

ATTACHMENT 1

13-NC-QD-200, REVISION 2

9202270409 920207
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REVISION 02

CALCULATION REVISION/TITLE SHEET

Palo Verde Nuclear Generating Station

CALCULATION NO. 13-NC-QB-200		REV. 2	CLASS: Q <input type="checkbox"/> QAG <input type="checkbox"/> NQR <input checked="" type="checkbox"/>		AFFECTED SHEET NO(S) See below				
CALCULATION TITLE Calculation for Holophane Emergency Lighting Unit Availability Study								ISSUED 1/30/92	
AFFECTED CHANGES N/A			REFERENCE(S) NRC Inspection Report #IR528/91-30-00 Letter#102-02091-WFC/TRB/DLK, 12/27/91				UNITS AFFECTED <input checked="" type="checkbox"/> UNIT 1 <input checked="" type="checkbox"/> UNIT 2 <input checked="" type="checkbox"/> UNIT 3 <input type="checkbox"/> COMMON		
REASON FOR CHANGE Partition: RCTS CATS No.: 040847 "Evaluate commitment in letter 102-02091-WFC/TRB/DLK, Attachment 1, Section I.b., Par 7 and provide compliance with CATS action sheets that implement the commitment." Action 01: "In letter 102-02091, APS committed to provide updated information to the NRC on Exide and Holophane inverter availability by 01/31/92."									
DESCRIPTION OF CHANGE <p><u>Description</u></p> <p>This revision (2) incorporates updated availability data obtained for the time period of June 1990 through November 1991. This information was prepared in a manner consistent with that specified within the body of the original calculation.</p> <p><u>Pages Changed</u></p> <p>Table of Contents, page 1 of 14 6.0 References, page 5 of 14</p> <p><u>Pages Added</u></p> <p>Table 3: Input Data and Calculated Known and Estimated Unavailable Days(1991), Pages 21 - 23 Table 4: Calculation of Unit and Plant Availabilities(1991), Page 24 - 25 Table 5: Availability Comparison (1990 - 1991), Page 26 - 27 Appendix B: Work Order History Graphs (1991), Pages 28 - 40.</p>									
J.R. Wadella Tech. Issues 01/06/92	N/A	N/A	N/A	N/A	N/A	S.K. Guy PRA 1/8/92	C.A. Cooper FP. Engr. 1-16-92	N/A	D.C. Fan PRA 1/6/92
Preparer	Dwg. Check	Mech.	Civil	Elec.	I & C	Technical Review	Other (Specify Org.)	Other (Specify Org.)	RS
Date	Date	Date	Date	Date	Date	Date	Date	Date	NEM

CROSS DISCIPLINE REVIEW

Procedure 81DP-4CC04

4. 2. 1



BY: John R. Wadella	DATE: 06 Jan 92	SUBJECT: CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)	SHEET NO.: Page 1 of 20
CHECKED BY: Sandra K. Guy	DATE: 08 Jan 92		JOB NO.: 13-NC-QB-200

TABLE OF CONTENTS

<u>TITLE</u>	<u>PAGE</u>
1.0 PURPOSE	2
2.0 SUMMARY	2
3.0 CRITERIA AND ASSUMPTIONS	2
4.0 INPUT DATA	3
5.0 CALCULATION AND RESULTS	4
5.1 Method	4
5.2 Scope	4
5.3 Calculation Process	4
5.4 Results	5
6.0 References	5
TABLE 1: Input Data and Calculated Known and Estimated Unavailable Days	6
TABLE 2: Calculation of Unit and Plant Availabilities	7
APPENDIX A: Work Order History Graphs	8
TABLE 3: Input Data and Calculated Known and Estimated Unavailable Days(1991)	21
TABLE 4: Calculation of Unit and Plant Availabilities(1991)	24
TABLE 5: Availability Comparison (1990 - 1991)	26
APPENDIX B: Work Order History Graphs (1991)	28 - 40

REVISION 02

REVISION 02

4 2 1



BY: <i>Shawn Rodgers</i>	DATE: 9-17-90	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO.: Page 2 of 20
CHECKED BY: <i>Yovan Lukic</i>	DATE: 9/22/90		JOB NO.: 13-NC-QB-200

1.0 PURPOSE

This calculation is performed as part of the PVNGS response to NRC Inspection Report 90 -121. Pages five and six of that report provide failure data on Holophane, Exide and Emergi-Lite units. The data is presented on a reliability basis, e.g., 4 of 4 Holophane units (100%) failed in Unit 1 in 1988. The conclusion is drawn that the emergency lighting is not reliable.

While the failure numbers used by the NRC in the report are an accurate reproduction of data provided to the NRC in the June 29, 1990 letter, their method of portraying failures can be misleading. The purpose of this study is to provide a more proper way of portraying the failures of the Holophane units.

2.0 SUMMARY

An average unavailability indicator was developed. The unavailability indicator for each component (and group of components) is calculated for a specific time period by dividing the total number of unavailable days by the total number of days in the time period. Thus, a value of zero means a component was always available. A value of one implies a component was never available. This method is basically the method employed by INPO (Ref. 1) to monitor the readiness of important safety systems to respond to off-normal events or accidents. An availability indicator is obtained by subtracting the unavailability from one.

The resulting average availability indicators for the various units and Holophanes as a whole, based on a time period from June 29, 1989 to June 30, 1990 are as follows:

Unit 1: 0.99

R1 Unit 2: 0.95

Unit 3: 0.87

R1 Unit Average: 0.94

3.0 CRITERIA AND ASSUMPTIONS

There are no applicable design criteria, design assumptions, codes, standards, or other requirements for this calculation. The basic equation used to calculate the average estimated unavailability for a Holophane unit is to divide the total number of unavailable days by the total number of days in the selected time period.

The details involved are described in Section 5.

Two assumptions are made in this calculation. The first assumption deals with estimating the calendar date when the Holophane failed. Following an accepted reliability approach the failure is assumed to have occurred mid-point between the last date the component is known to have been operational and the component failure discovery date. The second assumption is that for each Holophane unit there are no failures in the time period from the last Holophane unit test to 6/30/90. This is the assumption as made for INPO's safety system unavailability monitoring, i.e. if the failure is not observed then it is assumed that there has not been a failure.

01 2 1
12 1



BY: Shawn Rodgers	DATE: 9-17-90	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO.: Page 3 of 20
CHECKED BY: Yovan Lukic	DATE: 9/22/90		JOB NO.: 13-NC-QB-200

4.0 INPUT DATA

The input data for this calculation is a series of failure data for each Holophane unit that identify the failure discovery date, the component repair date, and the last date that component is known to have been operational. This information is used to calculate a known unavailable time and an estimated unavailable time as described in Section 5.1. The failure data is based on a review of Holophane work orders performed by an EED Electrical task force related to Emergency Lighting. A series of graphs were prepared which depict the work order history of the Holophane units for the time frame June 29, 1989 to June 30, 1990. These graphs serve as a visual aid and help document which work orders contain information relating to failure data. They are provided as Appendix A.

The failures were compared with Holophane failure evaluations previously described to the NRC in Reference 2. The results of that comparison follow.

- Unit 1: QBN-001 - consistent with Reference 2.
- Unit 1: QBN-002 - consistent with Reference 2 - the failure date here is one day earlier than in Reference 2 since that is the day the new batteries were installed.
- Unit 1: QBN-003 - consistent with Reference 2.
- Unit 1: QBN-004 - consistent with Reference 2.
- Unit 2: QBN-001 - consistent with Reference 2.
- Unit 2: QBN-002 - consistent with Reference 2 with the following exception. An 8 hour discharge test was supposed to have occurred prior to Unit 2 restart on 6/29/89, but did not occur until 7/3/90. This is treated as 4 days of unavailability.
- Unit 2: QBN-003 - the failure on 05/11/90 described in Reference 2 has since been reclassified as no failure.
- Unit 2: QBN-004 - the failures on 12/29/89 and 5/11/90 described in Reference 2 have since been reclassified as no failures.
- Unit 3: QBN-001 - consistent with Reference 2 with the clarification that the 3-11-90 event is not a failure.
- Unit 3: QBN-002 - consistent with previous evaluations.
- Unit 3: QBN-003 - consistent with Reference 2.
- Unit 3: QBN-004 - consistent with Reference 2.

The failure data is contained in Table 1.

5.0 CALCULATION AND RESULTS

5.1 Method

An unavailability indicator was developed to quantify the readiness of Holophane units to respond to situations in which they would be required. The indicator for each component (or any group of components) is calculated for a specific time period by dividing the total number of unavailable days by the total number of days in the time period. Thus, a value of zero for a component means the component was always available. A value of one

2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100



BY: <i>Shawn Rodgers</i> Shawn Rodgers	DATE: <i>6-17-90</i> 6-17-90	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO.: Page 4 of 20
CHECKED BY: <i>Yovan Lukic</i> Yovan Lukic	DATE: <i>9/27/90</i> 9/27/90		JOB NO.: 13-NC-QB-200

means a component was never available. This method is basically the method employed by INPO to monitor the readiness of important safety systems to respond to off-normal events or accidents.

The method requires the development of known and estimated unavailable time periods. The known unavailable time periods are the times a component is not available for service when the beginning and ending time of the unavailability due to a failure are known, i.e. failure discovery time and repair time respectively. The estimated time periods are the average times a component was in a failed state prior to failure discovery. This time is estimated as one-half time interval measured from the last time the component is known to be operable to the time it is discovered as failed. Thus, for a component which failed an eight-hour discharge test, the estimated unavailable time would probably be one-half the time since the last successful eight-hour discharge test for that component. A more recent preventive maintenance would be used if a determination could be made that the specific failure mode would have been detected by the maintenance. The unavailable times described above are only those stemming from events judged to be component failures.

5.2 Scope

The scope of this evaluation includes all Holophane Units in Units 1, 2, and 3. The time period begins on June 29, 1989 (Unit 2 restart). The process of determining failure dates, repair dates, and last known available dates requires extensive review of work orders. These work orders are not intended for this purpose and chronological reconstructions can be difficult and time consuming. The selection of 6/29/89 as a start date for this calculation is based on it being both representative and recent. An end date of 6/30/90 was chosen as the conclusion of the time period for this study. The basis for the selection of this end date is that it allows for an extended history without having to consider open work orders. Although the limited time period is based on time and resource constraints, a one-year period is considered adequate to estimate Holophane availability.

5.3 Calculation Process

The calculation process used is straight-forward. For each failure event, three dates are required as input data: the failure discovery date, the component repair date, and the last date the component is known to have been available. The time between the failure discovery date and the component repair date is the known unavailable hours as discussed in Section 5.1. The estimated unavailable time is one-half the time between the last time the component is known to be available and the failure discovery date. An exception to this calculation of the estimated unavailable time is made for cases in which the estimated unavailable time period is prior to the June 29, 1989 start date. In those cases, the estimated unavailable time is taken from the start date to the failure date. The calculated known and estimated unavailable days are shown with the input data in Table 1. Once the known and estimated unavailable days are determined for each component, they are entered into a spreadsheet which: (1) totals the known and estimated unavailable days for each component; and, (2) calculates the component average unavailability indicator by dividing this total by the total time period for the component (366 days). The spreadsheet also sums the unavailable days and the total time periods for all the components in a unit, and then calculates a unit average. This process is repeated for all three units. A Holophane overall plant unit average is calculated. The spreadsheet calculations were manually verified. The spreadsheet is duplicated in Table 2.



ENGINEERING SKETCH PAD

BY: John R. Wadella <i>QW</i>	DATE: 06 Jan 92	SUBJECT: CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)	SHEET NO.: Page 5 of 20
CHECKED BY: Sandra K. Guy <i>SKG</i>	DATE: 08 Jan 92		JOB NO.: 13-NC-QB-200

5.4 Results

The resulting average availability indicators for the various units and Holophanes as a whole, based on a time period from June 29, 1989 to June 30, 1990 are as follows:

Unit 1: 0.99
Unit 2: 0.95
Unit 3: 0.87
Unit Average: 0.94

6.0 REFERENCES

1. August 30, 1989 Letter from Terence J. Sullivan of INPO to William F. Conway Enclosure 2
2. August 1, 1990 letter from W. F. Conway to J. B. Martin: 161-03373-WFC/WFQ
3. December 27, 1991 letter from W. F. Conway to J. B. Martin: 102-02091-WFC/TRB/DLK

REVISION 02



ENGINEERING SKETCH PAD

REV 1

BY: <i>Shawn Rodgers</i>	DATE: <i>7-17-90</i>	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO.: Page 6 of 20
CHECKED BY: <i>Yovan Lukid</i>	DATE: <i>9/22/90</i>		JOB NO.: 13-NC-QB-200

TABLE 1. Input Data and Calculated Known and Estimated Unavailable Days

Equipment ID	Discovery Date	Repair Date	Last Known Available Date	Unavailable Known Days	Unavailable Estimated Days	Unavailable Total Days
1EQBNN01	No Failures					
1EQBNN02	08-May-90	26-May-90	08-May-90	18	0	18
1EQBNN03	No Failures					
1EQBNN04	No Failures					
R1 2EQBNN01	05-Mar-90	16-Mar-90	22-Nov-89	11	51.5	62.5
2EQBNN02	29-Jun-89	03-Jul-89	29-Jun-89	4	0	4
R1 2EQBNN03	No Failures					
2EQBNN04	No Failures					
3EQBNN01	*29-Jun-89	25-Jul-89	29-Jun-89	26	0	26
3EQBNN02	No Failures					
3EQBNN03	03-May-90	18-Jun-90	05-Oct-89	46	105	151
3EQBNN04	07-Feb-90	16-Feb-90	07-Feb-90	9	0	9

* The actual discovery date was June 8. The June 29 date is the start time for the availability evaluation.



