CABLE PRESSURIZATION RESPONSIBILITIES GENERAL

1. GENERAL

1.01 This section covers this Company's policy of cable pressurization and designates responsibilities for the program. It also provides the cable pressurization criteria for the various classes of plant.

1.02 This section is reissued to update titles, change responsibilities for Construction and Cable Maintenance forces, provide pressurization criteria, change air dryer selection criteria, and adds information concerning LARP and pressure monitor installation. Since this is a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 Cables as outlined in paragraph 3.02 shall be placed under pressure as rapidly as possible and followed up with the necessary conditioning to gain minimum objective pressures as outined in paragraph 3.04.

1.04 In many locations both Cable Maintenance and Construction forces are simultaneously working in cable sheaths, therefore, it is necessary to establish a single reporting point so that accurate records can be maintained of sheath openings, etc. The Repair Service Bureau is the appropriate reporting point.

2. DESIGN, INSTALLATION, AND MAINTENANCE GENERAL

2.01 It shall be the responsibility of Outside Plant Engineering to determine which cables will be included in a given cable pressurization system. Using AIRPAP as a guide, the Engineer will design an adequate system and determine the work required to implement the overall plan. Depending upon the gross expenditures required, either an Estimate or Job Order will be prepared to obtain proper authorization and approvals. Once approval has been obtained, work prints will be issued to show the location and identification of all additions, removals, and replacement of retirement units of pressurization equipment. This will be done in accordance with the information presented in BSPs 637-050-100 and 901-473-900NB. Outside Plant Engineering shall also coordinate with Equipment Engineering, Building Engineering, and Cable Maintenance such items as floor space assignment, AC power supply, central office emergency power, and the installation of all pressurization alarms.

2.02 The Construction Supervisor shall be responsible for placing, connecting, and splicing the following items required to establish and maintain the pressure system as shown on Engineering work orders. Air Pipe, C junction boxes, transducer housings, transducers, contactors, manifolds, hi valves, pressure tubing and pressure plugs.

2.03 The Construction Supervisor shall be responsible for connecting cables as outlined in paragraph 3.02 to the pressure system, energizing pressure monitors, and verifying their operation to the designated monitoring location.

2.04 The Construction Supervisor shall be responsible to maintain pressure in new and existing cables as outlined paragraph 3.02 during placing and splicing operations so as not to jeopardize the monitoring capabilities of the existing monitoring or pressure system. Procedures for accomplishing this are in Section 11 of this section.

2.05 It shall be the responsibility of the Manager-Construction within each district to assure that all as outlined in paragraph 3.02 cables are installed in a manner which assures air tightness upon the completion of each phase of construction. The following practices may be used as reference for construction tests and procedures:

(a) 637-450-011 - Construction Tests - General
(b) 637-450-500 - Construction Tests - Placing
(c) 637-450-501 - Construction Tests - Splicing

2.06 The Manager-Construction shall be responsible for the preparation of Form 3649 (Pressurization Acceptance Exhibit K). This form shall be prepared upon the completion of the splicing operation associated with a job order or estimate

and serve as notification to Cable Maintenance that the cable is ready for pressure acceptance. Form 3649 shall also be prepared upon the completion of the removal of a pressurized cable.

2.07 Form 3649 shall be prepared in triplicate. Copy A shall be retained by Construction. Copies B and C shall be forwarded directly to the appropriate Cable Maintenance Supervisor.

2.08 Construction forces shall also be responsible for maintaining minimum acceptable pressure in all newly placed cable as outlined in paragraph 3.02 prior to acceptance by Cable Maintenance forces.

2.09 The Cable Maintenance Supervisor shall be responsible, either by using his own personnel or by providing expertise to other work groups for the proper installation of air dryers, pipe alarm meter panels, flow rate indicators and air dryer manifolds.

2.10 The Cable Maintenance Supervisor shall be responsible to perform pressurization acceptance to insure the quality of the pressure system within his area. Acceptance procedures are in Section 4 of this section.

2.11 It shall be the responsibility of the Cable Maintenance Supervisor to maintain all pressurized cable at or above the minimum levels stipulated in Section 3.

3. PRESSURE CRITERIA

3.01 A Cable Pressure System is utilized to prevent or minimize service affecting troubles in air core cable as outlined in paragraph 3.02. This is accomplished primarily by preventing the entry of water into the cable core. There are two air core protection methods used to protect cables from water entry.

A. Cable Pressurization

B. Cable Venting

3.02 All air pipe and the following air core cables shall be pressurized.

1. All underground cables.

2. All buried pulp or paper insulated conductor cables.

3. All pulp or paper insulated conductor toll or trunk cables or exchange cables containing critical circuits.

4. All air core PIC insulated conductor toll or trunk cables.

5. All air core buried PIC insulated conductor cables containing 400 or more pairs placed after issue date of this practice.

6. All pulp or paper insulated conductor cables containing 200 or more pairs. (See alternative paragraph 3.03).

3.03 Venting is applicable to aerial lead sheath, pulp or paper insulated copper conductor cables of less than 200 pairs that are not used as a toll or trunk cable or one that contains critical circuits. Venting of 200 pair or large cables is applicable only when it is isolated from a pressure source and constructing pressure to the cable is not economical.

Venting of cables is a passive cable upkeep method. Vented cables shall be closely monitored for excessive trouble reports and maintenance hours and replaced when this condition is observed.

3.04 The minimum acceptable cable pressures for pressurized cable in the Indiana Bell Company are as follows:

	Minimum Pressure		
Cable Category	Underground	Buried	Aerial
Toll	5 PSIG	3 PSIG	2 PSIG
Trunk, ETV & CATV	5 PSIG	3 PSIG	2 PSIG
Exchange	5 PSIG	3 PSIG	2 PSIG

3.05 The following chart lists the flows which are acceptable for Indiana Bell Telephone Company:

	Maximum Flow Per Sheath Mile		
Cable Category	Underground	Buried	Aerial
Toll	5 SCFD	5 SCFD	5 SCFD
Trunk, ETV & CATV	5 SCFD	5 SCFD	5 SCFD
Exchange	AIRPAP*	AIRPAP*	AIRPAP*

*To be obtained from local Outside Plant Engineering.

3.06 When minimum pressures or maximum flows are exceeded and cannot be economically maintained at these acceptable levels, other maintenance consideration as outlined in paragraph 3.03, shall be given.

3.07 Cables should have a minimum end pressure of 2 PSIG. If this cannot be obtained locate the 2 PSIG point and refer the remainder of the cable to Engineering on Form 3662A (Exhibit P).

3.08 It is the objective in Indiana Bell to monitor all cable air pressure, air flow, and air dryer alarms by CPMS. It is the responsibility of the Outside Plant Engineer to provide facilities required for monitoring.

4. CABLE PRESSURIZATION ACCEPTANCE

4.02 In areas where air pipe system exists, the Cable Maintenance Supervisor, upon receipt of Copies B and C of Form 3649 from the Construction Manager, shall issue copies of the appropriate Job Order or Estimate work prints to his forces and direct them in performing the following work operations:

(a) Allow approximately 48 hours for pressure and flow stabilization. This period will vary and will be dependent upon the size, gauge, and lengths of the cable to be accepted.

CAUTION: Close observation of existing pressures and flows is required during this stabilization period to avoid pressures falling below minimum acceptable levels.

(b) Upon stabilization, measure the flow and pressure to the appropriate cable, using a Puregas 546 Flow Rater and C pressure gauge or equivalents, at affected manifold location. Record the stabilized manifold pressure, manifold flow, and hi-valve pressure readings on Form E-5406 (Exhibit M). These readings shall be retained by the Cable Maintenance Supervisor as outlined in BSP 637-050-300.

(c) Remote equipment may be used to perform the stabilized reading functions where such equipment is available.

4.02 If the readings obtained on the newly installed cable meet or exceed the minimum acceptable pressures, as stipulated in Section 3 of this practice, the cable shall be accepted by Cable Maintenance. Acceptance shall be signified by the Cable Maintenance Supervisor. He shall complete and sign Form 3649. Copy B of this form shall be returned to the Construction Manager where it may be filed with the completed work order. Copy C shall be retained by the Cable Maintenance Supervisor for a period of one year. This form shall serve as a basis for the preparation of Form 2947B "Monthly Cable Pressurization Report" (Exhibit A).

