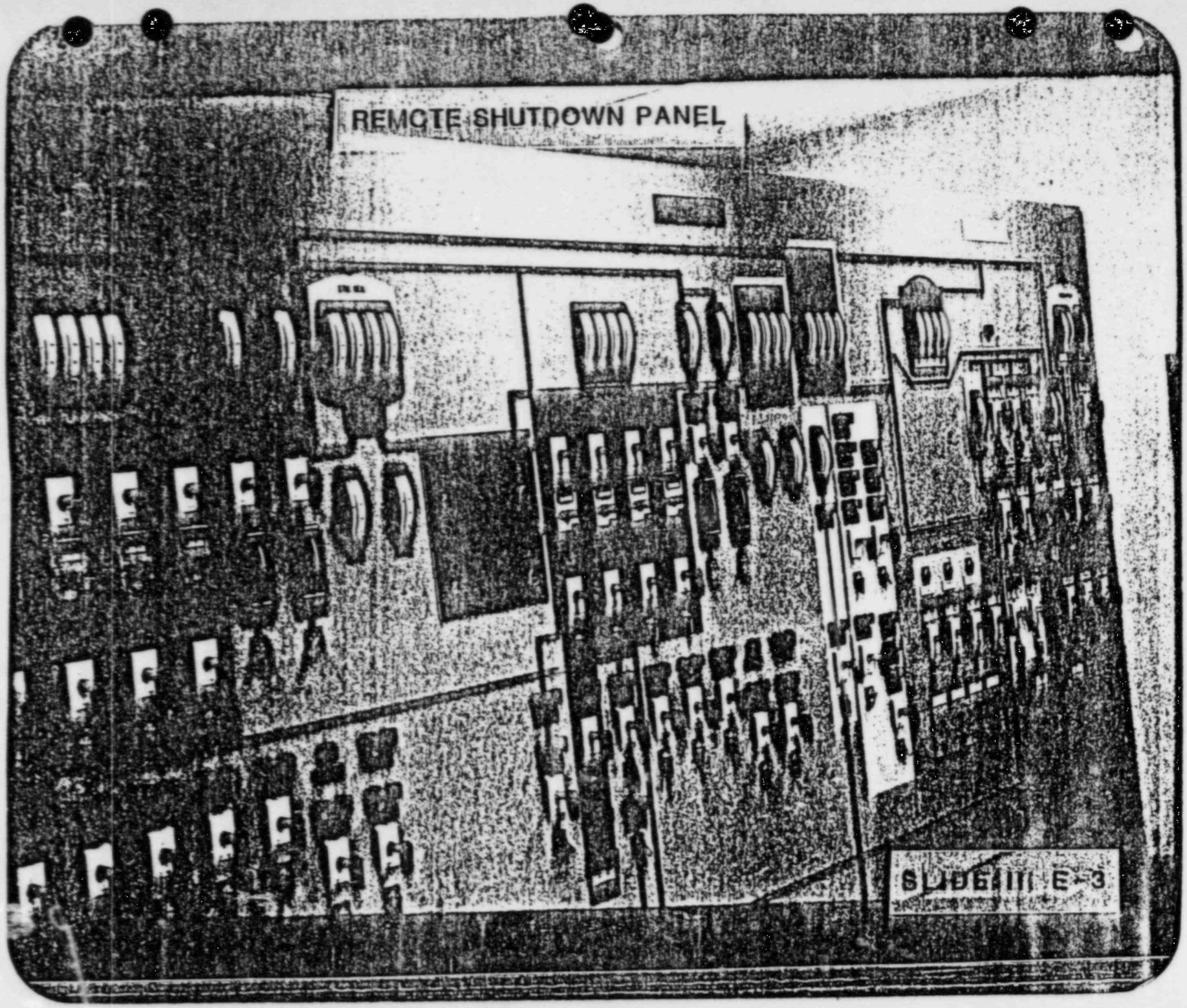
In summary, we believe Commonwealth Edison is providing an adequate human factors review of the Braidwood Station control room. The extensive Preliminary Design Assessment was performed for initial operation of Braidwood Station. The Detailed Control Room Design using operating experience from Braidwood and other stations will be performed for the operating Braidwood Station.

PRELIMINARY DESIGN ASSESSMENT

- OPERATOR QUESTIONNAIRE
- CONTROL BOARD REVIEW
- HUMAN FACTOR ENGINEERING CHECKLIST REVIEW
  - CONTROL ROOM WORKSPACE
  - COMMUNICATIONS
  - ANNUNCIATOR WARNING SYSTEM
  - CONTROLS
  - DISPLAYS
  - LABELS AND LOCATION AIDS
  - PROCESS COMPUTERS
  - PANEL LAYOUT
  - CONTROL DISPLAY INTEGRATION
- PROCEDURE WALK-THROUGH