ENGINEERING SKETCH PAD

REV 1

BY: <i>Shawn Rodgers</i> Shawn Rodgers	DATE: <i>9-17-90</i>	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO.: Page 7 of 20
CHECKED BY: <i>Yovan Lukic</i> Yovan Lukic	DATE: <i>9/22/90</i>		JOB NO.: 13-NC-QB-200

TABLE 2. Calculation of Unit and Plant Availabilities

Equipment ID	Known Unavailable Days	Estimated Unavailable Days	Total Unavailable Days	Required Days	Average Availability
1EQB..01	0	0	0	366	100.0%
1EQB..02	18	0	18	366	95.1%
1EQB..03	0	0	0	366	100.0%
1EQB..04	0	0	0	366	100.0%
Totals	18	0	18	1464	
Average Unit Availability					98.8%
2EQB..01	11	51.5	62.5	366	82.9%
2EQB..02	4	0	4	366	98.9%
2EQB..03	0	0	0	366	100.0%
2EQB..04	0	0	0	366	100.0%
Totals	15	51.5	66.5	1464	
Average Unit Availability					95.5%
3EQB..01	26	0	26	366	92.9%
3EQB..02	0	0	0	366	100.0%
3EQB..03	46	105	151	366	58.7%
3EQB..04	9	0	9	366	97.5%
Totals	81	105	186	1464	
Average Unit Availability					87.3%
Plant Totals	114	156.5	270.5	4392	
Average Plant Availability					93.8%

ENGINEERING SKETCH PAD

REV 1

BY: <i>Shawn Rodgers</i> Shawn Rodgers	DATE: <i>7-17-90</i> 7-17-90	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO.: Page 8 of 20
CHECKED BY: <i>Yovan Lukic</i> Yovan Lukic	DATE: <i>9/22/90</i> 9/22/90		JOB NO.: 13-NC-QB-200

APPENDIX A

WORK ORDER HISTORY GRAPHS



ENGINEERING SKETCH PAD

REV 1

BY: Shawn Rodgers	DATE: 7-17-90	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO: Page 9 of 20
CHECKED BY: Yovan Lukic	DATE: 9/22/90		JOB NO: 13-NC-QB-200

June 89 July 89 Aug 89 Sept. 89 Oct 89 Nov 89 Dec 89 Jan 90 Feb 90 Mar 90 Apr 90 May 90 June 90 July 90

Revision 1

DATA START DATE - 6/29/89 (UNIT 2 RESTART)

00360691 (7/6/89 - 7/10/89) MONTHLY INSPECTION / TEST OK

00360692 (8/18/89 - 8/18/89) MONTHLY INSPECTION / TEST OK

00360693 (9/7/89 - 9/8/89) MONTHLY INSPECTION / TEST OK

00376693 (9/29/89 - 10/2/89) MONTHLY INSPECTION / TEST OK

00383242 (10/30/89 - 10/30/89) MONTHLY INSPECTION / TEST OK

00389548 (12/17/89) MONTHLY INSPECTION / TEST. BBFV WAS LOW (24.3 VDC) HIGH VOLTAGE POT WOULD NOT ADJUST. WR # 312244 INITIATED. ADEQUATE MARGIN FOR 8 - HOUR ILLUMINATION.
00392826 (12/27/89) MONTHLY INSPECTION / TEST. BBFV WAS HIGH (30.6). VOLTAGE WAS ADJUSTED SATISFACTORILY. WR # 312244 CANCELLED. WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.
00389542 (12/27/89) 8-HOUR DISCHARGE TEST. TEST VOLUNTARILY TERMINATED AFTER 7.5 HOURS DUE TO INSUFFICIENT LOAD ON LAMP FIXTURE 1EQBN001 - B AND 1EQBN002 - D. WO 404923 INITIATED TO REPLACE BALLAST. BATTERIES WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.

00398424 (2/21/90) MONTHLY INSPECTION / TEST. BBFV WAS LOW (25.7 VDC). NO VOLTAGE ADJUSTMENT. WO # 415243 INITIATED TO REPLACE CHARGER CARD. ADEQUATE MARGIN FOR 8 - HOUR ILLUMINATION.

00401574 (3/6/90 - 3/7/90) MONTHLY INSPECTION / TEST. BBFV WAS LOW (25.0). NO VOLTAGE ADJUSTMENT. (WO # 415243 PREVIOUSLY INITIATED). ADEQUATE MARGIN FOR 8 - HOUR ILLUMINATION.
00404923 (3/6/90 - 3/7/90) (CM) CHANGED OUT LAMPS AND BALLASTS IN FIXTURES 1EQBN001 - B AND 1EQBN002 - D TO RESOLVE WO # 319542. RETEST TO BE PERFORMED UNDER WO # 405060. WOULD HAVE MET ILLUMINATION CRITERIA.

00415243 (3/30/90) (CM) VOLTAGE COULD NOT BE ADJUSTED. CHARGER CARD REPLACED TO RESOLVE WO 401574 AND 398424. WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.

00407299 (3/30/90) MONTHLY INSPECTION / TEST OK

00405060 (3/31/90 - 4/1/90) 8-HOUR DISCHARGE TEST OK

00412838 (4/19/90) MONTHLY INSPECTION / TEST OK

00421867 (4/30/90 - 5/1/90) 8-HOUR DISCHARGE TEST OK

00401319 (5/5/90 - 5/8/90) INSTALL NEW EQD TAGS

00419387 (5/17/90) MONTHLY INSPECTION / TEST OK

00426498 (6/3/90) LOAD VERIFICATION / OK

00429866 (6/12/90) LAMPS WATTAGE INSPECTION / OK

00430399 (6/15/90 - 6/18/90) REWORK FIREPROOFING AS PART OF SITE MOD 1-SM-QD-007

00430485 (6/14/90) REPLACE LIGHTS WITH LONG LIFE LIGHTS

00430563 (6/15/90 - 6/19/90) 8-HOUR DISCHARGE TEST OK. BATTERY CELL 5A HAD LOW IGV (11.7 VDC) WO # 431191 ISSUED TO REPLACE CELL # 5A. WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.
00431191 (6/19/90) (CM) REPLACED BATTERY CELL # 5A TO RESOLVE WO 430563. WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.

REQUIRED AVAILABLE DAYS: 366
KNOWN UNAVAILABLE DAYS: 0
TOTAL UNAVAILABLE: 0

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUIP: 1EQBN001
TYPE: HOLOPHANE - UPS
LOAD: 900 WATTS

Available
Known unavailable
Estimated unavailable



ENGINEERING SKETCH PAD

REV 1

BY: <i>Shawn Rodgers</i>	DATE: <i>9-17-90</i>	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO. Page 10 of 20
CHECKED BY: <i>Yovan Lukte</i>	DATE: <i>9/22/90</i>		JOB NO: 13-NC-QB-200

June 89 July 89 Aug 89 Sept. 89 Oct 89 Nov 89 Dec 89 Jan 90 Feb 90 Mar 90 Apr 90 May 90 June 90 July 90

Revision 1

DATA START DATE - 6/29/89 (UNIT 2 RESTART)

00360695 (7/6/89 - 7/10/89) MONTHLY INSPECTION / TEST OK

00360696 (8/18/89 - 8/18/89) MONTHLY INSPECTION / TEST - BATTERY CELL # 1A HAD LOW IBV (11.1 VDC) WO # 341770 INITIATED TO REPLACE CELL # 1A. WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.

00360697 (9/7/89 - 9/9/89) MONTHLY INSPECTION / TEST - BATTERY CELL # 1A HAD LOW IBV (11.19 VDC) (WO # 341770 PREVIOUSLY INITIATED). WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.

00376694 (9/29/89 - 10/2/89) MONTHLY INSPECTION / TEST - BATTERY CELL # 1A HAD LOW IBV (11.2 VDC) (WO # 341770 PREVIOUSLY INITIATED). WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.

00383243 (10/20/89 - 10/20/89) MONTHLY INSPECTION / TEST - BATTERY CELL # 1A HAD LOW IBV (11.2 VDC) (WO # 341770 PREVIOUSLY INITIATED). CELL # 3A HAD A CRACKED / FLATTENED BATTERY POST. WO # 419231 INITIATED TO REPLACE CELL # 3A. WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.

00389549 (12/17/89 - 12/17/89) MONTHLY INSPECTION / TEST - BATTERY # 1A HAD LOW IBV (11.1 VDC) (WO # 341770 PREVIOUSLY INITIATED). CELL # 3A HAD A CRACKED / FLATTENED BATTERY POST.

00392827 (12/27/89 - 12/27/89) MONTHLY INSPECTION / TEST - BATTERY CELL # 1A HAD LOW IBV (11.2 VDC) (WO # 341770 PREVIOUSLY INITIATED). CELL # 3A HAD A CRACKED / FLATTENED BATTERY POST. (WO # 419231 PREVIOUSLY INITIATED). WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.

00389543 (1/27/89 - 1/6/90) 8-HOUR DISCHARGE TEST - TEST VOLUNTARY TERMINATED AFTER 7.5 HOURS DUE TO INSUFFICIENT LOAD. FAULTY BALLAST ON LAMP FIXTURE IEQBN002-D WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION. WO 404923 INITIATED TO REPLACE BALLAST.

00398425 (2/21/90 - 2/21/90) MONTHLY INSPECTION / TEST - BATTERY CELL # 1A HAD LOW IBV (11.2 VDC) (WO # 341770 PREVIOUSLY INITIATED). CELL # 3A HAD A CRACKED / FLATTENED BATTERY POST. (WO # 419231 PREVIOUSLY INITIATED). WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.

00401575 (3/6/90 - 3/7/90) MONTHLY INSPECTION / TEST - BATTERY CELL # 1A HAD LOW IBV (11.2 VDC) (WO # 341770 PREVIOUSLY INITIATED). CELL # 3A HAD A CRACKED / FLATTENED BATTERY POST. (WO # 419231 PREVIOUSLY INITIATED). WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.

00404923 (3/6/90 - 3/7/90) (CM) DIM LIGHTS. CHANGED OUT LAMPS AND BALLASTS IN FIXTURES IEQBN001-B AND IEQBN002-D WOULD HAVE MET ILLUMINATION CRITERIA. REF. WO # 319543 AND 405061

00341770 (3/24/90 - 3/26/90) (CM) REPLACE CELL # 1A AND 3A (REF WO # 419231)

00405061 (3/26/90 - 3/30/90) 8 - HOUR DISCHARGE TEST OK

00407300 (3/27/90 - 4/2/90) MONTHLY INSPECTION / TEST OK

00412839 (4/19/90 - 4/19/90) MONTHLY INSPECTION / TEST OK

00419231 (5/1/90 - 5/14/90) (CM) REPLACED BATTERIES PER MNCR 90-QB-003 WO # 00424862 ISSUED FOR RETEST

00424862 (5/1/90 - 5/1/90) 8-HOUR DISCHARGE TEST FAILED 0.5 HOURS. DEFECTIVE BATTERIES INSTALLED UNDER WO # 419231. WO # 425127 INITIATED TO INSTALL NEW BATTERIES. WOULD HAVE PREVIOUSLY PASSED 8 - HOUR TEST

00419388 5/17/90 - 5/26/90 MONTHLY INSPECTION / TEST OK

00425127 (5/20/90 - 6/5/90) (CM) BATTERIES REPLACED TO RESOLVE FAILURE FROM WO # 00424862

00425962 (5/21/90 - 5/26/90) 8 - HOUR DISCHARGE TEST OK. RESTORED FAILURE FROM WO # 00424862

00426500 (6/4/90 - 6/12/90) (CM) CHECKED INVERTER LOAD AND FUSES / OK

00429105 (6/12/90 - 6/12/90) (CM) CHECKED 40W LAMPS / OK

00428019 (6/19/90 - 6/19/90) MONTHLY INSPECTION / TEST OK

00429189 (7/8/90 - 7/10/90) MONTHLY INSPECTION / TEST OK

REQUIRED AVAILABLE DAYS: 366
KNOWN UNAVAILABLE DAYS: 18
ESTIMATED UNAVAILABLE DAYS: 0

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUIP: IEQBN002
TYPE: HOLOPHANE - UPS
LOAD: 700 WATTS

☒ Available
☒ Known unavailable
☒ Estimated unavailable



ENGINEERING SKETCH PAD

REV 1

BY: <u>Shawn Rodgers</u>	DATE: <u>9-17-90</u>	SUBJECT: <u>CALCULATION OF HOLOPHANE AVAILABILITY</u>	SHEET NO.: <u>Page 11 of 20</u>
CHECKED BY: <u>Yovan Lukic</u>	DATE: <u>9/22/90</u>		JOB NO.: <u>13-NC-QB-200</u>