4.03 In the event a new cable does not meet the objectives outlined in Section 3, the Cable Maintenance Supervisor shall so designate by completing the appropriate section of Form 3649 and he shall return both copies to the Manager-Construction. The Manager-Construction may then forward Copy C to the appropriate supervisor for corrective action.

4.04 The addition of cable to a pressure pipe system will usually create an increasee in system flows. At this time it will be necessary to readjust the pipe alarms which guard the appropriate cable run. This procedure should be performed after the flows have stabilized.

4.05 (a) In areas where no pipe system exists, the same procedure as outlined in Paragraphs 4.01 and 4.02 of this section shall be used with the exception of connecting and reading manifold flows and pressures. For sources other than air pipe, the initial and stabilized flows shall be taken at the B Meter Panel, or equivalent, or at the pole mounted air dryer.

NOTE: Flows may be calculated with the Cable Pressurization Computer — Form E-4829 or equivalent — at pole mounted installations which are not equipped with flow rate devices.

(b) Flows which are recorded at B Meter Panels may be obtained from Form 2949 (Exhibit B) and transcribed to Form 3649.

(c) When a cable as outlined in paragraph 3.02 is added in a "blast" area and the new cable is not connected physically to the pressure source, the flow created by this addition may be recorded by noting the increase in flow from meter

panels. This flow increase will appear on the flow indicator for the existing cable which feeds the new cable addition. The flow increase noted is the entry which shall be made on Form 3649.

(d) In areas where air pipe is not utilized, initial analysis valves shall be placed at intervals not to exceed 3000 feet in all underground and buried cable as outlined in paragraph 3.02 and at the end of all 100 pair or larger aerial exchange cable as outlined in paragraph 3.02. A spacing, not exceeding 3000 feet, shall be satisfactory for acceptance purposes in aerial trunk and toll cables. The lowest pressure reading along the cable route shall be recorded on Formm 3649 upon initial acceptance.

4.06 A comparison of the sheath feet added from Form 3649 and the acceptable flows shown in paragraph 3.05 will aid the Cable Maintenance Supervisor in determining the amount of conditioning work necessary after he has accepted a given cable. For example, the addition of 5000 feet of underground exchange cable will justify an increase in flow of approximately 20 standard cubic feet per day. If a flow exists above this value, additional conditioning will be required.

4.07 The cable pressurization acceptance shall normally be completed in no more than five (5) work days from the receipt of Form 3649 by the Cable Maintenance Supervisor.

5. REPORTING CABLE SHEATH PRESSURIZED

5.01 The District Manager-Loop Maintenance in each district shall be responsible for the preparation of Form 2947B, "Monthly Cable Pressurization Report", showing the amount of sheath added to or removed from a pressurized status within his district during the month of the report. Cable sheath reported on Form 2947B as pressurized under "Existing Plant" is all cable sheath pressurized that is not reportable under "New Plant". Cable sheath reported on Form 2947B as new plant will be any new cables added to an existing pressurized system.

5.02 When cable is removed from pressurized plant, it shall be the responsibility of the Manager-Construction in each district to report the work order number, using Form 3649, to the Cable Maintenance Supervisor. The Cable Maintenance Supervisor may then survey the work order to assure that all monitoring devices have been removed from plant and all records have been properly corrected.

5.03 The definition of pressurized cable is cable having an internal pressure equal to or exceeding the recommended minimum levels as defined in Paragraph 3.04 and monitored by contactors and transducers.

5.04 The Cable Maintenance Supervisor shall forward monthly to his Manager, the sheath feet of cable added or removed in the pressurized plant. This information shall be obtained from Form(s) 3649, "Cable Pressurization Acceptance".

5.05 It is the responsibility of the Manager in charge of Cable Maintenance to forward the information required on Form 2947B to the District Manager-Loop Maintenance by the last day of the month under report.

5.06 The District Manager-Loop Maintenance shall forward Form 2947B to the Operations Results, Room 1855, 220 North Meridian Street, Indianapolis, Indiana, by the 5th day of the month following the month under report.

6. RECORDING AND ANALYSING AIR FLOW AND USAGE IN NON-CPMS AREAS

6.01 The total daily air usage at a specific Central Office or CDO is obtained by a daily reading of the gas meter or meters. These meters are self-contained in some air dryers and are mounted externally at other dryer installations.

6.02 All air dryers have an output rating in standard cubic feet per day — SCFD. These output capacities are listed in the manual which accompanies each dryer model.

6.03 Two models of gas meters are presently in use. One model displays a cubic feet per day readout — CFD. The second displays a readout in standard cubic feet per day — SCFD. The type of readout is plainly marked on the face of each meter. Meters which are marked CFD will require conversion to SCFD for the reading to be meaningful in pressurization work. Exhibit C of this practice may be used to make the necessary conversions.

6.04 All air usage from air rate indicators and gas meters (Exception, Paragraph 6.05) shall be recorded on Form 2949 (Exhibit B). Daily readings shall be recorded by Central Office forces at attended Central Office locations. At unattended offices, readings should be taken and recorded on each visit (not to exceed once a day) by Central Office

or Cable Maintenance forces. Daily usage can be figured for unattended offices by dividing the usage by the number of days since the last recording. The Repair Service Bureau shall be notified immediately of a daily increase in excess of 10 SCFD on the gas meter and/or .5 SCFH on any one flow rate indicator. Form 2949 shall be forwarded by Central Office to the Repair Service Bureau no later than the 5th day after the reporting month. See Indiana Bell Practice 660-195-910NB for Repair Service Bureau responsibilities.

6.05 Form E-5403 (Exhibit L), "Gas Usage Log Pipe Alarm Meter Panel", shall be maintained at or near the pipe alarm meter panel. Daily readings shall be taken from each meter panel and entered on Form E-5403 to include the date, CFD usage, and flow rate in SCFD. See Bell System Practice 637-050-300 for detail. These readings shall normally be recorded by Network forces.

7. SELECTION OF AIR SOURCE

7.01 It shall be the responsibility of the local Outside Plant Engineering, in cooperation with the Cable Maintenance Supervisor, to select the appropriate dry air source for each installation. In Indiana Bell the primary source of dry air shall be supplied by electrically ran air dryers.

7.02 When an air pipe system is to be installed, a minimum air source shall be planned that has a capacity sufficient to delivery 1,000 standard cubic feet per day for each air pipe in the system. The number of pipes needed must be determined from AIRPAP results. In addition a back up air source shall be provided in the event of an air source failure. This back up source shall have the SCFD air delivery rate equal to one complete compressor and drying system or unit.

Other air source considerations that shall be considered are explained in BSP 930-210-500 and section 15 of this practice.

7.03 Selection of pole mounted air dryers and CO air dryers in non pipe systems shall be governed by the type, size, and gauge of cable relative to allowable flows.

7.04 Due to competition and constant improvements in air dryers, several models are acceptable for use within this company. In the past CSI, Dielectric, McIntire, and Puregas have been used. As other companies enter the market and are approved, notification will be sent. Refer questions to your local Staff.

7.05 Bell System Practices shall no longer be issued for non-KS air dryers. Maintenance of these dryers shall be performed by reference to the appropriate manual furnished with each dryer. Additional copies of maintenance manuals may be obtained by contacting the appropriate dryer manufacturer or Staff.

8. MAINTENANCE RESPONSIBILITIES — GENERAL

8.01 The following items will be routined and maintained by the Cable Repair forces:

(a) Pole Mounted Air Dryers
(b) Pipe Alarm Panels
(c) Air Rate Indicators
(d) Gas Meters
(e) Moisture Separators

8.02 The routines, maintenance, and repair of CO and CDO air dryers have been established in each area by district. This may be changed with District approval of the forces involved. It is recommended that Cable Repair forces do this work.

8.03 In non-CPMS locations, the reading and recording of air flow and usage in attended offices will be done by CO forces.

8.04 In non-CPMS unattended locations, the reading and recording of air rate indicators and/or gas meters must be read periodically. The supervisor in charge of this type office shall make the arrangements for this work to be done.

9. MAINTENANCE OF DRYING EQUIPMENT

9.01 It shall be the responsibility of the supervisor in charge of air dryer maintenance to maintain a current copy of Form 3457B (Exhibit G), Form 3457-1 (Exhibit H), or Form 3457-2 (Exhibit I), as appropriate.

