



Duquesne Light

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September 14, 1984

United States Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Mr. George W. Knighton, Chief
Licensing Branch 3
Office of Nuclear Reactor Regulation

SUBJECT: Beaver Valley Power Station - Unit No. 2
Docket No. 50-412
Electrical Separation R.G. 1.75 Information

Gentlemen:

In accordance with commitments made at a meeting with your staff on August 30, 1984, concerning our electrical separation program, we are submitting the meeting agenda (Attachment 1), a copy of the slides and diagrams (Attachment 2) of the program presentation, and the notes of conference (Attachment 3).

DUQUESNE LIGHT COMPANY

By *E. J. Woolever*
E. J. Woolever
Vice President

GHO/wjs
Attachment

cc: Mr. C. Anderson, Region 1 (3) (w/attachment)
Mr. J. Knox (w/attachment)
Ms. M. Ley, Project Manager (w/attachment)
Mr. G. Walton, Resident Inspector (w/attachment)

SUBSCRIBED AND SWORN TO BEFORE ME THIS
14th DAY OF September, 1984.

Anita Elaine Reiter
Notary Public

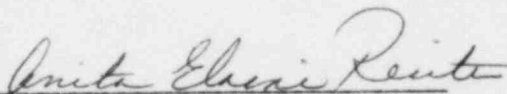
ANITA ELAINE REITER, NOTARY PUBLIC
ROBINSON TOWNSHIP, ALLEGHENY COUNTY
MY COMMISSION EXPIRES OCTOBER 20, 1986

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1/1

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF ALLEGHENY)

On this 14th day of September, 1984, before me, a Notary Public in and for said Commonwealth and County, personally appeared E. J. Woolever, who being duly sworn, deposed and said that (1) he is Vice President of Duquesne Light, (2) he is duly authorized to execute and file the foregoing Submittal on behalf of said Company, and (3) the statements set forth in the Submittal are true and correct to the best of his knowledge.



Notary Public

ANITA ELAINE REITER, NOTARY PUBLIC
ROBINSON TOWNSHIP, ALLEGHENY COUNTY
MY COMMISSION EXPIRES OCTOBER 20, 1986

ATTACHMENT 1

DUQUESNE LIGHT COMPANY
BEAVER VALLEY POWER STATION - UNIT NO. 2

MEETING AGENDA

AUGUST 30, 1984, 8:00 A.M.

ELECTRICAL SEPARATION AND R.G. 1.75 (REV. 2) IMPLEMENTATION PROGRAM

SITE EMERGENCY RESPONSE FACILITY CONFERENCE ROOM

	<u>ITEM</u>	<u>SPEAKER</u>
I.	INTRODUCTION	J. J. CAREY
II.	OVERVIEW OF MEETING AGENDA	H. M. SIEGEL
	1. Purpose/Scope of Meeting	
	2. Introduction of Speakers	
III.	OVERVIEW OF BVPS-2 ELECTRICAL SEPARATION AND R.G. 1.75 (REV. 2) IMPLEMENTATION PROGRAM	J. F. KONKUS
IV.	SEPARATION PROGRAM IMPLEMENTATION CONCEPTS	C. WILBUR
V.	TEST PROGRAM	C. WILBUR
VI.	PROGRAM SCHEDULE	C. WILBUR
VII.	I&E UNRESOLVED ITEMS	H. M. SIEGEL
VIII.	SUMMARY STATEMENT	H. M. SIEGEL
IX.	LUNCH (TIMING IS ADJUSTABLE)	
X.	PLANT TOUR	
XI.	DISCUSSION	

**DUQUESNE LIGHT COMPANY
BEAVER VALLEY POWER STATION - UNIT NO. 2
ELECTRICAL SEPARATION AND R.G. 1.75
(REV. 2) IMPLEMENTATION PROGRAM**

MEETING AGENDA

- I. INTRODUCTION
- II. OVERVIEW OF MEETING AGENDA
 1. PURPOSE/SCOPE OF MEETING
 2. INTRODUCTION OF SPEAKERS
- III. OVERVIEW OF BVPS-2 ELECTRICAL SEPARATION
R.G. 1.75 (REV. 2) IMPLEMENTATION PROGRAM
- IV. SEPARATION PROGRAM IMPLEMENTATION
CONCEPTS
- V. TEST PROGRAM
- VI. PROGRAM SCHEDULE
- VII. I&E UNRESOLVED ITEMS
- VIII. SUMMARY STATEMENT
- IX. PLANT TOUR
- X. DISCUSSION

**MINIMUM REQUIREMENTS – THE SPATIAL DIMENSIONS
CONTAINED IN IEEE-384-74 WHICH WHEN ACHIEVED
REQUIRE NO FURTHER ACTION.**

**REDUCED ALLOWABLES – MINIMUM SPACE REQUIRED
TO ALLOW INSTALLATION OF COVERS, BARRIERS AND
WRAPS TO MEET R.G. 1.75.**

**REWORK – PHYSICAL ACTIVITIES REQUIRED TO MEET
AT A MINIMUM REDUCED ALLOWABLES.**

**CONSEQUENTIAL WORK – INSTALLATION OF COVERS,
BARRIERS AND WRAPS WHEN THE MINIMUM
REQUIREMENTS ARE NOT MET.**

STATUS OF BVPS-2 REG. GUIDE 1.75 (REV. 2) IMPLEMENTATION PROGRAM

- **DESIGN CRITERIA DOCUMENTS AND INSTALLATION DOCUMENTS HAVE BEEN REVISED TO INCORPORATE REG. GUIDE 1.75 (REV. 2) CRITERIA**
- **TRAINING PROGRAM FOR ENGINEERS, DESIGNERS, QC AND CONSTRUCTION PERSONNEL IMPLEMENTED**
- **TRACKING SYSTEM DEVELOPED AND IMPLEMENTED TO IDENTIFY CASES WHERE SPATIAL SEPARATION IS LESS THAN REG. GUIDE 1.75 (REV. 2) REQUIREMENTS**
- **DRAWING REVIEW AND ENGINEERING WALKDOWN OF THE PLANT TO IDENTIFY SPATIAL SEPARATIONS LESS THAN REG. GUIDE 1.75 (REV. 2) CRITERIA COMPLETED**
- **SOLUTION OF ITEMS IDENTIFIED IN THE ENGINEERING WALKDOWN OF EXTERNAL CABLE AND RACEWAY IS 70% COMPLETE**
- **AN ENGINEERING TESTING SCOPE HAS BEEN DEVELOPED**

**DESIGN CRITERIA DOCUMENTS AND
INSTALLATION DOCUMENTS HAVE BEEN
REVISED TO INCORPORATE REG. GUIDE 1.75
(REV. 2) CRITERIA**

- 1. 2BVM-41 – CRITERIA FOR DESIGN AND
IDENTIFICATION OF ELECTRICAL CABLE AND
RACEWAY SYSTEMS**
- 2. 2BVM-173 – PROCEDURE FOR IMPLEMENTATION
OF ELECTRICAL SEPARATION (R.G. 1.75) REQUIREMENTS**
- 3. 2BVS-931 – SPECIFICATION FOR ELECTRICAL
INSTALLATION**

TRAINING PROGRAM

1. TRAINING COORDINATOR
2. TRAINING COURSES
3. ORGANIZATIONS

DUQUESNE LIGHT COMPANY

- a) PROJECT ENGINEERING GROUP
- b) SITE QUALITY CONTROL

STONE & WEBSTER ENGINEERING CORPORATION

- a) PROJECT ENGINEERING GROUP
- b) SITE ENGINEERING GROUP
- c) CONSTRUCTION MANAGEMENT

SARGENT ELECTRIC COMPANY

- a) NON-MANUAL
- b) MANUAL

- **TRACKING SYSTEM DEVELOPED AND IMPLEMENTED TO IDENTIFY CASES WHERE SPATIAL SEPARATION IS LESS THAN REG. GUIDE 1.75 (REV. 2) REQUIREMENTS**