June 89 July 89 Aug 89 Sept. 89 Oct 89 Nov 89 Dec 89 Jan 90 Feb 90 Mar 90 Apr 90 May 90 June 90 July 90

Revision 1

DATA START DATE - 6/29/89 (UNIT 2 RESTART)
00360701 7/6/89 - 7/11/89 MONTHLY INSPECTION / TEST OK

00360702 7/29/89 - 7/29/89 MONTHLY INSPECTION / TEST OK

00375563 8/21/89 - 8/29/89 MONTHLY INSPECTION / TEST OK

003676700 (10/7/89 - 10/7/89) MONTHLY INSPECTION / TEST OK

00383244 (10/30/89 - 10/30/89) MONTHLY INSPECTION / TEST OK

00387301 (11/29/89 - 6/15/90) LED BOARDS FOUND OUT OF CALIBRATION (INDICATION ONLY; UNIT FUNCTIONAL TESTED OK) UNIT TO BE REPLACED AS PART OF S-MOD 15M-QD-007 BY WO # 429921

00389550 (12/27/89 - 12/30/89) MONTHLY INSPECTION / TEST. HAD LOW BBFV (27.4 VDC) PLACED ON 24 HOUR EQUALIZE CHARGE. ADEQUATE MARGIN AVAILABLE FOR 8 - HOUR ILLUMINATION

00389544 (1/6/90 - 1/21/90) 8 - HOUR DISCHARGE TEST OK
00393215 (1/6/90 - 1/7/90) MONTHLY INSPECTION / TEST OK

00398430 (2/21/90 - 2/21/90) MONTHLY INSPECTION / TEST OK
00411965 (2/27/90 - 3/2/90) 8 - HOUR DISCHARGE TEST OK

00401576 (3/11/90 - 3/12/90) MONTHLY INSPECTION / TEST OK

00407305 (3/30/90 - 4/2/90) MONTHLY INSPECTION / TEST OK

00412840 (4/24/90 - 4/25/90) MONTHLY INSPECTION / TEST OK

00419389 (5/22/90 - 5/23/90) MONTHLY INSPECTION / TEST OK
00429158 (6/12/90 - 6/12/90) INSPECTION OF FLUORESCENT LIGHTS WATTAGE / OK
00429172 (6/12/90 - 6/13/90) INSPECTION OF FLUORESCENT LIGHTS WATTAGE / OK
00430416 (6/14/90 - 6/14/90) INSPECTION OF FLUORESCENT LIGHTS TYPE / OK
00430564 (6/14/90 - 6/18/90) (CM) NEW BATTERIES INSTALLED AS PART OF SITE MOD 15M-QD-007. 8 - HOUR DISCHARGE TEST OK
00426501 (6/18/90 - 6/19/90) CHECK INVERTER LOAD AND FUSES OK

00430400 (7/8/90 - 7/8/90) NEW BATTERIES INSTALLED PER MSCR # 90-08-001 8 - HOUR DISCHARGE TEST OK

REQUIRED AVAILABLE DAYS: 366
KNOWN UNAVAILABLE DAYS: 0
ESTIMATED UNAVAILABLE DAYS: 0

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUIP: 1EQBN003
TYPE: HOLOPHANE - UPS
LOAD: 900 WATTS

☒ Available
☒ Known unavailable
☒ Estimated unavailable



ENGINEERING SKETCH PAD

REV 1

BY: <i>Shawn Rodgers</i>	DATE: 7-17-90	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO.: Page 12 of 20
CHECKED BY: Yovan Lukic	DATE: 9/22/90		JOB NO.: 13-NC-QB-200

June 89 July 89 Aug 89 Sept. 89 Oct 89 Nov 89 Dec 89 Jan 90 Feb 90 Mar 90 Apr 90 May 90 June 90 July 90

Revision 1

DATA START DATE - 6/29/89 (UNIT 2 RESTART)

00366333 (7/7/89 - 7/8/89) MONTHLY INSPECTION / TEST OK
00360703 (7/12/89 - 7/12/89) MONTHLY INSPECTION / TEST OK

00360704 (7/29/89 - 7/29/89) MONTHLY INSPECTION / TEST OK

00360705 (8/21/89 - 9/1/89) MONTHLY INSPECTION / TEST OK

00371273 (9/23/89 - 9/23/89) MONTHLY INSPECTION / TEST OK

00341116 (11/7/89 - 11/7/89) MONTHLY INSPECTION / TEST, BATTERY CELL #2A HAD LOW IBV (11.1VDC). WO # 391762 INITIATED TO REPLACE BATTERY CELL #2A. WOULD HAVE PROVIDED 1 - HOUR ILLUMINATION.

00393216 (1/30/90 - 2/6/90) MONTHLY INSPECTION / TEST, BBV WAS LOW (21.4 VDC), ADJUSTED TO 27.9 VDC. BATTERY CELL # 2A HAD LOW IBV (12.2 VDC). (WO # 397162 PREVIOUSLY ISSUED TO REPLACE BATTERY CELL # 2A). ADEQUATE MARGIN FOR 1 - HOUR ILLUMINATION.
00390519 (1/30/90 - 3/3/90) 1 - HOUR DISCHARGE TEST COMPLETED ON 3/1/90 / TEST OK

00391762 (2/27/90 - 2/28/90) (CM) BATTERY CELL # 2A REPLACED TO RESOLVE WO # 341116 AND 397216. WOULD HAVE PROVIDED 1 - HOUR ILLUMINATION.
00403152 (2/21/90 - 2/21/90) MONTHLY INSPECTION / TEST OK

00401421 (4/1/90 - 4/2/90) MONTHLY INSPECTION / TEST OK

00412841 (4/30/90 - 4/30/90) MONTHLY INSPECTION / TEST OK

00423175 (5/8/90 - 5/11/90) 1-HOUR DISCHARGE TEST OK

420940 (5/21/90) MONTHLY INSPECTION / TEST OK

REQUIRED AVAILABLE DAYS: 366
KNOWN UNAVAILABLE DAYS: 0
ESTIMATED UNAVAILABLE DAYS: 0

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUID:1EQBN004
TYPE: HOLOPHANE - UPS
LOAD: 400 WATTS

■ Available
▣ Known unavailable
▤ Estimated unavailable



ENGINEERING SKETCH PAD

REV 1

BY: <i>Shawn Rodgers</i>	DATE: <i>9-17-90</i>	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO.: Page 13 of 20
CHECKED BY: <i>Yovan Lukic</i>	DATE: <i>9/22/90</i>		JOB NO.: 13-NC-QB-200

June 89 July 89 Aug 89 Sept. 89 Oct 89 Nov 89 Dec 89 Jan 90 Feb 90 Mar 90 Apr 90 May 90 June 90 July 90

Revision 1

- # 00356529 (6/24/89 - 6/26/89) MONTHLY INSPECTION / TEST OK
DATA START DATE - 6/29/89 (UNIT 2 RESTART)
- # 00364092 (8/2/89 - 8/2/89) MONTHLY INSPECTION / TEST OK
- # 00371985 (8/14/89 - 8/15/89) BATTERY CELL # 4B REPLACED. HAD A CRACKED POST. (4 BATTERIES REPLACED, DUE TO PACKAGING). WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION
- # 00372897 (8/28/89 - 8/28/89) MONTHLY INSPECTION / TEST OK
- # 00380771 (10/02/89 - 10/4/89) MONTHLY INSPECTION / TEST OK
- # 00385138 (10/31/89 - 10/31/89) MONTHLY INSPECTION / TEST OK
- # 00389416 (11/1/89 - 11/1/89) REPLACED LIGHTS WITH LONG LIFE LIGHTS
- # 00381567 (11/20/89 - 11/22/89) 8 - HOUR DISCHARGE TEST OK
- # 00388910 (11/27/89 - 11/28/89) MONTHLY INSPECTION / TEST OK
- # 00393424 (12/29/89 - 12/29/89) MONTHLY INSPECTION / TEST OK
- # 00398846 (1/23/90 - 1/23/90) MONTHLY INSPECTION / TEST OK
- # 00403611 (2/20/90 - 2/20/90) MONTHLY INSPECTION / TEST OK
- # 00412340 (3/5/90 - 3/6/90) 8-HOUR DISCHARGE TEST FAILED (6 HOUR) WO # 414355 ISSUED TO REPLACE BATTERIES
- # 00414355 (3/12/90 - 3/16/90) (CM) REPLACED ENTIRE BATTERY BANK TO RESOLVE WO # 412340 RESTORED 3/16/90. 8-HOUR DISCHARGE TEST OK
- # 00420443 (4/18/90 - 4/18/90) MONTHLY INSPECTION / TEST OK
- # 00424858 (5/9/90 - 5/9/90) OUTPUT VOLTAGE TAKEN / OK
- # 00420403 (5/11/90 - 5/11/90) MONTHLY INSPECTION / TEST OK
- # 00424291 (6/11/90 - 6/12/90) MONTHLY INSPECTION / TEST OK
- # 00430543 (6/16/90 - 6/27/90) INSPECTED LIGHTS (WATT) / OK
- # 00425953 (6/18/90 - 7/2/90) BATTERY REPLACEMENT PER MONCR 90-QB-003, 8 - HOUR DISCHARGE TEST OK

REQUIRED AVAILABLE DAYS: 366
KNOWN UNAVAILABLE DAYS: 10
ESTIMATED UNAVAILABLE DAYS: 52

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUID:2EQBN001
TYPE: HOLOPHANE - UPS
LOAD: 600 WATTS

- Available
- ▨ Known unavailable
- ▩ Estimated unavailable



ENGINEERING SKETCH PAD

REV 1

BY: Shawn Rodgers	DATE: 9-17-90	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO.: Page 14 of 20
CHECKED BY: Yovan Lukic	DATE: 9/22/90		JOB NO.: 13-NC-QB-200

June 89 July 89 Aug 89 Sept. 89 Oct 89 Nov 89 Dec 89 Jan 90 Feb 90 Mar 90 Apr 90 May 90 June 90 July 90

Revision 1

#00282626 (5/5/88) 8 - HOUR DISCHARGE TEST, FAILED, INVERTER TRIPPED SHORT CIRCUIT DETECTOR BOARD REPLACED BY WO # 293202. RETEST PERFORMED BY WO # 368210

DATA START DATE - 6/29/89 (UNIT 2 RESTART)

00368210 (7/3/89 - 7/6/89) 8 - HOUR DISCHARGE TEST OK. RETEST FOR WO 282626

00364093 (7/6/89 - 7/6/89) MONTHLY INSPECTION / TEST OK

00369070 (8/5/89 - 8/8/89) MONTHLY INSPECTION / TEST OK

00374630 (9/5/89 - 9/5/89) MONTHLY INSPECTION / TEST OK

00380772 (10/2/89 - 10/4/89) MONTHLY INSPECTION / TEST OK

00385139 (10/31/89 - 10/31/89) MONTHLY INSPECTION / TEST OK

00388911 (11/27/89 - 11/28/89) MONTHLY INSPECTION / TEST OK

00393425 (12/29/89 - 12/29/89) MONTHLY INSPECTION / TEST OK

00395666 (1/1/90 - 1/15/90) 8 - HOUR DISCHARGE TEST OK
00398847 (1/23/90 - 1/23/90) MONTHLY INSPECTION / TEST. BATTERY CELL # 2 B HAD LOW IBV (11.6 VDC) WO # 410186 INITIATED TO REPLACE BATTERY CELL # 2B. WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION

00403612 (2/20/90 - 2/20/90) MONTHLY INSPECTION / TEST. BATTERY CELL # 2 B HAD LOW IBV (11.6 VDC) WO # 410186 PREVIOUSLY INITIATED TO REPLACE BATTERY CELL # 2B. WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION

00410186 (3/13/90 - 4/18/90) (CM) REPLACED BATTERY CELL # 2B. 8 - HOUR DISCHARGE TEST OK
00412479 (3/14/90 - 4/18/90) (CM) UPS READS 30% LOAD AT NO LOAD CORRECTED

00420444 (4/18/90 - 4/18/90) MONTHLY INSPECTION / TEST OK

00416662 (4/25/90 - 4/28/90) (CM) FIXED UPPER CABINET DOOR

00420402 (5/11/90 - 5/15/90) MONTHLY INSPECTION / TEST OK

00424292 (6/11/90 - 6/12/90) MONTHLY INSPECTION / TEST OK
00429914 (6/29/90 - 7/6/90) REPLACED BATTERIES PER MNCR 90-QB-003. 8 - HOUR DISCHARGE TEST OK

00432614 (6/29/90 - 7/6/90) (CM) DISPLAY BOARD READING 100% CORRECTED

00425415 (7/14/90 - 7/10/90) MONTHLY INSPECTION / TEST OK

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUIP: 2EQBN002
TYPE: HOLOPHANE - UPS
LOAD: 700 WATT'S
REQUIRED AVAILABLE DAYS: 366
KNOWN UNAVAILABLE DAYS: 4
ESTIMATED UNAVAILABLE DAYS: 0

Available
Known unavailable
Estimated unavailable



ENGINEERING SKETCH PAD

REV 1

BY: Shawn Rodgers	DATE: 7-7-90	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO: Page 15 of 20
CHECKED BY: Yovan Lukic	DATE: 9/22/90		JOB NO: 13-NC-QB-200