9.02 A dryer maintenance history is provided on the back of each Form 3457. It is the responsibility of each supervisor in charge of air dryer maintenance to record all maintenance visits to each air dryer. This information will provide a history for each unit and serve to prevent undue maintenance expense beyond the economic life of the dryer. These forms are general in nature and may or may not contain complete routine maintenance requirements.

This is due to enhancements in manufacturer requirements and manufacturing of new models. Routine maintenance shall always be completed according to manufacturers specifications.

9.03 The appropriate 3457 Form shall be maintained at each dryer location. The supervisor in charge of these dryers shall make two copies of Form 3457 at 6 month intervals. One copy will be sent to Staff Associate Ca. Press., Rm 1310, 220 N. Meridian St., Indpls. One copy will be maintained on file with the supervisor in charge. Following is an explanation of each form:

(a) Form 3457B — Designed to provide a maintenance routining check list for Puregas KS-16432L1, KS-16432L2, and KS-16523 Central Office air dryers. These dryers are equipped with an oil type compressor and require a more detailed maintenance routine. See BSPs 161-305-701 & 161-307-701 for maintenance procedures.

(b) Form 3457-1 — Designed to provide a maintenance routine check list for CSI, Dielectric, McIntire, and Puregas Central Office air dryers which are equipped with centrifugal, water-seal compressors. These dryers are of a more recent design and incorporate higher capacity with simplified maintenance. For Puregas maintenance procedures refer to BSP 161-308-701 and BSP 161-301-802. For maintenance procedures on CSI, Dielectric, and McIntire Central Office dryers, refer to the manufacturer's manual.

(c) Form 3457-2 — Designed to provide a maintenance routine check list for pole mounted air dryers and some CO dryers. Detailed maintenance procedures for each dryer listed shall be obtained from the appropriate maintenance manual for each air dryer. See Paragraph 7.05 of this practice.

10. MOISTURE SEPARATOR MAINTENANCE

10.01 A moisture separator is a device which may be placed at the junction of PIC and pulp insulated cable when such cable is pressurized. The purpose of the moisture separator is to prevent moisture which has been created by diffusion in PIC cable from entering the pulp insulated cable.

10.02 Local Outside Plant or Trunk Engineering shall be responsible for issuing the work order for the installation, rearrangement, or removal of all moisture separators. See BSP 637-245-900NB for detail.

10.03 Form 3460 (Exhibit D) is provided as a maintenance record for all periodic maintenance visits. The Cable Maintenance Supervisor shall be responsible for determining the frequency of these visits. BSP 637-245-900NB, Paragraph 4, may be used as an aid in determining an initial maintenance schedule.

10.04 Form 3460 shall be maintained by the Cable Repair Supervisor.

11. CONSTRUCTION RESPONSIBILITIES

11.01 To assure the integrity of the pressure system during construction activity, the Construction Supervisor in charge of the work operation shall ensure these activities are in accordance with current pressure practices.

11.02 The following functions shall be performed so as not to jeopardize the monitoring capability of an existing pressure system or create the possibility of other pressure related failures.

(a) PROPER BUFFERING will be used at all times to eliminate work related pressure alarms and cable failures.

(b) Prior to new or extended air pipe being connected to a cable the moisture content of the air in the pipe must be varified to be less than 5%.

(c) The Construction Supervisor shall notify CPMS prior to connecting an air pipe or cable to an existing pressure system.

(d) The procedures in paragraph 13.04 of this section shall be followed when installing, removing, relocating, or reassigning pressure monitoring devices.

(e) Pressure monitors that are placed and energized by construction forces prior to acceptance shall be maintained at or above the alarm level stipulated by CPMS.

(g) All cables that are to be pressurized from an existing pipe system shall be charged to 1/2 PSIG above the existing pipe pressure prior to connection to the pipe.

(h) All cables that are to be pressurized from an existing blast system shall be charged to 1/2 PSIG above the feeder source prior to connection to the cable.

11.03 Section 4 of this practice shall be adhered to upon the completion of construction activity in pressurable cable.

11.04 It shall be the responsibility of each employee who opens a pressurized cable to properly buffer (provide supplementary air) in accordance with the most recent buffering practices.

12. TOLL AND TRUNK CABLE MAINTENANCE RESPONSIBILITIES AND PROCEDURES

12.01 It shall be the responsibility of the Division Manager-Loop Maintenance to assure that all trunk and toll cable routes within his division have been assigned boundaries for maintenance responsibility.

12.02 It shall be the responsibility of the District Manager-Loop Maintenance to assure that maintenance personnel are provided to properly maintain all toll and trunk cable routes within his area.

12.03 It shall be the responsibility of the Manager Loop Maintenance in charge of cable maintenance to administer toll and trunk pressurization and maintenance in a manner which will:

(a) Provide assurance that minimum acceptable pressures are maintained in all pressurable toll and trunk cable routes under his jurisdiction.

(b) Assure ample manpower coverage to meet all toll and trunk pressure alarms and maintenance situations which occur, whether during scheduled or non-scheduled periods.

(c) Assure that all toll and trunk cable maintenance functions such as maintenance of warning signs, markers, contactors, and transducers are being performed.

(d) Assure that the annual inspection of all toll and trunk cables within his area is performed and Forms 3650A and 3650-1 are properly distributed. (See Paragraph 12.05 of this practice.)

12.04 It shall be the responsibility of the Cable Maintenance Supervisor to direct the performance of all toll and trunk cable maintenance functions within his area and assure that pressure sources and alarming equipment are adequate and properly maintained.

12.05 (a) It shall be the practice within the Indiana Bell Telephone Company to perform an annual pressurization and maintenance inspection on all toll and trunk cables. Form 3650A (Exhibit N), "Toll and Trunk" Pressurization and Maintenance Inspection", is provided as a work sheet and record to assure that proper pressure, pressure equipment, warning devices, and cable route conditions exist.

(b) After the inspection has been completed, the Cable Repair Maintenance Supervisor will assure that Form 3650A is properly filled in, including Line O, and return one copy to the Manager-Loop Maintenance and one copy to the Manager-Engineering by December 31 of each year. One copy will be retained for a maintenance reference. The Cable Repair Maintenance Supervisor shall prepare Form 3086, "Outside Plant Maintenance Report", for each item listed on Line O of Form 3650A that has not been repaired by December 31.

(c) Upon receiving the completed Form 3650A for all trunk and toll cables in this area, the Loop Maintenance Manager-Loop Maintenance will complete Form 3650-1 (Exhibit 0) by January 15 of each year and forward one copy each to the District Manager-Loop Maintenance and District Manager-Loop I&M Staff. One copy will be retained as a maintenance reference.

(d) It shall be the responsibility of the Manager-Loop Maintenance to inquire, monthly, as to the disposition of items listed on Line O of Form 3650A and to notify, monthly (Form 3650-1), those persons listed in Paragraph (c) of changes.

(e) It shall be the responsibility of the District Manager-Loop Maintenance to assure all defects listed on Form 3650-1 are corrected within the time period prescribed on Form 3086.

12.06 Field inspection has indicated that the following items should be observed when performing toll pressure routines. Check for:

(a) Broken or missing strap wires on all contactor terminals.
(b) Deteriorated or "frozen" yoke bolts.
(c) Cracked terminal covers.
(d) Missing yoke bolts.
(e) Broken terminal cover gaskets.
(f) Defective terminal cover gaskets.
(g) Cracked terminal housings.
(h) Missing cap screws.
(i) Defective or vandalized warning signs.
(j) Broken or leaning warning sign posts.
(k) Missing marker posts.
(l) Continuity of the "cableman's talk pair".
(m) Operation of the contactor or transducer alarm mechanism.
(n) Valve and valve cap security.
(o) Pole line conditions (tree trimming, broken or unsafe poles, numbering).
(p) Cable and strand bonding and grounding.

