CABLE FAILURE RESTORATION — GENERAL

1. GENERAL

1.01 This section contains general guidelines for the restoral of service due to a cable failure or damage.

1.02 Whenever this section is reissued, the reason(s) for reissue will be provided in this paragraph.

1.03 Cable failures can result from various types of conditions and activities. This section is written to provide a general reference to aid in the restoral.

1.04 Only those Supervisors and Cable Repair Technicians having complete knowledge of safety, fault locating procedures and test equipment, portable tools, and repair procedures should be assigned the task of a cable failure restoral.

1.05 The Maintenance Center (MC) or Service Control Center (SCC) shall notify the Cable Maintenance or Duty Supervisor immediately of a suspected cable failure.

1.06 When it becomes apparent there is a major service outage the local 2nd and 3rd level Cable Maintenance Managers will be notified.

1.07 It is the responsibility of the 3rd level Cable Maintenance Manager or their designated Duty Supervisor to notify Service Control of a major cable failure occurrence and of the completion of the restoral. It is the responsibility of the MC to provide restoral progress reports to Service Control every 2 hours.

2. PRECAUTIONS

2.01 Certain temporary measures which are expedient under emergency conditions may not be considered satisfactory practice under normal conditions. However, restoration of service without endangering the safety of employees or others is essential.

NO JOB IS SO IMPORTANT AND NO SERVICE IS SO URGENT THAT WE CANNOT TAKE TIME TO PERFORM OUR WORK SAFELY.

2.02 Since cable failures may result from abnormal conditions, it is important to be especially alert for safety hazards. Some items to be considered are listed below:

(a) Work should not be permitted on a cable when lightning storms are in the vicinity or if there is any question as to whether or not foreign voltage is across the cable. The 188A test set (Section 081-705-102) should be used to test for the presence of AC power voltages.

(b) Life preservers shall be worn when working over swollen streams, deep water, and with boats or rafts.

(c) Precautions shall be observed to avoid cave-ins when digging or working in splice pits and trenches, especially under wet soil conditions (Section 622-020-020).

(d) Work forces, especially those not normally engaged in outside plant work, should be cautioned against major hazards such as traffic along highways, downed power lines, slippery footing, flammable material, lightning furnaces or other conditions that could lead to injuries.

(e) Since there is usually an increase in activity around a cable failure site by personnel and equipment, extra work area protection should be used.

(f) Employee's personal safety is of the greatest importance. Certain occasions or locations may require the contracting of security guards for this reason.

(g) Consideration should always be given to notification of property owners when gaining access to or working on utility easements. This is especially important during non day-light hours.

(h) Persons involved in cable restorals must be familiar with the procedures and precautions listed in the following Bell System Practices.

Section

010-110-006 General Safety Precautions Placing, Removing, or Maintaining Cable, Guys, Wire, and Strand near Power

081-705-102 188A Test Set

081-020-011 Eye Protection

081-020-010 Safety Headgear

620-100-010 Occupational Exposure to Lead Cable Removal

620-100-011 Minimum Approach Distances to Exposed Energized Power Conductors

620-100-015 Protective Measures for Working in the Vicinity of Extra High Voltage Power Lines

620-102-010 Outside Plant Precautions Underground & Buried Work

620-103-010 Electrical Protection When Using Portable AC Operated Tools and Equipment

620-131-010 Precautions to Be Taken Before Climbing Poles or Working From Strand- or Pole-Supported Equipment

620-135-010 Warning Devises-Use

Addendum

620-135-100 Standard Warning Devices - Description and Use

620-140-501 Testing and Ventilating Manholes

620-145-010 Petroleum Products in Underground Conduit Systems - Removal Procedures

620-210-011 Clearances and Separations for Aerial Plant - General

620-150-010 Manhole Covers - Removing and Replacing

622-020-020 Conduit and Manhole Construction

629-020-100 Buried Plant-Installation-Telephone and Power-Same Trench and in Separate Trenches in Same Easement

629-020-102 Buried Plant-Maintenance to Existing System-Procedures and Precautions

629-100-010 Buried Plant-Precautions

629-200-200 Buried Plant-Right-of-Way

629-200-205 Buried Plant-Trenching and Backfilling

632-020-101 Cable Tags Underground Cable

632-800-300 Repair of Aerial Pulp Cable

632-800-301 Repair of Underground Pulp Cable

634-020-010 Electrical Test Equipment

634-215-500 Cable Restoration Dedicated Plant

634-220-500 Locating UG Pipes and Cables-Low Frequency Method

634-220-501 Locating UG Pipes and Cables-High Frequency Method

634-355-500 Cable Testing - General Section Replacement - General Rules

634-355-501 Section Replacement - Cable Containing Voice Frequency Pairs

644-104-090 Fault Locating Outside Plant

644-200-030 Restoring Wet Pic Cable using Air Drying

644-200-033 C Reclamation Compound Reclaiming Wet Buried Pic Cable

644-200-040	Toll Cable Restoration
644-200-042	Coaxial Cable Restoration
644-200-101	Drying wet pulp cable & Splices
002-701-100NB	General Contract Administration

3. FAULT LOCATING AND SECTIONALIZATION

3.01 During most cable failures the MC will usually have information as to the geographical location and size of the affected area, the number of affected subscribers, and type of trouble being tested. At the time the MC makes the initial contact with the Cable Repair Technician all available information will be provided.