June 89 July 89 Aug 89 Sept. 89 Oct 89 Nov 89 Dec 89 Jan 90 Feb 90 Mar 90 Apr 90 May 90 June 90 July 90

Revision 1

00363974 (6/5/89 - 6/6/89) 8 - HOUR DISCHARGE TEST OK
00352697 (6/6/89 - 6/8/89) MONTHLY INSPECTION / TEST OK

DATA START DATE - 6/29/89 (UNIT 2 RESTART)

00357548 (7/6/89 - 7/7/89) MONTHLY INSPECTION / TEST OK

00364034 (8/5/89 - 8/8/89) MONTHLY INSPECTION / TEST OK

00373829 (8/16/89 - 8/29/89) INDICATOR LIGHT NOT FUNCTIONING
WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION

00374631 (9/5/89 - 9/6/89) MONTHLY INSPECTION / TEST OK

00380773 (10/0/89 - 10/1/89) MONTHLY INSPECTION / TEST OK

00385140 (10/31/89 - 10/31/89) MONTHLY INSPECTION / TEST OK

00388912 (11/29/89 - 11/29/89) MONTHLY INSPECTION / TEST OK
00388914 (12/3/89 - 12/6/89) 8 - HOUR DISCHARGE TEST OK

00393426 (12/29/89 - 12/29/89) MONTHLY INSPECTION / TEST. BATTERY CELL # 2B HAD LOW IBV
(10.99 VDC) WO # 410185 INITIATED TO REPLACE BATTERY CELL # 2B
WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION

00398848 (1/24/90 - 1/24/90) MONTHLY INSPECTION / TEST. CELL # 2B LOW IBV (10.99 VDC)
(WO # 410185 PREVIOUSLY INITIATED TO REPLACE BATTERY CELL # 2B).
WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION

00410185 (2/23/90 - 2/23/90) REPLACED BATTERIES TO RESOLVE WO # 393426 AND 398848. 8 - HOUR
DISCHARGE TEST OK. BATTERY CELL # 3B HAD LOW IBV (12.58 VDC). WO # 415963 ISSUED TO
REPLACE BATTERY CELL # 3B. WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION

00415963 (4/3/90 - 4/5/90) REPLACEMENT OF CELL # 3B (FROM WO # 410185) NOT REQUIRED
RESTORED BY NORMAL FLOAT CHARGE. 8 - HOUR DISCHARGE TEST OK
00409090 (4/5/90 - 4/5/90) MONTHLY INSPECTION / TEST OK

00344009 (4/17/90 - 4/19/90) BATTERY CELL # 4B REPLACED DUE TO BAD BOLT (IDENTIFIED PRIOR
TO CHART TIME FRAME). WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION

00420404 (5/11/90 - 5/13/90) MONTHLY INSPECTION / TEST. LOW BBFV (26.6 VDC)
NOTE: 8/24/90 ASSESSMENT DETERMINED WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.
00424806 (5/16/90 - 5/18/90) 8 - HOUR DISCHARGE TEST OK

00430010 (6/12/90 - 9/12/90) FLUORESCENT LAMP VERIFICATION / OK
00424293 (6/12/90 - 6/12/90) MONTHLY INSPECTION / TEST OK

REQUIRED AVAILABLE DAYS: 366
KNOWN UNAVAILABLE DAYS: 0
ESTIMATED UNAVAILABLE DAYS: 0

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUIP: 2EQBN003
TYPE: HOLOPHANE - UPS
LOAD: 600 WATTS

Available
Known unavailable
Estimated unavailable



ENGINEERING SKETCH PAD

REV 1

BY: <u>Shawn Rodgers</u>	DATE: <u>9-17-90</u>	SUBJECT: <u>CALCULATION OF HOLOPHANE AVAILABILITY</u>	SHEET NO.: <u>Page 16 of 20</u>
CHECKED BY: <u>Yovan Lukic</u>	DATE: <u>9/22/90</u>		JOB NO.: <u>13-NC-QB-200</u>

June 89 July 89 Aug 89 Sept. 89 Oct 89 Nov 89 Dec 89 Jan 90 Feb 90 Mar 90 Apr 90 May 90 June 90 July 90

Revision 1

DATA START DATE - 6/29/89 (UNIT 2 RESTART)

0035749 (7/8/89 - 7/10/89) MONTHLY INSPECTION / TEST OK

00365137 (8/5/89 - 8/8/89) MONTHLY INSPECTION / TEST OK

00373829 (8/16/89 - 8/25/89) (CM) UNIT HAD A FALSE LOAD INDICATION (20 - 40%). TIGHTENED LOOSE CONNECTION. WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION

00374632 (9/5/89 - 9/6/89) MONTHLY INSPECTION / TEST: BATTERY CELL # 3A HAD LOW IBV (11.88 VDC). WO # 36676 INITIATED TO REPLACE BATTERY CELL # 3A. WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.

00381416 (10/15/89 - 10/16/89) (CM) BATTERY CELL # 3A REPLACED TO RESOLVE WO # 374632. (4 CELLS REPLACED, DUE TO PACKAGING). WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION.

00381566 (10/16/89 - 10/16/89) MONTHLY INSPECTION / TEST OK

00385141 (10/31/89 - 11/1/89) MONTHLY INSPECTION / TEST OK

00381568 (11/16/89 - 11/20/89) 8 - HOUR DISCHARGE TEST OK

00388913 (11/28/89 - 11/29/89) MONTHLY INSPECTION / TEST OK

00393427 (12/29/89 - 1/1/90) MONTHLY INSPECTION / TEST. HAD LOW BBFV (27.4 VDC). BBFV WAS ADJUSTED TO 27.6 VDC WHICH IS ACCEPTABLE. HOWEVER, WO # 405149 WAS INITIATED TO REPLACE THE POTENTIOMETER BECAUSE NO FURTHER ADJUSTMENT WAS AVAILABLE. ENOUGH MARGIN WAS AVAILABLE AND WOULD HAVE PASSED 8 - HOUR TEST.

00398449 (1/24/90 - 1/24/90) MONTHLY INSPECTION / TEST OK. (NOTE: WO # 405149 WAS PREVIOUSLY ISSUED TO REPLACE THE POTENTIOMETER BECAUSE NO FURTHER ADJUSTMENT WAS AVAILABLE)

00403614 (2/19/90 - 2/20/90) MONTHLY INSPECTION / TEST OK

00405091 (3/23/90 - 3/23/90) MONTHLY INSPECTION / TEST OK
00405149 (3/23/90 - 3/23/90) TROUBLESHOOT AND ADJUST BATTERY VOLTAGE POT TO RESOLVE THE LACK OF FURTHER ADJUSTMENT IDENTIFIED IN WO # 393427. NO PROBLEM FOUND OR PARTS REPLACED.

00420446 (4/17/90 - 4/17/90) MONTHLY INSPECTION / TEST OK

00420405 (5/11/90 - 5/12/90) MONTHLY INSPECTION / TEST. HAD LOW BBFV (26.8 VDC). BBFV WAS ADJUSTED TO 27.9 VDC. ENOUGH MARGIN WAS AVAILABLE AND WOULD HAVE PASSED 8 - HOUR TEST.
00424305 (5/12/90 - 5/15/90) 8 - HOUR DISCHARGE TEST OK

00424294 (6/12/90 - 6/12/90) MONTHLY INSPECTION / TEST OK

REQUIRED AVAILABLE DAYS: 366
KNOWN UNAVAILABLE DAYS: 0
ESTIMATED UNAVAILABLE DAYS: 0

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUID:2EQBN004
TYPE: HOLOPHANE - UPS
LOAD: 400 WATTS

☒ Available
☒ Known unavailable
☒ Estimated unavailable



ENGINEERING SKETCH PAD

REV 1

BY: Shawn Rodgers	DATE: 9-17-90	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO.: Page 17 of 20
CHECKED BY: Yovan Lukic	DATE: 9/22/90		JOB NO.: 13-NC-QB-200

June 89 July 89 Aug 89 Sept. 89 Oct 89 Nov 89 Dec 89 Jan 90 Feb 90 Mar 90 Apr 90 May 90 June 90 July 90

00363643 (6/8/89 - 6/8/89) BATTERY CELLS 3A AND 3B ISOLATED FROM SYSTEM DUE TO EXCESSIVE CURRENT DRAW WO # 366390 ISSUED TO REPLACE CELLS # 3A AND 3B

DATA START DATE - 6/29/89 (UNIT 2 RESTART)

00366390 (7/20/89 - 7/25/89) (CM) REPLACED BATTERY CELLS # 3A AND 3B TO RESOLVE WO # 363463
00369190 (7/22/89 - 7/23/89) MONTHLY INSPECTION / TEST OK
00364330 (7/22/89 - 7/25/89) 8-HOUR DISCHARGE TEST OK WO # 363463 FAILURE RESTORED 7/25/89
00364967 (7/29/89 - 10/8/89) IMPLEMENT DCP 3FE-QD-023, INCREASED LOAD ON UPS. (REF. WO# 36189)

00372645 (8/21/89 - 8/21/89) MONTHLY INSPECTION / TEST OK

00378211 (9/21/89 - 9/21/89) MONTHLY INSPECTION / TEST OK

00386189 (10/6/89 - 10/18/89) 8-HOUR DISCHARGE TEST OK

00384638 (10/19/89 - 10/23/89) MONTHLY INSPECTION / TEST OK

00389242 (11/23/89 - 11/27/89) MONTHLY INSPECTION / TEST OK

00392546 (12/13/89 - 12/14/89) MONTHLY INSPECTION / TEST OK

00390747 (1/18/90 - 1/19/90) MONTHLY INSPECTION / TEST OK

00402047 (2/14/90 - 2/14/90) MONTHLY INSPECTION / TEST OK

00413441 (3/9/90 - 3/13/90) 8-HOUR DISCHARGE TEST OK

00403974 (4/5/90 - 4/5/90) MONTHLY INSPECTION / TEST OK

00410534 (5/2/90 - 5/4/90) MONTHLY INSPECTION / TEST OK

00427153 (5/25/90 - 5/29/90) OUTPUT VOLTAGE TEST OK
00415005 (5/29/90 - 5/29/90) MONTHLY INSPECTION / TEST OK

00429870 (6/11/90 - 6/12/90) TYPE AND WATTAGE LIGHT INSPECTION / OK
00430218 (6/15/90 - 6/18/90) REMOVED FIREPROOFING AS PART OF SITE MOD 3SM-QD-007.
00429796 (6/16/90 - 6/18/90) BATTERIES REPLACED AS PART OF SITE MOD 3SM-QD-007.
DURING RETEST BATTERY 2A HAD LOW IBV. BATTERY REPLACED AS PART OF THE WORK ORDER. 8-HOUR DISCHARGE TEST OK

REQUIRED AVAILABLE DAYS: 366
KNOWN UNAVAILABLE DAYS: 26
ESTIMATED UNAVAILABLE DAYS: 0

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUID:3EQBN001
TYPE: HOLOPHANE - UPS
LOAD: 900 WATTS

■ Available
▣ Known unavailable
▤ Estimated unavailable

Revision 1



ENGINEERING SKETCH PAD

REV 1

BY: Shawn Rodgers	DATE: 6-17-90	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO.: Page 18 of 20
CHECKED BY: Yovan Lukic	DATE: 9/22/90		JOB NO.: 13-NC-QB-200

June 89 July 89 Aug 89 Sept. 89 Oct 89 Nov 89 Dec 89 Jan 90 Feb 90 Mar 90 Apr 90 May 90 June 90 July 90

Revision 1

DATA START DATE - 6/29/89 (UNIT 2 RESTART)

- # 00367174 (7/7/89 - 7/7/89) MONTHLY INSPECTION / TEST OK
- # 00364967 (7/29/89 - 10/9/89) IMPLEMENT DCP 3FE-OD-023, INCREASED LOAD ON UPS. (REF. WO# 382256)
- # 00370115 (8/8/89 - 8/11/89) MONTHLY INSPECTION / TEST OK
- # 00374474 (8/31/89 - 9/1/89) MONTHLY INSPECTION / TEST OK
- # 00381104 (10/3/89 - 10/4/89) MONTHLY INSPECTION / TEST OK
- # 00382256 (10/5/89 - 10/25/89) 8-HOUR DISCHARGE TEST OK
- # 00391479 (11/17/89 - 11/17/89) MONTHLY INSPECTION / TEST OK
- # 00317948 (11/17/89 - 11/22/89) (CM) ABNORMAL LOAD INDICATION NO IMPACT ON ILLUMINATION.
- # 00392547 (12/18/89 - 12/21/89) MONTHLY INSPECTION / TEST OK
- # 00397748 (1/19/90 - 1/19/90) MONTHLY INSPECTION / TEST OK
- # 00402048 (2/14/90 - 2/15/90) MONTHLY INSPECTION / TEST OK
- # 00403975 (3/21/90 - 3/23/90) MONTHLY INSPECTION / TEST OK
- # 00410538 (4/13/90 - 4/16/90) 8-HOUR DISCHARGE TEST OK
- # 00410535 (5/4/90 - 5/4/90) MONTHLY INSPECTION / TEST OK
- # 00415006 (5/30/90 - 5/30/90) MONTHLY INSPECTION / TEST OK
- # 00429871 (6/12/90 - 6/12/90) (CM) TYPE AND WATTAGE LIGHT INSPECTION / OK
- # 00422883 (6/26/90 - 6/28/90) MONTHLY INSPECTION / TEST OK