NOTE: Following is a list of Bell System Practices which may be used for reference:

	Defective Item	Reference
1)	Contactor mechanism	637-210-300
2)	Contactor covers, chains. screws, etc.	637-200-105 637-210-100 637-210-101
3)	Warning signs & metal posts	629-200-901NB
4)	Treated wooden posts	Purchase Locally
5)	Buried Plant Inspection	PP 402.210

13. MONITORING RESPONSIBILITIES AND PROCEDURES

13.01 Following is a description of the various alarm and monitoring devices which may be applied to a cable pressurization system:

(a) Pipe Alarm — A two-state or and on/off type of alarm device which is adjustable to a predetermined flow level to permit the operation of an alarm when an increase in flow occurs. It shall be the practice within Indiana Bell to establish all pipe alarm, levels at 100 standard cubic feet above the normal flow for each air pipe. Normal **allowable** flows shall be determined from AIRPAP results which are furnished by the local Outside Plant Engineer. See Paragraph 4.08 of this section for flow calculations for new or additional cable.

(b) Air Flow Transducer — An analog or graduated output type of monitoring device which permits the amount of flow in an air pipe or cable to be read from a remote location. Where available, this device may be used to supplement pipe alarms and pressure transducers by providing the amount of air flow at a specific time and location.

(c) C Pressure Transducer — An analog device which is used to monitor aerial or buried cable pressure. These transducers shall be placed at or near the riser pole or closure on all 200 pair or larger pressurable exchange lateral cables which feed pressurable cable beyond; at the riser or closure on all pressurizable exchange laterals more than 1000 ft. from the main cable run on all pressurized exchange cable so as to monitor no more than 40 pneumatic units of resistance in any direction of the trandsucer. These trandsucers shall be used to monitor trunk and toll cables provided they are paralleled by an exchange cable and monitored by CPMS.

(d) E&F Pressure Transducers — Analog monitoring devices which are intended for use on underground cables. The E&F pressure transducers utilize subscriber pairs and series resistances to provide pressure readings along an underground cable route. Where air pipe systems are utilized E&F transducers shall generally be placed at hi-valve locations. For those pressure systems which do not utilize air pipe, the locations shall be stipulated by Outside Plant or Trunk Engineering.

(e) G Pressure Transducer — Consists of an F pressure transducer (equipped with a 15 foot stub) attached to a mounting plate which permits it to be used in single installations.

(f) H Pressure Transducer — Consists of an F transducer equipped with an adapter plate for installation in a B transducer housing.

(g) E,K,T Contactor Terminals, J, N, P & R Contactors — These monitoring devices are two-state in design and provide a positive alarm from dedicated circuitry when a minimum pressure level is reached. These contactors shall be used on trunk or toll cables where subscriber lines are not available.

13.02 It shall be the responsibility of Outside Plant and/or Trunk Engineering to provide the necessary work order for the installation of all alarm and/or monitoring devices. This work order shall include the type of device, location of the device, and the identity of the device relative to the pressure system.

13.03 Pressurization alarms and monitoring devices generally utilize one of two basic types of cable circuitry. The type of circuitry used for a given device is usually determined by the category of plant to be monitored and the characteristics of the specific device used. These types of circuitry include:

(a) Dedicated Alarm Pairs — Used for all Central Office and pole mounted air dryer alarms; toll and trunk cable alarms where Type E, J, K, N, P, T and R pressure contactors are utilized; all air pipe flow alarms; technician talk pair in toll and trunk cables; B flow transducers when installed at a pipe alarm panel, pole mounted air dryer, and/or air pipe manifold location.

(b) Subscriber Pairs — Used for all C (aerial) pressure transducer installations; E, F, G, H (underground) pressure trandsucer locations; L or M pressure contactors where these contactors have been previously installed on early installations; flow transducers when used to supplement pipe alarms and pressure transducers.

13.04 The following procedures will be used when pressure monitors are placed, removed, relocated, or reassigned within the pressure system.

A. Monitor Installation

1. The Field Supervisor in charge of the work operation is responsible to request monitor Sensor Sheets from the LAC Supervisor according to work order prints.

2. The LAC Supervisor will prepare the Sensor Sheets according to BSP 680-201-030NB and request LARP assignment from CPMS.

3. LAC will provide jumper assignments to the C.O. forces to have jumpers ran from the LARP panel to the cable pairs.

4. After notification that the central office work has been completed LAC will issue the Sensor Sheets to CPMS, Pressure Supervisor, Construction Control Center, and RSB.

5. The Field Supervisor in charge of the work operation will distribute the Sensor Sheets to the Field Technician to perform the work.

6. The Field Technician will work with the RSB while at the work location to properly adjust the pressure monitor.

7. The Testing Technician will notify CPMS, while the Field Technician is still at the work location that the monitor is installed and request monitoring verification.

8. After installation work has been completed and the monitor properly tested, the RSB will send the completed Sensor Sheets to LAC.

9. LAC will send copies of the completed Sensor Sheets to CPMS and LMOS.

B. Monitor Removal

1. The Field Supervisor in charge of the work operation is responsible to request monitor Sensor Sheets from the LAC Supervisor according to work order prints.

2. LAC will prepare the Sensor Sheets with all pertinent information and forward copies to CPMS and the Field Supervisor.

3. The Field Supervisor in charge of the work operation will distribute the Sensor Sheets to the Field Technician to perform the work. The Field Technician will notify CPMS at the time of the actual monitor removal.

4. When the monitor has been removed in the field, the Field Supervisor will notify LAC that the work has been completed.

5. LAC will issue an order to the CO to have the LARP jumper removed from its associated cable pair.

6. Upon completion of the order by the CO forces LAC will issue the completed Sensor Sheets to the RSB, CPMS, and LMOS for updating record requirements.

C. Monitor Relocation (Field Request)

1. The Field Technician will contact LAC and provide them with all pertinent information regarding the intended move.

2. LAC will provide the RSB with a copy of the sensor sheets. If a pair charge is required LAC will also provide the RSB with a W Order.

3. After the monitor has been relocated the Field Technician will work with the RSB while at the work location to properly adjust the pressure monitor and OK W order work.

4. The Testing Technician will notify CPMS while the Field Technician is still at the work location that the monitor has been relocated and request monitor verification.

5. After the relocation work has been completed and the monitor properly tested and verified, the RSB will return the completed W order and Sensor Sheets to LAC.

6. LAC will make the necessary corrections to their records and send a copy of the sensor sheet to CPMS and LMOS.

D. Monitor Relocation or Redesignation (Job Order Requested)

Monitors that are to be relocated that require field involvement will be done according to work operation A (Installation) of this paragraph.

Monitors that are to be redesignated that require no field involvement will be done as follows.

1. If new LARP assignment are necessary LAC will request new LARP assignments from CPMS.

2. LAC will provide new jumper assignments to the CO Forces.

3. After notification that the central office work has been completed LAC will issue new Sensor Sheets to CPMS, Pressure Supervisor, RSB, and LMOS to update their records.

E. Maintenance Work

1. The Field Technicians will contact the RSB if testing assistance is required.

2. If after performing tests it is determined a pair change is required, the Testing Technician will request a W order from LAC and relay this information to the Field Technician.

3. When the maintenance condition has been cleared, the Testing Technician will return the completed W order to LAC.

4. LAC will make the necessary corrections to their records and send a copy of the sensor sheet to CPMS and LMOS.

13.05 In non-CPMS locations, it shall be the responsibility of the Repair Service Bureau in each location to administer and record the daily status of all pressurized cable plant in accordance with Indiana Bell Practice 660-195-910NB.

14. IDENTIFICATION OF PRESSURIZATION DEVICES

14.01 In air pipe systems, identification of pressurization devices shall be in accordance with BSP 637-600-200 and BSP 901-473-904NB. The general rules for identification are:

(a) Air Pipe — Shall be identified by letter designation throughout the air pipe route, including aerial and underground branch pipes. When the installation of 26 pipes is surpassed, a double letter designation will be used, such as, AA, AB, AC, etc.

(b) Pipe Alarm Meter Panel — Shall be designated by the same letter or letters as the air pipe it serves.

(c) Underground Transducers — Shall be designated by the air pipe, cable, and manifold section it monitors.

(d) Trunk & Toll Contactor (those that provide a direct short when operated) — Shall be identified by the manhole, marker, or pole designation at which it is located.

(e) Aerial Transducers (and high resistance type contactors such as the L&M) — Shall be designated by the air pipe, cable, transducer section, and the primary and/or secondary positioning of the monitor.

