

*“To Accomplish Great Things One  
Must Not Only Dream, But Act”  
~Bill Blackman*

# Summer Internship Presentation

**Presented By:**

**Brittani J. Sims**

**Internship Experience:**

Launch: June 4, 2007

Landing: August 10, 2007



# Overview

- Background
- Project Responsibilities
- Investigation/ Analysis of Unscheduled Outages
  - Goal Six Metric Review
- Fire Alarm / Suppression System Metrics Surveillance
  - 2.2.1-3, False Alarms and Evacuations
  - 2.2.1-13, Preventive Maintenance of Fire Alarms Systems
- Fire Alarm / Suppression Systems Availability
  - Fire Alarm and Suppression Systems Impairment Report
- Brittani's Prospective NOW
- Acknowledgements
- Questions



# Background

- Attend Morgan State University
  - Located in North East Baltimore, Maryland
- Senior, Electrical & Computer Engineering Major
- Native of San Diego, California
- 2006 -2007 NASA MUST Scholar
- Future Astronaut



# Project Responsibilities

## ■ Investigation/Analysis of Unscheduled Outages

Review and Understand Goal Six Metric

- Provide a Conclusion of the contractor is providing the government a good product regarding the causes and determination of “availability” criteria

## ■ Fire Alarms / Surveillance

2.2.1-3 False Fire

- Verify that E

2.2.1-13 Preventi

- Deferral Proc

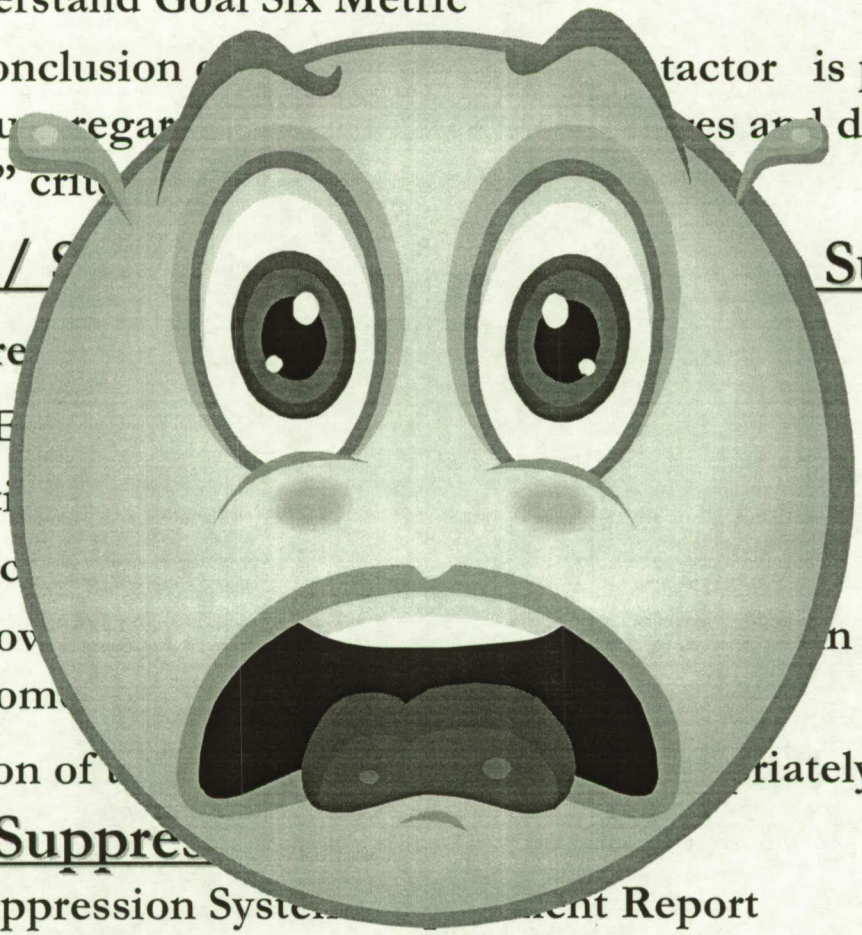
- Verify how the contractor is coordinating these with the customer

- Reflection of the contractor's performance appropriately

## ■ Fire Alarm/Suppression

Fire Alarm and Suppression System Performance Report

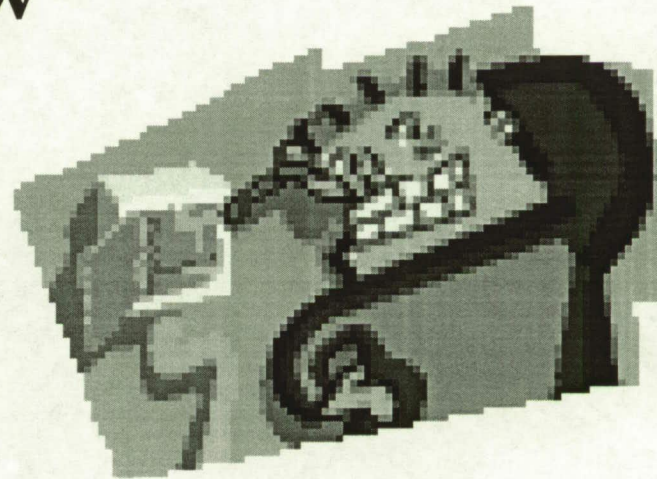
- Review weekly reports
- Asses how diligent the contractor is keeping systems in service



# Investigation/ Analysis of Unscheduled Outages

## GOAL SIX METRIC REVIEW

Goal Six Metric is used to  
Measure the Contractor's  
Compliance with  
\*Performance Standard 2.2.1-1



\*Critical and/or Mission Essential F/S/E/U shall be ready to the user 100% of the Time from Call to Station until the mission milestone is complete or cancelled.





# Methodology

## Goal 6 Metric

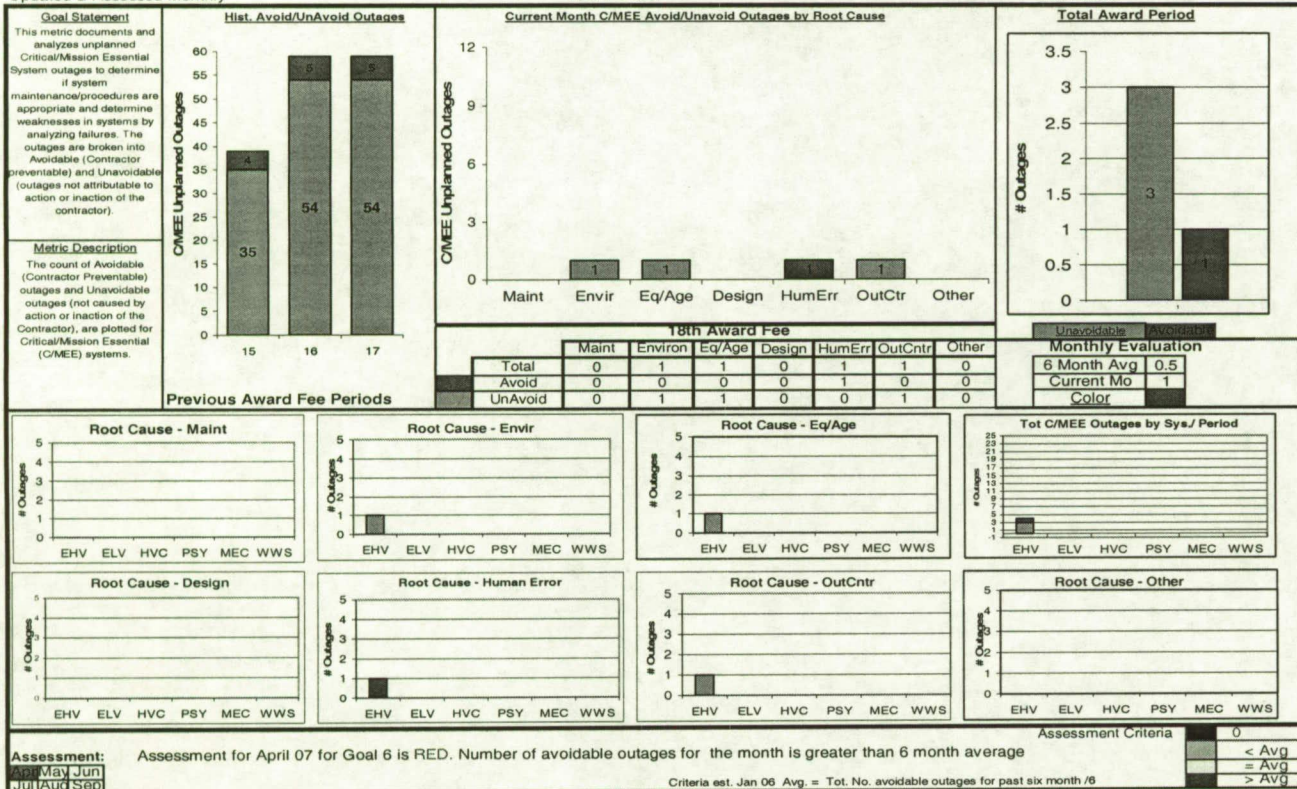
Following the Graphical portion of the Metric is a Brief Summary that Provides:

- Anomaly Number
- ERCA ID
- Owner
- Date of Incident
- System
- Anomaly Description
- Root Cause
- What Failed
- Root Cause Category
- Avoided Y/N
- Need Analysis
- How Mitigated
- Corrective Action
- Comments
- Status

POC: Ray Tuttle, SGS & Jose Mojica, CCSMO  
Updated & Assessed Monthly

Critical/MEE System Availability  
18th Period

Program Level Metric: Goal 6a  
Date: 4/30/2007



Reviewed & Evaluated May, April, June, & July

# Methodology Con't

- Outages Investigated
- “XY” Building
- AF Cafeteria
- FSA-3, 1360, 1635, 62630
- Cx 39 Pad A & B
- Contractor’s Method To
- Populate Goal Six Metric:
- Review Anomaly Report
  - Initial Report
- Review ERCA
  - Generated by Anomaly Report
- Review Utility Outage And Incident Report
  - AF Only
- Hold A FERB
  - Once a month, discuss outages mostly regarding splices, relays, etc.
- Hold A High Voltage Meeting
  - AF Only
  - IPT’s
    - Play a Role in Accepting the Metric