SAFETY INJECTION PANEL

SLIDE III-E-2


REMOTE SHUTDOWN PANEL
SUDGIII E-3

A GENERIC ACTIVITY FLOW CHART FOR THE DCRDR

I FOUNDATION PROCESS

OPERATING PERSONNEL SURVEY/HISTORICAL REPORT REVIEW

SYSTEM FUNCTION AND TASK ANALYSIS

CONTROL ROOM INVENTORY

II INVESTIGATION PROCESS

CONTROL ROOM SURVEY

VERIFICATION OF AVAILABILITY/SUITABILITY

VALIDATION OF CONTROL ROOM FUNCTION

III ASSESSMENT & IMPLEMENTATION PROCESS

ASSESS DISCREPANCY FINDINGS

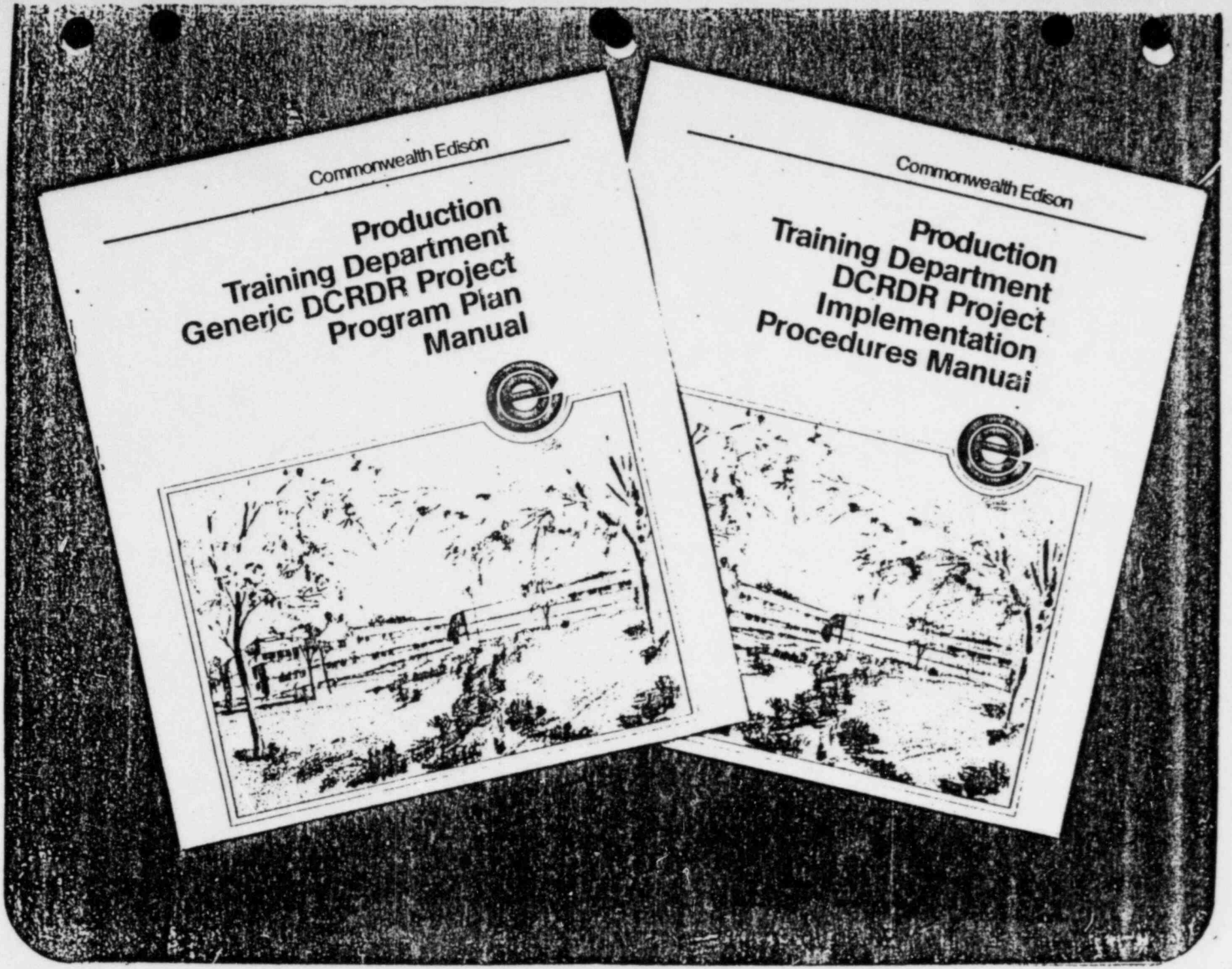
DETERMINE CORRECTIVE ACTIONS

SCHEDULE & IMPLEMENT DESIGN CHANGES

IV REPORTING

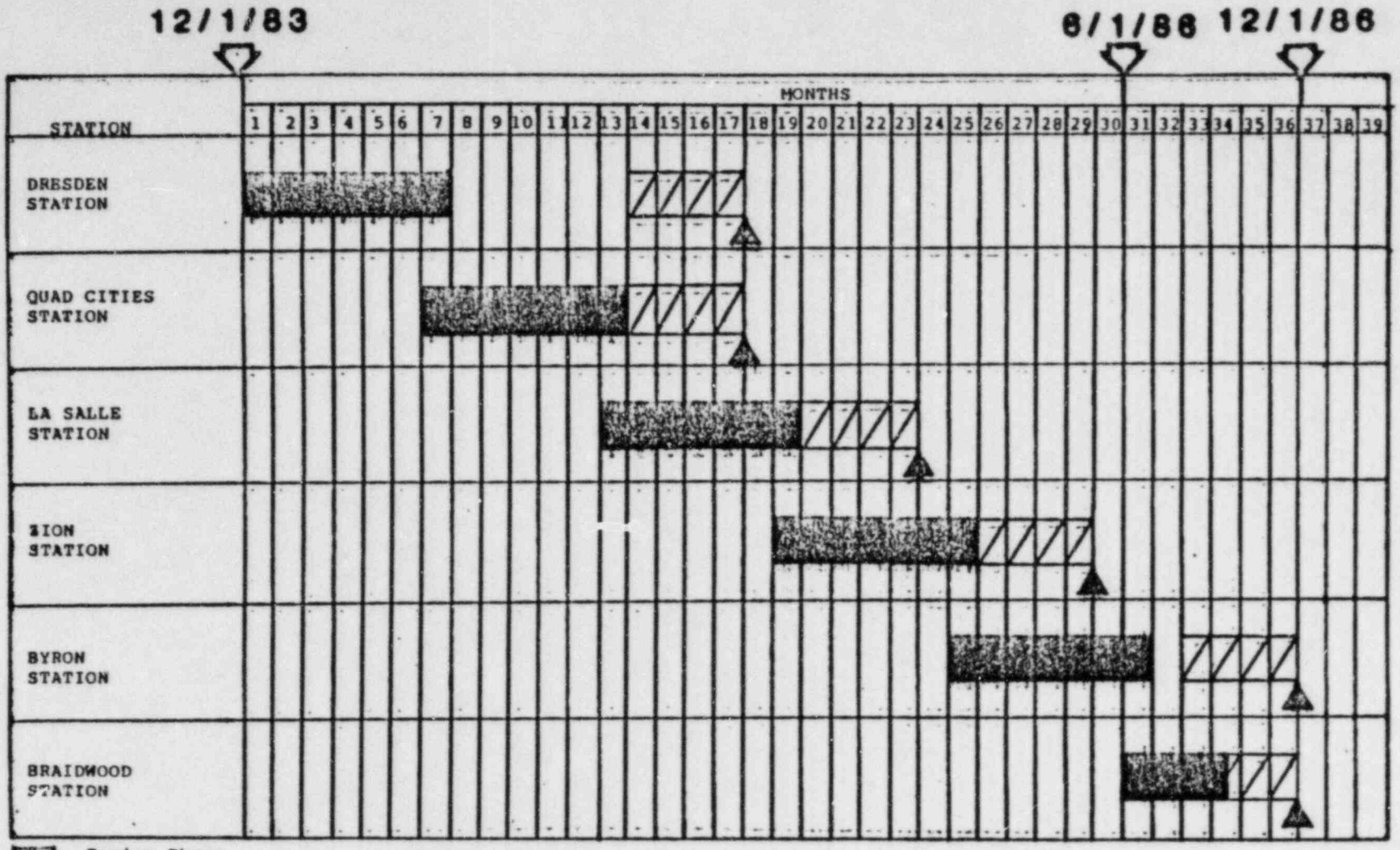
SUMMARY REPORT

SLIDE III E-4



DCRDR PROJECT PROGRAM PLAN AND IMPLEMENTING PROCEDURE MANUALS

SLIDE III E-5



PROPOSED DCRDR SCHEDULE

SLIDE III E-6

MATERIAL FROM MARCH 8, 9, 1984

ACRS SUBCOMMITEE MEETING

CECO PRESENTATION

III.F.1 OFF-SITE EMERGENCY PLANNING

- EMERGENCY OPERATING FACILITY (EOF)

BRAIDWOOD STATION ACRS

SECTION III.F.1 OFF-SITE EMERGENCY PLANNING

Commonwealth Edison Company uses as a basis for emergency planning activities a document entitled "Generating Stations Emergency Plan." The Generating Stations Emergency Plan (GSEP) is a radiological emergency plan that establishes the concepts, evaluation and assessment criteria, and protective actions that are necessary in order to limit and mitigate the consequences of potential or actual radiological emergencies. The GSEP provides the necessary prearrangements, directions, and organization so that all nuclear emergencies can be effectively and efficiently resolved in order to safeguard station personnel, property, and the general public.

The GSEP consists of two parts, a generic plan applicable to all generating stations, and a site specific annex for each nuclear generating station. This annex contains information and guidance that are unique to a particular station. The GSEP organization consists of directors and staff personnel who will ensure timely activation and implementation of any required emergency response. The GSEP organization can be divided into two functional areas: onsite and offsite.

The onsite GSEP organization consists of a Station Group that is primarily concerned with emergency response efforts necessary to control the plant during an incident. The Station Group functions under a Station Director who organizes and coordinates the emergency efforts at and within the immediate vicinity of the station.

Collectively, members of the Station Group provide for numerious activities during an emergency including but not limited to: plant systems operations; radiological survey and monitoring; firefighting; rescue operations; security; damage control and communications. Supporting these efforts are a number of cognizant offsite organizations who enter into formal agreement with CECo.

The offsite GSEP organization consists of corporate personnel, division support, and environmental assessment and monitoring teams that provide long term support to the affected station as well as liaison with Federal, State, and local authorities.

During the less serious emergencies, the GSEP Corporate Command Center Group, located in downtown Chicago, is responsible for evaluating, coordinating, and dicrecting the overall company activities involved in coping with the emergency. The Corporate Command Center Group (CCC) functions under a CCC Director. The CCC groups responsibilities include command and control, intelligence, logistics, engineering support, medical care, manpower requirements, communications, accounting, legal, health physics, environmental, and information.

For the more serious emergencies, the CCC Director is responsible for activating a GSEP Recovery Group at the affected station's Emergency Operations Facility (EOF). Once activated, this Recovery Group will direct, control, and coordinate all Commonwealth recovery efforts. The CCC Group then becomes a support staff to the Recovery Group. The Recovery Group functions under a Recovery Manager and has responsibilities consistent with the recommendations of the Institute of Nuclear Power Operations.

The Generating Stations Emergency Plan (GSEP) has been in place since 1971 for nuclear stations. In 1981 the entire plan was rewritten and expanded to meet stricter requirements imposed by the Nuclear Regulatory Commission following an evaluation of the Three-Mile Island Accident. The GSEP is periodically revised to take into account improvements that are developed as a result of knowledge and experience gained during emergency exercises that test integrated CECo, State and local response. As a result, the interaction of Commonwealth Edison with the State and local governments has been improved.

The State of Illinois Emergency Services and Disaster Agency (IESDA) coordinates "protective action" planning for Illinois aided by the Illinois Department of Nuclear Safety (IDNS) when it concerns radiological accidents. Each local government (County) involved is also required to have a specific plan prepared. To date, IESDA has developed five (5) site-specific annexes, two (2) of which have received FEMA 350 interim approval, and the rest are well along the approval process.