(f) Manifold & Hi-Valve Manhole Locations — Shall be identified by street address or manhole number and address. Example: 1737 N. Main or MH227 U.S. 36W.

(g) Central Office Air Dryer — Shall be identified by number and Central Office or CDO location.

(h) Pole Mounted Air Dryer — Shall be identified by marker or pole number and street, road, or cable route name.

14.02 When an underground transducer is utilized within an air pipe system, the hi-valve manhole which contains the transducers shall be considered as the anchor point for the monitoring of the underground cables between two manifold delivery points. Therefore, it may be termed that each air pipe system will be divided into "transducer sections".

14.03 In non-CPMS systems, Form E-5405 (Exhibit F) is provided for the purpose of recording all underground and aerial transducers in a manner which groups them by transducer section. This form may be used on either air pipe or blast systems. See Indiana Bell Practice 660-195-910NB for details.

14.04 In non-pipe systems, identification of pressurization devices are: (Exhibit E)

(a) Aerial Transducers & High Resistance Type Contactors (such as the L&M) — Shall be designated by the conduit route, cable, primary and/or secondary positioning of the monitor.

NOTE: If no conduit run exists, a theoretical letter shall be designated for the purpose of monitor identification.

(b) Trunk & Toll Contactors (those that provide a direct short when operated) Aerial or Underground — Shall be identified by the manhole, marker, or pole designation at which it is located.

(c) Central Office Air Dryers — Shall be identified by number and Central Office or CDO location.

(d) Meter Panel — Shall be designated by the air dryer it monitors.

(e) Flow Indicator — Shall be designated by the cable it serves.

(f) Pole Mounted Air Dryers — Shall be identified by marker or pole number and street, road, or cable route name.

NOTE: When converting a non-pipe system to an air pipe system, it will be necessary for Engineering to issue a renumbering work order.

15. EMERGENCY PROCEDURES

15.01 Cable pressure systems within this company are designed to be as fail safe as possible and a total collapse of an air pipe system should rarely be experienced. This section provides a guideline for the procedures to be used when applying corrective action to a given emergency situation.

15.02 (a) Total Power Failure — All Central Office air dryers shall be electrically wired to provide continuous service upon the loss of commercial power. However, should a situation occur such as a total power shut down, it shall be the responsibility of the Manager in charge of Cable Maintenance to pre-arrange a source of supply of either nitrogen or externally powered emergency air dryers to provide a capacity equal to the normal system demand.

(b) In some areas, nitrogen cylinder trailers are available on a rental basis which have a capacity sufficient to maintain a large Central Office.

(c) An emergency air source connection should be provided in each CO or CDO which will permit a rapid installation of emergency equipment. Where cable vaults with outside access exist, it may be advisable to install a vacant or spare air pipe which may be readily connected at the pipe alarm meter panels and at an outside pressure source.

(d) Care should be exercised in large offices which provide heavy flows. Multiple emergency connection points may be needed to overcome the restricting effect of a single connection.

(e) In the event of a total power failure, it shall be the responsibility of the Repair Service Bureau and/or the Service Control Center to notify the Cable Maintenance forces immediately so that an emergency source may be provided.

15.03 (a) Central Office or CDO Air Dryer Failure — In the event of dryer failure at these locations, it shall be the responsibility of the Repair Service Bureau, Service Control Center, and/or CPMS to dispatch the trouble to whatever force is responsible for CO dryer maintenance in that area.

(b) All Central office and/or CDO air dryers not monitored by CPMS shall be connected to a major Central Office alarm, or equivalent, and shall be transferred to an appropriate place, such as the Service Control Center, when the Central Office and/or Repair Service Bureau is not attended.

(c) It shall be the responsibility of the Air Dryer Maintenance forces to notify the Cable Repair Supervisor if any additional air source is needed when an air dryer failure occurs.

15.04 (a) Pole Mounted Air Dryer Failure — It shall be the responsibility of the Repair Service Bureau, Service Control Center and/or CPMS to notify the Cable Maintenance Supervisor when a failure occurs on a pole mounted air dryer.

(b) Dedicated Alarm Pairs — Shall be used on all pole mounted air dryer installations and either monitored by CPMS or shall terminate at a location where they may be included as a positive, audible alarm with transfer features which will assure 24 hour recognition.

15.05 (a) Air Pipe Alarm Operation — Pipe alarm operations may occur as a result of either splicing activity or substantial cable leakage. The amount of flow increasee which occurs after a pipe alarm operation and the associated transducer pressure drop will determine the seriousness of an alarm situation. For example, an increase in flow of 100 SCFD may create a pressure drop as great as 8 PSI within 2000 feet on certain large size cables. It, therefore, is evident that a flow rate/pressure drop ratio be established upon an alarm operation. To accomplish this it will be necessary to read the pressure transducers which parallel the affected pipe route and determine if any transducer reads below the minimum acceptable pressure level for the specific type of plant being observed. See Section 3 of this practice for minimum acceptable pressures.

(b) In the event a pipe alarm operation is succeeded by a pressure sink below minimum acceptable levels on either underground, buried, or primary aerial transducers, the RSB, Service Control Center, and/or CPMS shall immediately notify the Cable Maintenance Supervisor or other designated person responsible for cable pressurization in each district. Refer to Indiana Bell Practice 660-195-910NB for details.

(c) Form E-5404 — Pipe Alarm Log shall be maintained by the local RSB and each pipe alarm operation shall be recorded to include the flow rate, trouble cause and corrective action. All pipe alarms, including those created by splicing activity, shall be entered on this form. (See Exhibit J)

(d) Multiple pipe alarm operations may be experienced from a sudden reduction in temperature which, in turn, opens multiple cable leaks. It will be necessary to analyze the affected areas from transducer readings and dispatch repairmen to those areas which have experienced the greatest pressure loss until all defects have been repaired. At certain periods during the year, such as early winter, it may be necessary to consider additional force or temporary force adjustment to effectively correct the situation.

15.06 (a) Toll Contactor or Transducer Alarm — It shall be the responsibility of the Toll Test Center, CPMS, and/or Service Control Center to notify the appropriate RSB or Service Supervisor upon the operation of any pressure alarm which monitors toll cable.

(b) The Service Supervisor in charge of cable pressurization in each district shall be responsible for the dispatch, analysis, and corrective action relative to each toll alarm operation.

(c) In non-CPMS locations the appropriate Toll Test Center and/or Service Control Center shall be notified of the corrective action which has been taken to eliminate all toll alarm situations. This notification should include the cause of the defect, location of the defect, location of any temporary buffering, and the name of the person reporting the clearing action.

Attachments:

Exhibit A: Form 2947B— Monthly Cable Pressurization Report (Reference: Section 5)
Exhibit B: Form 2949 — Cable Pressurization Air Usage (Reference: Section 6)
Exhibit C: Cubic Feet Conversion Chart (Reference: Section 6)
Exhibit D: Moisture Separator Inspection & Maintenance (Reference: Section 10)
Exhibit E: Monitor Identification Layout (Reference: Section 14)
Exhibit F: Form E-5405 — Record of Contactors & Transducers (Reference: Section 14)
Exhibit G: Form 3457B — Central Office Air Dryer Maintenance Routine — Oil Type Compressor (Reference: Section 9)
Exhibit H: Form 3457-1 — Central Office Air Dryer Maintenance Routine — Centrifugal Type Compressor (Reference: Section 9)
Exhibit I: Form 3457-2 — Pole Mounted Air Dryer Maintenance Routine (Reference: Section 9)
Exhibit J: Form E-5404 — Pipe Alarm Log (Reference: Section 15)
Exhibit K: Form 3649 — Cable Pressurization Acceptance (Reference: Section 4)
Exhibit L: Form E-5403 — Gas Usage Log Pipe Alarm Meter Panel (Reference: Section 6)
Exhibit M: Form E-5406 — Pressure Readings Manifold and Hi-Valve Manhole (Reference: Section 4)
Exhibit N: Form 3650A — Toll & Trunk Cable Pressurization & Maintenance Inspection (Reference: Section 12)
Exhibit O: Form 3650-1 — Toll & Trunk Cable Pressurization & Maintenance Inspection Summary (Reference: Section 12)
Exhibit P: Form 3662A — Cable Status Report (Reference: Section 3)