# The Air Force Communication Range Building Outage

\*Reflected for May Metric

## “XY” Building

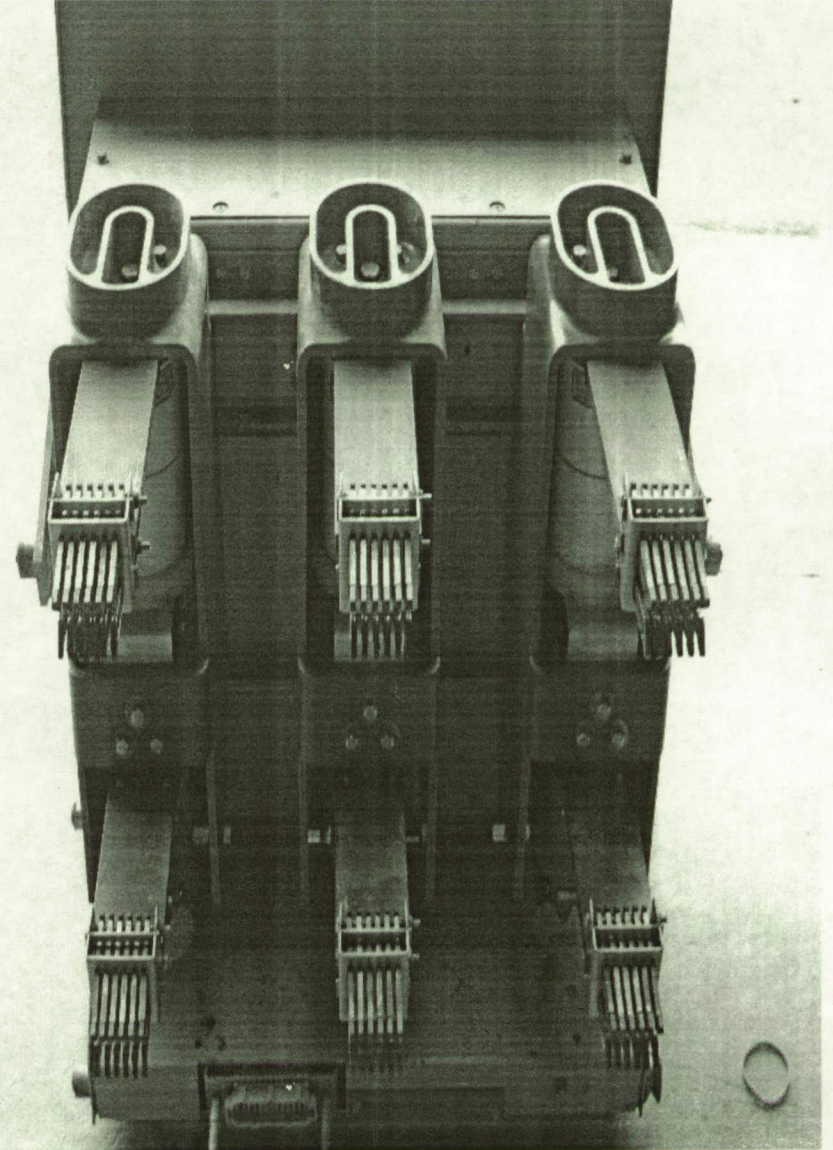
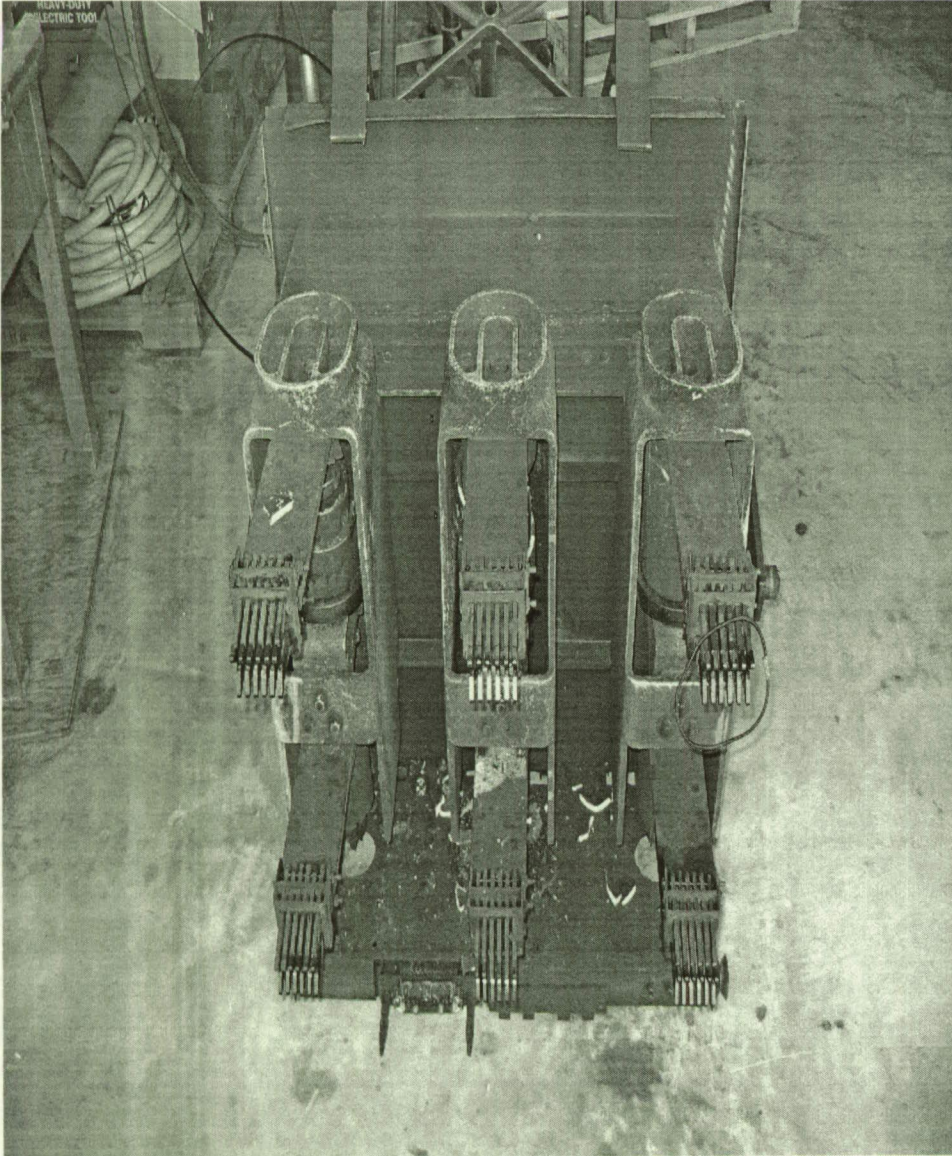
**Date:** May 21, 2007

**Root Cause:** Fault at the Primary Automatic Transfer (ATS) that resulted in loss of power

**Contributing Cause:** As a result of a fault at the South Substation, which was created by FLP during a routine testing on their 115kV protective circuits



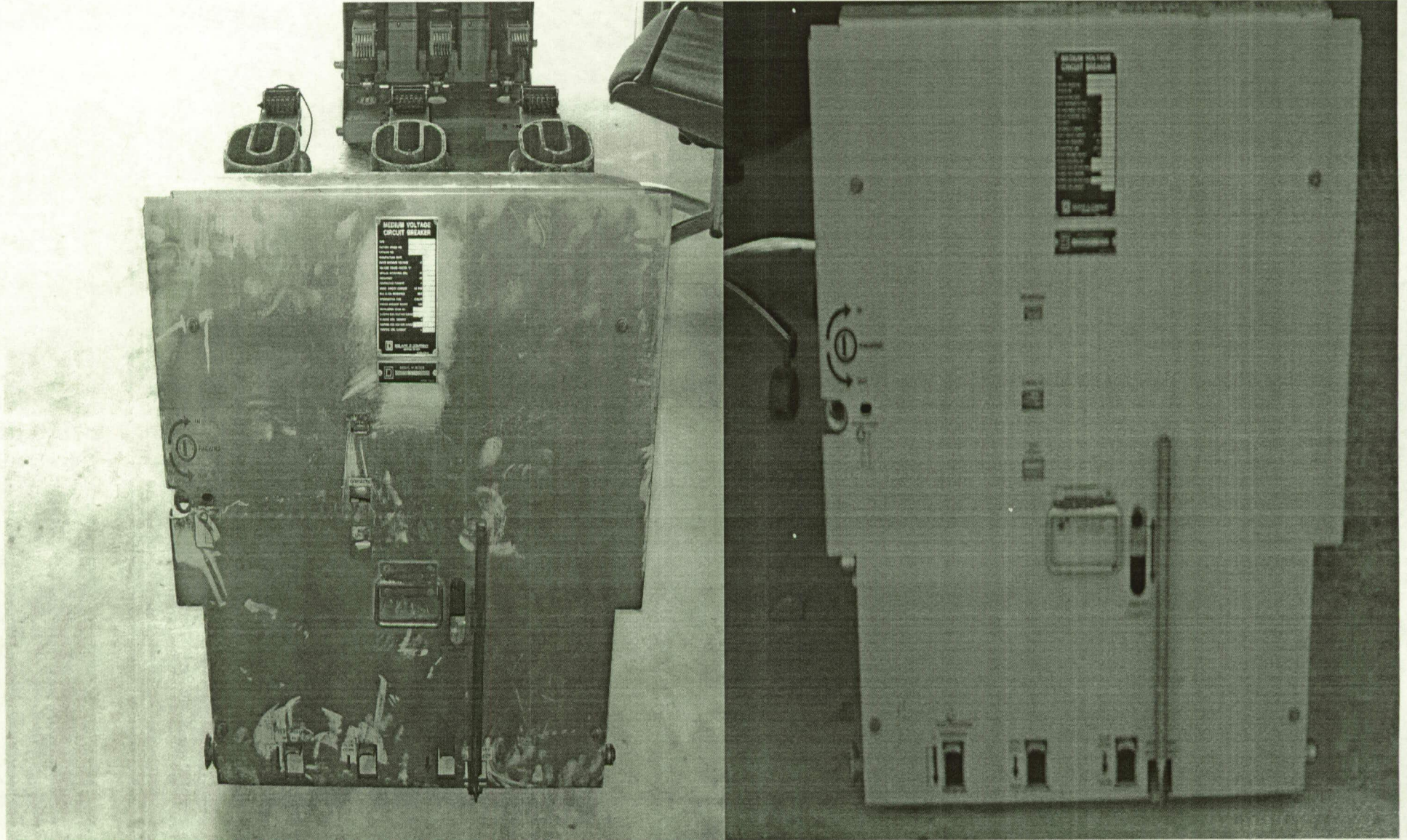
# The Air Force Communication Range Building Outage