Some of the cooperative efforts among Edison and the governments include conducting exercises of the emergency plans to demonstrate communications and rehearse the emergency procedures. During the exercises, the governments' actions may include temporary relocation of groups, such as school children, to rehearse their evacuation procedures. Since 1980, IESDA and CECo have successfully conducted thirteen (13) major exercises.

Another cooperative effort is to install sirens or other public alerting equipment which will notify the citizens within ten miles of a station should an emergency occur. The Prompt Notification System (PNS) for Braidwood is now in the final design phase. When installed, Commonwealth Edison will maintain the sirens and the State and local governments will operate them. The funds for this system were provided by Edison.

The emergency plans of Edison and the government agencies include provisions for an information distribution program to educate the population near the stations. The information includes a description of the emergency plans and recommended actions should an emergency occur. This program is an annual direct mailing to the residents and distribution of brochures to public facilities in the vicinity of the stations.

BRAIDWOOD STATION

OFFSITE EMERGENCY PLANNING

PRINCIPAL AGENCIES RESPONSIBLE FOR OFFSITE EMERGENCY PREPAREDNESS:

- ILLINOIS EMERGENCY SERVICES AND DISASTER AGENCY (IESDA)

- ILLINOIS DEPARTMENT OF NUCLEAR SAFETY (IDNS)

PRINCIPAL OFFSITE EMERGENCY PLANNING DOCUMENT:

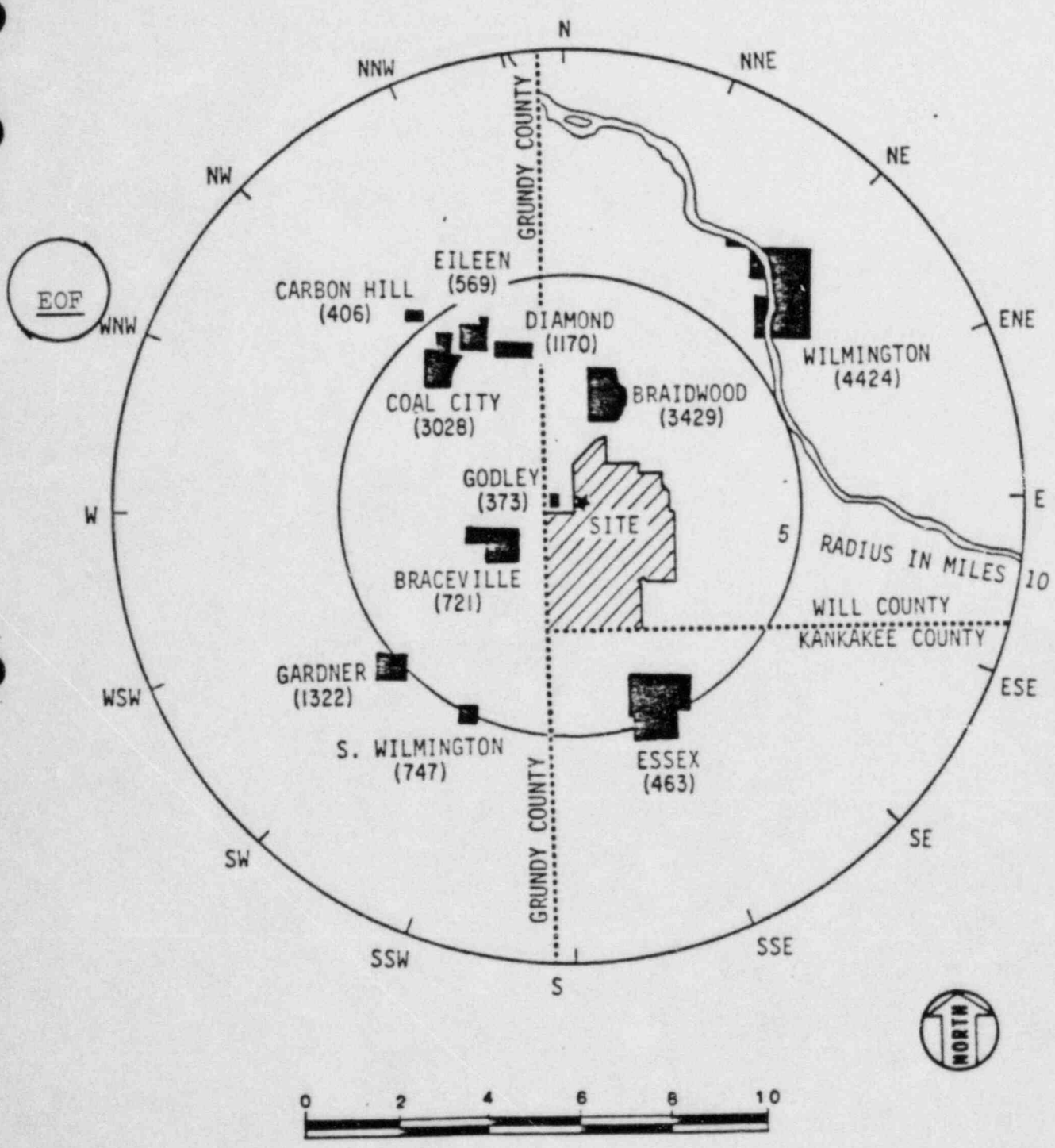
- THE ILLINOIS PLAN FOR RADIOLOGICAL ACCIDENTS (IPRA) - BRAIDWOOD, VOL. VII

- IPRA CONTAINS IESDA SITE-SPECIFIC INFORMATION AS WELL AS LOCAL EMERGENCY PLANS AND PROCEDURES FOR:

  - WILL COUNTY
  - GRUNDY COUNTY
  - KANKAKEE COUNTY
  - AND APPROPRIATE LOCAL MUNICIPALITIES WITHIN THESE COUNTIES

BRAIDWOOD STATION

10-MILE EMERGENCY PLANNING ZONE



POPULATION DATA

0-2 MILES	3,084
2-5 MILES	9,388
5-10 MILES	15,010
TOTAL EPZ	27,482

SLIDE
III.F.1-3

BRAIDWOOD IPRA SCHEDULE:

- PROJECT INITIATION - 3/15/84
- DEVELOP IPRA VII REV. 0 - 7/1/84
- DEVELOP IPRA VII REV. 1 - 10/15/84
- CONDUCT FULL-SCALE EXERCISE - 8/85

N.B. SINCE 1980 IESDA AND CECO HAVE SUCCESSFULLY CONDUCTED THIRTEEN (13) MAJOR EXERCISES. ALSO, IESDA HAS DEVELOPED FIVE (5) SITE-SPECIFIC ANNEXES, TWO OF WHICH HAVE RECEIVED FEMA 350 INTERIM APPROVAL, AND THE REST ARE WELL ALONG THE APPROVAL PROCESS.

OTHER BRAIDWOOD OFFSITE EMERGENCY PLANNING PROJECTS:

- PROMPT NOTIFICATION SYSTEM

  DESIGN COMPLETE 8/84

  INSTALLATION COMPLETE 7/85

- EVACUATION TIME ESTIMATE STUDY

  REV. 0 TO NRC 4/84

- PUBLIC INFORMATION BROCHURE

  INITIAL DISTRIBUTION 7/85

SLIDE
III.F.1-5

EMERGENCY OPERATIONS FACILITY

- THREE PRIMARY FUNCTIONS
  - COORDINATION OF RECOVERY OPERATIONS
  - COORDINATION OF EVALUATION OF OFF-SITE RELEASES
  - DISSEMINATION OF PUBLIC INFORMATION
- LOCATED IN MAZON
- DESIGNED TO REQUIREMENTS OF NUREG 0696

SLIDE
III.F.1-6

2. DURING THE PROCEEDINGS OF THE MARCH 8 AND 9, 1984 MEETING WITH THE ACRS SUBCOMMITTEE OF THE BRAIDWOOD STATION, CERTAIN ADDITIONAL INFORMATION BEYOND THAT CONTAINED IN THE COMMONWEALTH EDISON COMPANY PRESENTATION MATERIAL WAS DISCUSSED, MOSTLY AS A RESULT OF QUESTIONS FROM THE SUBCOMMITTEE MEMBERS. THE COMMONWEALTH EDISON COMPANY FORMALLY PROVIDED THIS ADDITIONAL MATERIAL TO THE ACRS BY LETTER DATED MARCH 13, 1984 FROM E. D. SWARTZ TO E. G. IGNE. THE PURPOSE OF THIS PRESENTATION ITEM IS TO PROVIDE AND PLACE INTO THE PUBLIC RECORD THESE ADDITIONAL PRESENTATION MATERIALS.

Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

March 13, 1984

Mr. Elpidio G. Igne
Designated Federal Employee
US Nuclear Regulatory Commission
Advisory Committee on Reactor Safeguards
Subcommittee on Braidwood Station Units 1 and 2
1717 H Street NW
Washington, DC 20555

Subject: ACRS Subcommittee Meeting on
Braidwood Station Units 1 and 2 held
On March 8 and 9, 1984 in Joliet, Illinois
Applicant Submittal of Supplemental
Information for the Record
NRC Docket Nos. 50-456 and 50-457

Dear Mr. Igne:

During the ACRS Subcommittee meeting on Braidwood Station, certain additional information beyond that contained in our presentation handout material was discussed, mostly as a result of questions from the Subcommittee Members. The purpose of this letter is to provide this additional presentation material to supplement the public record.

Specifically, we are enclosing the following:

1. Supplemental Slides III.C.2-3 and III.C.2-4 to be added to presentation III.C.2 "Project Management Organization" used to discuss our Quality Review and Verification Program (QRVP) Plan in draft outline form.

2. Supplemental Slide III.C.3-6A to be added to presentation III.C.3 "Plant Operating Organization" to address the ACRS question concerning additional staff experience level information.

3. Supplemental Slide III.F.2-2A to be added to presentation III.F.2 "Safety Parameter Display System (SPDS)" used to discuss parameters associated with each critical safety function.

4. Supplemental Slides III.J-4, III.J-5, III.J-6 and III.J-7 to be added to presentation III.J "Siting, Seismic and Flooding Differences from Byron" used to discuss geological and siting issues.

5. Supplemental Slides V-1 and V-2 used to respond to the ACRS question "Does Braidwood have computers or microprocessors in safety-related areas and if so, how do we validate the software?"

Finally, we believe that the concluding remark made by the Subcommittee Chairman Dr. Axtmann concerning construction related fatalities was unfair and does not typify the existing safety record at Braidwood Station. Since Commonwealth Edison was not provided an opportunity to respond to this statement, we are formally submitting the following information and request that it be made part of the record.

Since site activity began on the Braidwood Project in August 1975, some eight and one half years ago, over 21,700,000 manhours have been expended. During that period, there have been no construction related fatalities on the job site. The four deaths which did occur on the job site all were due to natural causes.

As a part of the corporate Commonwealth Edison Safety Program, every work unit in the Company, comprised of Edison management and bargaining unit personnel, participates in safety contests to promote an awareness for safety. On the Braidwood site our Station Organization is one such unit. Through early March 1984, that group had experienced over 1,600,000 manhours without suffering an injury which resulted in a loss of job time. Moreover, since personnel in the Station Organization were first assigned to the Project, no person in that group has ever experienced an accident resulting in lost job time. In addition, it is corporate policy to require each site contractor to have and maintain a safety program for all their personnel.

In contrast to Dr. Axtmann's remark, we believe that these statistics demonstrate our exemplary safety record and the Commonwealth Edison Company concern with and commitment to safety in constructing our Braidwood Station.

It is our desire to have the ACRS Subcommittee supplement the record with the facts contained in this letter and the enclosed slides. Please address any questions concerning this matter to this office.

Very truly yours,

E. Douglas Swartz

E. Douglas Swartz
Nuclear Licensing Administrator

Enclosure
cc: Ms. Janice A. Stevens LB-1
James G. Keppler - RIII

8287N

(DRAFT OUTLINE)

BRAIDWOOD PROJECT

QUALITY REVIEW AND VERIFICATION PROGRAM (QRVP) PLAN

I. BACKGROUND

II. DESCRIPTION AND SCOPE OF QRVP

III. ADMINISTRATION OF QRVP

IV. QUALITY ASSURANCE CONTROL OF QRVP

QUALITY REVIEW AND VERIFICATION PROGRAM (QRVP) PLAN

V. AREAS ADDRESSED BY QRVP

- A. INSTALLATION OF SAFETY RELATED EQUIPMENT
- B. QUALITY CONTROL INSPECTOR REINSPECTION
- C. SAFETY RELATED HANGER RETRO-INSPECTION
- D. ELECTRICAL INSTALLATION REVIEW
- E. HVAC WELDING RETRO-INSPECTION
- F. HVAC DUCT FITTING DETAIL RETRO-INSPECTION
- G. HVAC DUCT FITTING DETAIL RETRO-INSPECTION
- H. INSTRUMENTATION RETRO-INSPECTION
- I. QUALITY CONTROL STRUCTURAL STEEL REVIEW
- J. PIPING HEAT NUMBER TRACEABILITY VERIFICATION
- K. ETC. (OTHER AREAS TO BE DETERMINED)

VI. SCHEDULES FOR COMPLETION OF QRVP AREAS

VII. STATUS AND COMPLETION REPORTS FOR QRVP

VIII. INDEPENDENT OVERVIEW OF QRVP

AVERAGE EXPERIENCE LEVELS IN YEARS

JOB TITLE		AVE. COMMERCIAL NUC.	AVE. MILITARY NUC.	TOTAL OTHER*	TOTAL EXPERIENCE	AVERAGE EXP. PER JOB TITLE	RANGE
STATION SUPT.	(1)	20.1	-	5.3	25.4	25.4	N/A
OP. ASS'T. SUPT.	(1)	10.5	7.0	-	17.5	17.5	N/A
MAINT. ASS'T. SUPT.	(1)	8.6	6.0	-	14.6	14.6	N/A
ADMIN. ASS'T. SUPT.	(1)	11.1	4.7	-	16.8	15.8	N/A
OPERATING ENG.	(3)	9.4	2.2	1.3	35.9	12.0	9 - 15
SHIFT. ENG.	(2)	12.0	-		25.5	12.8	11 - 15
SHIFT FOREMAN	(15)	5.9	4.6	1.7	159.6	10.6	6 - 17
SCRE	(3)	1.4	1.5	4.0	12.6	4.2	2 - 6
(NSO)	(18)	4.2	1.5	-	102.6	5.7	2 - 13
EA	(21)	0.8	0.3	6.5	30.8	1.5	.3 - 7[1]
EO	(7)	2.3	-	1.2	17.5	2.5	2 - 3
OP. STAFF	(1)	13.4	-	1.0	14.4	14.4	N/A
LEAD MECH.	(3)	10.5	-	-	31.4	10.5	8 - 15
RAD/CHEM SUPV.	(1)	8.9	-	-	8.9	8.9	N/A
RAD/CHEM MGMT.	(9)	5.7	-	9.8	61.4	6.8	.5 - 34[2]
RAD/CHEM TECH.	(5)	7.7	-	5.7	44.1	8.8	7 - 12
Q.C. SUPV.	(1)	10.4	6.0	-	16.4	16.4	N/A
Q.C. STAFF	(7)	4.2	-	30.7	59.9	8.6	6 - 13
SECURITY ADMIN.	(1)	8.3	5	-	13.3	13.3	N/A
TECH. STAFF SUPV.	(1)	18.7	-	-	18.7	18.7	N/A
TECH. STAFF	(68)	2.4	1.2	34.7	280.0	4.1	.7 - 18[3]
TRAINING SUPV.	(1)	7.7	1	-	8.7	8.7	N/A
NUCLEAR TRAINING STAFF	(7)	2.4	6.4	2.5	64.7	9.2	1 - 17
OTHERS**	(79)	4.5	0.1	187.9	545.7	6.9	.5 - 29
TOTALS	(257)	-	-	-	1625.4	-	

* INDICATES POWER PLANT RELATED EXPERIENCE AREAS
** INDICATES REMAINDER OF PLANT STAFF OTHER THAN CLERICAL STAFF

THE AVERAGE EXPERIENCE LEVEL OF THE TECHNICAL PERSONNEL IN THIS FIGURE IS APPROXIMATELY 4.8 YEARS.