REQUIRED AVAILABLE DAYS: 366
KNOWN UNAVAILABLE DAYS: 0
ESTIMATED UNAVAILABLE DAYS: 0

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUID:3EQBN002
TYPE: HOLOPHANE - UPS
LOAD: 700 WATTS

■ Available
▣ Known unavailable
▤ Estimated unavailable



ENGINEERING SKETCH PAD

REV 1

BY: Shawn Rodgers	DATE: 9-17-90	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO. Page 19 of 20
CHECKED BY: Yovan Lukić	DATE: 9/22/90		JOB NO: 13-NC-QB-200

June 89 July 89 Aug 89 Sept. 89 Oct 89 Nov 89 Dec 89 Jan 90 Feb 90 Mar 90 Apr 90 May 90 June 90 July 90

Revision 1

- # 0036333 (6/19/89 - 6/24/89) 8-HOUR DISCHARGE TEST OK
DATA START DATE - 6/29/89 (UNIT 2 RESTART)
- # 00365336 (7/1/89 - 7/8/89) MONTHLY INSPECTION / TEST OK
00364967 (7/29/89 - 10/9/89) IMPLEMENT DCP 3FE-QD-023, INCREASED
LOAD ON UPS. (REF. WO# 366188)
- # 00370116 (8/1/89 - 8/11/89) MONTHLY INSPECTION / TEST OK
- # 00374475 (8/31/89 - 9/1/89) MONTHLY INSPECTION / TEST OK
- # 00381105 (10/3/89 - 10/5/89) MONTHLY INSPECTION / TEST OK
00386188 (10/5/89 - 10/9/89) 8-HOUR DISCHARGE TEST (REF. WO# 364967) OK
- # 00385615 (11/1/89 - 11/2/89) MONTHLY INSPECTION / TEST OK
- # 00391678 (12/1/89 - 12/1/89) MONTHLY INSPECTION / TEST OK
- # 00395763 (1/1/90 - 1/1/90) MONTHLY INSPECTION / TEST OK
- # 00402049 (2/6/90 - 2/6/90) MONTHLY INSPECTION / TEST OK
- # 00403977 (3/21/90 - 3/23/90) MONTHLY INSPECTION / TEST OK
- # 00403978 (4/3/90 - 4/5/90) MONTHLY INSPECTION / TEST: BATTERY CELL # 4B HAD A SPLIT POST. WO # 392637
INITIATED TO REPLACE BATTERY CELL. FAILURE OF ITSELF WOULD NOT HAVE PREVENTED 8-HOUR
ILLUMINATION.
- # 00410536 (4/19/90 - 4/20/90) MONTHLY INSPECTION / TEST OK
- # 00410539 (5/3/90 - 5/30/90) 8-HOUR DISCHARGE FAILED (AFTER 6.45 HOURS) WO # 430333
TO INSTALL BATTERIES / UPS AS PART OF SITE MOD 35M-QD-007
- # 00418534 (5/16/90 - 6/18/90) REPLACED BATTERY CELL # 4B AND OTHERS TO RESOLVE WO # 410539. 8 HOUR
DISCHARGE RETEST UNDER WO# 410539 FAILED. SITE MOD 35M-QD-007 TO BE INSTALLED
UNDER WO # 430333, TO REPLACE UPS AND BATTERIES
- # 00413690 (5/19/90 - 5/21/90) MONTHLY INSPECTION / TEST
- # 00430333 (6/15/90 - 6/20/90) INSTALLED BATTERIES / UPS AS PART OF SITE MOD 35M-QD-007.
ALSO USED TO RESOLVE THE FAILURE IDENTIFIED BY WO # 410539. RESTORED 6/15/90
8-HOUR DISCHARGE TEST OK

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUID:3EQBN003
LOAD: 900 WATTS
TYPE: HOLOPHANE - UPS
REQUIRED AVAILABLE DAYS: 366
KNOWN UNAVAILABLE DAYS: 46
ESTIMATED UNAVAILABLE DAYS: 105

☒ Available
☒ Known unavailable
☒ Estimated unavailable



ENGINEERING SKETCH PAD

REV 1

BY: Shawn Rodgers	DATE: 7-17-90	SUBJECT: CALCULATION OF HOLOPHANE AVAILABILITY	SHEET NO. Page 20 of 20
CHECKED BY: Yovan Lukic	DATE: 9/22/90		JOB NO: 13-NC-QB-200

June 89 July 89 Aug 89 Sept. 89 Oct 89 Nov 89 Dec 89 Jan 90 Feb 90 Mar 90 Apr 90 May 90 June 90 July 90

Revision 1

00365337 (6/19/89 - 6/22/89) 8 - HOUR DISCHARGE TEST OK
DATA START DATE - 6/29/89 (UNIT 2 RESTART)

00370117 (8/7/89 - 8/11/89) MONTHLY INSPECTION / TEST OK

00374476 (8/31/89 - 9/1/89) MONTHLY INSPECTION / TEST OK

00381106 (10/2/89 - 10/4/89) MONTHLY INSPECTION / TEST OK
0037951 (10/9/89 - 11/22/89) LEDS OUT OF CALIBRATION; NO IMPACT ON ILLUMINATION

00385616 (11/22/89 - 11/22/89) MONTHLY INSPECTION / TEST OK

00391679 (12/2/89 - 12/2/89) MONTHLY INSPECTION / TEST OK

00395764 (1/5/90 - 1/5/90) MONTHLY INSPECTION / TEST OK

00400102 (2/6/90 - 2/20/90) 8 - HOUR DISCHARGE TEST PERFORMED ON 2/6/90
00403303 (2/1/90 - 2/16/90) INITIATED TO FIX FAULTY LED AND FOUND FAULTY POWER SUPPLY, REPLACED POWER SUPPLY, S.C.D. BOARD AND LOAD DISPLAY BOARD TO RESTORE UNIT. MAINTENANCE ERROR, POWER SUPPLY DAMAGED BY TECH. - DELAY IN GETTING PARTS. RESTORED 2/16/90

00403979 (3/21/90 - 3/23/90) MONTHLY INSPECTION / TEST. INITIAL BBFV LOW (27.5 VDC) ADJUSTED TO 27.92 VDC. ADEQUATE MARGIN FOR 8 - HOUR ILLUMINATION

00412560 (4/3/90 - 4/3/90) (CM) UNIT HAD A FALSE LOAD INDICATION (10 - 90%). TIGHTENED LOOSE CONNECTION. WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION
00403980 (4/3/90 - 4/5/90) MONTHLY INSPECTION / TEST OK

00410537 (4/19/90 - 4/24/90) MONTHLY INSPECTION / TEST OK

00423814 (5/4/90 - 5/7/90) (CM) UNIT HAD A FALSE LOAD INDICATION (60%). TIGHTENED LOOSE CONNECTION ON DISPLAY BOARD. WOULD HAVE PROVIDED 8 - HOUR ILLUMINATION

00413691 (5/21/90 - 5/21/90) MONTHLY INSPECTION / TEST OK

00429873 (6/12/90 - 6/13/90) (CM) FLUORESCENT LAMP INSPECTION OK

00422887 (6/18/90 - 6/25/90) MONTHLY INSPECTION / TEST OK

REQUIRED AVAILABLE DAYS: 366
KNOWN UNAVAILABLE DAYS: 9
ESTIMATED UNAVAILABLE DAYS: 0

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUIP: 3EQBN004
TYPE: HOLOPHANE - UPS
LOAD: 400 WATTS

■ Available
▣ Known unavailable
▤ Estimated unavailable



BY: John R. Wadella <i>qu</i>	DATE 06 Jan 92	SUBJECT CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)	SHEET NO: Page 21
CHECKED BY: Sandra K. Guy <i>SKG</i>	DATE: 08 Jan 92		JOB NO: 13-NC-QB-200

TABLE - 3

INPUT DATA AND CALCULATED KNOWN AND ESTIMATED UNAVAILABLE DAYS (1991)



BY John R. Wadella <i>RLW</i>	DATE 06 Jan 92	SUBJECT CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)	SHEET NO. Page 22
CHECKED BY. Sandra K. Guy <i>SKG</i>	DATE: 08 Jan 92		JOB NO.: 13-NC-QB-200

TABLE 3. Input Data and Calculated Known and Estimated Unavailable Days

Equipment ID	Discovery Date	Repair Date	Last Known Available Date	Unavailable Known Days	Unavailable Estimated Days	Unavailable Total Days
UNIT-1						
1EQBN001	*12-June-90	18-June-90	12-June-90	6	0	6
* Unavailability due to the implementation of Site Modification #SM-QD-007.						
1EQBN002	*01-Aug-90	12-Aug-90	01-Aug-90	11	0	11
	#09-Nov-90	16-Nov-90	09-Nov-90	7	0	7
* Unavailability due to the implementation of Site Modification #SM-QD-007						
# Unavailability due to battery replacement / retest (Re: WO #00448138)						
1EQBN003	*12-June-90	17-June-90	12-June-90	5	0	5
* Unavailability due to the implementation of Site Modification #SM-QD-007.						
1EQBN004	*02-Aug-90	14-Aug-90	02-Aug-90	12	0	12
* Unavailability due to the implementation of Site Modification #SM-QD-007.						
UNIT-2						
2EQBN001	*11-Oct-90	25-Oct-90	11-Oct-90	14	0	14
* Unavailability due to the implementation of Site Modification #SM-QD-007.						
2EQBN002	*08-Oct-90	22-Oct-90	08-Oct-90	14	0	14
* Unavailability due to the implementation of Site Modification #SM-QD-007.						
2EQBN003	*04-Oct-90	18-Oct-90	04-Oct-90	14	0	14
* Unavailability due to the implementation of Site Modification #SM-QD-007.						
2EQBN004	*02-Oct-90	15-Oct-90	02-Oct-90	13	0	13
* Unavailability due to the implementation of Site Modification #SM-QD-007.						

ENGINEERING SKETCH PAD

BY: John R. Wadella <i>[Signature]</i>	DATE: 06 Jan 92	SUBJECT: CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)	SHEET NO Page 23
CHECKED BY: Sandra K. Guy <i>[Signature]</i>	DATE: 08 Jan 92		JOB NO.: 13-NC-QB-200

TABLE 3. Input Data and Calculated Known and Estimated Unavailable Days (continued)-

Equipment ID	Discovery Date	Repair Date	Last Known Available Date	Unavailable Known Days	Unavailable Estimated Days	Unavailable Total Days
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UNIT-3

3EQBN001	*12-June-90	20-June-90	12-June-90	8	0	8
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* Unavailability due to the implementation of Site Modification #SM-QD-007.

3EQBN002	*02-Aug-90	17-Aug-90	02-Aug-90	15	0	15
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* Unavailability due to the implementation of Site Modification #SM-QD-007.

3EQBN003	*16-June-90	19-June-90	16-June-90	3	0	3
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* Unavailability due to the implementation of Site Modification #SM-QD-007.

3EQBN004	*02-Aug-90	08-Aug-90	02-Aug-90	6	0	6
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* Unavailability due to the implementation of Site Modification #SM-QD-007.