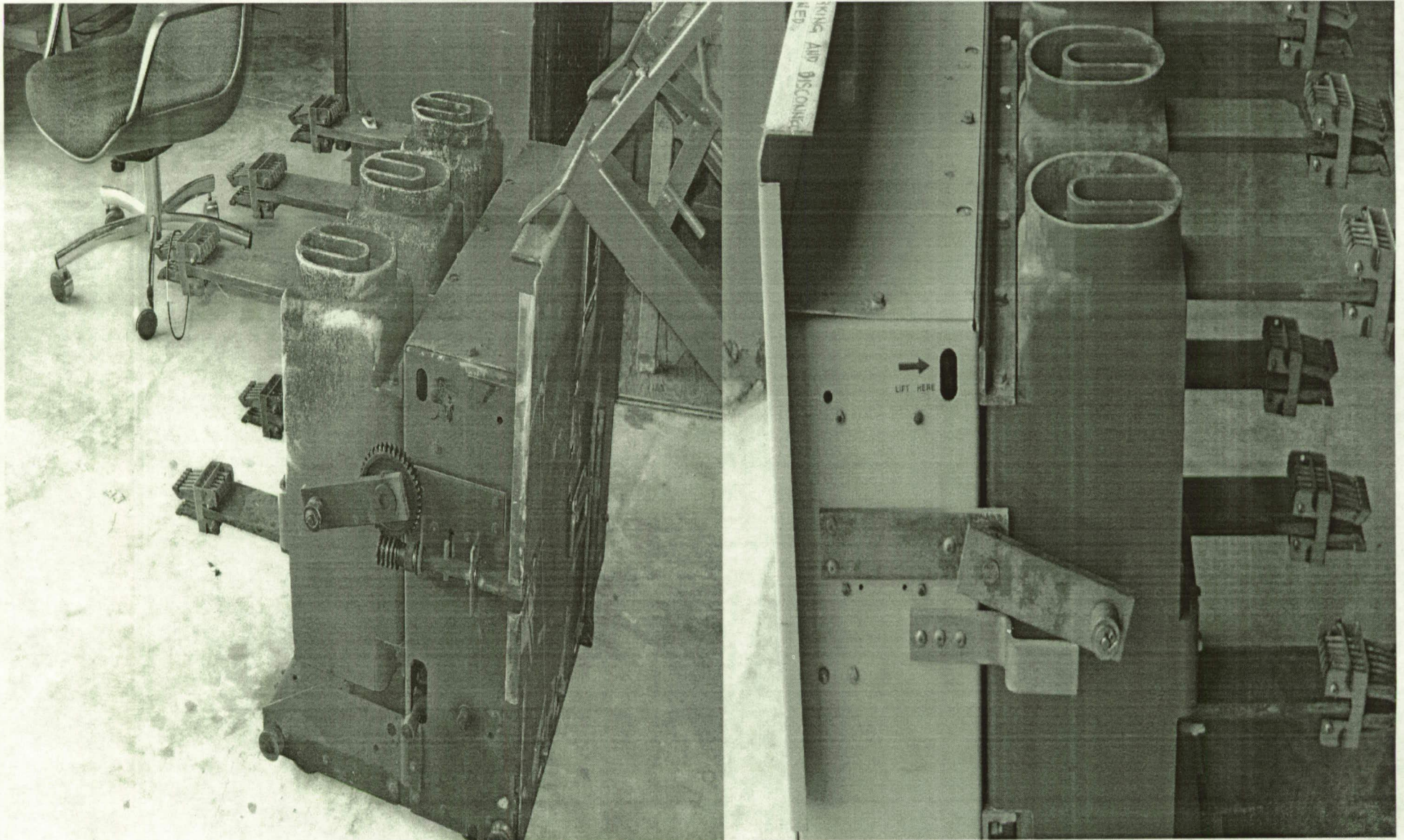
# The Air Force Communication Range Building Outage



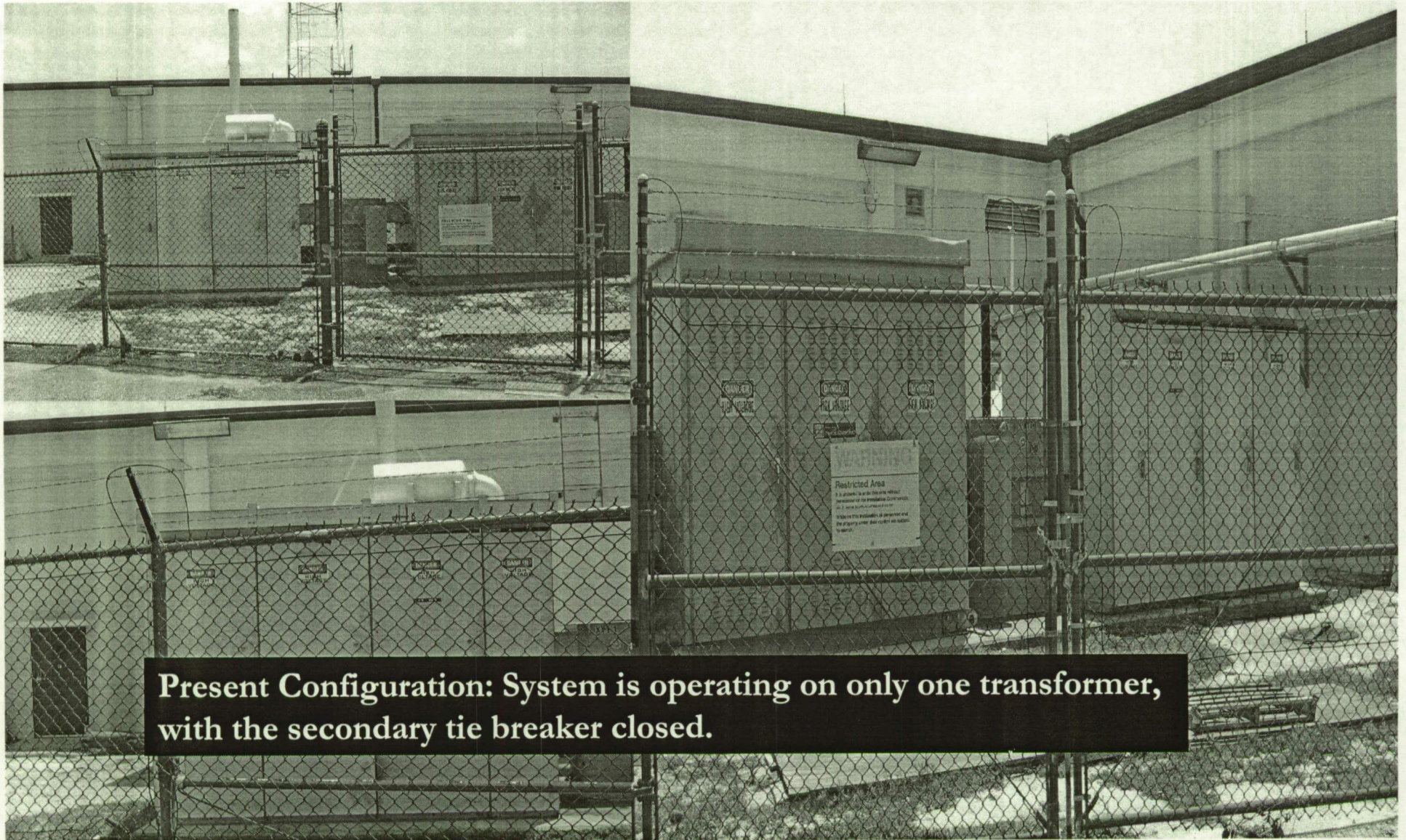
# The Air Force Communication Range Building Outage



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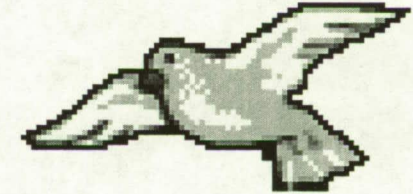
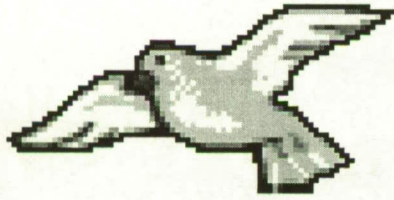
# The Air Force Communication Range Building Outage



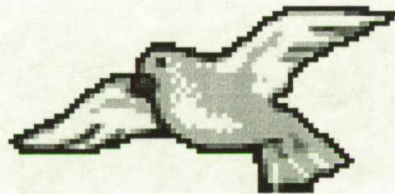
**Present Configuration: System is operating on only one transformer, with the secondary tie breaker closed.**