1. **ELECTRICAL SEPARATION TRACKING SYSTEM (ESTS)**
2. **CABLE SEPARATION STATUS REPORT (CSSR)**

**DRAWING REVIEW AND ENGINEERING
WALKDOWN OF THE PLANT TO
IDENTIFY SPATIAL SEPARATIONS LESS
THAN REG. GUIDE 1.75 (REV. 2) CRITERIA
COMPLETED**

- 1. FCP-422 ELECTRICAL SEPARATION
WALKDOWN PROCEDURE**
- 2. DRAWINGS WERE CHANGED TO
REFLECT THE USE OF TRAY COVERS
TO MEET R.G. 1.75**

**IMPLEMENTATION OF R.G. 1.75 DESIGN CRITERIA
TO ASSURE THE ABILITY TO COMPLY WITH THE SPATIAL
REQUIREMENTS OF IEEE 384-1975**

**INSTALLATION
STATUS**

ACTION

- 1. MEETS MINIMUM REQUIREMENTS
- 2. MEETS REDUCED ALLOWABLES
- 3. LESS THAN REDUCED

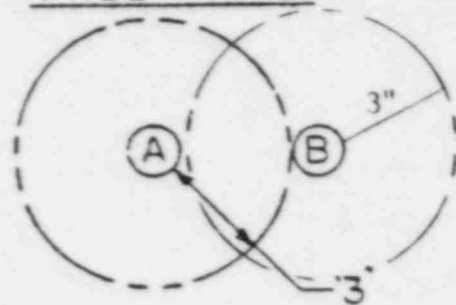
NONE

**IDENTIFY AND PERFORM
CONSEQUENTIAL WORK**

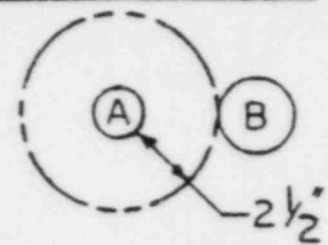
REWORK TO MEET 1 OR 2

FREE SPACE REQUIREMENTS

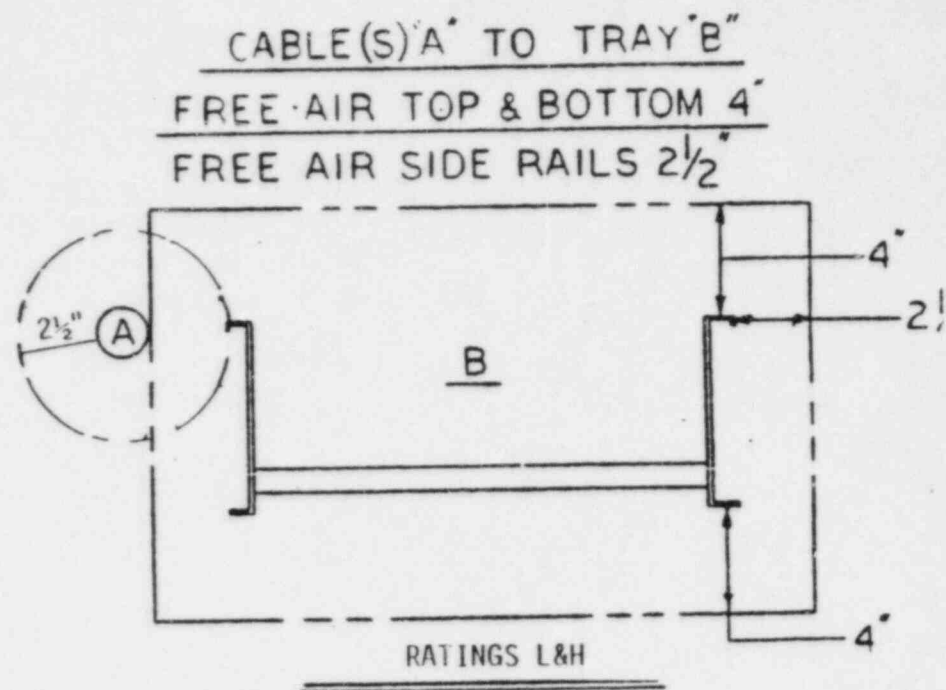
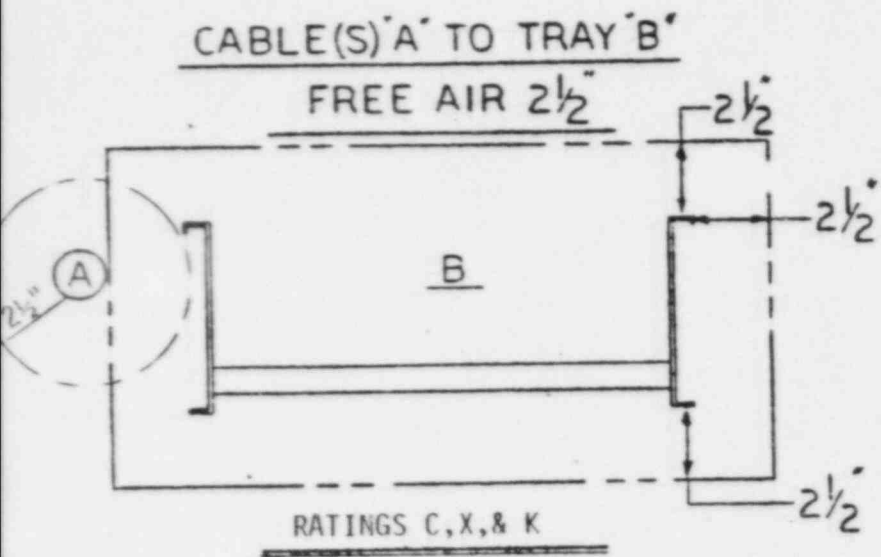
CABLE(S) "A" TO CABLE(S) "B"
FREE AIR 3"



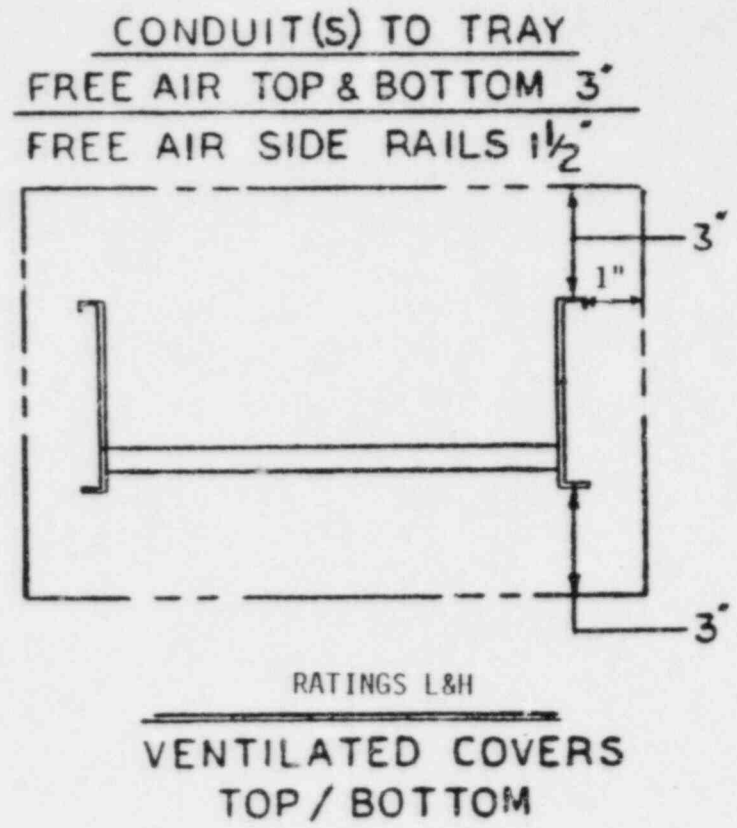
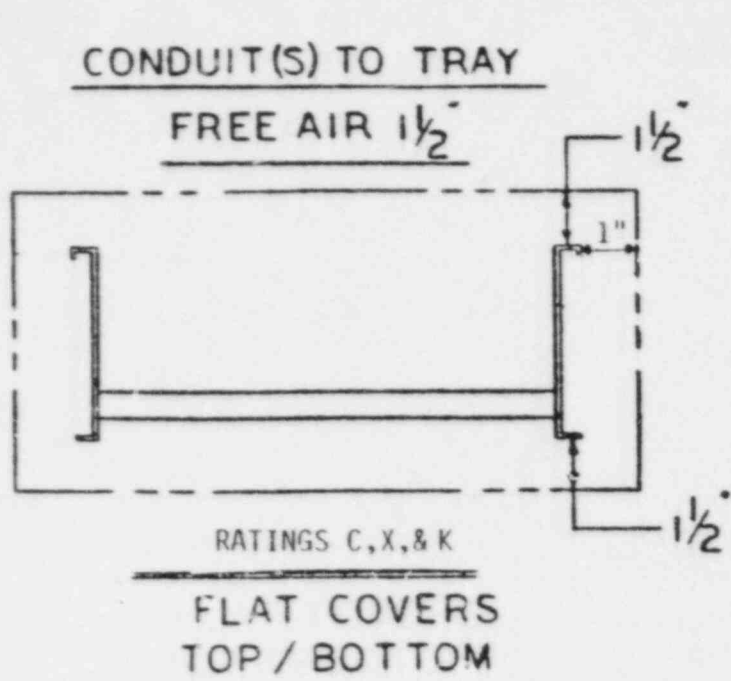
CABLE(S) "A" TO CONDUIT(S) "B"
FREE AIR 2 1/2"