BY: John R. Wadella <i>RW</i>	DATE: 06 Jan 92	SUBJECT CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)	SHEET NO.: Page 24
CHECKED BY: Sandra K. Guy <i>SKG</i>	DATE: 08 Jan 92		JOB NO.: 13-NC-QB-200

TABLE - 4

**CALCULATION OF UNIT
AND
PLANT AVAILABILITIES
(1991)**



ENGINEERING SKETCH PAD

REVISION 02

BY: John R. Wadella <i>QW</i>	DATE: 06 Jan 92	SUBJECT: CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)	SHEET NO.: Page 25
CHECKED BY: Sandra K. Guy <i>SKG</i>	DATE: 08 Jan 92		JOB NO.: 13-NC-QB-200

TABLE 4: Calculation of Unit and Plant Availability

Equipment ID	Known Unavailable Days	Estimated Unavailable Days	Total Unavailable Days	*Required Days	Average Availability
UNIT-1					
1EQBN001	6	0	6	518	98.8%
1EQBN002	18	0	18	518	96.5%
1EQBN003	5	0	5	518	99.0%
1EQBN004	12	0	12	518	97.7%
Totals:	41	0	41	2072	
Average Unit Availability:					98.0%
UNIT-2					
2EQBN001	14	0	14	518	97.3%
2EQBN002	14	0	14	518	97.3%
2EQBN003	14	0	14	518	97.3%
2EQBN004	13	0	13	518	97.5%
Totals:	55	0	55	2072	
Average Unit Availability:					97.4%
UNIT-3					
3EQBN001	8	0	8	518	98.5%
3EQBN002	15	0	15	518	97.1%
3EQBN003	3	0	3	518	99.4%
3EQBN004	6	0	6	518	98.8%
Totals:	32	0	32	2072	
Average Unit Availability:					98.5%
PALO VERDE PROJECT					
	128	0	128	6216	97.9%

* Required days 01 June 1990 through 01 November 1991 (518 days)

BY: John R. Wadella <i>JRW</i>	DATE: 06 Jan 92	SUBJECT: CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)	SHEET NO.: Page 26
CHECKED BY: Sandra K. Guy <i>SKG</i>	DATE: 08 Jan 92		JOB NO.: 13-NC-QB-200

TABLE - 5

AVAILABILITY COMPARISON (1990 - 1991)



ENGINEERING SKETCH PAD

REVISION 02

BY John R. Wadella <i>rw</i>	DATE 06 Jan 92	SUBJECT CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)	SHEET NO.: Page 27
CHECKED BY: Sandra K. Guy <i>SKG</i>	DATE: 08 Jan 92		JOB NO.: 13-NC-QB-200

TABLE 5: Availability Comparison

Equipment ID	Previous Calculation June 1989 - June 1990	Present Calculation June 1990 - November 1991
1EQBN001	100.0%	98.8%
1EQBN002	95.1%	96.5%
1EQBN003	100.0%	99.0%
1EQBN004	100.0%	97.7%
UNIT AVERAGE:	98.8%	98.0%
2EQBN001	82.9%	97.3%
2EQBN002	98.9%	97.3%
2EQBN003	100.0%	97.3%
2EQBN004	100.0%	97.5%
UNIT AVERAGE:	95.5%	97.4%
3EQBN001	92.9%	98.5%
3EQBN002	100.0%	97.1%
3EQBN003	58.7%	99.4%
3EQBN004	97.5%	98.8%
UNIT AVERAGE:	87.3%	98.5%
PVNGS PROJECT AVERAGE:	93.8%	97.9%



ENGINEERING SKETCH PAD

BY: John R. Wadella <i>[Signature]</i>	DATE: 06 Jan 92	SUBJECT: CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)	SHEET NO.: Page 28
CHECKED BY: Sandra K. Guy <i>SKG</i>	DATE: 08 Jan 92		JOB NO.: 13-NC-QB-200

APPENDIX - B

WORK ORDER HISTORY GRAPHS (1991)



ENGINEERING SKETCH PAD REVISION 02	
BY: John R. Wadella CHECKED BY: Craig A. Cooper DATE: 06 Jan 92 DATE: 11/5/92	SUBJECT: CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991) SHEET NO: 29 PROJ: 13-NC-QB-200

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUID: IEQDNN05 (IEQBN001) TYPE: HOLOPHANE - UPS

Required available days: 518
 Known unavailable days: 6
 Estimated unavailable days: 0

☐ Available
☒ Known unavailable
☒ Estimated unavailable

Unavailable 06/12/90
 Available 06/12/90

- #00429921 (06/12/90) Implementation of SM-QD-007, Installed New Inverters
- #00430563 (06/18/90) Perform Preliminary Charge of Batteries Installed in UPS WR #396907 Written for Defective C&B-SA
- #00431191 (06/19/90) Removed and Replaced Defective Battery-SA
- #00429188 (07/05/90) Monthly Inspection, Task #041178
- #00440721 (08/28/90) Monthly Inspection, Task #041178
- #00441928 (09/17/90) Monthly Inspection, Task #041178
- #00444211 (10/09/90) Monthly Inspection, Task #041178
- #00446230 (10/09/90) Performed Six-Month Discharge Test, Task #033713
- #00449159 (11/06/90) Monthly Inspection, Task #041178
- #00453592 (12/06/90) Monthly Inspection, Task #041178
- #00459505 (01/08/91) Monthly Inspection, Task #041178
- #00463081 (02/04/91) Monthly Inspection, Task #041178
- #00467303 (02/14/91) Monthly Inspection, Task #041178
- #00470692 (03/19/91) Monthly Inspection, Task #041178
- #00470689 (03/19/91) Performed Six-Month Discharge Test, Task #033713
- #00462355 (03/27/91) Replaced Ballast with Mark III Type Ballast
- #00474845 (04/16/91) Monthly Inspection, Task #041178
- #00479114 (05/16/91) Monthly Inspection, Task #041178
- #00482356 (06/13/91) Monthly Inspection, Task #041178
- #00494231 (07/13/91) Monthly Inspection, Task #041178
- #00497506 (08/03/91) Monthly Inspection, Task #041178
- #00504831 (09/03/91) Perform 6-Month Discharge Test, Task #033713
- #00504833 (09/06/91) Monthly Inspection, Task #041178
- #00508461 (10/01/91) Monthly Inspection, Task #041178
- #00512781 (11/01/91) Monthly Inspection, Task #041178
- #00516692 (11/29/91) Monthly Inspection, Task #041178

June 90 July 90 Aug 90 Sept 90 Oct 90 Nov 90 Dec 90 Jan 91 Feb 91 Mar 91 Apr 91 May 91 June 91 July 91 Aug 91 Sept 91 Oct 91 Nov 91

June 90 July 90 Aug 90 Sept 90 Oct 90 Nov 90 Dec 90 Jan 91 Feb 91 Mar 91 Apr 91 May 91 June 91 July 91 Aug 91 Sept 91 Oct 91 Nov 91

#00429165 (06/12/90) Inspect Fluorescent light fixtures, Work Completed, Lamps replaced as required.
#00430485 (06/14/90) Check Lamps installed in fixtures, Removed and replaced incorrect lamps.

#00429189 (07/10/90) Monthly Inspection, Task #041292

#00431907 (08/01/90) Implementation of SM-QD-007, Installed new Inverters.

#00439330 (08/12/90) Install Batteries and retest UTS Inverter

#00441929 (09/05/90) Monthly Inspection, Task #041292

#00441930 (09/27/90) Monthly Inspection, Task #041292

#00444235 (10/24/90) Monthly Inspection, Task #041292, Noted excessive swelling on cell 5A and
BBFV = 27.31 vdc (high).

#00448138 (11/16/90) Open circuit battery string containing batteries 5A and 5B, Replaced all UTS
batteries and retested.

#00451524 (11/22/90) Monthly Inspection, Task #041292

#00455169 (12/21/90) Monthly Inspection, Task #041292

#00461371 (01/20/91) Monthly Inspection, Task #041292

#00467346 (02/04/91) Perform Six-Month Discharge Test, Task #033826

#00463082 (02/11/91), Monthly Inspection, Task #041292

#00474334 (02/28/91) Troubleshoot the bar graph indication problem, Troubleshooting revealed
loose connections problem cleared.

#00470693 (03/18/91) Monthly Inspection, Task #041292

#00474846 (04/16/91) Monthly Inspection, Task #041292

#00482334 (05/08/91) Perform Six-Month Discharge Test, Task #033826

#00482336 (05/13/91) Replace all ballasts with Mark-III type

#00479115 (05/16/91) Monthly Inspection, Task #041292

#00495832 (05/23/91) Troubleshoot the stated problem with the QBN002, Task #041292

#00482337 (06/13/91) Monthly Inspection, Task #041292

#00494232 (07/13/91) Monthly Inspection, Task #041292

#00497507 (08/05/91) Monthly Inspection, Task #041292

#00508789 (08/05/91) Lead indicator pressed on, Fire watch noted abnormal odor, Maintenance
noted no problems found.

#00504834 (09/05/91) Monthly Inspection, Task #041292

#00508662 (10/01/91) Monthly Inspection, Task #041292

#00512782 (10/30/91) Monthly Inspection, Task #041292

Unavailable 08/01/90
Available 08/12/90

Unavailable 11/09/90
Available 11/16/90

Required available days: 518
Known unavailable days: 18
Estimated unavailable days: 0

EMERGENCY LIGHTING COMPONENT AVAILABILITY

EQUID: IEQDNN06 (IEQBNO02) TYPE: HOLOPHANE - UPS

☐ Available
☒ Known unavailable
☒ Estimated unavailable

ENGINEERING SKETCH PAD

REVISION 02

BY: John R. Wadella	DATE: 06 Jan 92	SHEET NO: 13-NC-QB-200
CHECKED BY: Craig A. Cooper	DATE: 1/15/92	PAGE: 30
SUBJECT: CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)		

ENGINEERING SKETCH PAD

REVISION 02

BY John R. Wadella	DATE 06 Jan 92	SHEET NO. 31
CHECKED BY Craig A. Cooper	DATE 11/15/92	PAGE NO. 13-N-C-QB-200
SUBJECT CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)		

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUID: IEQDNN07 (IEQBN003) TYPE: HOLOPHANE - UPS

Required available days: 518
Known unavailable days: 5
Estimated unavailable days: 0

☒ Available
☒ Known unavailable
☒ Estimated unavailable

Use: Rate 06/12/90
Avail: 06/17/90

#00429921 (06/12/90) Implementation of SM-QD-007, Installed new inverters.
#00430564 (06/17/90) Install batteries and reset UPS inverter
#00428025 (06/25/90) Monthly Inspection, Task #044851

#00430257 (07/20/90) Monthly Inspection, Task #044851

#00440922 (08/22/90) Monthly Inspection, Task #044851
#00440863 (08/27/90) Troubleshoot six month timer audio alarm being locked in alarm, Timing circuit on bar graph board found defective.

#00441932 (09/17/90) Monthly Inspection, Task #044851

#00445427 (10/22/90) Monthly Inspection, Task #044851

#00449160 (11/13/90) Monthly Inspection, Task #044851

#00451517 (11/29/90) Perform Six-Month Discharge Test, Task #033828

#00453599 (12/12/90) Monthly Inspection, Task #044851

#00459508 (01/08/91) Monthly Inspection, Task #044851

#00463086 (02/04/91) Monthly Inspection, Task #044851
#00462357 (02/22/91) Replaced Ballast with Mark III Type Ballast
#00469671 (02/27/91) Monthly Inspection, Task #044851

#00473521 (03/29/91) Monthly Inspection, Task #044851
#00473511 (04/01/91) Perform Six-Month Discharge Test, Task #033828

#00475197 (05/01/91) Monthly Inspection, Task #044851

#00480390 (05/28/91) Monthly Inspection, Task #044851

#00493490 (06/24/91) Monthly Inspection, Task #044851

#00502553 (07/02/91) Replace the bar graph board

#00495515 (07/23/91) Monthly Inspection, Task #044851

#00502834 (08/23/91) Monthly Inspection, Task #044851

#00505705 (09/16/91) Perform Six-Month Discharge Test, Task #033828
#00509844 (09/19/91) Monthly Inspection, Task #044851

#00505710 (10/15/91) Monthly Inspection, Task #044851

#00513984 (11/15/91) Monthly Inspection, Task #044851

June 90 July 90 Aug 90 Sept 90 Oct 90 Nov 90 Dec 90 Jan 91 Feb 91 Mar 91 Apr 91 May 91 June 91 July 91 Aug 91 Sept 91 Oct 91 Nov 91

June 90 July 90 Aug 90 Sept 90 Oct 90 Nov 90 Dec 90 Jan 91 Feb 91 Mar 91 Apr 91 May 91 June 91 July 91 Aug 91 Sept 91 Oct 91 Nov 91

- #00429862 (06/13/90) Inspect fluorescent light fixtures
- #00430486 (06/14/90) Inspect and replace lamps as required
- #00426502 (06/19/90) Take AMP readings at each ballast and check fuses
- #00428026 (06/26/90) Monthly Inspection, Task #044852
- #00431922 (06/26/90) Performed 8-hour Discharge Testing, Task #033830
- #00431879 (06/26/90) Troubleshoot stated problem, Removed charger, transfer board and replaced fuses
- #00431277 (07/19/90) Monthly Inspection, Task #044852
- #00435477 (07/25/90) Replace batteries, Complete unit to be changed on wo 431078
- #00431908 (08/02/90) Implementation of SM-QD-007, Installed new inverters
- #00439333 (08/14/90) Install batteries and retest UPS inverter
- #00441933 (09/21/90) Monthly Inspection, Task #044852
- #00441934 (09/28/90) Monthly Inspection, Task #044852
- #00445428 (10/24/90) Monthly Inspection, Task #044852
- #00450349 (11/21/90) Monthly Inspection, Task #044852
- #00454386 (12/21/90) Monthly Inspection, Task #044852
- #00461376 (01/15/91) Monthly Inspection, Task #044852
- #00463064 (02/03/91) Perform six-month discharge test, Task #033830
- #00463087 (02/07/91) Monthly Inspection, Task #044852
- #00469672 (02/27/91) Monthly Inspection, Task #044852
- #00474326 (02/28/91) Troubleshoot load indication bar graph display
- #00473522 (03/29/91) Monthly Inspection, Task #044852
- #00475198 (05/01/91) Monthly Inspection, Task #044852
- 300462358 (05/13/91) Replace ballasts in light fixtures
- #00493479 (05/10/91) Perform six-month discharge test, Task #033830
- #00480391 (05/28/91) Monthly Inspection, Task #044852
- #00497379 (06/11/91) Troubleshoot problem, Initial problem corrected by tightening loose connection
- #00499052 (06/17/91) Replace bar graph with new one, Replaced bar graph was faulty replaced again
- #00493491 (06/25/91) Monthly Inspection, Task #044852
- #00495516 (07/23/91) Monthly Inspection, Task #044852
- #00502835 (08/23/91) Monthly Inspection, Task #044852
- #00514882 (09/12/91) Monthly Inspection, Task #044852
- #00505711 (09/19/91) Monthly Inspection, Task #044852
- #00509845 (10/15/91) Monthly Inspection, Task #044852
- #00513985 (11/15/91) Monthly Inspection, Task #044852

Unavailable 08/02/90
Available 08/16/90

Required available days: 518
Known unavailable days: 12
Estimated unavailable days: 0

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUID: IEQDNN08 (IEQB004) TYPE: HOLOPHANE - UPS

- ☒ Available
- ☒ Known unavailable
- ☒ Estimated unavailable

BY John R. Wadella	DATE 06 Jan 92	SHEET NO. Page: 32
CHECKED BY Craig A. Cooper	DATE 11/5/92	REVISION 02
SUBJECT CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)		
JOB NO. 13-NC-QB-200		

BY: John R. Wadella		DATE: 06 Jan 92	SHEET NO.: 33
CHECKED BY: Craig A. Cooper		DATE: 11/5/92	
SUBJECT: CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)			JOB NO.: 13-NC-QB-200

ENGINEERING SKETCH PAD

REVISION 02

EMERGENCY LIGHTING COMPONENT AVAILABILITY EQUID: 2EQDNN05 (2EQBN001) TYPE: HOLOPHANE - UPS

Required available days: 518
Known unavailable days: 14
Estimated unavailable days: 0

Unavailable 10/1/90
Available 10/25/90

☒ Available
☒ Known unavailable
☒ Estimated unavailable

June 90 July 90 Aug 90 Sept 90 Oct 90 Nov 90 Dec 90 Jan 91 Feb 91 Mar 91 Apr 91 May 91 June 91 July 91 Aug 91 Sept 91 Oct 91 Nov 91

#00424291 (06/11/90) Monthly Inspection, Task #044894
#00430543 (06/16/90) Inspect/verify all fluorescent tubes.