1 INCLUDES 9 - 4 MONTHS, 4 - 1 YEAR OR MORE, 6 - 2 YEARS OR MORE, 2 - 3 YEARS OR MORE
2 INCLUDES 2 - 6 MONTHS, 3 - 2 YEARS OR MORE, 2 - 3 YEARS OR MORE, 2 - 11 YEARS OR MORE
3 TWO NEW PEOPLE NOT INCLUDED. INCLUDES 14 - 8 MONTHS, 15 - 1 YEAR OR MORE, 9 - 2 TO 5 YEARS, 24 - 5 TO 11 YEARS, 3 - 13 TO 18 YEARS

SUPPLEMENTAL SLIDE
III. C. 3-6A

Parameters Associated with Plant Function Monitoring

Reactivity Control

Power Mismatch
Tavg
Startup Rate
Core Exit Temperature

Reactor Core Cooling

Core Exit Temperature
NR SG Level
WR SG Level

Reactor Coolant System Integrity

NR SG Level
WR SG Level
WR RCS Pressure
Pressurizer Level
Pressurizer Pressure
Net Charging/Letdown Flow Rate

Reactor Coolant System Inventory Control

Net Charging/Letdown Flow Rate
Pressurizer Level
Containment Floor Drain Sump Level

Containment Activity Level

Containment Activity
Containment Floor Drain Sump Level

Containment Integrity

Containment Temperature
Containment Pressure

Secondary System Status

NR SG Level
WR SG Level
Power Mismatch
Tavg

SUPPLEMENTAL SLIDE
III. F. 2-2A

BORING A-1

SURFACE ELEVATION 593.9

DEPTH (FEET)	OTHER TESTS	SHEAR STRENGTH PSF	ATTERBERG LIMITS: LIQUID LIMIT %	ATTERBERG LIMITS: PLASTIC LIMIT %	ATTERBERG LIMITS: PLASTICITY INDEX %	FIELD MOISTURE CONTENT %	DRY DENSITY PCF	WATER LOSS (LUGEONS)	PERCENT RECOVERED	RQD	BLOW COUNTS SAMPLES	SYMBOLS	DESCRIPTIONS	ELEVATION (FEET)
0											25	SM	REDDISH-BROWN SILTY FINE SAND WITH SOME FINE ORGANIC DEBRIS IN ZONES (MEDIUM DENSE) (EQUALITY FORMATION)	595
5						11.8	110				23			590
10						22.9	100				30	SP	LIGHT BROWN FINE SAND WITH TRACE OF SILT (MEDIUM DENSE)	585
15											33		GRADES VERY CLEAN	580
20											22		GRADES TO LIGHT GRAY COLOR	575
25		12 725				9.3	134				165	ML	DARK GRAY CLAYEY SILT WITH SAND AND DOLOMITE GRAVEL, OCCASIONAL COBBLE OR BOULDER (HARD) LARGE BOULDER FROM 23 TO 26 FEET (WEDRON FORMATION)	570
30		9950				9.7	133				79			565
35						11.4	129				49		GRADES TO MORE CLAY (STIFF)	560
40						15.6	115				47	ML	GRAY SANDY SILT WITH TRACE OF CLAY AND SOME GRAVEL (HARD)	555
45													TOP OF BEDROCK (CARBONDALE FORMATION) GRAY FINE SANDY SILTSTONE, MICACEOUS, THINLY LAMINATED, IRREGULAR, CROSS BEDDED IN ZONES, WEATHERED, FRIABLE, HIGH ANGLE AND 45° FRACTURES SPACED 2 TO 10 INCHES FROM 52.0 TO 61.6 FEET.	550
50														545
55									100	80			BEDDING GRADES HORIZONTAL, REGULAR AT 55.5 FEET	540
60													GRADES WELL INDURATED AT 60.2 FEET, BASE OF WEATHERED ZONE	535
65									100	95			HIGH ANGLE FRACTURE 62.7 TO 63.3 FEET	530
70													HIGH ANGLE FRACTURES 65.6 TO 66.3 FEET	525
75									100	89			GRAY SILTY SHALE, FINELY MICACEOUS; THINLY LAMINATED, HORIZONTAL, OCCASIONAL 1 INCH SIDERITE CONCRETION	520
													BORING CONTINUED	

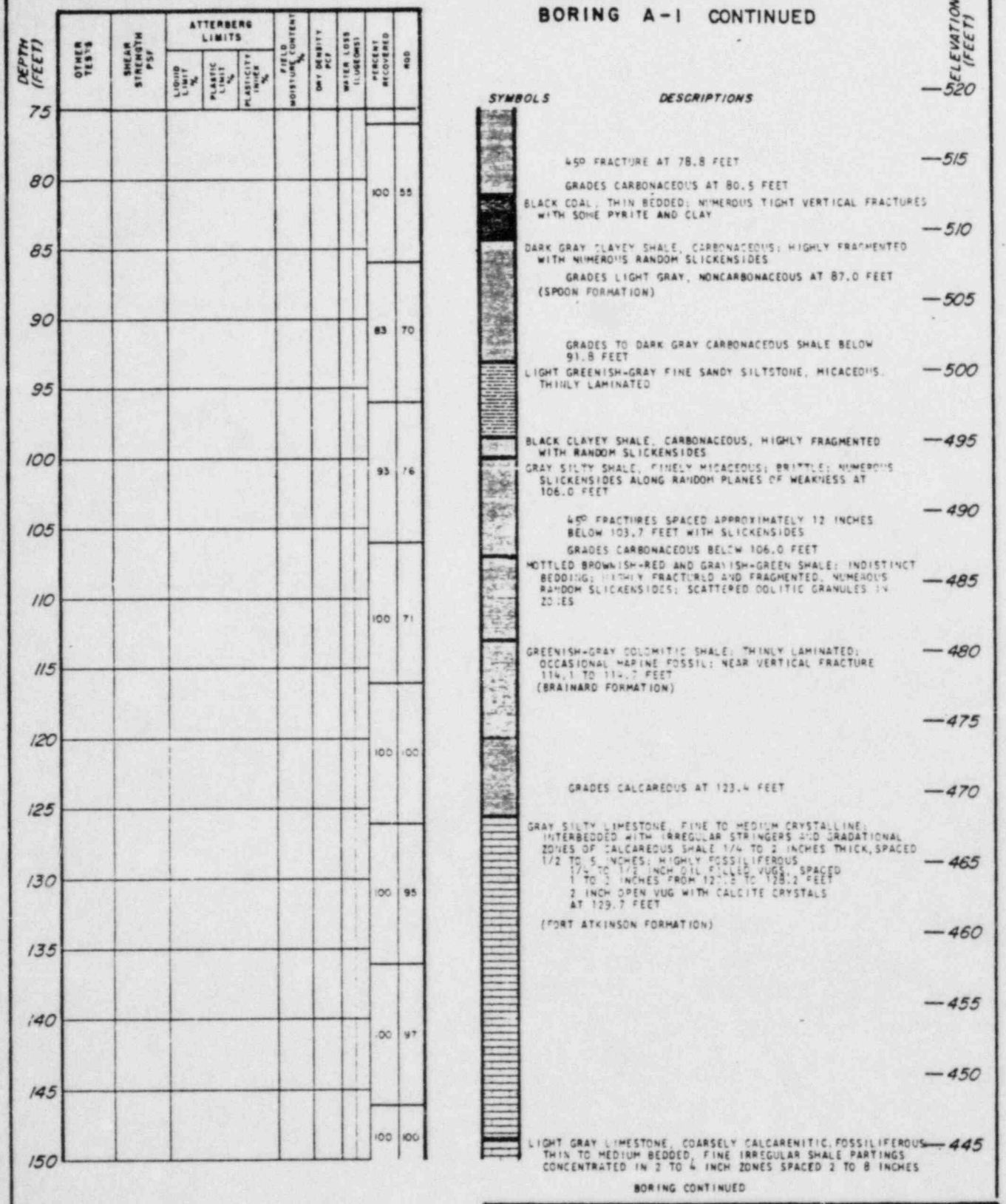
BRAIDWOOD STATION
FINAL SAFETY ANALYSIS REPORT

FIGURE 2.5-123

LOG OF BORING A-1

(SHEET 1 of 4)