MONTHLY CABLE PRESSURIZATION REPORT

District _____

Date _____

The following amounts of cable have been added and/or removed from a pressurized status during the month:

EXHIBIT A

NEW CONSTRUCTION

	Type of Pressure System			
	Pipe		Continuous Flow	
Type Cable	Feet Added	Feet Removed	Feet Added	Feet Removed
Aerial				
Underground				
Buried & Submarine				

EXISTING PLANT

	Type of Pressure System			
	Pipe		Continuous Flow	
Type Cable	Feet Added	Feet Removed	Feet Added	Feet Removed
Aerial				
Underground				
Buried & Submarine				

Remarks _____

_____

Signed _____

LOCATION Alpha Office

MONTH March, 1960

REMARKS
* Working in cable
** Cable shut off

EXHIBIT B

	METER READING	DAILY USAGE	AIR RATE INDICATOR READINGS										
			CA #1	CA #2	CA #3	CA #4	CA #5	CA #6	CA #7	CA	CA	CA	CA
31													
30													
29													
28													
27													
26													
25													
24													
23													
22													
21													
20													
19													
18													
17													
16													
15													
14													
13													
12													
11													
10													
9													
8													
7													
6	01044	21	2.3	2.4	2.4	1.1	2.3	.2	.5				
5	01023	20 *	2.5	2.3	2.4	1.1	2.2	.2	.4				
4	00993	20	2.4	2.3	2.4	1.1	2.2	.2	.4				
3	00973	22	2.3	2.4	2.5	1.2	2.3	.2	.5				
2	00951	21	2.3	2.4	2.5	1.2	2.3	.2	.5				
1	00930		2.4	2.4	2.4	1.1	2.2	.2	.4				

Attachment 3

TABLE FOR CONVERTING GAS METER READINGS TO STANDARD CUBIC FEET OF AIR

Meter Reading	Standard Cu. Ft. of Air at Various Output Pressures					
	8 PSI	9 PSI	10 PSI	11 PSI	12 PSI	15 PSI
50 cu. ft.	78	81	84	88	92	101
100	155	162	169	176	183	202
150	235	242	253	263	274	303
200	310	322	338	352	366	404
250	388	405	422	440	457	505
350	542	567	591	615	640	707
400	620	650	677	702	730	810
450	698	727	760	790	822	910
500	775	810	845	880	916	1010
550	852	891	929	968	1006	1110
600	930	972	1014	1056	1098	1210
650	1007	1053	1098	1144	1189	1310
700	1085	1134	1183	1232	1281	1415
750	1162	1215	1267	1320	1372	1515
800	1240	1296	1352	1408	1464	1615
850	1317	1377	1436	1496	1555	1715
900	1395	1458	1521	1584	1647	1820
950	1472	1539	1605	1672	1738	1920
1000	1550	1620	1690	1760	1830	2020
1050	1627	1701	1774	1848	1921	2120
1100	1705	1782	1859	1936	2013	2220
1150	1782	1863	1943	2024	2104	2320
1200	1860	1944	2028	2112	2196	2425
1250	1937	2025	2112	2200	2287	2520
1300	2015	2106	2197	2288	2397	2620
1350	2092	2187	2281	2376	2470	2730
1400	2170	2268	2366	2464	2562	2825
1450	2247	2349	2450	2552	2653	2930
1500	2325	2430	2535	2640	2745	3030
1550	2402	2511	2619	2728	2837	3135
1600	2480	2592	2704	2816	2928	3235
1800	2790	2916	3042	3168	3294	3640
2000	3100	3240	3380	3520	3660	4040
2200	3410	3564	3718	3872	4026	4450
2400	3720	3888	4056	4224	4392	4850
2600	4030	4212	4394	4576	4758	5250
2800	4340	4536	4732	4928	5124	5660
3000	4650	4860	5070	5280	5490	6060
3200	4960	5184	5488	5632	5856	6470
3400	5270	5508	5748	5984	6222	6870
3600	5580	5832	6084	6336	6588	7275
3800	5890	6156	6422	6688	6954	7680
4000	6200	6480	6760	7040	7320	8100
4200	6510	6804	7098	7392	7686	8500

EXHIBIT C

Indiana Bell

Form 3460
(8-82)

MOISTURE SEPARATOR INSPECTION AND MAINTENANCE

LOCATION OF MOISTURE SEPARATOR	JOB ORDER NUMBER INSTL'D. ON	CABLE DESIGNATION	DATE OF FIRST INSPECTION	INITIALS OF INSP'R.	FREQ. OF INSP. FOR FIRST 3 MOS.	DATE INSP.	INITIALS OF INSP'R.	DATE INSP.	INITIALS OF INSP'R.	DATE INSP.	INITIALS OF INSP'R.	FREQ. OF INSP. AFTER FIRST 3 MOS.	DATE INSP.	INITIALS OF INSP'R.	DATE INSP.	INITIALS OF INSP'R.	DATE INSP.	INITIALS OF INSP'R.

EXHIBIT D

Attachment 5

SECTION 637-020-901NB

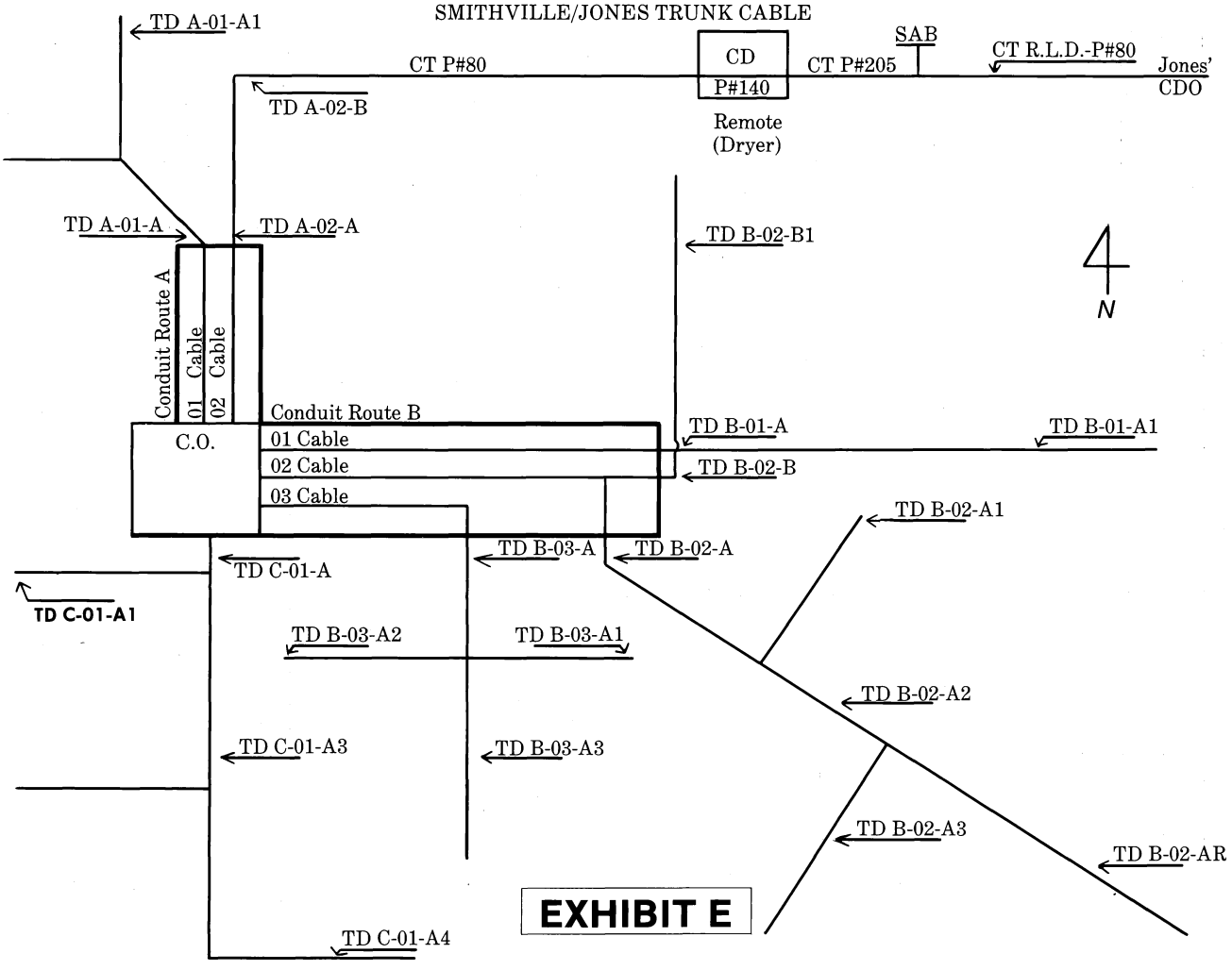

EXHIBIT E (NON-PIPE SYSTEM)

CONTACTOR AND TRANSDUCER DATA

FORM E-5405

SHEET NO._____OF ____

C.O. _____

PIPE ROUTE _____

Transducer or Contactor*	Location	Line Number	Cable No.		Cable Pressure	
			UG	Aerial	Normal	Alarm Setting or Alert Pressure**

* Indicate by "TD" for Transducer and "C" for Contactor.