FREE SPACE REQUIREMENTS



FREE SPACE REQUIREMENTS



CABLE DERATING

- **TRAY COVERS HAVE BEEN DESIGNED TO ELIMINATE THE NEED FOR ADDITIONAL DERATING.**
- **CABLE WRAP INSTALLATION CRITERIA HAVE BEEN ENGINEERED TO ELIMINATE THE NEED FOR ADDITIONAL DERATING.**

SEPARATION IMPLEMENTATION METHODS

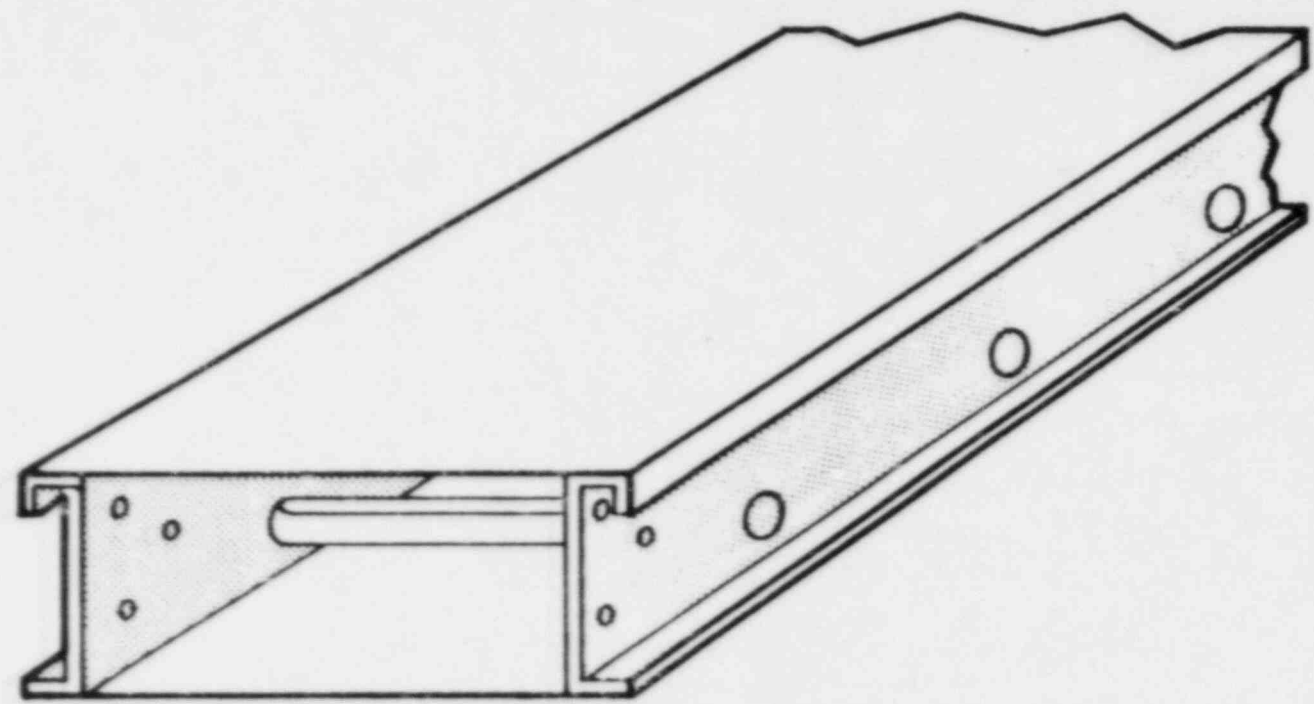
IEEE 384-1974

- 4.3 METHODS OF SEPARATION. THE SEPARATION OF CIRCUITS AND EQUIPMENT SHALL BE ACHIEVED BY SAFETY CLASS STRUCTURES, DISTANCE, OR BARRIERS, OR ANY COMBINATION THEREOF.**

GENERAL

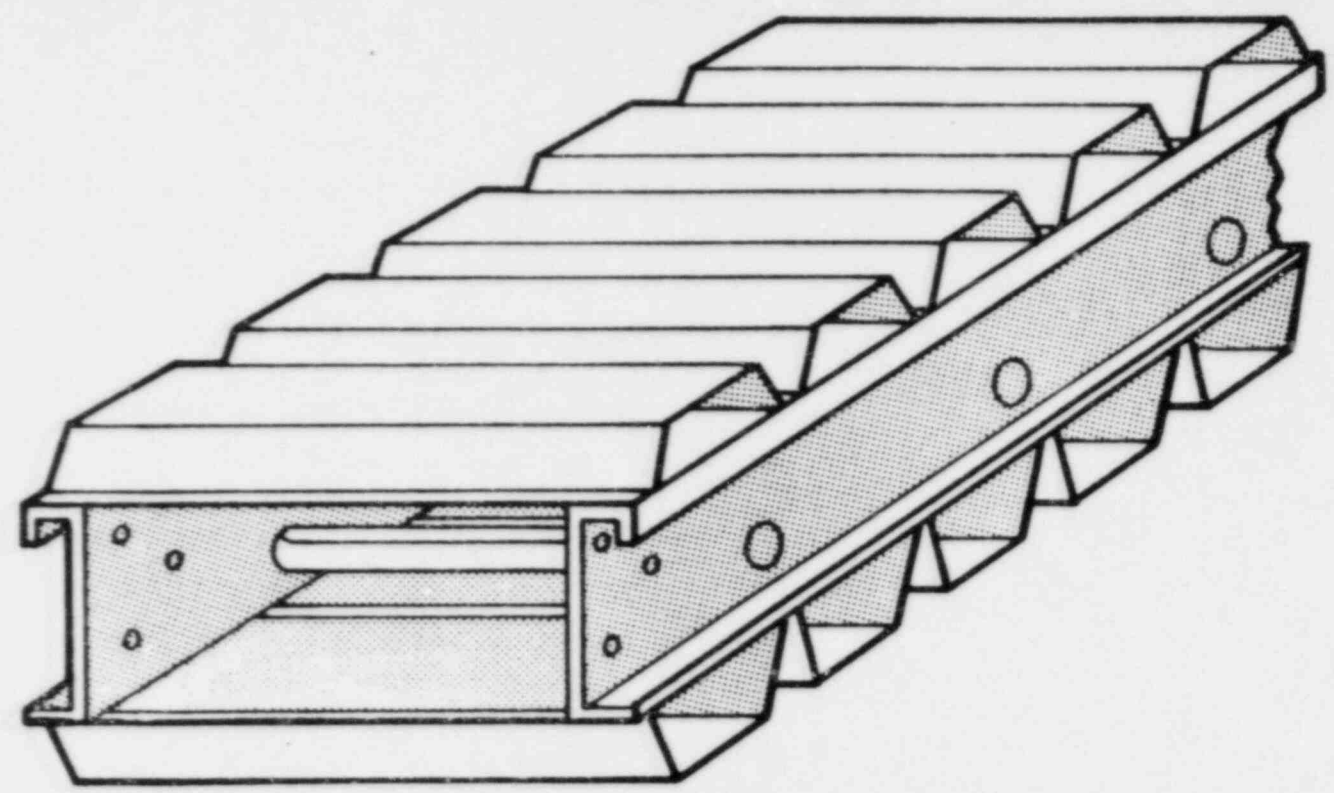
- 1. ENCLOSE 4KV POWER CABLES
(H SERVICE LEVEL)**
- 2. ENCLOSE CONTINUOUS DUTY AND
LARGE SIZE POWER CABLES
(L SERVICE LEVEL)**
- 3. ENCLOSE CABLES WITH SILTEMP OR
RACEWAY**