# USAF Cafeteria Outage

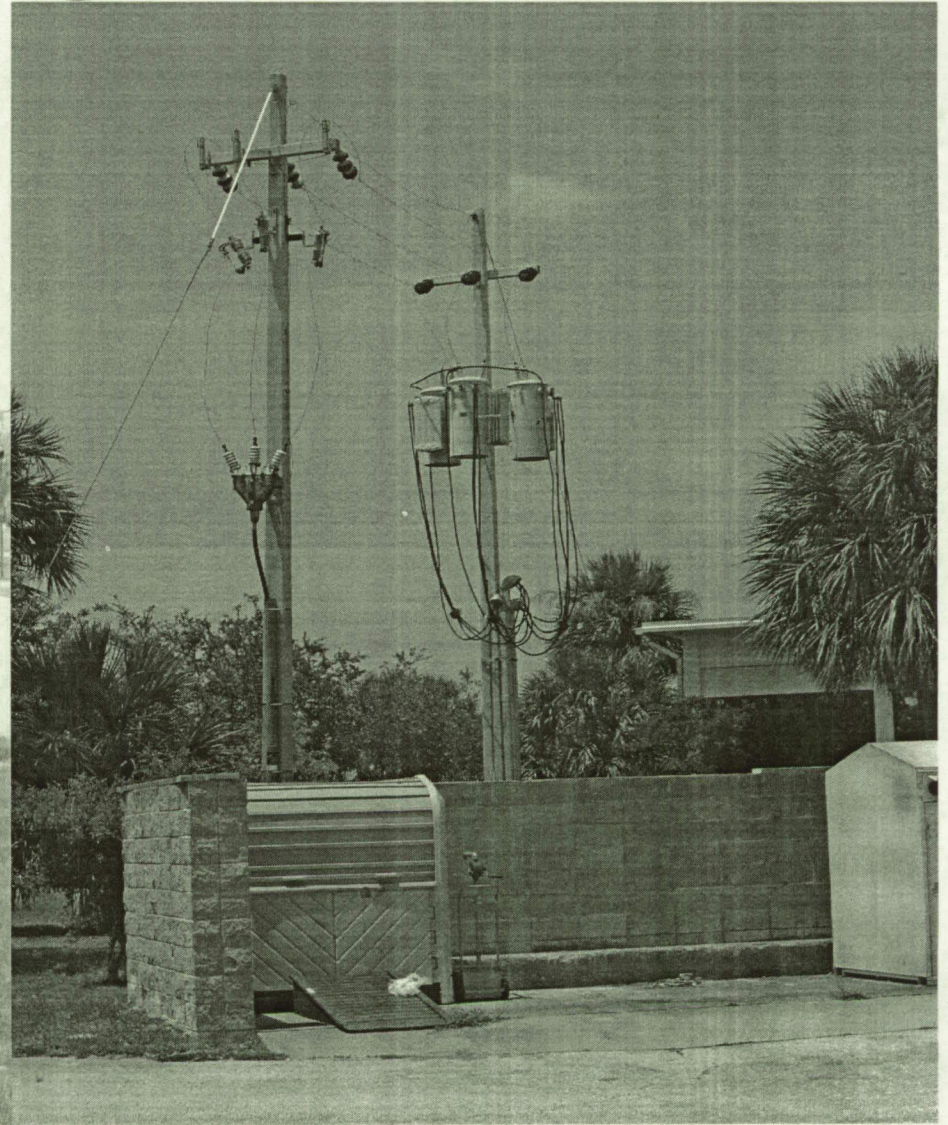
\* Reflected on June Metric



- **Date:** June 6, 2007
- **Root Cause:** Blown fuses on pole A110-8IF and A110-7IF. Two vultures created contact with the energized power lines causing a short circuit.
- **Contributing Cause:** A cafeteria dumpster is located very close to poles A110-8IF and A110-7IF. The dumpster attracts a large number of birds, which results in them coming in contact with the power line .

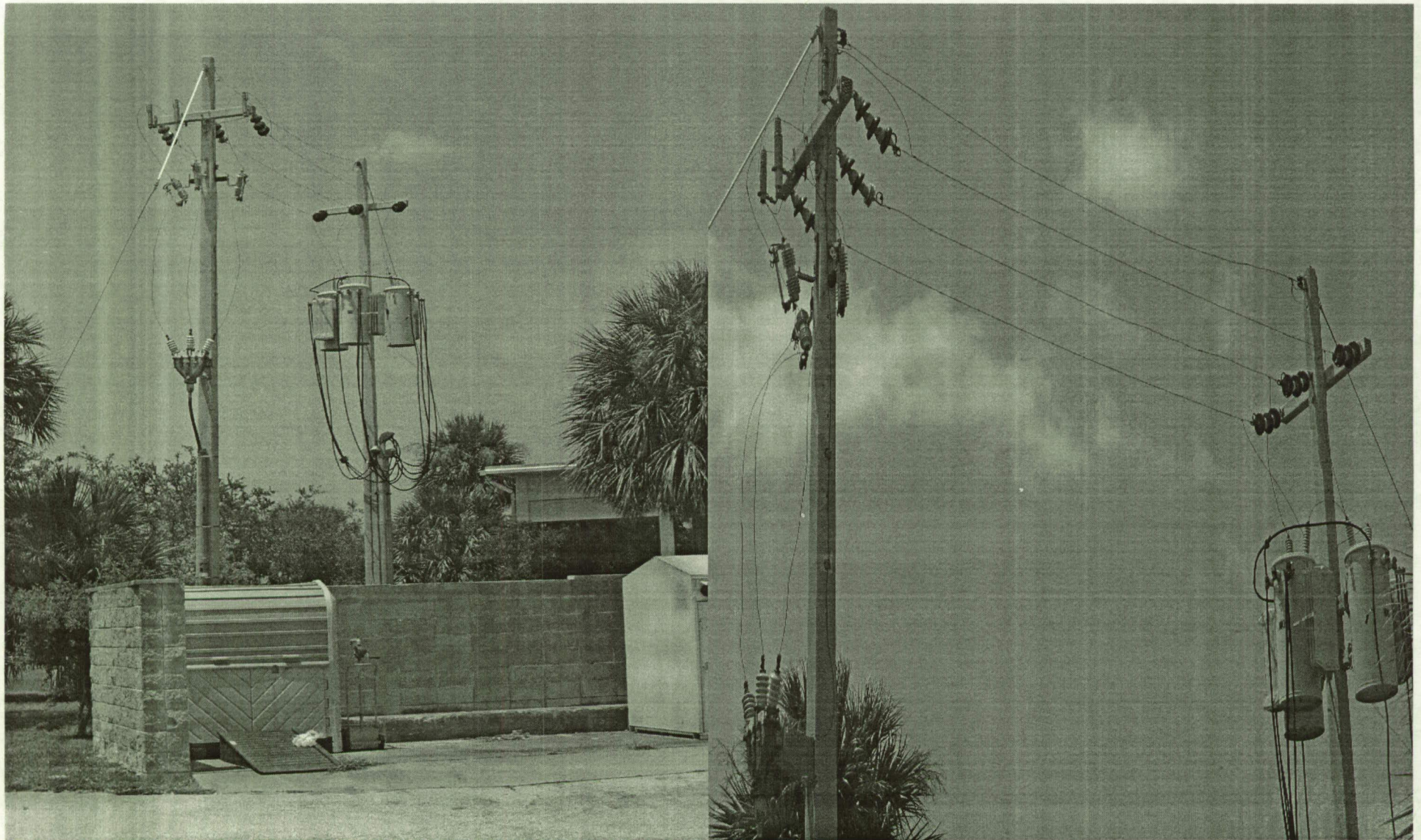


# USAF Cafeteria Outage

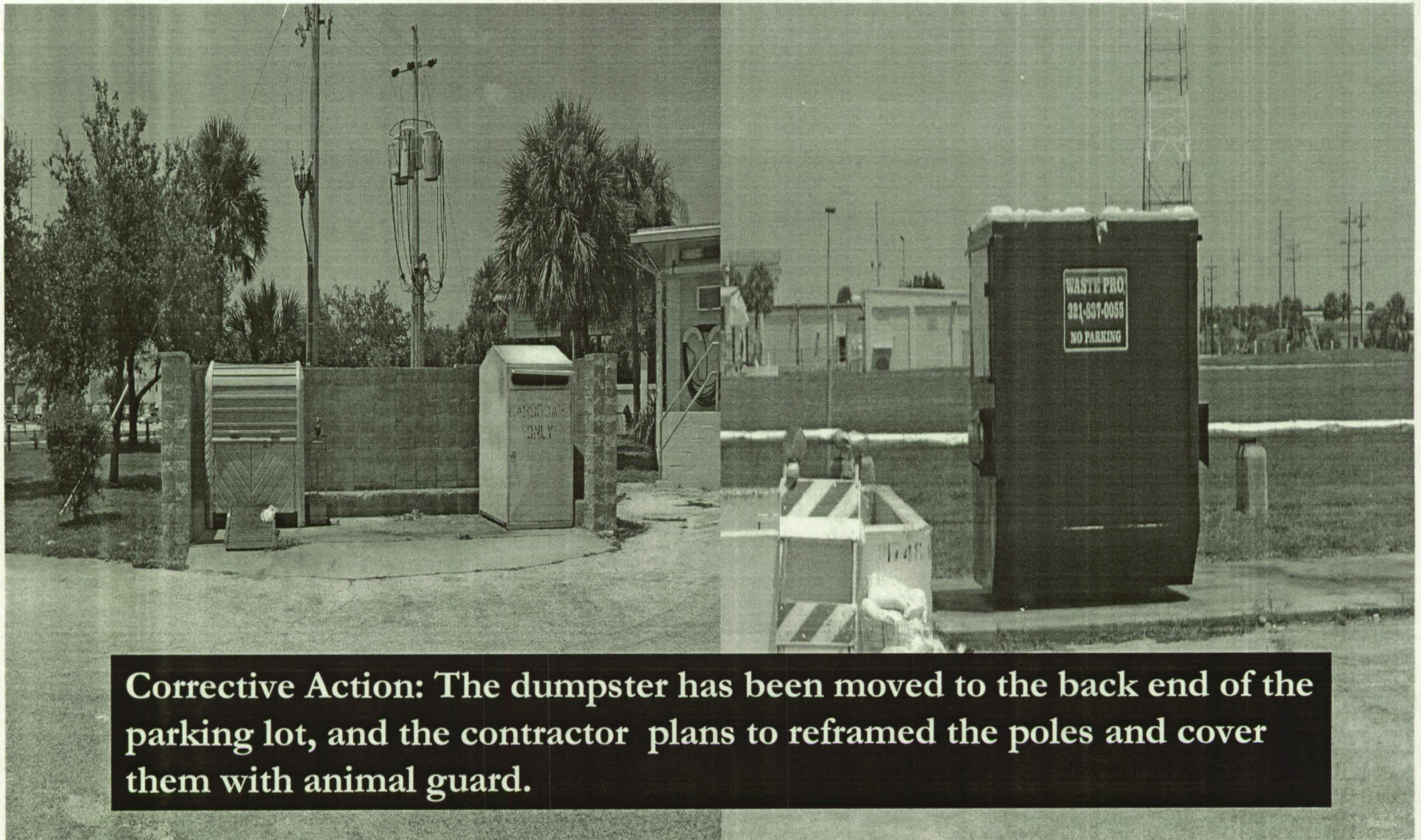




# USAF Cafeteria Outage



# USAF Cafeteria Outage



**Corrective Action:** The dumpster has been moved to the back end of the parking lot, and the contractor plans to reframe the poles and cover them with animal guard.

# FSA-3, 1360, 1635, 62630

## Outage

\*Reflected June Metric

- **Date:** June 18, 2007
- **Root Cause:** Under ground cable fault between two switches (CCIG4 Pos. 5 and CX36IGT5 Pos. 1)
- **Contributing Cause:** Improperly assembled aerial splice feeding under ground line. This aerial splice was made by AF contractor not under control of JBOSC.