3.02 If the MC provided information to the Cable Repair Technician of a cut cable or fire damage, very little sectionalization will be required since the general location of the damage will usually be known by the MC.

3.03 When tests made by the MC indicate a significant number of FEMF the Switching Control Center shall be notified immediately. It is the responsibility of the MC and Switching Control Center to determine when the heat coils are to be removed to protect the operation of the central office. It is the responsibility of the MC and the Cable Repair Technician or Supervisor to determine when the heat coils will be removed to protect against further damage to the outside plant facilities.

3.04 With the information supplied by the MC and using the PLR's the Cable Repair Technician should determine the route of the suspected cable failure.

3.05 By analyzing the test result provided by the MC the Cable Repair Technician should be able to determine the approximate location where fault locating should begin. If a significant number of FEMF has been tested sectionalization will usually begin at the MDF.

3.06 Sectionalization of the suspected failure into or out of the underground plant should be done as soon as possible. When failures are proven into the underground plant the Cable Repair Technician should report this fact to the MC immediately and request underground equipment and assistance as required.

3.07 During the initial fault locating tests made by the Cable Repair Technician several pairs in the affected cable should be tested for resistive and capacitive type faults. The pair tested as having the most predominant fault should be chosen for fault locating and sectionalization. A resistive fault that can be toned should always be used when possible.

3.08 When proceeding to the location where test results indicate the failure to be, the Cable Repair Technician should follow the cable route looking for signs of activity. If fault locating tone has been applied check for tone at all possible underground dips. These procedures will vary in application depending on test results.

3.09 After sectionalization has proven the suspected cable failure as being either aerial, buried or underground trouble additional isolation can be done using the guidelines in BSP 644-104-090.

3.10 When a cable failure has been isolated into a underground or buried section and there are no physical signs of damage, final test measurements should be made from the closest available splice or terminal location on either side of the suspected section. This requirement would apply to aerial cable when fault locating tone is ineffective.

4. IMMEDIATE CORRECTIVE ACTION

4.01 When the location of the cable failure has been identified the Cable Repair Technician at the scene should procede as follows:

A. Place work area protection

B. Evaluate the site for safety precautions and additional work area protection requirements such as.

1. Traffic Hazards
2. Electrical Hazards
3. Cut gas lines
4. Flooding
5. Cave-in
6. Broken or damages poles, strand, etc.

C. After required safety precautions have been taken, the Cable Repair Technician should evaluate the failure for possible temporary restoral and immediate corrective action. — Actions that will restore customer's service temporarily or reduce the possibility of the failure expanding such as:

1. Clearing the ends on a cut cable
2. Removing the sheath on a wet aerial pulp cable and applying a drying agent.
3. Pumping adjacent manholes
4. Pressure Buffering, etc.

D. While temporary restoral procedures are being preformed, the Cable Repair Technician should also be reevaluating the failure for permanent repair requirements.

E. After temporary restoral and immediate corrective action have been completed, the Cable Repair Technician should notify the MC of the location, type and size of the cable failure, and estimated restoral requirements and time.

NOTE: At the time the Cable Maintenance or Duty Supervisor arrives at a cable failure scene they will assume coordination and restoral responsibilities until other arrangements have been agreed to.

4.02 In order to provide service to customers affected by a cable failure, it is sometimes expeditious to temporarily place and splice a section of cable or cut working pairs onto non working pairs. The MC should be notified before this type of temporary restoral begins. When possible, temporary restoral of this type shall always be made over the span of which permanent repair will eventually be made.

5. RESTORAL EVALUATIONS

5.01 The following items should be considered when evaluating a cable failure for permanent restoral requirements:

1. Additional safety and work area protection.
2. Type and size of cable involved (Pic/Pulp, Aerial / Buried / Underground / Submarine, Toll/Trunk/Exchange/Carrier/Dedicated, Specials).
3. Total extent of damage (check adjacent manholes or aerial spans etc.).
4. Damages and/or location of other utilities.
5. Excavation requirements.
6. Manpower requirements.
7. Equipment requirements (Testing and Portable Tools).
8. Tagging requirement and information.
9. Buffering requirements and information.
10. Material requirements, delivery, placement.
11. Communication requirements (Company).
12. Legal requirements.
13. Notification of customers.
14. Emergency phone requirements (customers).
15. Notification of upper level management and other involved departments. The overall responsibility, directly or indirectly, for the restoral of a cable failure rests with the District Manager cable maintenance.