TOTAL ENCLOSURE OPEN LADDER CABLE TRAY WITH TOP AND BOTTOM FLAT COVERS

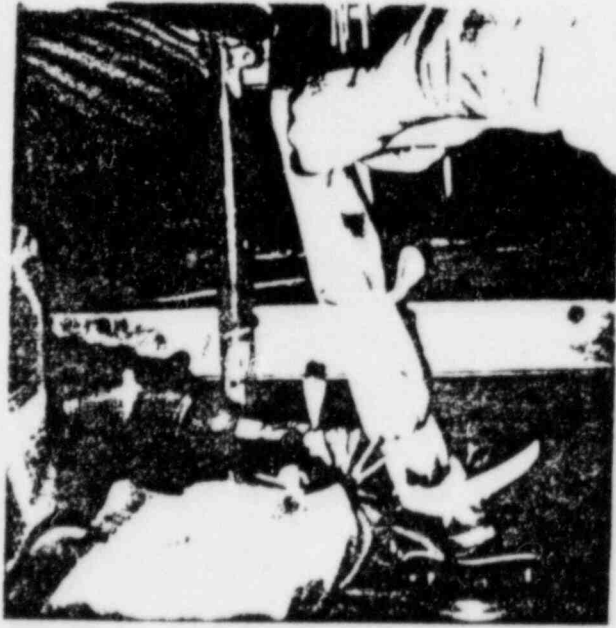


(NON-VENTILATED)

TOTAL ENCLOSURE OPEN LADDER CABLE TRAY WITH TOP AND BOTTOM COVERS



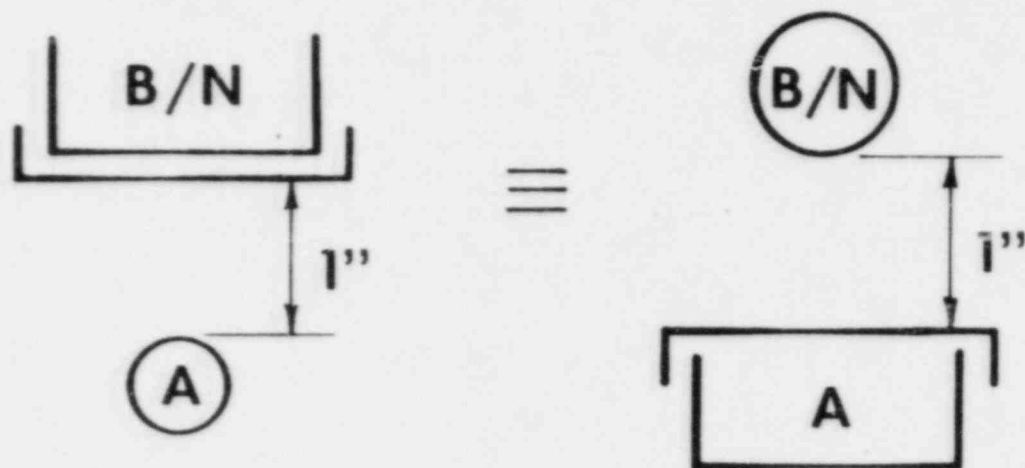
(VENTILATED)



GENERAL PLANT AREA OTHER THAN TOTAL ENCLOSURE

TOTAL ENCLOSURE (1ST SYSTEM)

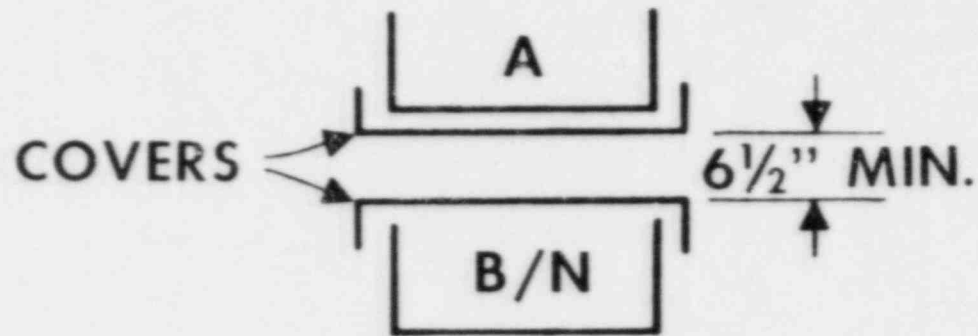
SINGLE COVER (2ND SYSTEM)



GENERAL PLANT AREAS OTHER THAN TOTAL ENCLOSURE

SINGLE COVER (1ST SYSTEM)

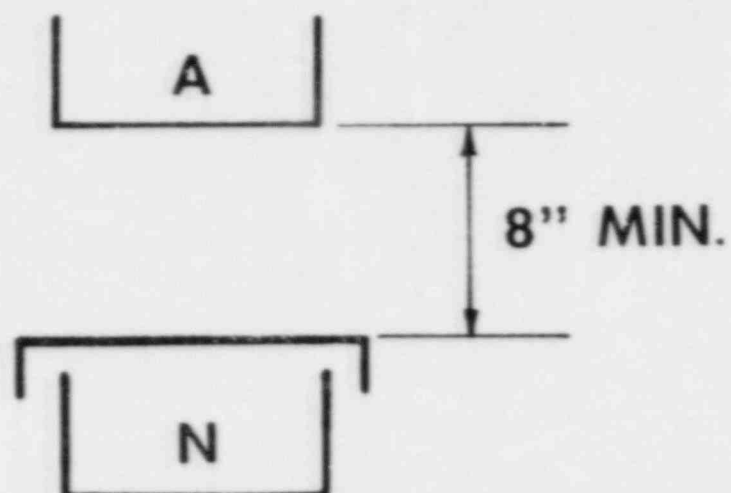
SINGLE COVER (2ND SYSTEM)