#00425953 (07/01/90) Elec maint to replace batteries, Criteria met
#00435661 (07/13/90) Perform FCR #E-N2229, Rewire fixtures, SM-QD-007 mod.07.
#00435463 (07/16/90) 8-hour discharge test following completion of WO #00435661, Satisfactory
#00428279 (07/16/90) Monthly Inspection, Task #044894
#00435651 (07/17/90) elec maint to troubleshoot and rework prob. No problems

#00438280 (08/07/90) Monthly Inspection, Task #044894
#00433202 (08/07/90) Monthly Inspection, Task #044894

#00441994 (07/06/90) Monthly Inspection, Task #044894
#00438284 (09/11/90) Perform 8-Hour Discharge Test, Task #044902

#00442469 (10/01/90) Monthly Inspection, Task #044894

#00431910 (10/11/90) Implementation of SM-QD-007, Installed new inverters
#00438762 (10/25/90) Install Batteries and Retest UTS Inverter
#00447264 (10/30/90) Monthly Inspection, Task #044894
#00454668 (11/09/90) Electrical maintenance to take voltage readings on installed halophane inverters for systems Q11 and QD
#00454716 (11/10/90) Perform Six-Month Discharge Test, Task #044902
#00453494 (11/24/90) Monthly Inspection, Task #044894
#00454665 (11/30/90) Replace all ballast with Mark-111 Type

#00456452 (12/27/90) Monthly Inspection, Task #044894

#00460602 (01/21/91) Monthly Inspection, Task #044894

#00462072 (02/20/91) Monthly Inspection, Task #044894

#00466141 (03/18/91) Monthly Inspection, Task #044894

#00472632 (04/18/91) Monthly Inspection, Task #044894

#00477049 (05/15/91) Monthly Inspection, Task #044894
#00477053 (05/15/91) Perform Six-Month Discharge Test, Task #044902

#00480739 (06/11/91) Monthly Inspection, Task #044894

#00493005 (07/10/91) Monthly Inspection, Task #044894

#00507997 (07/30/91) Monthly Inspection, Task #044894
#00497763 (08/05/91) Monthly Inspection, Task #044894

#00503630 (09/05/91) Monthly Inspection, Task #044894

#00505994 (09/23/91) 8-Hour Discharge Test per site modification 2-SM-QD-007
#00507997 (10/01/91) Monthly Inspection, Task #044894

#00513297 (10/30/91) Monthly Inspection, Task #044894

BY John R. Wadella		DATE 06 Jan 92
CHECKED BY Craig A. Cooper	DATE 11/5/92	
SUBJECT CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)		
SHEET NO. Page: 34		JOB NO. 13-NC-QB-200

ENGINEERING SKETCH PAD

REVISION 02

EMERGENCY LIGHTING COMPONENT AVAILABILITY EQUID: 2EQDNN06 (2EQBN002) TYPE: HOLOPHANE - UPS

Required available days: 518
Known unavailable days: 14
Estimated unavailable days: 0

Usable 100290
Avail 102290

☒ Available
☒ Known unavailable
☒ Estimated unavailable

- #00424292 (06/11/90) Monthly Inspection, Task #044895, Satisfactory.
- #00432614 (07/06/90) Elec maint troubleshoot and rework 2EQBN001, Retest and work completed
- #00429914 (07/06/90) MNCR 90-QB-003 Identified incorrect amp-hour rating capable of meeting 8-hour discharge requirements, Replaced and performed Functional Retest, Satisfactory.
- #00425415 (07/06/90) Perform 8-Hour Discharge Test, Task #044918
- #00428280 (07/14/90) Monthly Inspection, Task #044895
- #00438281 (08/07/90) Monthly Inspection, Task #044895
- #00433203 (08/07/90) Monthly Inspection, Task #044895
- #00441995 (09/06/90) Monthly Inspection, Task #044895
- #00442470 (10/01/90) Monthly Inspection, Task #044895
- #00431911 (10/08/90) Implementation of SM-QD-007, Installed new inverters.
- #00438763 (10/22/90) Install Batteries and Retest LTS Inverter
- #00447265 (10/30/90) Monthly Inspection, Task #044895
- #00434668 (11/09/90) Electrical maintenance to take voltage readings on installed halophane inverters for systems QB and QD.
- #00454718 (11/12/90) Perform Six-Month Discharge Testing, Task #044918
- #00433493 (11/26/90) Monthly Inspection, Task #044895
- #00434665 (11/30/90) Replace all ballast with Mark-111 Type
- #00456453 (12/27/90) Monthly Inspection, Task #044895
- #00460603 (01/21/91) Monthly Inspection, Task #044895
- #00462073 (02/20/91) Monthly Inspection, Task #044895
- #00466142 (03/18/91) Monthly Inspection, Task #044895
- #00472633 (04/18/91) Monthly Inspection, Task #044895
- #00477050 (05/15/91) Monthly Inspection, Task #044895
- #00477054 (05/15/91) Perform Six-Month Discharge Test, Task #044918
- #00480740 (06/11/91) Monthly Inspection, Task #044895
- #00493006 (07/10/91) Monthly Inspection, Task #044895
- #00497764 (08/05/91) Monthly Inspection, Task #044895
- #00505994 (09/24/91) Perform 8-Hour Discharge Test upon completion of SM-QD-007
- #00507998 (09/28/91) Monthly Inspection, Task #044895
- #00513302 (10/15/91) Perform Six-month Discharge Test, Task #044918, Closed to WO #00505994
- #00513298 (10/30/91) Monthly Inspection, Task #044895

June 90 July 90 Aug 90 Sept 90 Oct 90 Nov 90 Dec 90 Jan 91 Feb 91 Mar 91 Apr 91 May 91 June 91 July 91 Aug 91 Sept 91 Oct 91 Nov 91

ENGINEERING SKETCH PAD

REVISION 02

BY: John R. Wadella	DATE 06 Jan 92	SHEET NO. Page: 35
CHECKED BY: Craig A. Cooper	DATE 11/15/92	
SUBJECT: CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)		TOR NO. 13-NC-QB-200

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUID: 2EQDNN07 (2EQBN003) TYPE: HOLOPHANE - UPS

Required available days: 518
Known unavailable days: 14
Estimated unavailable days: 0

Unavailable 1894/90
Available 1018/90

☒ Available
☒ Known unavailable
☒ Estimated unavailable

#00430010 (06/12/90) Doc meant to inspect/verify all fluorescent tubes are appropriate wattage
#00424293 (06/12/90) Monthly Inspection, Task #044896

#00430400 (07/08/90) MNCR 90-QB-003 Identified incorrect amp-hour rating capable of meeting
8-hour discharge requirements, Replaced and performed Functional Return

#00428281 (07/14/90) Monthly Inspection, Task #044896

#00438282 (08/07/90) Monthly Inspection, Task #044896
#00433204 (08/07/90) Monthly Inspection, Task #044896

#00441996 (09/06/90) Monthly Inspection, Task #044896

#00442471 (10/01/90) Monthly Inspection, Task #044896

#00431912 (10/04/90) Implementation of SM-QD-007, Installed New Inverters.

#00433682 (10/18/90) Install Batteries and Retest UTS Inverter

#00447266 (10/31/90) Monthly Inspection, Task #044896

#00454668 (11/09/90) Electrical maintenance to take voltage readings on installed halophane inverters
for systems QB and QD

#00454719 (11/15/90) Perform Six-Month Discharge Test, Task #044919

#00453496 (11/26/90) Monthly Inspection, Task #044896

#00454665 (11/30/90) Replace all ballast with Mark-III Type

#00456454 (12/27/90) Monthly Inspection, Task #044896

#00460604 (01/21/91) Monthly Inspection, Task #044896

#00462074 (02/20/91) Monthly Inspection, Task #044896

#00466143 (03/18/91) Monthly Inspection, Task #044896

#00472634 (04/19/91) Monthly Inspection, Task #044896

#00477031 (05/17/91) Monthly Inspection, Task #044896

#00477055 (05/16/91) Perform Six-Month Discharge Test, Task #044919

#00480741 (06/11/91) Monthly Inspection, Task #044896

#00493007 (07/10/91) Monthly Inspection, Task #044896

#00497765 (08/05/91) Monthly Inspection, Task #044896

#00503632 (09/05/91) Monthly Inspection, Task #044896

#00507999 (09/30/91) Monthly Inspection, Task #044896

#00510724 (10/10/91) Perform 8-Hour Discharge Test upon completion of SM-QD-007

#00513299 (10/30/91) Monthly Inspection, Task #044896

June 90 July 90 Aug 90 Sept 90 Oct 90 Nov 90 Dec 90 Jan 91 Feb 91 Mar 91 Apr 91 May 91 June 91 July 91 Aug 91 Sept 91 Oct 91 Nov 91

BY: John R. Wadella		DATE: 06 Jan 92	SHEET NO. Page: 36
CHECKED BY: Craig A. Cooper		DATE: 11/15/92	
SUBJECT: CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)		JOB NO.: 13-NC-QB-200	

ENGINEERING SKETCH PAD

REVISION 02

EMERGENCY LIGHTING COMPONENT AVAILABILITY EQUID: 2EQDNN08 (2EQBN004) TYPE: HOLOPHANE - UPS

Required available days: 518
Known unavailable days: 13
Estimated unavailable days: 0

Unavailable 100290
Available 101590




☒ Available
☒ Known unavailable
☒ Estimated unavailable

- #00424294 (06/12/90) Monthly Inspection, Task #044897
#00430010 (06/12/90) Elec maint to inspect/verify all fluorescent tubes
#00430210 (06/18/90) Elec maint to inspect/verify all fluorescent tubes
- #00430611 (07/01/90) MENC 90-QB-003 Identified incorrect amp/hour rating capable of meeting 8-hour discharge requirements, Replaced and performed Functional Retest
#00428282 (07/14/90) Monthly Inspection, Task #044897
- #00438283 (08/07/90) Monthly Inspection, Task #044897
#00433205 (08/07/90) Monthly Inspection, Task #044897
- #00441997 (09/06/90) Monthly Inspection, Task #044897
- #00442472 (10/01/90) Monthly Inspection, Task #044897
#00431913 (10/02/90) Implementation of SM-QD-007, Installed new inverters.
#00438629 (10/15/90) Install Batteries and Retest UPS Inverter.
#00447267 (10/31/90) Monthly Inspection, Task #044897
#00454668 (11/09/90) Electrical maintenance to take voltage readings on installed halophane inverters for systems QB and QD
#00454720 (11/19/90) Perform Six-Month Discharge Test, Task #044920
#00453497 (11/26/90) Monthly Inspection, Task #044897
#00454668 (11/30/90) Replace all ballast with Mark-III Type
- #00456455 (12/27/90) Monthly Inspection, Task #044897
- #00462075 (02/16/91) Monthly Inspection, Task #044897
- #00460605 (01/21/91) Monthly Inspection, Task #044897
- #00466144 (03/18/91) Monthly Inspection, Task #044897
- #00472635 (04/19/91) Monthly Inspection, Task #044897
- #00477052 (05/17/91) Monthly Inspection, Task #044897
#00477056 (05/16/91) Perform Six-Month Discharge Test, Task #044920
#00496273 (05/30/91) Output load indicator LEDs were not on during discharge test, 3K and 47K ohm pots were out of adjustment
- #00480742 (06/11/91) Monthly Inspection, Task #044897
- #00493003 (07/10/91) Monthly Inspection, Task #044897
- #00497766 (08/05/91) Monthly Inspection, Task #044897, BBFV = 27.29 vdc (High)
#00503345 (08/09/91) Adjusted BBFV to meet acceptance criteria
- #00510725 (10/11/91) Perform 8-Hour Discharge Test upon completion of SM-QD-007
#00513300 (10/30/91) Monthly Inspection, Task #044897