SUPPLEMENTAL SLIDE
III. J-4



BORING CONTINUED

BRAIDWOOD STATION

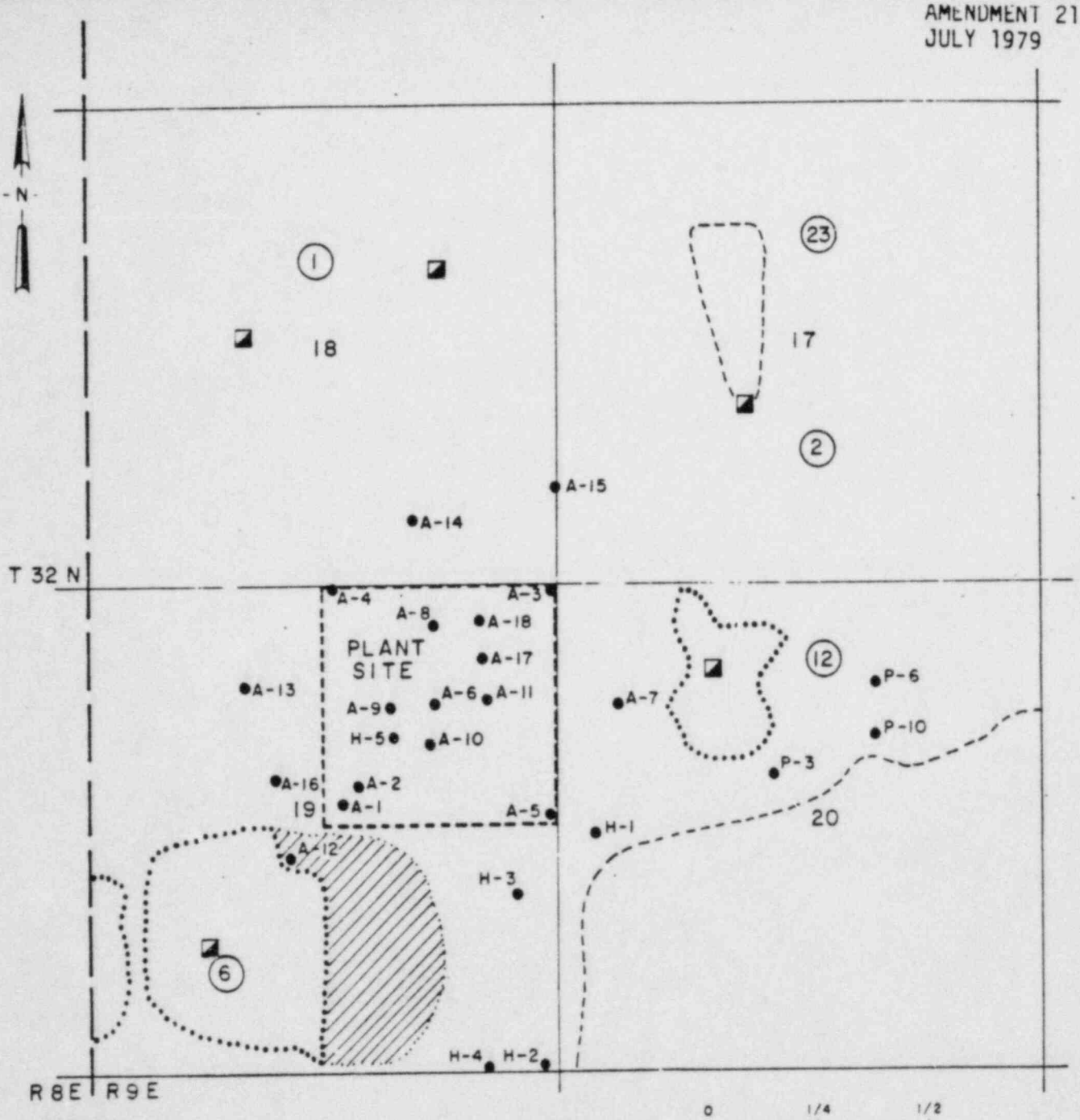
FINAL SAFETY ANALYSIS REPORT

FIGURE 2.5-123

LOG OF BORING A-1

(SHEET 2 of 4)

SUPPLEMENTAL SLIDE III. J-5



LEGEND

- MINE SHAFT LOCATION
- UNDERGROUND MINING LIMIT BASED ON ILLINOIS GEOLOGICAL SURVEY MINED-OUT COAL MAPS AND PEABODY COAL COMPANY COAL DEVELOPMENT DRILL HOLES
- STRIP MINE BOUNDARY
- (6) MINE MULCER
- PEABODY COAL COMPANY DEVELOPMENT DRILL HOLE DATA INDICATE THAT UNDERGROUND COAL MINING HAS NOT OCCURED WITHIN THIS PORTION OF LIMITS INDICATED BY ILLINOIS STATE GEOLOGICAL SURVEY MINED-OUT COAL AREA 8 MAP

REFERENCE

MODIFIED FROM:

1. MINED-OUT COAL AREA 1 MAP, ILLINOIS STATE GEOLOGICAL SURVEY URBANA, ILLINOIS, JANUARY 1, 1969.
2. MINED-OUT COAL AREA 8 MAP, ILLINOIS STATE GEOLOGICAL SURVEY URBANA, ILLINOIS, JANUARY 1, 1969
3. UNPUBLISHED COAL DEVELOPMENT DRILL HOLE DATA FROM PEABODY COAL COMPANY, IN THE FILES OF DAMES AND MOORE, PARK RIDGE, ILLINOIS (COAL DEVELOPMENT DRILL HOLES ARE SPACED ON APPROXIMATELY 300 FOOT CENTERS IN SECTION 20 AND THE EASTERN ONE-HALF OF SECTION 19).

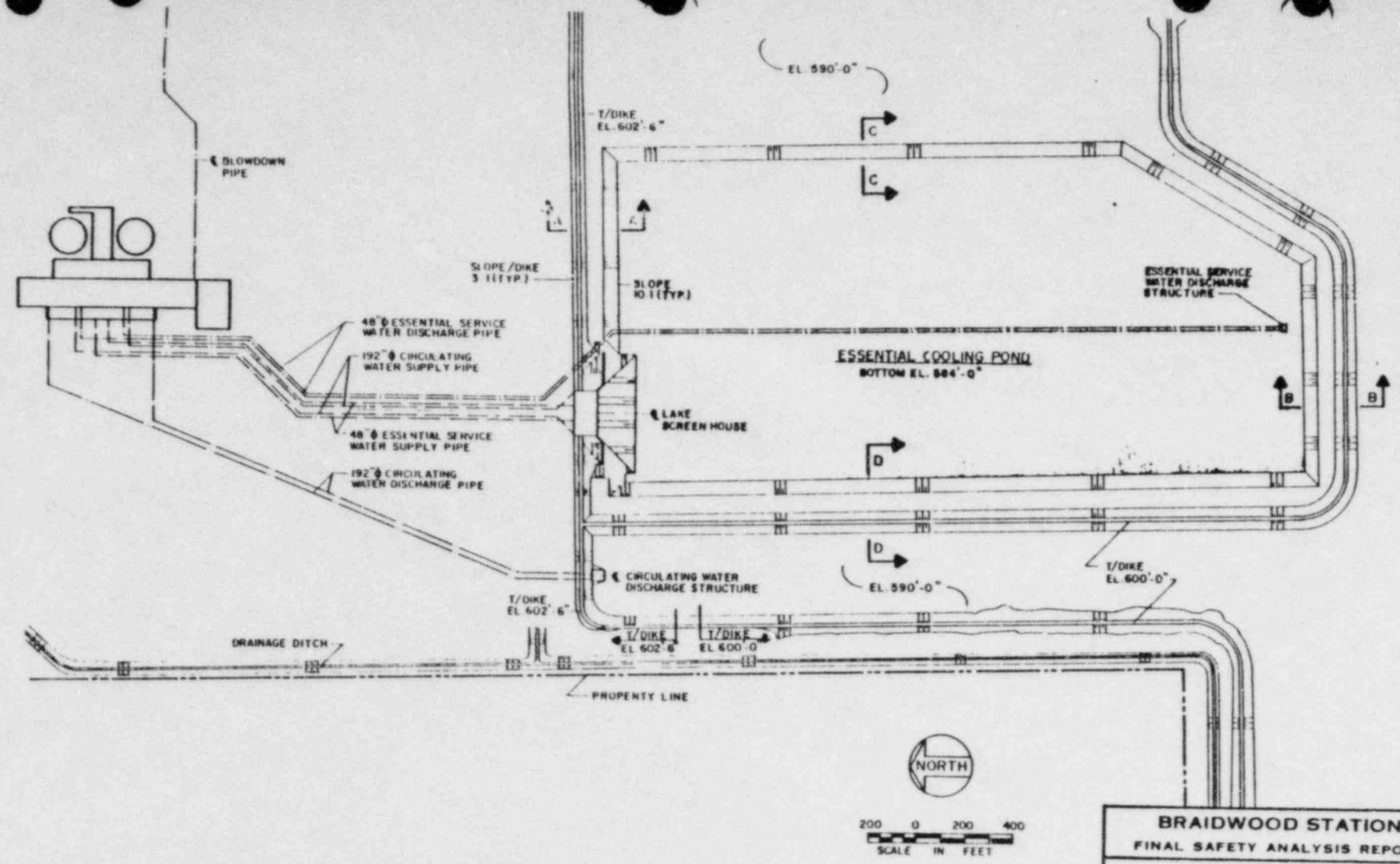
BRAIDWOOD STATION

FINAL SAFETY ANALYSIS REPORT

FIGURE 2.5-36a

KNOWN COAL MINES IN PLANT AREA

SUPPLEMENTAL SLIDE
III. J-6



BRAIDWOOD STATION
FINAL SAFETY ANALYSIS REPORT

FIGURE 2.4-47

ESSENTIAL COOLING POND

SUPPLEMENTAL SLIDE
III. J-7

V.1 ACRS QUESTION, " DOES BRAIDWOOD HAVE COMPUTERS OR MICROPROCESSORS IN SAFETY RELATED AREAS, AND IF SO, HOW DO WE VALIDATE THE SOFTWARE?"