NOTE: EITHER COVER OR BOTH COVERS MAY BE VENTILATED

CABLE SPREADING AREA OTHER THAN TOTAL ENCLOSURE

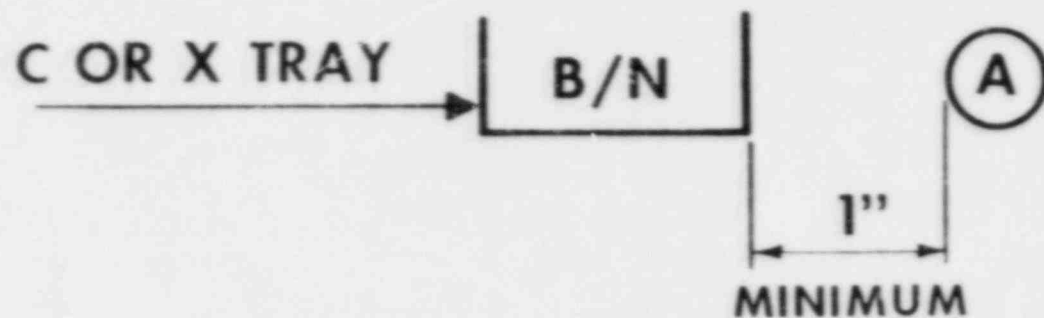
REDUCED SEPARATION BETWEEN ONE
SYSTEM AND "N" SYSTEM



C AND X SERVICE LEVELS ONLY

CABLE SPREADING AREA OTHER THAN TOTAL ENCLOSURE

TOTAL ENCLOSURE OF ONE SYSTEM



26

TEST PROGRAM

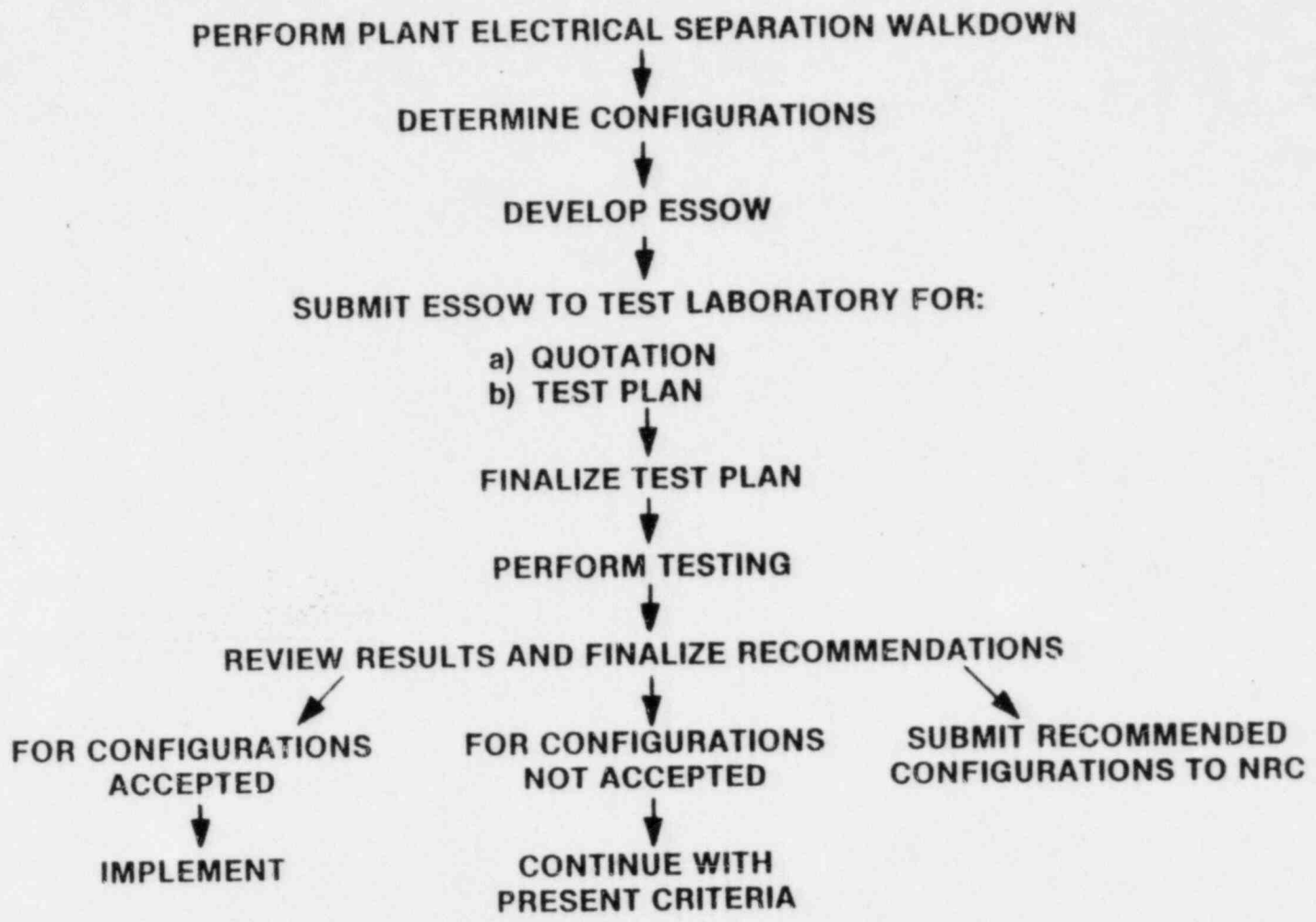
IEEE 384-1974

- 5.1.1.2 IN THOSE AREAS WHERE THE DAMAGE POTENTIAL IS LIMITED TO FAILURES OR FAULTS INTERNAL TO THE ELECTRICAL EQUIPMENT OR CIRCUITS, THE MINIMUM SEPARATION DISTANCE CAN BE ESTABLISHED BY ANALYSIS OF THE PROPOSED CABLE INSTALLATION. THIS ANALYSIS SHALL BE BASED ON TESTS PERFORMED TO DETERMINE THE FLAME RETARDANT CHARACTERISTICS OF THE PROPOSED CABLE INSTALLATION CONSIDERING FEATURES SUCH AS CABLE INSULATION AND JACKET MATERIALS, CABLE TRAY FILL, AND CABLE TRAY ARRANGEMENT.

TEST PROGRAM

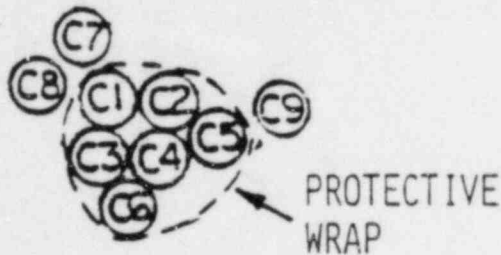
THIS TEST PROGRAM IS TO DEMONSTRATE THAT CERTAIN DETAILED ARRANGEMENTS OF CABLES AND RACEWAYS AS PRESENTLY INSTALLED AT BVPS-2 HAVE INHERENT CONSERVATIVE ATTRIBUTES AND THAT VARIOUS OPTIONAL MEANS EXIST OF ACHIEVING ACCEPTABLE SEPARATION WHICH WOULD MITIGATE THE EFFECT OF CONSEQUENTIAL WORK ON THE SCHEDULE.