# FSA-3, 1360, 1635, 62630 Outage



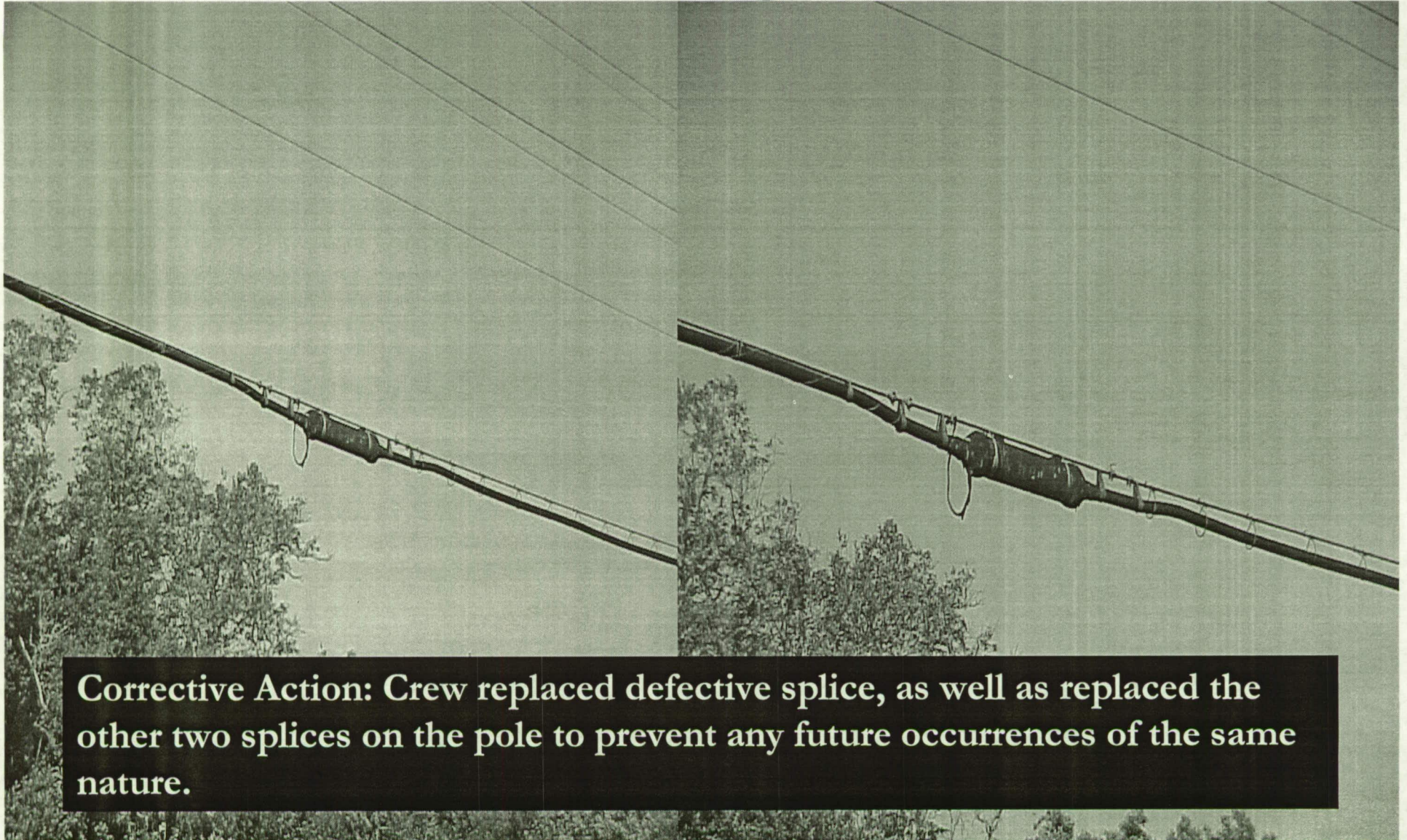
# FSA-3, 1360, 1635, 62630

## Outage



# FSA-3, 1360, 1635, 62630

## Outage



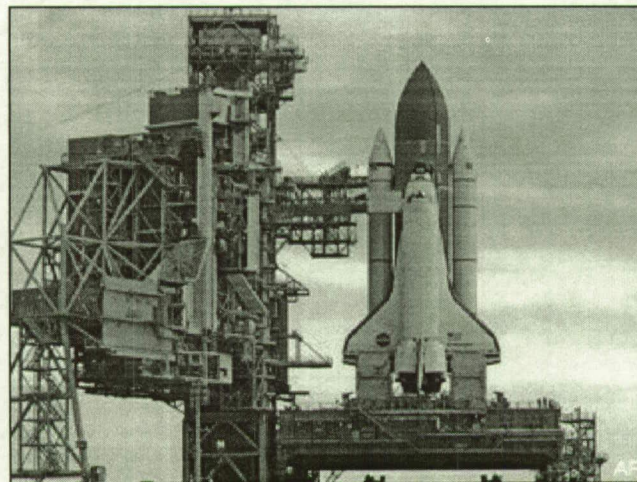
**Corrective Action: Crew replaced defective splice, as well as replaced the other two splices on the pole to prevent any future occurrences of the same nature.**

# Complex 39 Pad A & B

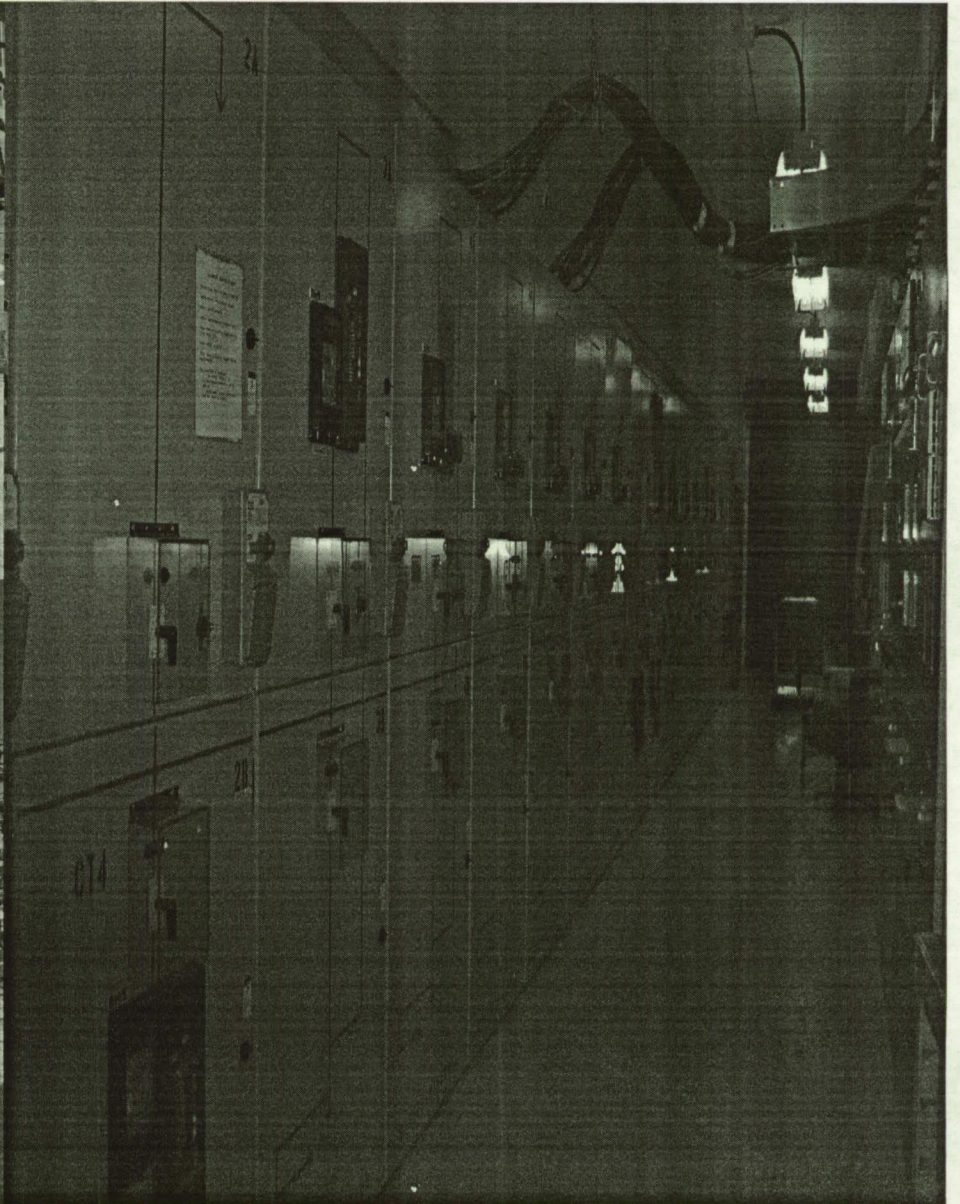
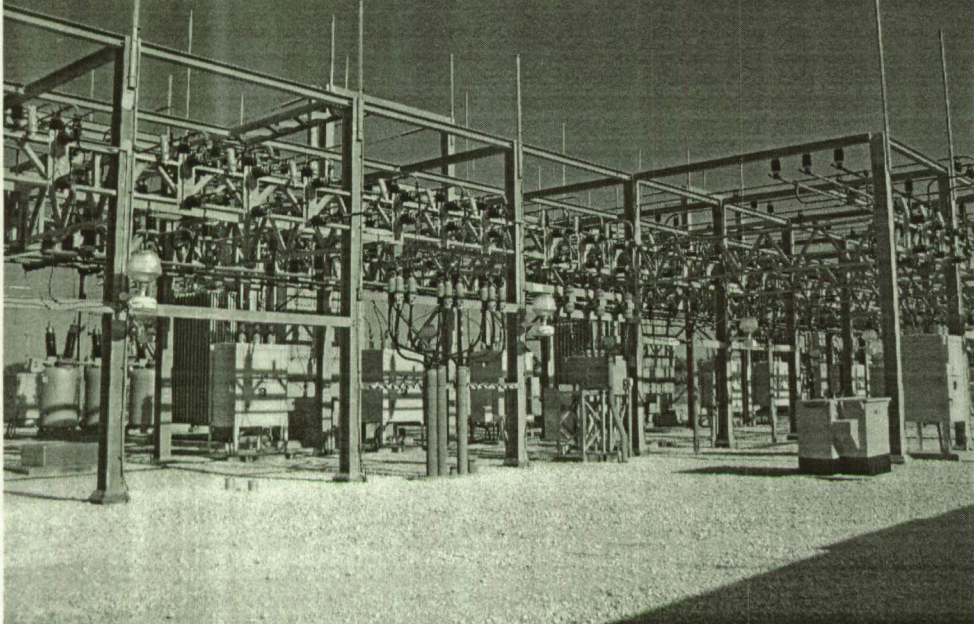
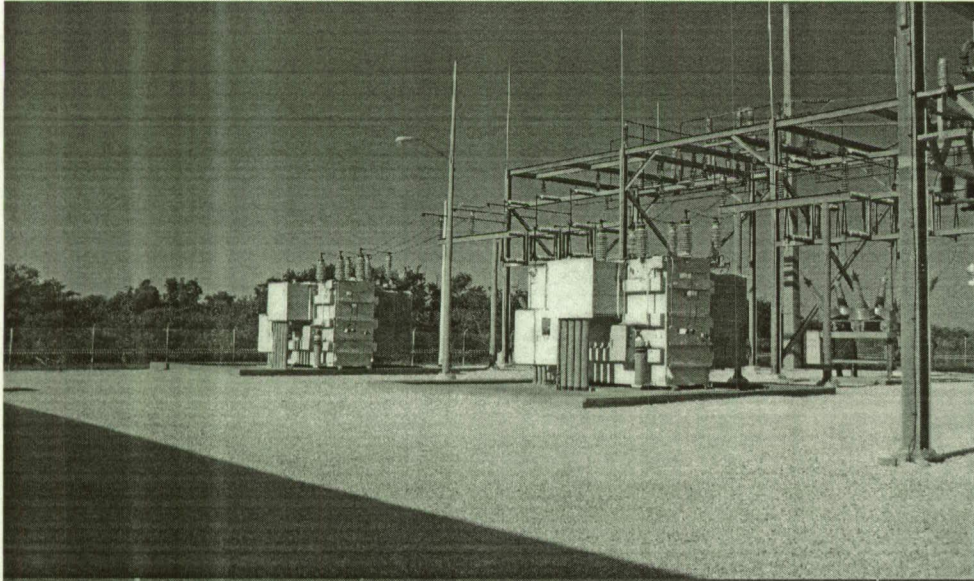
## Outage