OFFSITE CODES

° SIMPLE ALGORITHIMS

° LIMITED ALGORITHIM INTERACTIONS

° MEET NRC VERIFICATION REQUIREMENTS

(OTHER CODES, TESTS, HAND CALCULATIONS)

(BENCHMARKING, STARTUP TESTS)

° USED WITHIN WELL-ESTABLISHED PERFORMANCE ENVELOPES - COVERING SPECTRUM OF DESIGN BASIS OPERATION

ONSITE CODES

° AS ABOVE - ALSO STARTUP TESTING INCLUDE SPECIAL COMPUTER VERIFICATION

° AGAIN, CODES OPERATE WITHIN ESTABLISHED ENVELOPS

INTERACTIVE PLANT CONTROL

° CODES NOT USED FOR COMPUTER PLANT CONTROL (i.e. - THEY ARE NOT ANALOGOUS TO NASA FLIGHT CONTROL OR OTHER CODES USING COMPLEX, INTERACTIVE ALGORITHIMS)

COMPUTER CODES (NOT LINKED)

OFFSITE

1. HARDWARE DESIGN (PIPING, STRUCTURES. ETC.)
2. PLANT TRANSIENT ANALYSIS (FSAR, CONTAINMENT PRESSURE, TEMPERATURE, ETC.)
3. FUEL CYCLE (ECONOMICS, BURNUP, LOADING)

ONSITE

4. INFORMATION DISPLAY
5. PREDICTIVE PLANT BEHAVIOR (DNBR, XENON, WATER BALANCE)
6. PLANT PROCESS CONTROL (NONE)

3. AT THE CONCLUSION OF THE MARCH 8 AND 9, 1984 PROCEEDINGS AN OBSERVATION CONCERNING CONSTRUCTION FATALITIES AT BRAIDWOOD STATION WAS MADE. (TRANSCRIPT PAGES 285-286) COMMONWEALTH EDISON WAS NOT PROVIDED AN OPPORTUNITY TO RESPOND TO THIS CONCLUDING REMARK PRIOR TO THE MEETING ADJOURNMENT. BECAUSE THE OBSERVATION DID NOT TYPIFY THE EXISTING SAFETY RECORD AT BRAIDWOOD STATION, THE COMMONWEALTH EDISON COMPANY FORMALLY RESPONDED TO THIS REMARK IN THE LETTER ENCLOSED IN ITEM 2 ABOVE.

COMMONWEALTH EDISON TAKES AN ACTIVE ROLE IN SAFETY OF THEIR EMPLOYEES. AS A PART OF THE CORPORATE SAFETY PROGRAM, EVERY WORK UNIT OF THE COMPANY (BARGAINING UNIT AND MANAGEMENT PERSONNEL ALIKE) PARTICIPATES IN TRAINING, AWARENESS PROGRAMS, AND CONTESTS, TO PROMOTE A CONSCIOUSNESS OF THE HAZARDS INHERENT IN THE WORK PERFORMED BY EACH UNIT.

ADDITIONALLY, AS A PART OF EACH CONTRACT FOR WORK PERFORMED BY COMPANIES OTHER THAN COMMONWEALTH EDISON, CONTRACTORS ARE REQUIRED TO PROVIDE AND MAINTAIN A SAFE WORKING PLACE FOR THEIR EMPLOYEES. AT BRAIDWOOD STATION, COMMONWEALTH EDISON FUNCTIONS ESSENTIALLY AS A CONTRACTS MANAGER, WITH CONSTRUCTION BEING PERFORMED BY OTHERS. SINCE ACTIVITY BEGAN AT BRAIDWOOD IN AUGUST, 1975, MORE THAN 27,500,000 MANHOURS HAVE BEEN EXPENDED. IN THAT TIME, THERE HAS BEEN ONLY ONE CONSTRUCTION-RELATED DEATH, THE RESULT OF A FALL

IN OCTOBER, 1984. SIX OTHER CONTRACTOR EMPLOYEES DIED IN THAT PERIOD FROM NATURAL CAUSES, ALL HEART ATTACKS.

THE COMMONWEALTH EDISON OPERATING, TESTING AND MAINTENANCE GROUP ASSIGNED TO THE STATION RECENTLY EXCEEDED 2,000,000 MANHOURS WITHOUT A DISABLING INJURY AND SEVEN YEARS WITHOUT A LOST TIME ACCIDENT. UNFORTUNATELY, THE CONTRACTORS' LOST TIME ACCIDENT RECORDS DO NOT MATCH THIS RECORD, PRIMARILY AS A RESULT OF THE NATURE OF THE CONSTRUCTION BUSINESS. DUE TO THEIR CONTRACTUAL POSITION, COMMONWEALTH EDISON DOES NOT DIRECT CONTRACTOR SAFETY OPERATIONS; EACH CONTRACTOR IS PRIMARILY RESPONSIBLE FOR THE SAFETY OF THEIR EMPLOYEES. RECENTLY COMMONWEALTH EDISON BECAME MORE INVOLVED IN THE SURVEILLANCE OF CONTRACTOR SAFETY PROGRAMS. AT THE RECOMMENDATION OF THE INSTITUTE FOR NUCLEAR POWER OPERATIONS (INPO), A POSITION WAS CREATED WITHIN THE COMMONWEALTH EDISON CONSTRUCTION MANAGEMENT ORGANIZATION TO ASSIST CONTRACTORS IN THE IMPROVEMENT OF THEIR SAFETY RECORDS. THE PROJECT SAFETY SURVEILLANCE COORDINATOR ACCOMPLISHES THIS THROUGH SURVEILLANCE OF CONTRACTORS' PROGRAMS AND COORDINATION OF CONTRACTOR TRAINING. ADDITIONALLY, A COMMITTEE WAS FORMED COMPOSED OF SAFETY AND MANAGEMENT PERSONNEL FROM EACH SITE CONTRACTOR TO COORDINATE THE SAFETY EFFORTS OF THE ENTIRE CONTRACTOR WORKFORCE. CONTRACTOR FEEDBACK ON THESE EFFORTS HAS BEEN FAVORABLE.

NRR STAFF PRESENTATION

TO THE

ACRS SUBCOMMITTEE

FOR

BRAIDWOOD STATION, UNITS 1 AND 2

JANUARY 29, 1985

PRESENTED BY

JANICE A. STEVENS

LICENSING PROJECT MANAGER

DISCUSSION TOPICS

- o OVERVIEW OF LICENSING ACTIVITIES
- o DUPLICATE PLANT CONCEPT
- o STATUS OF UNRESOLVED ITEMS

OVERVIEW OF LICENSING ACTIVITIES

- o CONSTRUCTION PERMIT ISSUED 12/31/75
- o APPLICATION FOR OPERATING LICENSE SUBMITTED 6/27/78
- o BYRON/BRAIDWOOD FSAR DOCKETED 11/30/78
- o BYRON SER PUBLISHED 2/82
- o BRAIDWOOD SER PUBLISHED 11/83
- o PUBLIC HEARING ON SAFETY MATTERS TO BE SCHEDULED
- o CONSTRUCTION STATUS:

	UNIT 1	80%
	UNIT 2	54%

- o APPLICANT FUEL LOAD DATE:

	UNIT 1	4/1/86
	UNIT 2	7/1/87

- o BYRON LOW POWER LICENSE ISSUED 10/31/84
- o BYRON COMMISSION MEETING FOR FULL POWER LICENSE SCHEDULED FOR 2/12/85

DUPLICATE PLANT CONCEPT

THE BYRON AND BRAIDWOOD STATIONS USE A DUPLICATE PLANT DESIGN IN ACCORDANCE WITH THE NRC'S "STATEMENT ON STANDARDIZATION OF NUCLEAR POWER PLANTS" DATED 8/31/78.