ELECTRICAL SEPARATION LOGIC

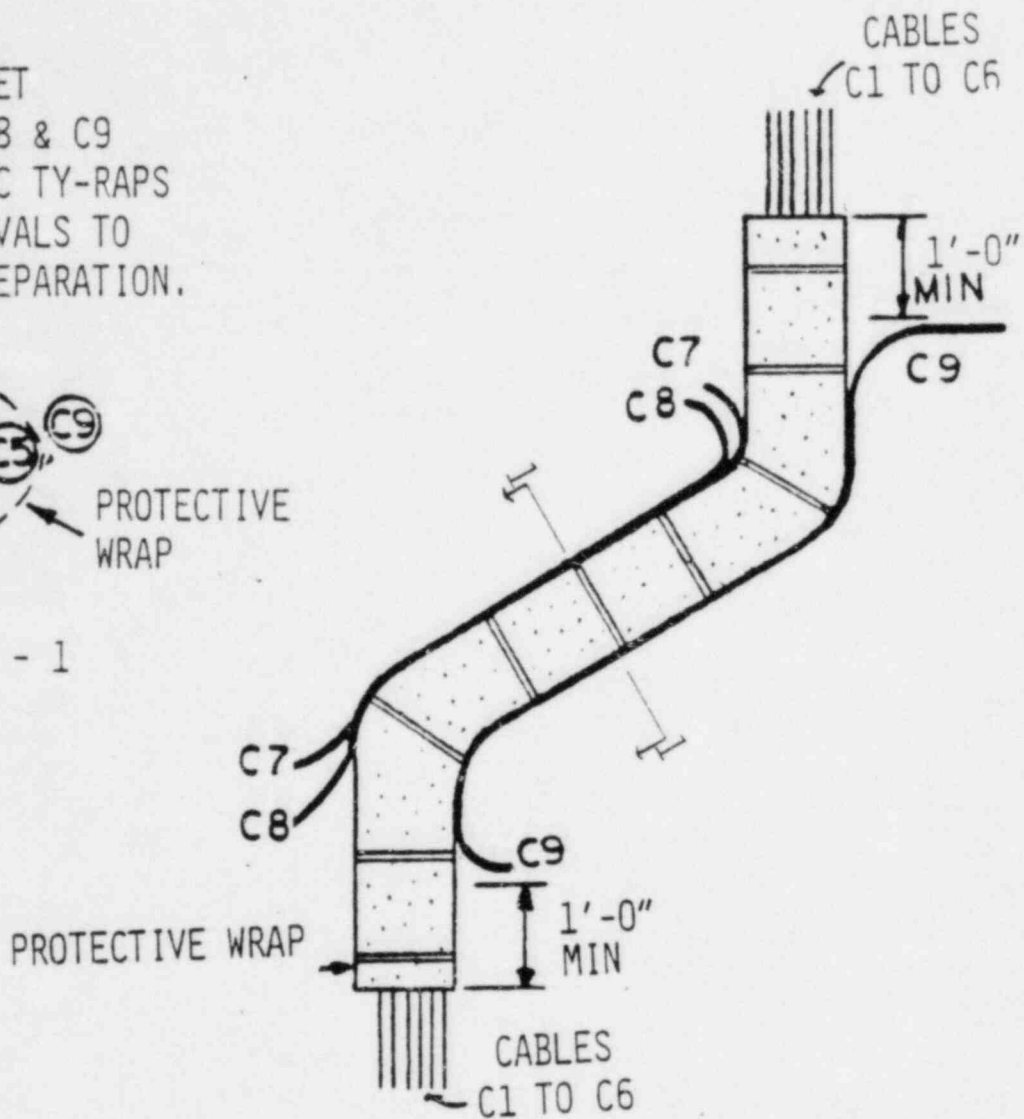


CONFIGURATION #1

SECURE TARGET
CABLES C7, C8 & C9
WITH PLASTIC TY-RAPS
AT 1' INTERVALS TO
ENSURE 0" SEPARATION.