\*Reflected on April Metric

- **Date:** April 8, 2007
- **Root Cause:** Loss of power on feeder 606 from C-5 switch station.
- **Contributing Cause:** A fault on “B” phase from C-5 switch station to switch 900 due to a defective cable splice.

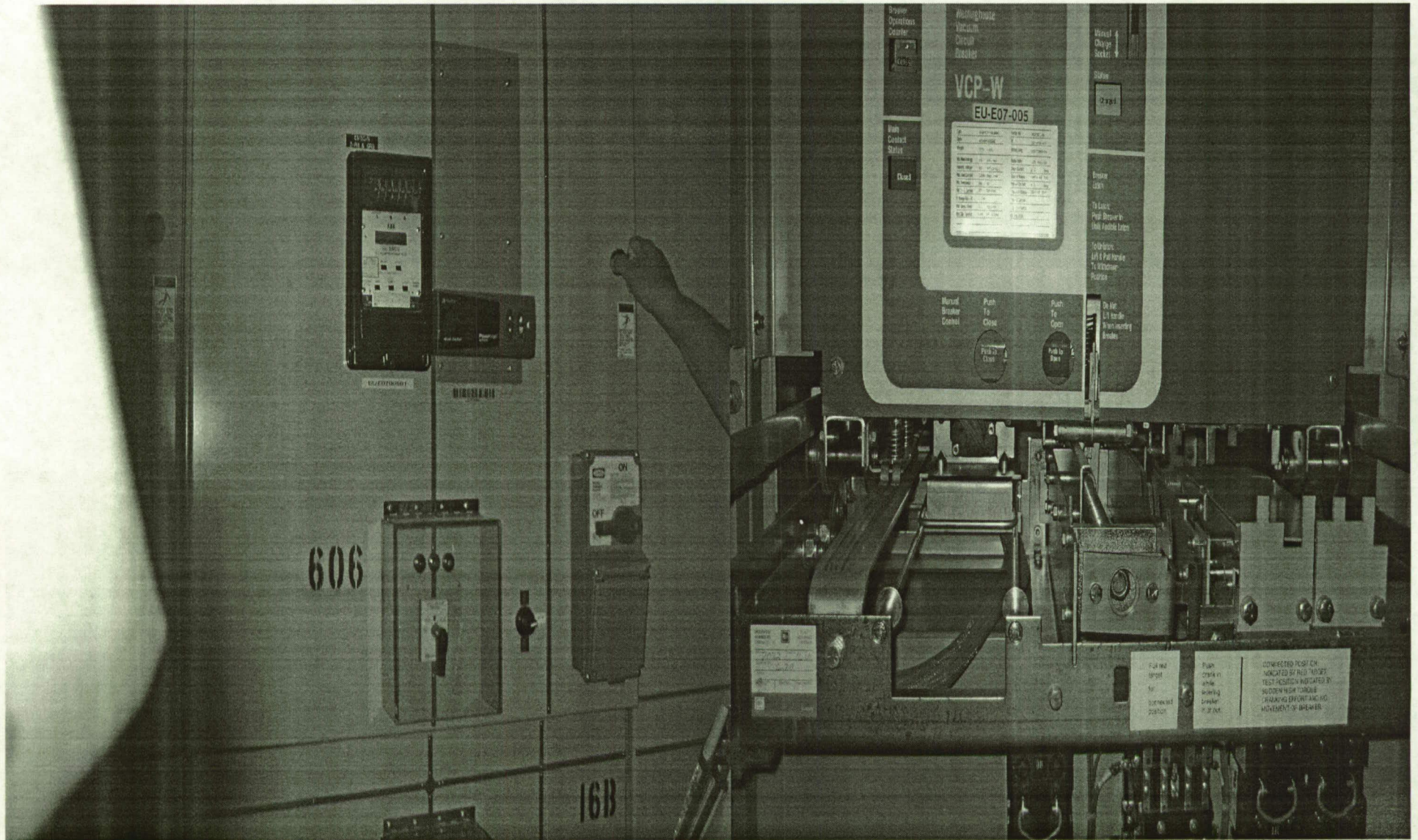


# Complex 39 Pad A & B Outage

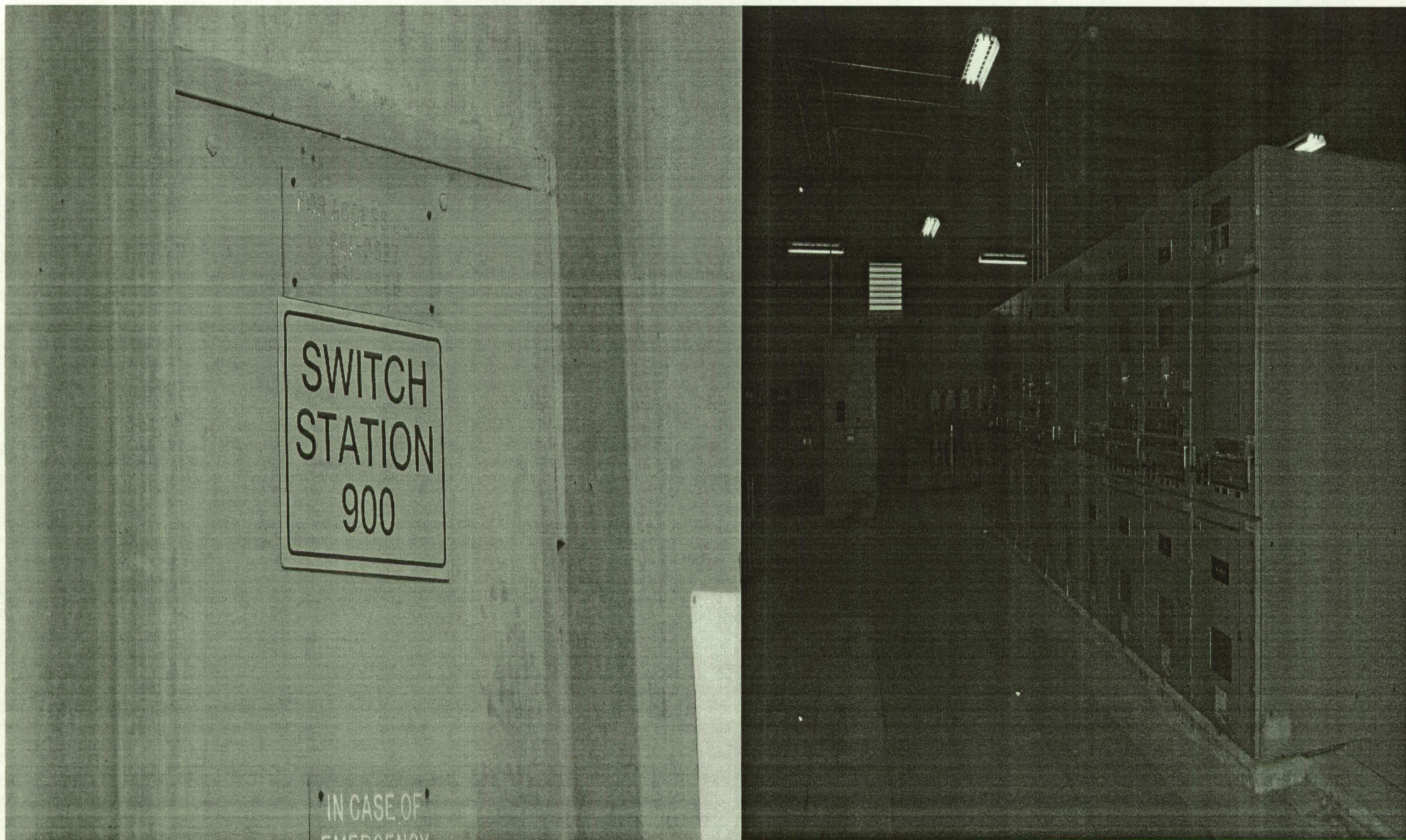




# Complex 39 Pad A & B Outage



# Complex 39 Pad A & B Outage

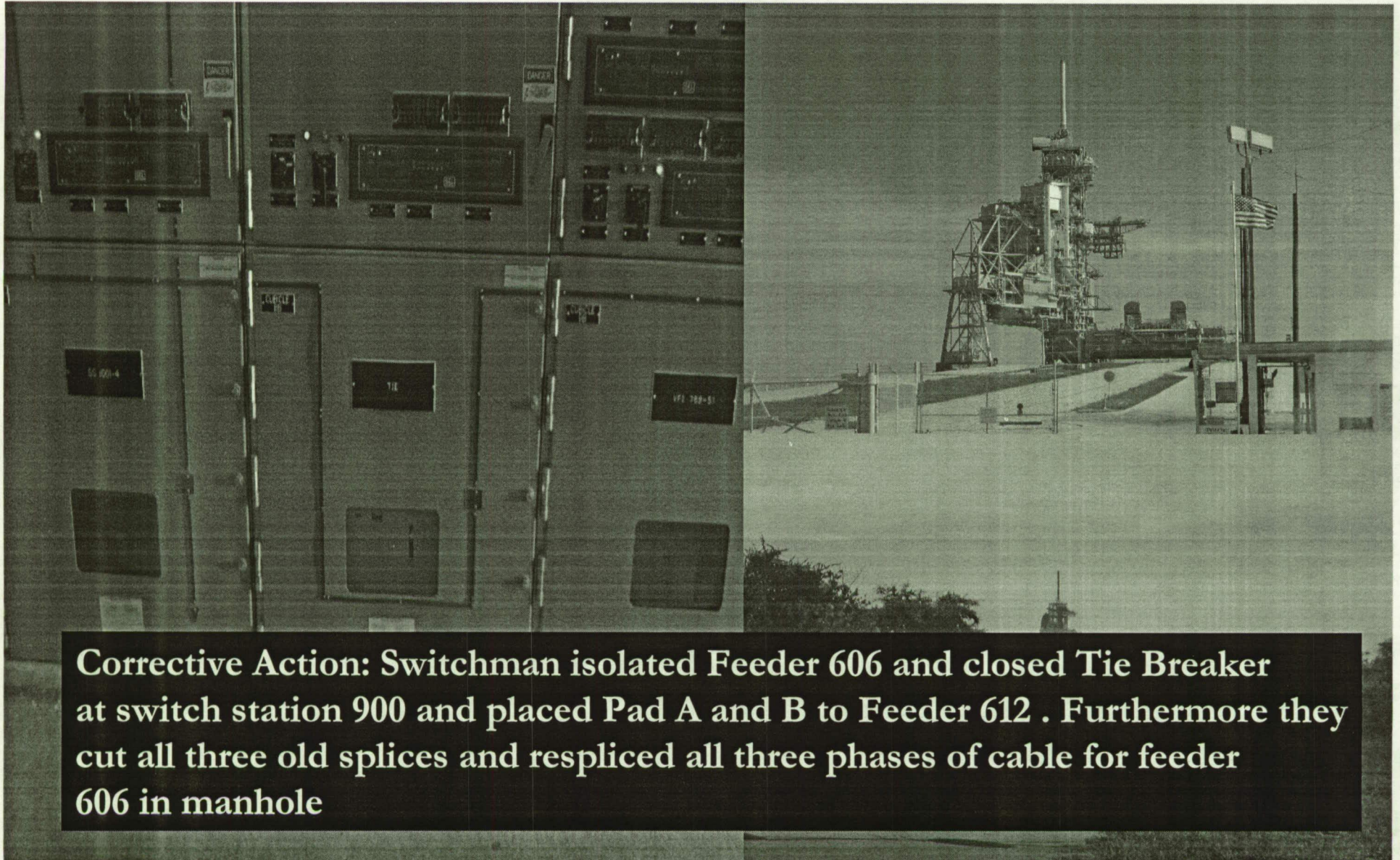


# Complex 39 Pad A & B

## Outage



# Complex 39 Pad A & B Outage



**Corrective Action: Switchman isolated Feeder 606 and closed Tie Breaker at switch station 900 and placed Pad A and B to Feeder 612 . Furthermore they cut all three old splices and respliced all three phases of cable for feeder 606 in manhole**

# Conclusion

## Goal 6 Metric

Through the varies procedures and formal discussions the contractor is providing the customers a good product regarding the analysis of outages and determination of “availability”

### Recommendations

#### Pass Or Fail Rating System

Based on the Performance Standard the contractor must have all critical and mission essential equipment available 100% of the time.

#### PMI Status Column

The contractor would state whether the equipment’s PMI is up to date (Yes/No) or whether the equipment is run to fail (N/A)

#### Written Procedure



A step by step procedure explaining how to populate Goal Six Metric (audit)



# Electrical Metrics Surveillance



2.2.1-3 False Fire Alarms and Evacuation

2.2.1-13 Preventive Maintenance of Fire Alarm Systems

**Deferral Process**



# Methodology



## 2.2.1-3 False Fire Alarms and Evacuation

**Performance Standard 2.2.1-3 :** No more than 20 false fire alarms per month or 13 facility evacuations shall occur per month resulting from O/M/E attributed action/inaction of the contractor.

### Exceptions:

- Weather intrusion that could not have been prevented by base operation maintenance



- Outside Contractors influence not controlled through base operation contraction monitors



- Accidental activations by others (Not on the base operation contract)

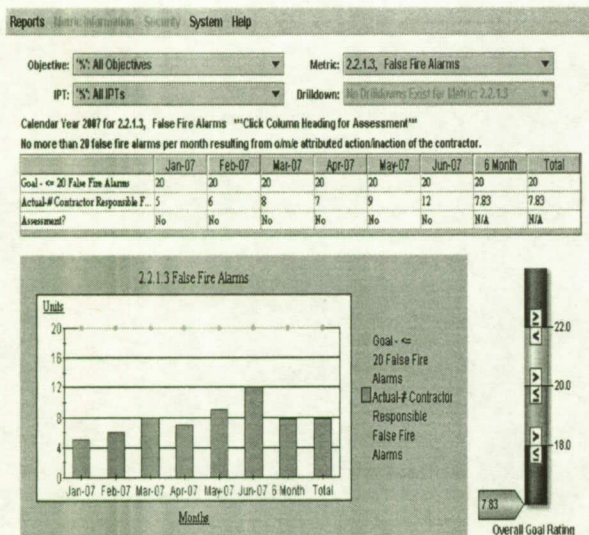


- An alarm that occurs during off hours and does not impact personal is not counted as an evacuation



# Methodology Con't

## Contractors Methods to Populate Metric



Metric 2.2.1-3

- Contractor Reviews NFIRS Report (National Fire Incident Report System)
- Creates a Report composed of All False Fire Alarms for Current Month
- Classifies each Incident by Cause (i.e. weather, equipment failure, etc.)
- Contractor Sends Report to Fire Marshall for Approval
- Fire Marshall makes Government Assessment based on Contract Exceptions
- Send Report Comments back to Contractor
  - Contractor populates Metric