June 90 July 90 Aug 90 Sept 90 Oct 90 Nov 90 Dec 90 Jan 91 Feb 91 Mar 91 Apr 91 May 91 June 91 July 91 Aug 91 Sept 91 Oct 91 Nov 91

Required available days : 518
Known unavailable days : 8
Estimated unavailable days : 0

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUID:3EQDNN05 (3EQBN001) TYPE:HOLOPHANE-UPS

 Available
 Known unavailable
 Estimated unavailable

BY: John R. Wadella	DATE: 05 Jan 92	SUBJECT: CALCULATION OF EXIDE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)	SHEET NO.: Page: 37
ORDERED BY: Craig A. Cooper	DATE: 11/5/92		POS NO.: 13-NC-QB-200

ENGINEERING SKETCH PAD

REVISION 02

June 90 July 90 Aug 90 Sept 90 Oct 90 Nov 90 Dec 90 Jan 91 Feb 91 Mar 91 Apr 91 May 91 June 91 July 91 Aug 91 Sept 91 Oct 91 Nov 91

#00429870 (06/12/90) Inspect Fluorescent Light Fixtures
#00430218 (06/16/90) Rework Structural Fireproofing to Support 3SMQD007
#00429606 (06/12/90) Implementation of SM-QD-007, Installed New Inverters.
#00429796 (06/20/90) Install Batteries and Retest UPS Inverter
#00429796 (06/20/90) Installed new modification #3-SM-QD-007,
#00429796 (06/20/90) Installed new modification #3-SM-QD-007,
#00429796 (06/20/90) Installed new modification #3-SM-QD-007.
#00434254 (08/21/90) Cycle 1/3, Task #045713, PM Invalid due to UPS replacement
#0045681 (10/11/90) Monthly Inspection, Task #045681
#00449353 (11/05/90) Monthly Inspection, Task #045681
#00452673 (12/07/90) Monthly Inspection, Task #045681
#00457412 (12/10/90) Performed Six-Month Discharge Test
#00453366 (12/31/90) Monthly Inspection, Task #045681
#00455074 (01/24/91) Replace all ballast with Mark-III Type
#00466215 (01/25/91) Replaced the power cable to essential light fixture 3EQBN001-C
#00458758 (01/29/91) Monthly Inspection, Task #045681
#00458759 (02/26/91) Monthly Inspection, Task #045681
#00471977 (03/29/91) Monthly Inspection, Task #045681
#00471978 (04/26/91) Monthly Inspection, Task #045681
#00471979 (05/24/91) Monthly Inspection, Task #045681
#00464002 (05/27/91) Performed Six-Month Discharge Test, Task #045713
#00491589 (06/13/91) Monthly Inspection, Task #045681
#00496391 (07/17/91) Monthly Inspection, Task #045681
#00502343 (08/09/91) Monthly Inspection, Task #045681
#00504594 (09/05/91) Monthly Inspection, Task #045681
#00511199 (09/27/91) Monthly Inspection, Task #045681
#00515569 (10/30/91) Monthly Inspection, Task #045681

ENGINEERING SKETCH PAD

REVISION 02

BY: John R. Wadella	DATE: 06 Jan 92	SHEET NO. Page: 38
CHECKED BY: Craig A. Cooper	DATE: 11/5/92	
SUBJECT: CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)		POB NO: 13-NC-QB-200

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUID:3EQDNN06 (3EQBN002) TYPE: HOLOPHANE - UPS

Required available days: 518
Known unavailable days: 15
Estimated unavailable days: 0

Unavailable: 0002790
Available: 001770

☐ Available
☒ Known unavailable
☒ Estimated unavailable

#00429871 (06/12/90) Inspect Fluorescent Light Fixtures
#00422883 (06/27/90) Monthly Inspection, Task #045682
#00422884 (07/17/90) Monthly Inspection, Task #045682
#00431906 (08/02/90) Implementation of SM-QD-007, Installed New Inverters
#00437851 (08/17/90) Install Batteries and Retest UPS Inverter
#00441786 (09/13/90) Monthly Inspection, Task #045682
#00433090 (10/10/90) Heat shrink spare wires IAW 131EN306
#00443955 (10/11/90) Monthly Inspection, Task #045682
#00449354 (11/07/90) Monthly Inspection, Task #045682
#00454674 (11/14/90) Engineering Verification and Record of UPS Battery Voltage to Ensure Display Board Voltage Bar Graphs Indicate Properly.
#00452674 (12/06/90) Monthly Inspection, Task #045682, Initiated WR #781342 Cells 8B & 1A Exhibited Signs of Leakage.
#00452677 (12/06/90) Perform Six-Month Discharge Test, Task #045716,
#00460334 (12/25/90) Replaced Battery Cells 1A and 8A per MNCR 90-QB-007
Batteries sent back to Vendor for Evaluation.
#00455367 (12/29/90) Monthly Inspection, Task #045682
#00455074 (01/24/91) Replace all ballast with Mark-III Type
#00458760 (01/29/91) Monthly Inspection, Task #045682
#00458761 (02/26/91) Monthly Inspection, Task #045682
#00471980 (03/29/91) Monthly Inspection, Task #045682
#00471981 (04/26/91) Monthly Inspection, Task #045682
#00471982 (05/23/91) Monthly Inspection, Task #045682
#00471989 (05/28/91) Perform Six-Month Discharge Test, Task #045716
#00491590 (06/18/91) Monthly Inspection, Task #045682
#00496392 (07/15/91) Monthly Inspection, Task #045682
#00502344 (08/09/91) Monthly Inspection, Task #045682
#00504595 (09/05/91) Monthly Inspection, Task #045682
#00511200 (09/27/91) Monthly Inspection, Task #045682
#00515571 (11/01/91) Monthly Inspection, Task #045682
#00515572 (11/24/91) Monthly Inspection, Task #045682

June 90 July 90 Aug 90 Sept 90 Oct 90 Nov 90 Dec 90 Jan 91 Feb 91 Mar 91 Apr 91 May 91 June 91 July 91 Aug 91 Sept 91 Oct 91 Nov 91



June 90 July 90 Aug 90 Sept 90 Oct 90 Nov 90 Dec 90 Jan 91 Feb 91 Mar 91 Apr 91 May 91 June 91 July 91 Aug 91 Sept 91 Oct 91 Nov 91

#00429606 (06/16/90) Install new batteries & additional capacity per mod 2 of site mod Jam-qd-007, R of, WO #430333 and 418334 replaced at power stations Jeqbn001 and Jeqbn003
#00418334 (06/18/90) Replace battery 4b troubleshoot and rework to correct any discrepancies found during the performance of work and retest. Batteries 1b, 3b, 4a and 4b and inverter cards were replaced failed pm retest 410339 entire UPS to be replaced under Jam-qd-007
#00430333 (06/19/90) Install new batteries, Installed new UPS unit replaced 2 vendor functional tests found
#00422886 (06/28/90) Monthly Inspection, Task #045683, Cancelled, WO #430333 installed site modification #3-SM-QD-007.
#00422885 (06/28/90) Monthly Inspection, Task #045683, Cancelled, WO #430333 installed site modification #3-SM-QD-007.
#00429053 (07/02/90) Cycle JJghung, Task #045717, PM Invalid due to UPS replacement

#00441791 (07/14/90) Monthly Inspection, Task #045683

#00447615 (10/10/90) Perform Six-Month Discharge Test, Task #045717
#00443956 (10/12/90) Monthly Inspection, Task #045683

#00449355 (11/07/90) Monthly Inspection, Task #045683
#00454674 (11/14/90) Engineering Verification and Record of UPS Battery Voltage to Ensure Display Board Voltage Bar Graphs Indicate Properly.
#00454707 (11/15/90) Electrical maint to adjust the UPS front display indicator/scale faceplate to achieve proper indication of dc voltage on the bar graph, wo complete
#00452675 (12/03/90) Monthly Inspection, Task #045683

#00455368 (12/29/90) Monthly Inspection, Task #045683

#00455074 (01/24/91) Replace all ballast with Mark-III Type
#00458762 (01/29/91) Monthly Inspection, Task #045683

#00458763 (02/26/91) Monthly Inspection, Task #045683
#00465468 (02/27/91) Perform Six-Month Discharge Test, Task #045717

#00471983 (03/26/91) Monthly Inspection, Task #045683

#00471984 (04/26/91) Monthly Inspection, Task #045683

#00471985 (05/25/91) Monthly Inspection, Task #045683

#00491591 (06/13/91) Monthly Inspection, Task #045683

#00496393 (07/12/91) Monthly Inspection, Task #045683

#00502345 (08/12/91) Monthly Inspection, Task #045683
#00502347 (08/13/91) Perform Six-Month Discharge Test, Task #045717, MNCR #91QB3014 written for high charge light after 168 hours.

#00504596 (09/04/91) Monthly Inspection, Task #045683

#00511201 (09/30/91) Monthly Inspection, Task #045683
#00511484 (09/30/91) Aux charging board & charger xfer board replaced, References: MNCR #91-QB-3014

#00515573 (10/25/91) Monthly Inspection, Task #045683

Transmittal 06/15/90
Available 06/15/90

Required available days: 518
Known unavailable days: 3
Estimated unavailable days: 0

EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUIP:3EQDNN07 (3EQBN003) TYPE: HOLOPHANE - UPS

☒ Available
☒ Known unavailable
☒ Estimated unavailable

ENGINEERING SKETCH PAD

REVISION 02

BY John R. Wadella	DATE 06 Jan 92	SUBJECT CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)	SHEET NO. Page: 39
CHECKED BY Craig A. Cooper	DATE 11/15/92		
FOR NO. 13-NC-QB-200			

ENGINEERING SKETCH PAD

REVISION 02

BY: John R. Wadell CHECKED BY: Craig A. Cooper	DATE: 06 Jan 92 DATE: 1/15/92	SUBJECT: CALCULATION OF HOLOPHANE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)	SHEET NO.: Page: 40 FOR NO.: 13-NC-QB-200
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EMERGENCY LIGHTING COMPONENT AVAILABILITY
EQUID:3EQDNN08 (3EQBN004) TYPE: HOLOPHANE - UPS

Required available days: 518
Known unavailable days: 6
Estimated unavailable days: 0

Unavailable 06/07/90
Available 06/08/90

☐ Available
☒ Known unavailable
☒ Estimated unavailable

#00429873 (06/12/90) Inspect the fluorescent light fixtures
#00422887 (06/18/90) Monthly Inspection, Task #045684

#00430215 (07/17/90) Cycle emergency lighting aux bldg 100* Task #045714
#00422888 (07/20/90) Monthly Inspection, Task #045684

#00431909 (08/02/90) Implementation of SM-QD-007, Install New Inverters
#00437860 (08/08/90) Install Batteries and Retest UPS Inverter

#00437157 (08/21/90) Monthly Inspection, Task #045684
#00441789 (09/12/90) Monthly Inspection, Task #045684

#00443957 (10/11/90) Monthly Inspection, Task #045684

#00449356 (11/07/90) Monthly Inspection, Task #045684
#00454674 (11/14/90) Electrical maint to support engineering's request to verify and record the
UPS battery voltage and ensure the display board voltage bar graphs indicate properly

#00452676 (12/03/90) Monthly Inspection, Task #045684
#00453369 (12/31/90) Monthly Inspection, Task #045684

#00455370 (01/01/91) Perform Six-Month Discharge Test, Task #045714
#00455074 (01/24/91) Replace ballasts in all fluorescent light fixtures fed from holophane UPS units,
#00458764 (01/29/91) Monthly Inspection, Task #045684

#00458765 (02/26/91) Monthly Inspection, Task #0458765
#00471986 (03/26/91) Monthly Inspection, Task #045684

#00471987 (04/26/91) Monthly Inspection, Task #045684
#00471988 (05/23/91) Monthly Inspection, Task #045684

#00482195 (06/10/91) Perform Six-Month Discharge Test, Task #045714
#00491592 (06/13/91) Monthly Inspection, Task #045684

#00496394 (07/12/91) Monthly Inspection, Task #045684
#00501699 (07/31/91) Implement DCP-01XG-QD027 to be worked with DCP-01-XE-QD026

#00502346 (08/15/91) Monthly Inspection, Task #045684
#00504597 (09/04/91) Monthly Inspection, Task #045684

#00511202 (09/30/91) Monthly Inspection, Task #045684
#00515575 (11/01/91) Monthly Inspection, Task #045684

June 90 July 90 Aug 90 Sept 90 Oct 90 Nov 90 Dec 90 Jan 91 Feb 91 Mar 91 Apr 91 May 91 June 91 July 91 Aug 91 Sept 91 Oct 91 Nov 91

BY John R. Wadella <i>RL</i>	DATE 06 Jan 92	SUBJECT CALCULATION OF EXIDE EMERGENCY LIGHTING UNITS AVAILABILITY (1991)	SHEET NO Page 22
CHECKED BY: Sandra K. Guy <i>SKG</i>	DATE 08 Jan 92		JOB NO.: 13-NC-QD-201

APPENDIX - B

WORK ORDER HISTORY GRAPHS (1991)