SECTION 1 - 1

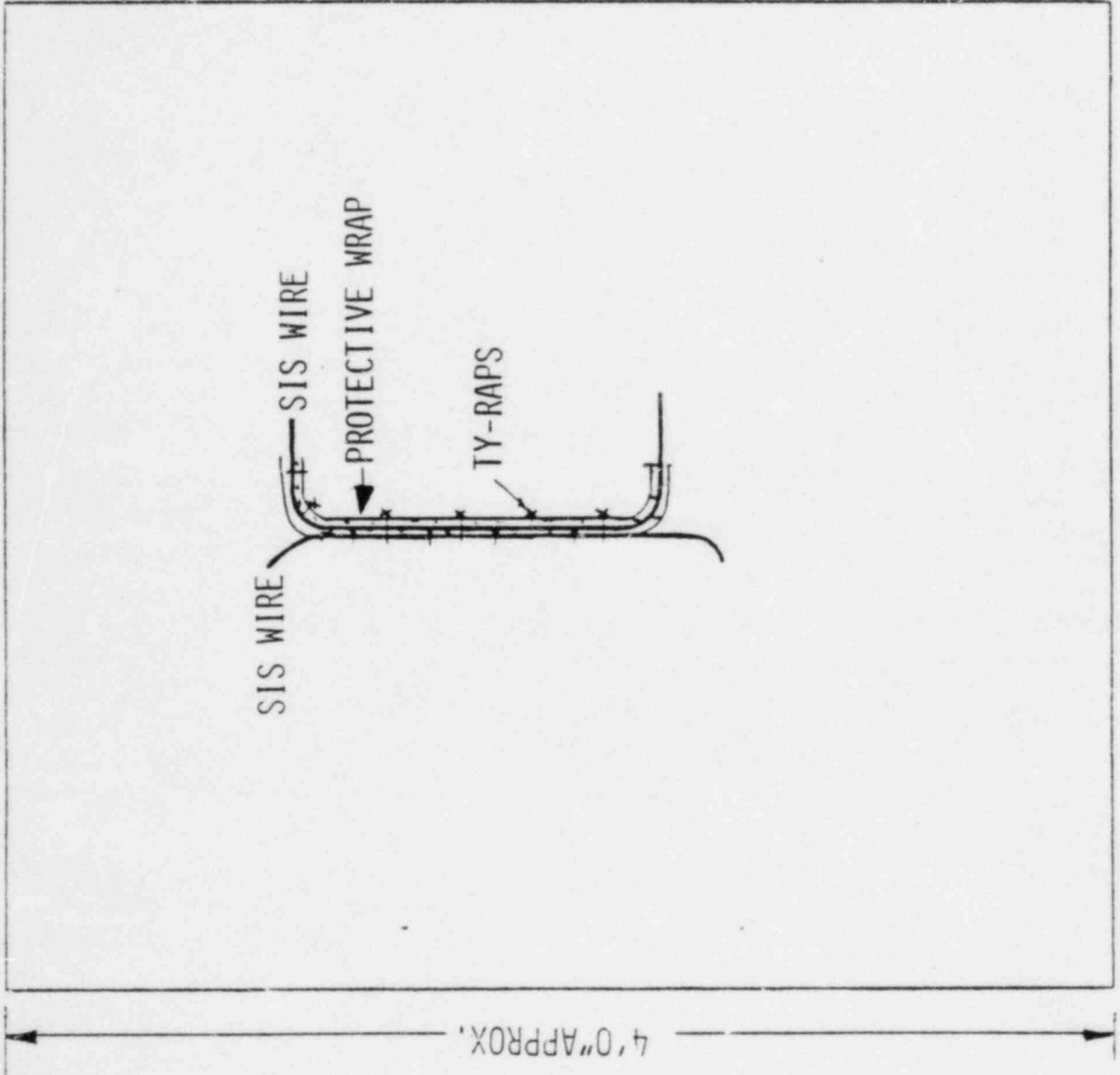


SIDE VIEW

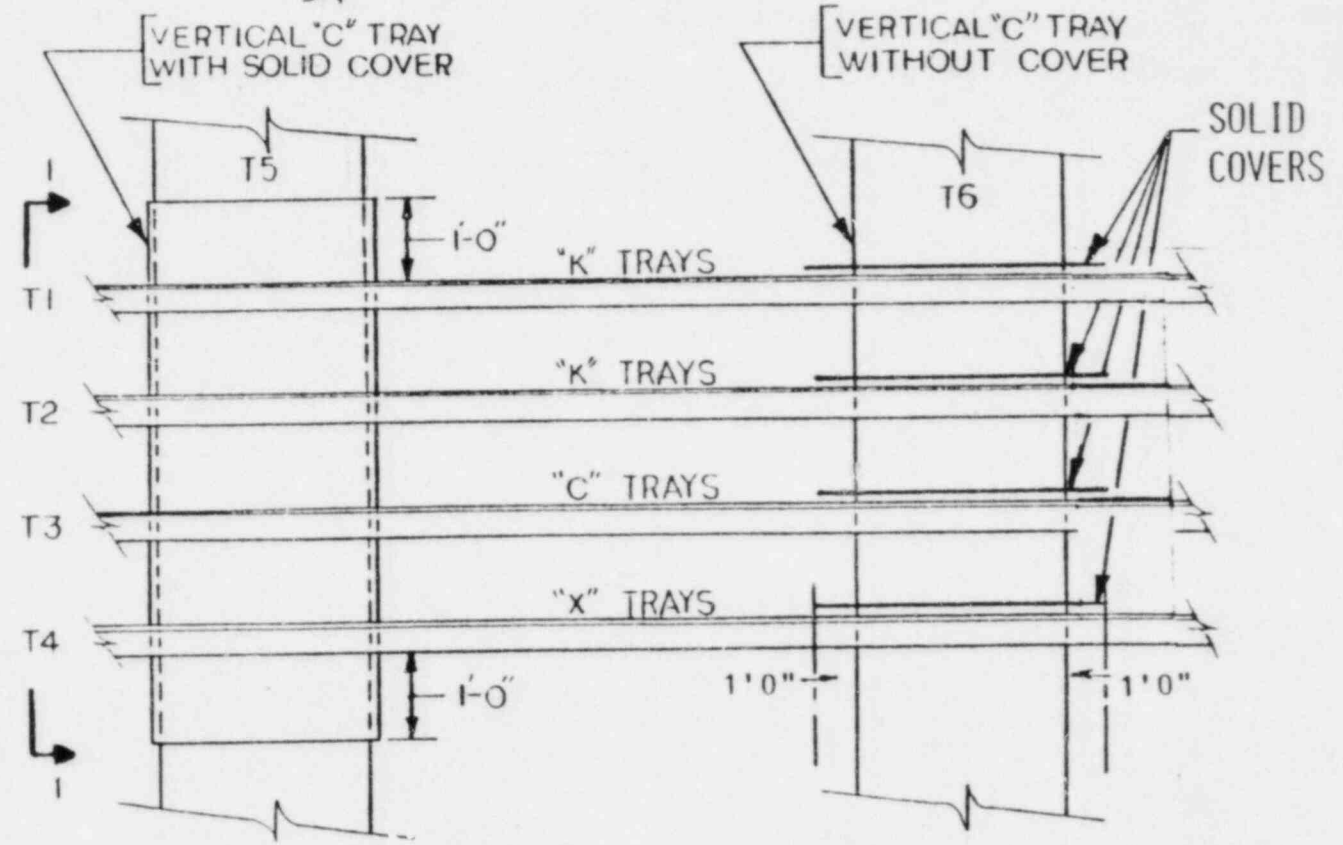
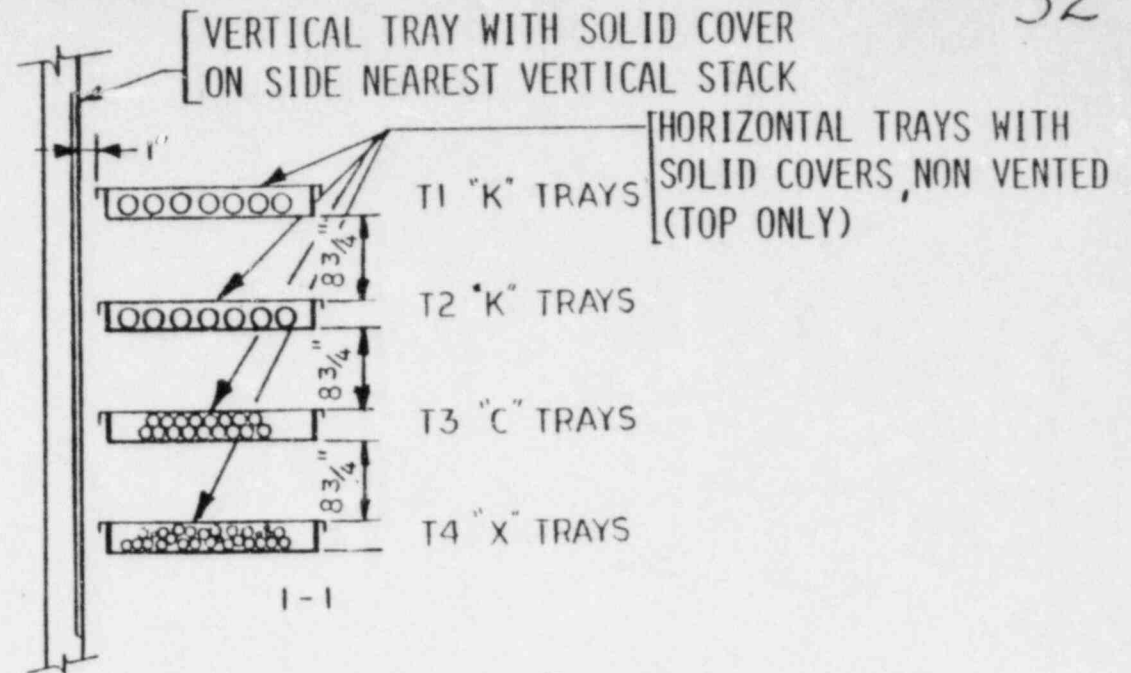
NOTES

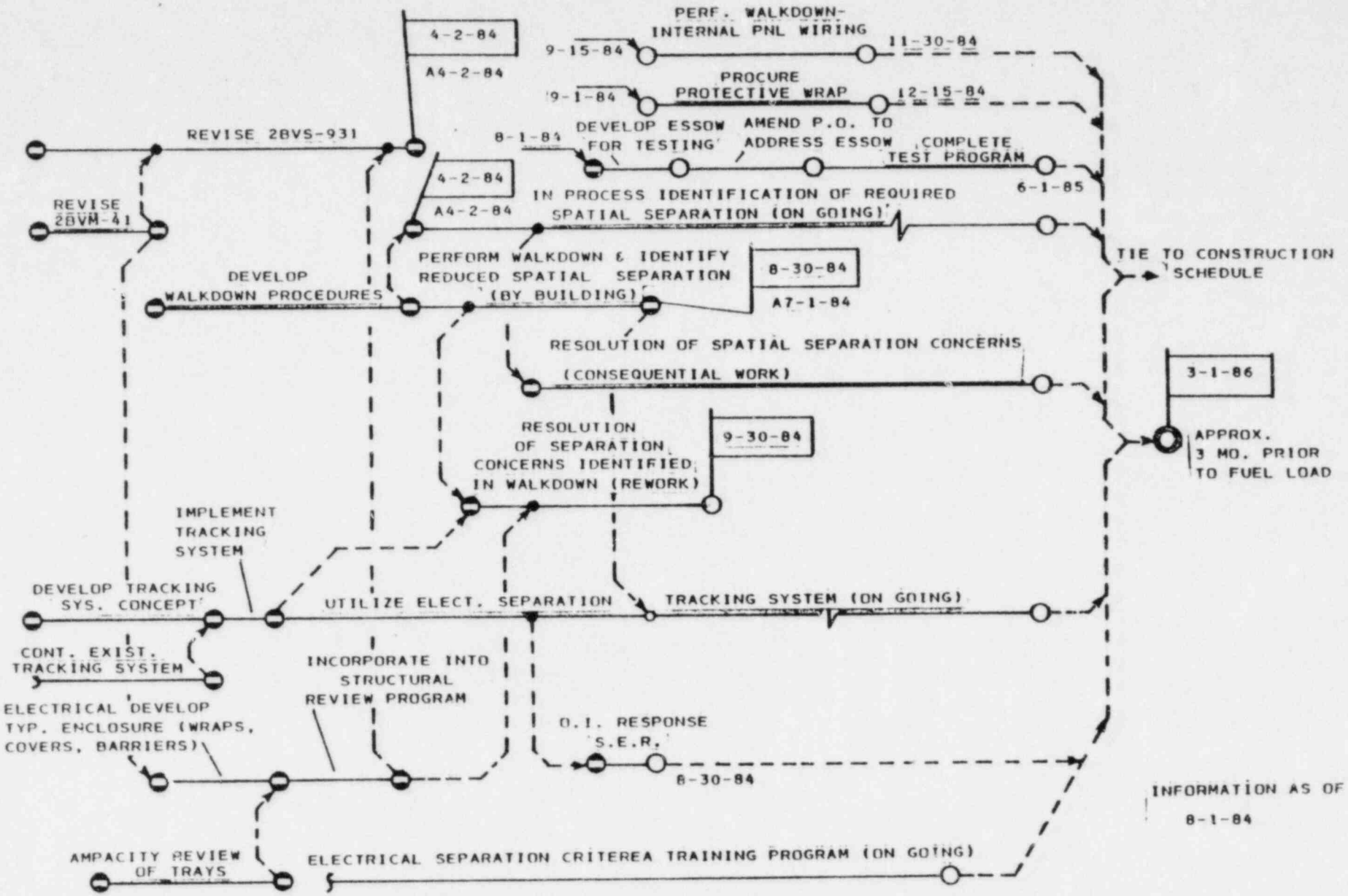
- 1.0 FAULT CABLE C6
- 2.0 TARGET CABLES C7, C8 & C9
- 3.0 TOTAL LENGTH OF WRAPPED CABLE IS 7'. HALF OF THE LENGTH IS WITH PROTECTIVE WRAP. THE OTHER HALF WITH SIL TEMP TAPE HALF LAPPED AND SECURED WITH BANDS OF 3M NO. 69 GLASS CLOTH TAPE EVERY 6".