# Conclusion

## 2.2.1-3 False Fire Alarms and Evacuation

As a result of Government Assessment 2.2.1-3 metric's exceptions are being applied correctly to the Metric

**Recommendation:**

**List of Responsible False Fire Alarms**

A small spreadsheet that shows the facility, date of incident, and primary cause

**Written Procedure**

A step by step procedure to populate metric



# Methodology

## 2.2.1-13 Preventive Maintenance of Fire Alarm Systems Deferral Process

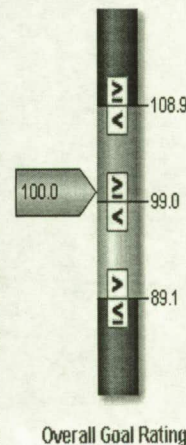
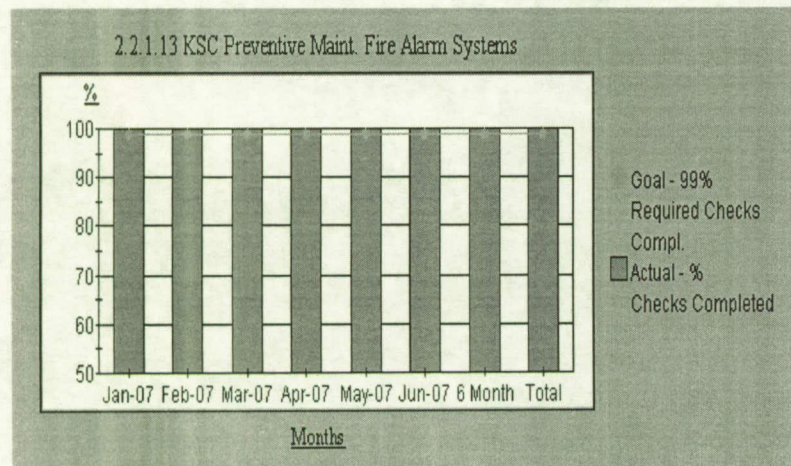
Reports Metric Information Security System Help

Objective:  Metric:   
 IPT:  Drilldown:

Calendar Year 2007 for 2.2.1.13, KSC Preventive Maint. Fire Alarm Systems \*\*\*Click Column Heading for Assessment\*\*\*  
 This metric will measure 99% of the number of required preventive maintenance checks performed vs number of actual checks ...

|                           | Jan-07 | Feb-07 | Mar-07 | Apr-07 | May-07 | Jun-07 | 6 Month | Total  |
|---------------------------|--------|--------|--------|--------|--------|--------|---------|--------|
| Goal - 99% Required C...  | 99     | 99     | 99     | 99     | 99     | 99     | 99      | 99     |
| Actual - % Checks Co...   | 100    | 100    | 100    | 100    | 100    | 100    | 100.00  | 100.00 |
| # Required Checks         | 23     | 35     | 31     | 37     | 29     | 21     | 176     | 176    |
| # Required Checks Com...  | 23     | 35     | 31     | 37     | 29     | 21     | 176     | 176    |
| # Required Checks Not ... | 0      | 0      | 0      | 0      | 0      | 0      | 0       | 0      |
| Assessment?               | No     | No     | No     | No     | No     | No     | N/A     | N/A    |

**Performance Standard**  
**2.2.1-13:**  
 100% completion of all  
 NFPA code-required and life  
 Safety maintenance





# Methodology Con't

## Contractors Methods For Deferral Approval

- Shop Supervisor submits a deferral approval form\*  
to customer
  - Supervisor proceeds to reschedule PM  
(creates a new TCD, leaves Won open with a deferred status)
- Customer signs deferral papers to approve



\*Documented Deferral Process Approvals were just created by contactors in Jan-Feb time frame...Before there were only verbal approvals

# Conclusion

- The Contractor is effectively coordinating PM deferrals with the customer in a **timely fashion NOW**
  - The New Process allows the customer to document approvals
- The Deferrals are **properly being reflected** on the 2.2.1-13 Preventive Maintenance of Fire Alarm Systems Metric
  - As a result of the new process the won has to stay open until the preventive maintenance is complete

## Recommendations

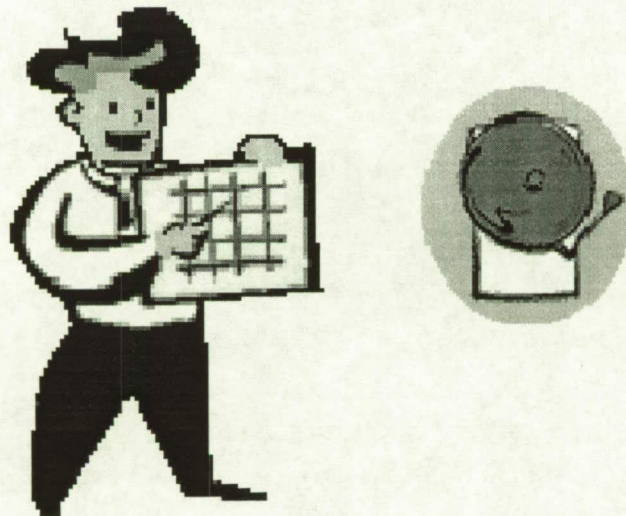
### Specific Deferral Process

A Deferral Process that is specific for each area (i.e. fire alarm, high voltage, etc.)