** No alarm setting for Transducer; an "alert" point should be assigned.

NOTES: 1. List Transducers sequentially outward from C.O. along pipe route.
2. List Contactors sequentially outward along lateral cable.

Contactor and Transducer Data

EXHIBIT F

FORM 3457B
CENTRAL OFFICE PURE GAS DRYERS
INSPECTION AND ROUTINE MAINTENANCE CHECK LIST

KS-16432L1	KS-16432L2	KS-16523L1	WEEKLY ROUTINE
X	X		Air Compressor Oil Level
X			Air Dehydrator Tank Draining
	X		Air Compressor Oil Pressure
161-304-701	**161-305-701**	**161-307-701**	**3 MONTHS ROUTINE**
X	X	X	General Cleaning
	X	X	Air Dehydrator Tank Draining
X	X	X	Drive Belt Tension
X	X		Pilot Unloader Operation
X	X	X	Air Compressor Operation
X	X	X	Pressure Regulator Operation
X	X	X	Air Compressor Filter Maintenance
X			Air Compressor Breather Valve Operation
X	X	X	Tank Safety Relief Valve Operation
X	X	X	High-Low Pressure Alarm Setting and Operation
X	X	X	Humidity Sensing Element Inspection and Alarm Operation
X	X	X	Refrigeration System Tank Temperature and Thermostat Operation
		X	Air Compressor Oil Level and Pressure
			6 MONTHS ROUTINE
X	X	X	Pilot Unloader Cleaning and Replacement Parts
	X	X	Water Ejector Cleaning
X			Air Compressor Discharge Line Check Valve Cleaning
		X	Water Drain Orifice Cleaning
			12 MONTHS ROUTINE
X			Air Compressor Motor Ground
X	X	X	Humidity Sensing Element Replacement
X	X	X	Air Compressor Crank Case Oil Change
X	X	X	Air Compressor Suction Unloader Valve - Parts Replacement
X	X		Air Compressor Motor Lubrication
	X		Water Drain Strainer Cleaning
	X		Water Drain Orifice Cleaning

DISTRICT _____ OFFICE _____ DRYER TYPE _____

EXHIBIT G

Indiana Bell

AIR DRYER COST TRACKING FORM

District ______________________

Responsible Supervisor ______________________

Form Start Date ______________________

Form End Date ______________________

Elasped Time ______________________

Dryer Make/Type ______________________

Dryer Location ______________________

Date Dryer Installed ______________________

Installation: ☐ Co/Bldg ☐ Pole Mount

☐ Heatless ☐ Water Seal ☐ Refrigerated

DATE	EMPLOYEE #	REASON FOR VISIT		DATE OF LAST ROUTINE MTC. CHECK	CAUSE OF TROUBLE/ MAINTENANCE REQUIRED TO REPAIR	REPRS COMPL.		REPAIR PARTS USED	PARTS COST	NEW	REBUILT	CUME. REPAIR COST DRYER	LBR HRS	LABOR HOURS CUME
		ROUTINE	ALARM			Y	N							

Attachment 10

INDIANA BELL TELEPHONE CO., INC.
Form 3457-1

CENTRAL OFFICE AIR DRYER MAINTENANCE CHECK LIST

CSI					Dielectric			McIntire				Puregas		
4000	8000	12000	16000	24000	7500	16000	24000	7500	12000	16000	24000	20336L1	20336L2	20336L3
															Routines
															Six Months
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Replace Air Inlet Filters
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Check Humidity Alarm
												X	X	X	Replace Condenser Filters (Puregas)
X	X	X	X	X	X	X	X	X	X	X	X				Clean Ventilator or Heat Exchange Filter
												X	X	X	Replace Water Screen and Bronze Filters
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Check System Pressure
															Twelve Months
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Perform Six Months Routine
X	X	X	X	X	X	X	X	X				X	X	X	Replace Water Screens
									X						Clean Drain Solenoid
X	X	X	X	X	X	X	X	X		X	X	X	X	X	Clean Dryer Cabinet and Accessories
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Check Electrical Ground for Security
					X	X	X								Clean Water Ejector Float Switch
															Eighteen Months
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Perform Six Months Routine
															Twenty-Four Months
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Perform Annual Routine
X	X	X	X	X	X	X	X	X	X	X	X				Overhaul Solenoid Valves
					X	X	X								Replace Power On Lamp

EXHIBIT H

DISTRICT _____ OFFICE _____ DRYER TYPE _____

Attachment 11

Indiana Bell

AIR DRYER COST TRACKING FORM

District ______________________________

Responsible Supervisor ______________________________

Form Start Date ______________________________

Form End Date ______________________________

Elasped Time ______________________________

Dryer Make/Type ______________________________

Dryer Location ______________________________

Date Dryer Installed ______________________________

Installation: ☐ Co/Bldg ☐ Pole Mount

☐ Heatless ☐ Water Seal ☐ Refrigerated

DATE	EMPLOYEE #	REASON FOR VISIT		DATE OF LAST ROUTINE MTC. CHECK	CAUSE OF TROUBLE/ MAINTENANCE REQUIRED TO REPAIR	REPRS COMPL.		REPAIR PARTS USED	PARTS COST	NEW	REBUILT	CUME. REPAIR COST DRYER	LBR HRS	LABOR HOURS CUME
		ROUTINE	ALARM			Y	N							

Attachment 12

INDIANA BELL TELEPHONE CO., INC.
Form 3457-2

POLE MOUNTED AIR DRYER MAINTENANCE CHECK LIST

CSI				Dielec-tric		McIntire			Puregas			Routines	Flow or Run Time: Date								
1000	1500	2000		750	1500	1000			C-500	1400	3000	Three Months	Initials								
									X			Replace Air Inlet Filter									
									X			Drain Water									
									X			Change Silica Gel									
												NOTE: See 637-510-300 for frequency of visits.									
												Six Months									
									X			Repeat 3 Month Routine - Puregas "C" Only									
X	X	X		X	X	X				X	X	Replace Air Inlet Filter									
X	X	X		X	X	X			X	X	X	Check Pressure Switch Settings									
X	X	X		X	X	X			X	X	X	Clean Cabinet Interior and Vents									
X	X	X		X	X	X			X	X	X	Check Humidity Alarm									
												Nine Months									
									X			Repeat 3 Month Routine - Puregas "C" Only									
												Twelve Months									
X	X	X		X	X	X			X	X	X	Repeat Six Month Routine									
X	X	X		X	X	X			X	X	X	Replace Compressor Rings and Valves									
				X	X							Clean Water Dump Trap									
						X						Replace Purge Filter									
						X						Replace Water Separator Filter									
X	X	X		X	X	X			X	X	X	Check Humidity Alarm									

EXHIBIT I

DISTRICT _____ EXCHANGE _____ LOCATION _____ TYPE _____

Indiana Bell

AIR DRYER COST TRACKING FORM

SECTION 637-020-901NB

District ______________________

Responsible Supervisor ______________________

Form Start Date ______________________

Form End Date ______________________

Elasped Time ______________________

Dryer Make/Type ______________________

Dryer Location ______________________

Date Dryer Installed ______________________

Installation: ☐ Co/Bldg ☐ Pole Mount

☐ Heatless ☐ Water Seal ☐ Refrigerated

DATE	EMPLOYEE #	REASON FOR VISIT		DATE OF LAST ROUTINE MTC. CHECK	CAUSE OF TROUBLE/ MAINTENANCE REQUIRED TO REPAIR	REPRS COMPL.		REPAIR PARTS USED	PARTS COST	NEW	REBUILT	CUME. REPAIR COST DRYER	LBR HRS	LABOR HOURS CUME
		ROUTINE	ALARM			Y	N							

FORM E-5404

PIPE ALARM LOG

C.O._____

Pipe Route	Alarm Date	Alarm Time	Flow Rate	Referred		Trouble Cause	Date		New Alarm Flow Setting*
				By	To		Trouble Cleared	Alarm Cleared	

EXHIBIT J

* New Alarm Flow Setting may be necessary after gas flow has stabilized (difference in gas meter readings on two successive days not exceeding 5%).