- SIMULTANEOUS REVIEW OF THE DUPLICATE PORTIONS OF A LIMITED NUMBER OF PLANTS TO BE CONSTRUCTED WITHIN A LIMITED TIME SPAN AT MULTIPLE SITES.
- APPROVED DUPLICATE DESIGN MAY BE INCORPORATED BY REFERENCE IN OL APPLICATIONS, UNLESS SIGNIFICANT NEW INFORMATION EXISTS WHICH SUBSTANTIALLY AFFECTS THE FINDINGS OF THE REFERENCE DESIGN REVIEW OR OTHER GOOD CAUSE.

DUPLICATE PLANT CONCEPT, CONT.

STAFF'S REVIEW OF REFERENCE DESIGN DOCUMENTED IN THE BYRON SER (NUREG-0876), INCLUDING FIVE SUPPLEMENTS

- o Nuclear Steam Supply Systems
- o Balance of Plant Systems
- o Associated Auxiliary Systems

STAFF'S FINAL DUPLICATE DESIGN APPROVAL (FDDA) DATED 6/82 DELINEATES TOPICS OUTSIDE THE SCOPE OF THE DUPLICATE DESIGN:

- o Site-Related Characteristics
- o Changes from the Byron Station Design
  - Offsite Power Systems
  - Water Systems
  - River Screenhouse Ventilation System and Diesel Generator Fuel Oil System
- o Utility-Oriented Safety-Related Matters
- o Other Items

STATUS OF OUTSTANDING ITEMS

PART A ITEMS

(1) PUMP AND VALVE OPERABILITY

(2) SEISMIC AND DYNAMIC QUALIFICATION OF EQUIPMENT

(3) ENVIRONMENTAL QUALIFICATION OF ELECTRICAL AND MECHANICAL EQUIPMENT

CLOSED (4) CONTAINMENT PRESSURE BOUNDARY COMPONENTS

CLOSED (5) ORGANIZATIONAL STRUCTURE

(6) EMERGENCY PREPAREDNESS PLANS AND FACILITIES

(7) PROCEDURES GENERATION PACKAGE (PGP)

(8) CONTROL ROOM HUMAN FACTORS REVIEW

STATUS OF OUTSTANDING ITEMS, CONT.

PART B ITEMS

(1) TURBINE MISSILE EVALUATION

(2) IMPROVED THERMAL DESIGN PROCEDURES

(3) TMI ACTION ITEM II.F.2: INADEQUATE CORE COOLING INSTRUMENTATION

CLOSED (4) STEAM GENERATOR FLOW-INDUCED VIBRATIONS (CLOSED)

(5) CONFORMANCE OF ESF FILTER SYSTEM TO RG 1.52

(6) FIRE PROTECTION PROGRAM

(7) VOLUME REDUCTION SYSTEM

STATUS OF CONFIRMATORY ITEMS

PART A ITEMS

(1) APPLICANT COMPLIANCE WITH THE COMMISSION'S REGULATIONS

CLOSED (2) SITE DRAINAGE

(3) PIPING VIBRATION TEST PROGRAM

(4) PRESERVICE INSPECTION PROGRAM

(5) REACTOR VESSEL MATERIALS

(6) ELECTRICAL DISTRIBUTION SYSTEM VOLTAGE VERIFICATION

(7) INDEPENDENCE OF REDUNDANT ELECTRICAL SAFETY EQUIPMENT

(8) RPM QUALIFICATIONS

CLOSED (9) REVISION TO PHYSICAL SECURITY PLAN

STATUS OF CONFIRMATORY ITEMS, CONT.

PART B ITEMS

(1) INSERVICE TESTING OF PUMPS AND VALVES

CLOSED (2) STEAM GENERATOR TUBE SURVEILLANCE

(3) CHARGING PUMP DEADHEADING

CLOSED (4) MINIMUM CONTAINMENT PRESSURE ANALYSIS FOR PERFORMANCE CAPABILITIES OF ECCS

CLOSED (5) CONTAINMENT SUMP SCREEN

CLOSED (6) CONTAINMENT LEAKAGE TESTING VENT AND DRAIN PROVISIONS

CLOSED (7) CONFIRMATORY TEST FOR SUMP DESIGN

CLOSED (8) IE BULLETIN 80-06

(9) REMOTE SHUTDOWN CAPABILITY

(10) TMI ACTION PLAN ITEM II.D.1

CLOSED TMI ACTION PLAN ITEM II.K.3.1

CLOSED TMI ACTION PLAN ITEM III.D.1.1

CLOSED (11) SWS PROCESS CONTROL PROGRAM

CLOSED (12) NOBLE GAS MONITOR

CLOSED (13) RCP ROTOR SEIZURE AND SHAFT BREAK

CLOSED (14) ANTICIPATED TRANSIENTS WITHOUT SCRAM (ATWS)

STATUS OF LICENSE CONDITIONS

PART A ITEMS

CLOSED (1) INSERVICE INSPECTION PROGRAM

CLOSED (2) NATURAL CIRCULATION TESTING

CLOSED (3) RESPONSE TIME TESTING

CLOSED (4) STEAM VALVE INSERVICE INSPECTION

CLOSED (5) IMPLEMENTATION OF SECONDARY WATER CHEMISTRY MONITORING AND CONTROL PROGRAM AS PROPOSED BY THE BYRON/BRAIDWOOD FSAR

PART B ITEMS

(1) MASONRY WALLS

CLOSED (2) TMI ITEM II.B.3 POSTACCIDENT SAMPLING

(3) FIRE PROTECTION PROGRAM

IN CONCLUSION

- o NRR IS PREPARED TO RECOMMEND LICENSING OF BRAIDWOOD STATION PENDING FAVORABLE RESOLUTION OF THE OUTSTANDING ITEMS, AS DESCRIBED IN THE SER, BY NRR AND THE CONSTRUCTION ISSUES BY REGION III.

- o THERE ARE NO DIFFERING PROFESSIONAL OPINIONS RELATING TO THE BRAIDWOOD OPERATING LICENSE REVIEW.

BRAIDWOOD

NRC

CONSTRUCTION

INSPECTION

EXPERIENCE

CURRENT STATUS SUMMARY

- NUMEROUS CONSTRUCTION RELATED PROBLEMS EXIST
- CECO HAS PROGRAMS TO IDENTIFY AND CORRECT PROBLEMS
- NRC HAS PLANNED PROGRAM TO FOLLOW CECO ACTIONS

CLARIFICATION

- o BYRON VS. BRAIDWOOD
  - . SIMILARITIES
    - .. SISTER PLANTS
    - .. COMMON CORPORATE QA PROGRAM
    - .. COMMON CORPORATE MANAGEMENT STRUCTURE
  - . DISSIMILARITIES
    - .. DIFFERENT SITE MANAGEMENT AND PERSONNEL
    - .. DIFFERENT SUB-CONTRACTORS'
    - .. QUESTION OF QC INSPECTOR QUALIFICATION - BYRON
    - .. QUESTIONS OF RECORDS AND EQUIPMENT INSTALLATION - BRAIDWOOD
- o NRC INSPECTION EFFORT

PROBLEM AREAS

- o PIPING
  - . TRACEABILITY
  - . MINIMUM WALL THICKNESS
  - . NAME PLATE APPLICATION
  - . INSTRUMENTATION
- o HVAC
  - . HANGER FITUP
  - . HANGER WELDING
- o ELECTRICAL
  - . CABLE SEPARATION
  - . UNAUTHORIZED USE OF BUTT SPLICES
  - . INCOMPLETE RECORDS
  - . CONTROL OF REWORK

CECO CORRECTIVE ACTION PROGRAMS

- 20 CORRECTIVE ACTION PROGRAMS

- BCAP

  - REINSPECTION PROGRAM

  - REVIEW OF PROCEDURES TO SPECIFICATION REQUIREMENTS

  - REVIEW OF SIGNIFICANT CORRECTIVE ACTION PROGRAMS

NRC INITIATIVES

- INSPECTION PERSONNEL
  - SRI CONSTRUCTION
  - RI CONSTRUCTION
  - SRI OPERATION
  - BCAP INSPECTOR
  - REGIONAL SPECIALISTS
- MANAGEMENT OVERSIGHT
  - MONTHLY MANAGEMENT MEETINGS (BCAP)
  - SALP
- MAJOR INSPECTION ACTIVITY
  - NDE VAN
  - CAT INSPECTION

CURRENT ISSUES

- ABILITY TO MANAGE MULTIPLE REINSPECTION EFFORTS AND DO ONGOING WORK