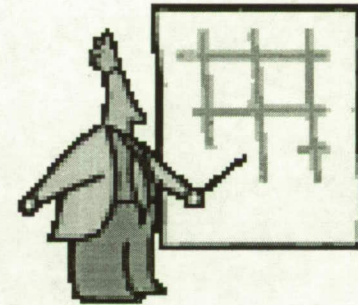
# Fire Alarm/Suppression Availability

## Fire Alarm and Suppression System Impairment Report



# Fire Alarm and Suppression System Report

- Government Requested Report
- Non DRD or contract obligation
- Report illustrates Facilities that have one or more Fire Alarm/and or Fire Suppression Systems out of service
- Impairment Systems are Categorized by Types of Work  
(i.e. type 2C, type 3C,etc.)



# Fire Alarm and Suppression System Report

**FIRE ALARM & SUPPRESSION SYSTEMS** (Items listed pertain to JBOSC assigned systems only) - Details of Outages are available on a shared network drive. The location path is as follows: Network Neighborhood //Kscboc2/Share/Jbosc/SGS/Protective Systems/Systems. Then drag the Shortcuts ("Shortcut to KSC.mdb" and "Shortcut to CCAS.mdb) to your desktop.  
**IMPORTANT NOTE:** If you have Office 95, you will not be able to open these files because they have been converted to the 2000 format. Contact your PC coordinator to obtain the required Office upgrade. Call Jim Lesky @ 861-6331 for any assistance

A ECD/STATUS of "PA =Pending Action" / "CS =Contractor Support"/ "\$\$ HOLD" have ECDs that are projected or actual completion dates that are not determined and/or set by SGS).

Facilities that have one or more Fire Alarm and/or Fire Suppression Systems out of service are listed below. Applicable system impairment and occupant notifications have been made.

Information is based on realtime update from SGS JCCC and applicable shop in accordance with Protective Systems procedure PPS-I-0007. POC: KSC - Ed Byczek

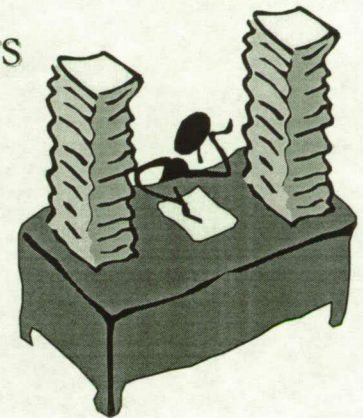
## IMPAIRMENTS (Repair/Corrective action) Type 2C, 2I, 2PG KSC Fire Detection/Suppression

| SYSTEM   | FACILITY | OPERATIONAL STATUS | ECD/STATUS     | START      | WON#          | COMMENT   |  |
|--|----------|--------------------|----------------|------------|---------------|---|--|
| FIRE SUPPRESSION   | CT-2     | OUT OF SERVICE     | 1/31/07        | 1/4/07     | 772523-1      | USA Impairment - System Maintenance recharging nitrogen cylinders.  |  |
| <b>KSC IMPAIRMENTS WITH ACTION PENDING (Long term) TYPES 3C, 3I, 4, 4.0, 5, 6, 7</b> |          |                    |                |            |               |   |  |
| SYSTEM   | FACILITY | OPERATIONAL STATUS | ECD            | INITIATED  | PROJECT WON # | COMMENTS  |  |
| FIRE ALARM   | J6-2466  | PARTIALLY DISABLED |                |            |               |   |  |
| FIRE ALARM   | J6-2375  | PARTIALLY DISABLED | PA by AHJ & TA | 6/20/06    | 10376532      | Duct Detectors Disabled - WORKING WITH AHJ/TA - 6/28/06   |  |
| FIRE ALARM   | K6-848D  | PARTIALLY DISABLED |                | 7/13/07    | 9/14/07       | 10084435  | Back-up generator damaged FA system which repaired by the shop. System will remain turned off in support of facility modifications per engineering direction |
| FIRE ALARM   | K6-1350  | PARTIALLY DISABLED |                | 6/18/07    | 5/21/07       | 10402468  | Manual pull station relocation   |
| FIRE ALARM   | K7-140   | PARTIALLY DISABLED |                | 4/20/07    | 9/27/05       | C0353SES  | Construction Support, 2P10D conversion to new JCCC   |
| FIRE SUPPRESSION   | K6-900   | OUT OF SERVICE     | PA             | 7/19/06    | 10164925      | 3P1, 3P1A, 3P15 - Unable to normalize Halon panel - System to be replaced under Type 3  |  |
| FIRE SUPPRESSION   | K6-900   | OUT OF SERVICE     | PA             | 7/19/06    | 10164929      | 3P2, 3P2A - Unable to normalize Halon panel - System to be replaced under Type 3  |  |
| FIRE ALARM   | K6-1096  | PARTIALLY DISABLED |                | 8/16/07    | 7/16/07       | 00304930  | Support rest room mods   |
| FIRE ALARM   | K6-1193  | PARTIALLY DISABLED | WGOVDI         | 3/17/04    | 10153070      | Smoke Detectors in vault area disabled - moisture problem. Wait for Government Disposition  |  |
| FIRE SUPPRESSION   | K6-1547  | PARTIALLY DISABLED | 5 YR Plan      | 06/20/2005 | 10278237      | Sprinkler system leaking - Type 3 requested - WPLN 07/20/05 PER RANDY SEWARD, SR PROCESS COMPLETED, IN E RPL STATUS UNTIL 1509/1510 INITIATED/COMPLETED; ZS (5 Y PLAN)  |  |
| FIRE ALARM   | K7-416B  | PARTIALLY DISABLED | PA             | 2/9/06     | 10339560      | Defective Power supply. To old for upgrade. Type 3 to upgrade 11/03/06 REPLACE EDWARDS FIRE ALARM SYSTEM WITH NEW PSYFA SYSTEM SR #4 (FORMERLY ON WON 10086016 in FBE   |  |
| FIRE ALARM   | M3-0002  | PARTIALLY DISABLED | CS             | 4/3/02     | 10081730      | Local reporting Only - Blölg. to be replaced - NAS10-99052(5) PCI 98462   |  |
| FIRE ALARM   | M5-1595  | PARTIALLY DISABLED | \$\$HOLD       | 2/15/01    | 00190786      | WON on \$\$ Hold CO2 suppression system disconnected  |  |
| FIRE ALARM   | M5-1695  | PARTIALLY DISABLED | \$\$HOLD       | 3/15/04    | 00190786      | System reprogram for silent alarm - shop task   |  |
| FIRE ALARM   | M6-138   | OUT OF SERVICE     | CS             | 10/03/05   | C0327000      | Support contractor in fire system modifications   |  |
| FIRE ALARM   | M6-342   | PARTIALLY DISABLED | PA             | 11/23/05   | 10362564      | PVC conduit broken-to be replaced-Duct Detector wiring lifted due ground faults (old #10359052)   |  |
| FIRE ALARM   | M6-409H  | OUT OF SERVICE     | 8/10/07        | 7/27/07    | 10364485      | Contractor replacing fire alarm panel.  |  |
| FIRE SUPPRESSION   | M6-744   | OUT OF SERVICE     | \$\$HOLD       | 3/07/05    | 10331997      | Sprinkler System has Broken Pipe  |  |
| FIRE ALARM   | M6-794   | PARTIALLY DISABLED | 4/30/07        | 10/03/06   | 10203529      | Fire Alarm system replacement by contractor. Ref 12035296   |  |
| FIRE ALARM   | M7-355   | PARTIALLY DISABLED | CS             | 6/11/07    | A1458614      | 1200 & 1400 (High Bay, Tunnel & south section) out of service to support modifications (ECD 11/25/2008)   |  |
| FIRE ALARM   | M7-409   | PARTIALLY DISABLED | 4/27/07        | 6/5/06     | 10360464      | Support AHJ mods by contractor  |  |
| FIRE ALARM   | M7-409H  | OUT OF SERVICE     | 8/10/07        | 7/27/07    | 10364485      | Contractor replacing fire alarm panel   |  |
| FIRE SUPPRESSION   | M7-505A  | OUT OF SERVICE     | \$\$HOLD       | 9/23/2002  | 0114990A      | 7/2/04 WON # 0114990 submitted on hold for funding 03/18/03 RETURNING TO WORK CONTROL DUE TO BUDGET CONSTRAINTS PER MIKE CHRISWELL ON 03/04/03, WON TO BE PLACED ON \$\$ HOLD, JLT 3/15/07 STILL ON \$\$ HOLD |  |



# Methodology

- Reviewed Impairment Report Daily
  - Tried to Obtain an understanding of the information on report
- Interviewed Electrical IPT Lead
- Interviewed Contractor that generates report
- Research Work Orders presented on Report
  - Found incorrect status and duplicate work orders
- Interviewed Customer





# Conclusion

- Contractor is diligently keeping systems in service based on finances
- Report is inconsistent and may cause confusion to those who are not directly working with these systems



## Recommendations

### Fire Alarm and Suppression System Impairment Database

- Allow user to view out of service fire alarm systems and work orders associated with them
- User Friendly



# Acknowledgements

- God
- Mrs. Kimberlyn Carter (My Mentor)
- Mr. Jose Mojica
- Integration Office
- Cape Canaveral Spaceport Management Office
- NASA MUST Program
- KSC Education Office
- Family & Friends

**THANK YOU !!!!!**



# Questions

