Design Analysis Cover Sheet

Complete only applicable items.

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QA: N/A

Page: 1

Of: 4

2. DESIGN ANALYSIS TITLE CABLE PULLING TENSION			
3. DOCUMENT IDENTIFIER (Including Rev. No.) BABBD A000-01717-0200-00092 REV 01		4. REV. NO. 01	5. TOTAL PAGES 4
6. TOTAL ATTACHMENTS 2	7. ATTACHMENT NUMBERS - NO. OF PAGES IN EACH I-1, II-1		8. SYSTEM ELEMENT ESF
	Print Name	Signature	Date
9. Originator	YURI SHANE		7/21/95
10. Checker	LESLIE FERNANDEZ		7/24/95
11. Lead Design Engineer	Robert E. Howell		7/24/95
12. QA Manager	Daniel M. Jenkins		07.24.95
13. Department Manager	Gene N. Kimura		7/24/95
14. REMARKS /			

Design Analysis Revision Record

CRWMS/M&O

Complete only applicable items.

1.

QA: N/A

Page: 2 Of: 4

2. DESIGN ANALYSIS TITLE		
CABLE PULLING TENSION		
3. DOCUMENT IDENTIFIER (Including Rev. No.)		4. REVISION NO.
BABBD A000-01717-0200-00092 REV 01		01
5. Revision No.	6. Total Pages	7. Description of Revision
00	4	Initial Issue
01	4	Removed TBV-127 Reformatted entire Design Analysis to conform with Procedure QAP-3-9 Rev. 5 Revised Purpose Statement

1. PURPOSE

The purpose and objective of this calculation is to determine the pulling tension the cable can withstand without damage.

2. QUALITY ASSURANCE

- 2.1 No quality assurance (QA) controls apply to the items and activities as they are discussed within this analysis and it is therefore QA classified as "NONE" per [Quality Administrative Procedure] QAP-2-0 Rev. 2, QAP-2-3 Rev. 7, and [Implementing Line Procedure] NLP-3-18 Rev. 2.
- 2.2 No applicable Determination of Importance Evaluations (DIEs) (Reference 5.1) have resulted in controls that would affect the structures, systems, or components/configuration items described within this analysis. If a subsequent DIE indicates that the information provided in this analysis is required for use as a design input, this design analysis will require revision.
- 2.3 This study was prepared in accordance with QAP-3-9 Rev. 5.

3. METHOD

The computer program Electrical Transient Analyzer Program (ETAP) developed by Operation Technology Inc. was used for this design.

4. DESIGN INPUTS

4.1 DESIGN PARAMETERS

- 4.1.1 Maximum Tension - 8.0 pounds/kcmil
- 4.1.2 Maximum Sidewall Pressure - 500 pounds/foot
- 4.1.3 Friction Factor - 0.150
- 4.1.4 Cable diameter and weight were taken from the vendor catalog. (Houston Wire and Cable Co.)

4.2 CRITERIA

Exploratory Studies Facility (ESF) Basis For Design 7.2 IV.1

4.3 ASSUMPTIONS

Typical values for maximum tension, maximum sidewall pressure, and friction factor were assumed.

4.4 CODES AND STANDARDS

NFPA 70-1993 National Electrical Code - 1993

5. REFERENCES

5.1 BABB00000-01717-2200-00001 REV. 05, DIE For ESF North Portal Pad.

6. USE OF COMPUTER SOFTWARE

The Electrical Transient Analysis Program (ETAP) by Operation Technology, Inc. (OTI) Version 6.52 was used for cable pulling tension calculations. The software used was appropriate for the nonquality affecting application.

7. DESIGN ANALYSIS

Cable pulling program was run to determine the maximum pulling tension cable can withstand. The program was run for the worst case. Pulling tensions were calculated for both directions of pull.

8. CONCLUSIONS

It was determined that the calculated pulling tension was within the maximum allowable pulling tension of the cable.

9. ATTACHMENTS

ATTACHMENT	TITLE
I	Computer Printout Study Case: 1
II	Cable Pulling Diagram

Title: Cable Pulling Tension

Page: I-1

CABLE PULLING

Project: ESF DESIGN-YUCCA MOUNTAIN
 Location: LAS VEGAS, NV.
 Contract: 4580823
 Engineer: B.MAJMUDAR *BMA*

ETAP 6.52

Study Case: 1

PAGE: 1/1

Date: 09-24-1993

SN: 88FDI30132

File: DUC8ANK2

PULL FROM MAIN SWITCHGEAR TO LOAD BREAK SWITCHES

# of Cables	Appli- cation	Conductor Size kcmil	kV	# of Cond.	Diam. (in)	Weight lbs/ft	Max Ten. lbs/kcmil	Max SW Pres lbs/ft
3	Power	750	750.0	15.00	1	1.89	3.189	8.0
1	Ground	212	212.0	15.00	1	1.30	1.150	8.0

	Trade Size	Int. Diam.	Friction Factor	Bend Friction
CONDUIT:	6.000	6.065	0.150	0.150

Conduit			Horiz. Bend		Max. Tension Limited by SDWL Press (lb)	Total Tension	
Length (ft)	Slope (deg)	Location	Rad. (ft)	Ang. (deg)		FWD. Pull (lb)	Rev. Pull (lb)
		SWGR				107	1196
60	0 --<		3.0	90	2816	308	1074
50	0 --<	MH-PF	3.0	90	2816	542	703
175	0 --<		3.0	45	2816	1052	157
35	0 --<		3.0	0	2816	1534	69
5	90 --<	LDBRK		...		1556	107

Max. Total Allowable Pulling Tension = 19696 lbs

Total Length of Run (Pull) = 325 feet

Equivalent tension for 50 (ft) of cable is added for pulling from the reel.

Title: Cable Pulling Tension

Page: II-1

ETAP-CP cable pulling diagram

Filename: DUCBANK2 Date: 09-24-1993

PROJECT : ESF DESIGN - YUCCA MOUNTAIN

LOCATION : LAS VEGAS, NV

CONTRACT : 4580823

STUDY CASE : 1

ENGINEER: B MAJMUDDAR *BMA*