Attachment 14

SECTION 637-020-901NB

EXHIBIT K

CABLE PRESSURIZATION ACCEPTANCE

Construction Report

Splicing has been completed on the attached work print(s) and the following cable is ready for acceptance by Cable Maintenance:

ESTIMATE _____ PRINT(S) NUMBER _____

JOB ORDER _____ PRINT(S) NUMBER _____

PRESSURIZED CABLE REMOVED: EST/J.O. _____ PRINT(S) _____

REMARKS: _____

_____

_____

DATE: _____ SIGNATURE: _____

CABLE PRESSURIZATION ACCEPTANCE

Construction Report

Splicing has been completed on the attached work print(s) and the following cable is ready for acceptance by Cable Maintenance:

ESTIMATE _____ PRINT(S) NUMBER _____

JOB ORDER _____ PRINT(S) NUMBER _____

PRESSURIZED CABLE REMOVED: EST/J.O. _____ PRINT(S) _____

REMARKS: _____

_____

_____

DATE: _____ SIGNATURE: _____

Initial Analysis

M/F OR SOURCE CONNECTED _____ (Date) INITIAL FLOW _____ (SCFH)

VALVE(S) CONNECTED _____ (Date) INITIAL LOW _____ (PSIG)

STABILIZATION PERIOD _____ (Hours) RETEST _____ (Date)

STABILIZED FLOW _____ (From E-5406 or 2949) STABILIZED LOW _____ (PSIG)

VALVE LOCATION OF STABILIZED LOW _____

DATE: _____ ACCEPTED BY: _____

DATE: _____ REJECTED BY: _____

REASON FOR REJECTION: _____

_____

_____

SHEATH FEET ADDED: _____ REMOVED: _____

CABLE PRESSURIZATION ACCEPTANCE

Construction Report

Splicing has been completed on the attached work print(s) and the following cable is ready for acceptance by Cable Maintenance:

ESTIMATE _____ PRINT(S) NUMBER _____

JOB ORDER _____ PRINT(S) NUMBER _____

PRESSURIZED CABLE REMOVED: EST/J.O. _____ PRINT(S) _____

REMARKS: _____

_____

_____

DATE: _____ SIGNATURE: _____

Initial Analysis

M/F OR SOURCE CONNECTED _____ (Date) INITIAL FLOW _____ (SCFH)

VALVE(S) CONNECTED _____ (Date) INITIAL LOW _____ (PSIG)

STABILIZATION PERIOD _____ (Hours) RETEST _____ (Date)

STABILIZED FLOW _____ (From E-5406 or 2949) STABILIZED LOW _____ (PSIG)

VALVE LOCATION OF STABILIZED LOW _____

DATE: _____ ACCEPTED BY: _____

DATE: _____ REJECTED BY: _____

REASON FOR REJECTION: _____

_____

_____

SHEATH FEET ADDED: _____ REMOVED: _____

FORM E-5403

SECTION 637-020-901NB

GAS USAGE LOG
PIPE ALARM METER PANEL

PIPE ROUTE _____

C.O. _____

Daily Reading Time _____

Pipe Pressure _____ psi

Date of Stabilization

Stabilized Daily Gas Usage (Meter Reading) _____ CFD* _____

Stabilized Gas Flow Rate (Flow Rate Indicator) _____ SCFD** _____

Alarm Flow Setting _____ SCFD _____

Date	Meter Reading (cfd)	Difference Between Readings * (cfd)	Flow Rate** (scfd)	Date	Meter Reading (cfd)	Difference Between Readings * (cfd)	Flow Rate** (scfd)

EXHIBIT L

NOTES: 1. Refer any daily "Difference Between Readings" that exceeds "Stabilized Daily Gas Usage" by 50 cfd.
2. Refer an Operated Alarm immediately, giving the "Stabilized Gas Flow Rate," the present flow rate, and the previous day's flow rate.
3. Send completed Gas Usage Log to test center monthly.

Attachment 18

E-5406

AIRFLOW AND PRESSURE READINGS — MANIFOLD AND HI-VALVE MANHOLES

PIPE ROUTE _____

WIRE CENTER_____

DATE	Manhole Location	Airflow Into Manifold	Airflow or Pressure Readings at Individual Cables (See Note)																			
			Ca#		Ca#		Ca#		Ca#		Ca#		Ca#		Ca#		Ca#		Ca#		Ca#	
			SCFH	PSIG	SCFH	PSIG	SCFH	PSIG	SCFH	PSIG	SCFH	PSIG	SCFH	PSIG	SCFH	PSIG	SCFH	PSIG	SCFH	PSIG	SCFH	PSIG

NOTE: Ca# = Individual Cable Airflow or Pressure at Manifold or Hi-Valve Manholes. Space is Available for Identifying The Cables in front of or Behind The Work Location.
SCFH = Standard Cubic Feet per Hour (Airflow at Manifold Manhole).
PSIG = Pounds per Square Inch Gauge (pressure at Hi-Valve Manhole).

EXHIBIT M -Airflow and Pressure Readings—Manifold and Hi-Valve Manholes

Indiana Bell

Form 3650
(8-82)

TOLL AND TRUNK CABLE
PRESSURIZATION AND MAINTENANCE INSPECTION

1st Level Supervisor **(A)** _____ CABLE ROUTE **(B)** _____ District **(C)** _____

DATE OF INSPECTION	MARKER POLE OR MANHOLE	TYPE TRANSDUCER OR CONTACTOR	CABLE PRESS. AT NON. & ADJ. L. READ (1)	ALARM PRESSURE	VERIFY ALARM IS RECEIVED (3)	VERIFY OPERATION OF TALK PAIR (2)	MARKERS	SIGNS	HOUSINGS	AIR TANKS	AIR DRYERS	POLE LINE CONDITION	MAINTENANCE CONDITIONS		DISPOSITION OF MAINTENANCE CONDITIONS NOT REPAIRED	DATE COND. REPAIRED
													REPAIRED	NOT REPAIRED		
(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)				(N)		(O)	

(1) Transducer Readings from CPMS or Manual Dial Up are acceptable
(2) Contactors Only
(3) Required if not monitored from CPMS or Manual Dial Up

EXHIBIT N

Attachment 20

SECTION 637-020-901NB

DISTRICT _____ A

SERVICE CENTER _____ B

TOLL AND TRUNK CABLE PRESSURIZATION AND MAINTENANCE INSPECTION SUMMARY SHEET

C	D	E	F	G	H	I	J	DATE	K
CABLE ROUTE	Date of Insp.	Minimum Pressure Reading	Monitors & Alarm Operate Properly	Number of Monitors	Number of Air Dryers	Number of Air Tanks	No. of Defects Not Repaired	DISPOSITION OF DEFECTS NOT REPAIRED LIST FORM 3086 IDENTITY NUMBER AND PRIORITY ONLY	

EXHIBIT O

Page _____ of _____

Form 3662
(8-82)

Indiana Bell

CABLE STATUS REPORT

No. _____

District _____ Exchange/C.O. _____ Date _____

Location _____

_____

_____

Location of 2 psig Pressure _____

_____

_____

If Cable is a Poor Maintenance Condition, Indicate:

Number of Trouble Sleeves _____

Number of Spans _____

Trouble History Per Last _____ Months _____

Suggested Disposition _____

_____

Engineering Receive Date _____

Disposition _____

_____

Reported By _____

_____
Engineering Supervisor

EXHIBIT P

Attachment 22