CONFIGURATION #2



CONFIGURATION #3





COMPLIANCE SCHEDULE
 REGULATORY GUIDE 1.75
 BEAVER VALLEY POWER STATION UNIT 2

LESS THAN REDUCED SEPARATION PROBLEM SUMMARY BY TYPE AND BY RESPONSIBLE GROUP (RG)		From:		To:		From:		To:	
		PREVAIL	BOB DUMPER	BOB DUMPER	BOB DUMPER	BOB DUMPER	BOB DUMPER	BOB DUMPER	BOB DUMPER
TYPE	TOTAL	TO BE RESOLVED BY R.G.				RESOLVED TO DATE BY RG.			
		C	D	E		C	D	E	H
CC	173	58	115	-	-	-	1	1	12
CJ	20	17	3	-	-	1	-	-	-
CS	65	22	43	-	-	-	-	11	5
CT	138	49	88	1	-	-	-	7	35
CX	193	104	61	28	-	-	12	112	12
JB	13	13	-	-	-	-	-	2	1
JJ	7	7	-	-	-	-	-	-	-
JS	7	6	1	-	-	-	-	4	-
JT	15	14	1	-	-	-	-	3	1
JX	9	8	-	1	-	-	-	-	-
SX	56	30	10	16	-	-	-	23	1
IT	35	27	2	6	-	-	-	28	-
TX	204	149	15	40	-	-	3	98	42
XX PP	57	40	3	8	-	-	2	38	6
TOTAL	993	545	348	100	1	18	328	115	115

PROBLEM TOTALS BY BUILDING BY TYPE

<u>BLDG</u>	<u>CX</u>	<u>TYPE</u> <u>SS</u>	<u>TT</u>	<u>TOTAL</u>
AB	55	169	55	279
CA	125	96	125	346
CB	246	82	246	574
DG	22	20	22	64
FB	1	7	1	9
MH	42	36	42	120
RB	108	160	108	376
RC	31	56	31	118
SB	136	149	136	421
SG	12	90	12	114
TB	27	9	27	63
VP	4	1	0	5
TOTAL	809	875	805	2,489

NRC I&E UNRESOLVED ITEM 82-05-01

- **SEPARATION CRITERIA LESS RESTRICTIVE THAN R.G. 1.75/IEEE 384**

RESPONSE: BVPS-2 HAS COMMITTED TO R.G. 1.75, REV. 2

- **NUMEROUS NONCONFORMANCES IDENTIFIED AGAINST LESS RESTRICTIVE CRITERIA CONTAINED IN 2BVS-931**

RESPONSE: BVPS-2 PROGRAM TO IDENTIFY, TRACK, AND RESOLVE NONCONFORMANCES DISCUSSED IN THIS MEETING. TRAINING PROGRAM INSTITUTED TO MINIMIZE FUTURE INSTANCES OF NON-CONFORMANCE

- **FAILURE TO COMPLY WITH NETWORK SUMMARY (JUNE 1983) REGARDING UPDATING OF 2BVM-41 AND 2BVS-931 FOR COMPLIANCE WITH R.G. 1.75/IEEE 384**

RESPONSE: THE NETWORK SUMMARY HAS BEEN UPDATED TO REFLECT CHANGES IN SCHEDULE AND COMMITMENTS WITH RESPECT TO R.G. 1.75, REV. 2

NOTES OF CONFERENCE
ELECTRICAL SEPARATION PRESENTATION TO NRC
BEAVER VALLEY POWER STATION - UNIT NO. 2
DUQUESNE LIGHT COMPANY

J.O.No. 12241

Held at Beaver Valley Power Station
Duquesne Light Company
Shippingport, PA
August 30, 1984

Present for:

Duquesne Light Company (DLC)

J. M. Arthur
J. J. Carey
E. J. Woolever
H. M. Siegel
N. R. Tonet
J. D. Sieber
K. Grada
R. Coupland
J. F. Konkus
R. J. Swiderski
D. Schmitt
G. L. Beatty
E. Horvath
J. Koepfinger

Nuclear Regulatory Commission
(NRC)

M. Ley
J. Knox
G. A. Walton
W. Troskoski
L. Tripp
C. Anderson

Stone & Webster Engineering
Corporation (SWEC)

P. RaySircar
J. D. Sutton
C. H. Wilbur
P. J. Bienick
E. F. Heneberry
F. P. Walker
G. P. Eckert
E. Andre

PURPOSE

The purpose of the conference was to inform representatives of the Nuclear Regulatory Commission of the present status and future activities of the BVPS-2 Electrical Separation Program. The meeting agenda and a copy of each of the slides used in the DLC presentation are provided as Attachments 1 and 2.

DISCUSSION

The presentation was initiated with a summary of the results of the December 20, 1983 meeting and a discussion of the progress of the BVPS-2 Electrical Separation Program. Specific accomplishments cited for the program included:

- i. Development and implementation of design criteria and installation documents reflecting the R.G. 1.75 criteria.
- ii. Development and implementation of a training program for engineers, designers, QC, and construction personnel.
- iii. Development and implementation of a computer-based system to track existing separation problems.
- iv. Completion of an engineering walkdown of the plant to identify spatial separations less than the R.G. 1.75 criteria.

Important terminology used in the separation program was presented and defined. (See Slides 2 through 5 in Attachment 2.)

It was reported that the engineering walkdown identified 1108 cases where rework was required. Of these, only 50 are remaining to be resolved by SWEC engineering and 348 by the electrical contractor's design group. Engineering will complete disposition of these items by September 30, 1984. The design group's target for completion is also September 30, 1984. Construction has committed to complete rework on all items by January 1, 1985.

The presentation also noted that new work is proceeding in a fashion that will allow the installation of covers and wraps as shown in the engineering documents (specifications, drawings, etc.). A schedule was presented (Attachment 2, Slide 34) that indicated that consequential work will start approximately April 1985.

Details of the proposed consequential work designs to satisfy Regulatory Guide 1.75 (Rev. 2) separation criteria (e.g., tray covers and cable wraps) were presented. Slides 19 through 25 provide some of these details. A sample of the Sil-temp material which will be employed for cable wrapping (where required) was offered for inspection. It was indicated that the detail designs would be documented in an amendment to Section 8.3 of the BVPS-2 FSAR.

A test program, which should justify reductions in the scope of the consequential work requirements, was described. NRC representatives noted that this represented a change in program emphasis as previously discussed in December 1983 and expressed interest in reviewing the proposed test program. The test program will be discussed with the NRC during the next licensing meeting, expected during the last week of September 1984. It was stressed to the NRC that BVPS-2 would successfully meet R.G. 1.75 criteria with the

present separation program, even if the test program results do not establish the bases for reductions in consequential work scope.

An updated schedule for the program (Slides 33 and 34) was also presented.

The presentation was concluded with a review of the issues raised by Region I personnel in Unresolved Inspection Item 82-05-01. DLC indicated that it felt that all of the issues had been addressed in the presentation and therefore hoped that this item could be closed.

At the conclusion of the presentation, a plant tour was conducted which included the rod control area, the cable spread area, and the main control room. The purpose was to show installations with insufficient separation which required rework to meet the separation criteria. An installation using the protective Sil-temp wrap was also viewed.

DLC stated it would issue minutes of the meeting to the NRC by September 15, 1984. In addition, a meeting with Mr. John Knox (NRR) was tentatively scheduled for September 26 to review the proposed plan for meeting the separation requirements, address the test plan, and provide details of acceptable consequential work designs.

DWDodson:AHB

Enclosures