NOTE: For cable failures that will involve a lengthy outage such as a wet underground cable requiring a section replacement a joint meeting or telephone conference chaired by the 3rd level Cable Maintenance Manager or his/her appointed deputy should be held to determine restoral procedures, time frames for restoration stages, alternate restoral possibilities, and to assign individual and departmental responsibilities. The departments normally participating in this meeting would be Cable Maintenance, Maintenance Center, Assignment, Engineering, Construction, and Network CO.

6. CABLE FAILURE RESTORAL

6.01 Technical requirements for restoring cable failures are covered in existing B.S.P.'s. The following guidelines will help accelerate restoral of most failures.

6.02 A list of names and telephone numbers of qualified (contractors with existing contracts) excavation contractors, traffic control personnel and equipment contractors, local utility company, local law enforcement, and fire department should be maintained in the district duty book.

6.03 Temporary communications should be established at a failure site if restoral time is estimated to be more than 8 hrs. or if it is decided direct communications between the MC and the failures site would aid in the restoral procedures. Telephone calls to the failure site should be limited to information that would aid in the restoral. Calls from the failure site to the MC are not limited, but should be made every 2 hrs for the purpose of updating the failure status.

Permanent assignments should be established for emergency or manhole telephone numbers and office equipment for each central office area. These assignments should be retained in the district duty book. These numbers should remain as a permanent circuits in COSMOS, ESS and LMOS. As the telephones are moved a "W" order should be written to change cable pair assignments.

6.04 All test sets and portable tools should be kept in proper operating condition at all times.

6.05 When tagging of cable pairs is required, steps to begin the tagging operation should start immediately. The information required is the location and pair count of terminals or cross connect points or a combination of both that contain the entire count of the affected cable. Information as to the number, type, and pair identification of any special circuits is also required. Efforts should always be made to restore special circuits first, however in some cases this will not be possible. If dedicated plant is involved, the tagging and splicing information explained in BSP 634-215-500 must be provided.

Some tagging locations may be located in buildings that are closed during the evenings or weekends. Arrangements should be made to tag or establish access agreements prior to this closing if possible. Original tagging information should be relayed to the failure site by telephone. If requested, restoral sheets will be prepared and hand carried to the job site. Failures involving dedicated plant will generally require restoral sheets at the failure site.

When it has been determined that tagging information is required the MC should make the request to Assignment immediately.

6.06 When pressurized cable is involved in a cable failure, buffering steps must be taken to maintain the pressure system at objective levels. As soon as it has been determined that the failure involves a pressurized cable the MC should notify CPMS and request that they review the pressure status in the affected area. Any changes in flows or pressure should be noted by CPMS and relayed to the MC who will make this information available to the failure site. CPMS will continue to monitor the affected area closely until final restoral has been completed. CPMS will retain all print-outs from the affected area for 2 weeks in the event of SFI is requested.

When a failure is proven to be in the underground, the 1st manhole on either side of the failure should be pumped and direct cable buffering applied. Pipe buffering should be done at the failure location. Different buffering requirements may be required as the restoral job progresses. Buffering responsibilities should be assigned to someone other than the persons doing the actual restoral work once cable restoral has begun.

Buffering of faulted pressurized aerial or buried cables can usually be accomplished by using the procedures in BSP 637-305-901NB. Additional buffering may be required as determined by the existing situation.

6.07 Prompt delivery of the required restoral equipment and material to a failure site is essential for an expedient restoral. The person in charge at the restoral site should determine as accurately as possible these requirements and notify the MC. MC personnel should, unless otherwise determined by a restoral committee, assume the responsibility of arranging for the pick-up and delivery of the required equipment and material. Personnel involved in the actual restoral work should not be responsible for pick-ups and deliveries unless it is determined to be the most expedient method.

6.08 All cable failures that are the result of damages to Indiana Bell property by other than Indiana Bell employees will require involvement with the Legal Claims Department (Ref. General bulletin 47-3). It is the responsibility of all employees involved in a damage related failure to obtain as much legal information as possible concerning the failure. It is the responsibility of the area Cable Maintenance Supervisor to accurately complete Forms 80-2 and 3330 relating to cable failures.

If, in the opinion of the Supervisor in charge, the available information is debatable or incomplete the Legal Claims Department should be contacted. The Legal Claims Department should also be notified as soon as possible of failures that involve toll cables, critical circuits, IBT damages to private or public property, or damages that are estimated to result in billing to recover extensive costs.

Note: Do not hesitate to contact the Legal Claims Department if there is any question as to the degree of involvement they should have.

6.09 The Supervisor in charge of a cable failure restoral which is the result of damages to IBT property by other than IBT employees shall obtain a Keep Cost Job order number from the local Engineering Department and direct all persons involved in the restoral to charge all materials and manhours associated with the failure to that number.

6.10 Consideration should always be given to notifying customers and providing emergency service to those affected by a cable failure. It is the responsibility of the 3rd level cable maintenance manager, or their appointed duty supervisor, to decide when and how these measures should be taken. Personnel doing the actual restoration should not be involved in notification activities.

The following items should be considered when considering customer notification and communication requirements.

1. Type and number of affected customers
2. Estimated restoral time
3. Geographical area
4. Emergency Agencies involved