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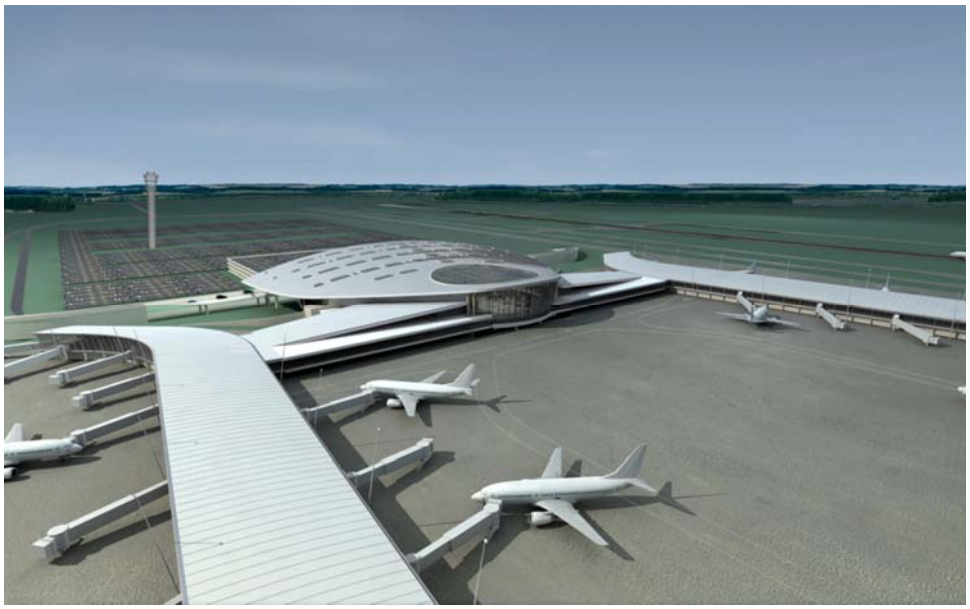
Advisor: Dr. Moeck
Technical 2 Assignment



Executive Summary:

This report analyzes the existing electrical distribution system of the new Indianapolis International Airport- the new Concourse B and compares NEC calculated full building loads to the actual consumption of the building. The information in this section includes design objectives and criteria, which meet the intent of specified codes, standards, regulatory requirements and the present and future operational electrical requirements of the Indianapolis International Airport. The layout of the electrical and lighting systems was all studied to see how they relate to the power distribution. A narrative or a summary of different area studied includes the emergency power systems, transformers, wiring and bus types, distribution voltages, equipment locations, voltage drops, short circuit current, power factor, total harmonic design consideration, transient voltage surge suppression design, energy conservation consideration, tenant area design and aircraft service with fixed group power units. The Concourse runs on a primary and secondary selective system. The electric utility load data was acquired from the Indianapolis Power and Light Company to determine how the Concourse will be charged in consuming power in the future. Certain areas of the Concourse such as the Uninterruptible Power System (UPS) as well as the exact number of mechanical equipments are not to be disclosed due to security limitation. Assumptions as well as approximate figures are given by Syska Hennessey for the purpose of this assignment. The beneficial comparison cannot be made due to the fact that the load calculation includes only one Concourse, which is part of an entire structure consist of the Main Terminal as well as another nearly identical Concourse.

System Narrative

The Concourse B's distribution system consists of primary and secondary selective systems. The primary selective systems is supplied from a medium voltage switchgear consisting of three 13.2 kV utility source with interconnecting automatic tie breakers. Closed transition transfer will be provided if permitted by IPL. The secondary selective system is then consist of a radial feed arrangement. A radial feed is provided to feed each side of the five double ended unit substations. Two additional double-ended unit substations are proposed for year 2020 fit-out at Concourses A and B.

Emergency Power Systems.

Diesel engine driven emergency generator sets are provided at two exterior locations at the Midfield terminal to provide back up power in the event of a utility power failure or failure of the interior normal distribution equipment. The emergency standby generators will satisfy the emergency/legally required and optional loads. The estimated emergency/legally required load is 1,800 kVA. The two generators, 1500 kW each, will support the estimated load. Emergency and legally required loads are designed with automatic transfer switches to provide emergency power within 10 seconds of normal power loss to satisfy Code requirements including:

a. Emergency Egress lighting
b. Fire Alarm and Rescue Systems
c. Security and Intrusion Alarm Systems
d. Egress Signage
e. Communications Systems
f. Apron Lighting
g. Sewage ejector pumps
h. Selectively switched elevators
i. Emergency Generator equipment
j. UPS
k. Fire Suppression Systems
l. Fire Pump
m. Approximately 5% of normal lighting to provide 1 fc at floor level areas required by local authorities.

The Airport Control Tower(navigational aids) and the Airfield Lighting (runway/ taxiway) have a separate emergency power system and will not be fed form the Midfield terminal(2 main) generators.

Uninterruptible Power System

Per Syska Hennessey/HOK Aviation/Indiana Airport Authority's agreement, detail description of the UPS is not allowed to discuss to any organizations that is other than active design participants of the project.

Transformer

Designation	Primary Voltage	Secondary Voltage	Phase	Type	Primary Feeder	Secondary Feeder
T1A	13200	480Y/277	3	Dry	3 #350MCM, 1 #4G 3"c	1 #1/0, 3/4" c
T1B	13200	480Y/277	3	Dry	3 #350MCM, 1 #4G 3"c	1 #1/0, 3/4" c
1 TGA	480	208Y/120	3	Dry	7	8
1 TGB	480	208Y/120	3	Dry	30	31
1 TSA	480	208Y/120	3	Dry	7	8
1 TDA	480	208Y/120	3	K13 Factor Dry	7	8
1 TDB	480	208Y/120	3	K13 Factor Dry	7	8
1 TDC	480	208Y/120	3	K13 Factor Dry	7	8
1 TGC	480	208Y/120	3	K13 Factor Dry	7	8
1 TGD	480	208Y/120	3	K13 Factor Dry	7	8

Wiring and Bus Type

Feeder Number	Conductors (3 phase, 3 wire) with ground	Raceway Size Conduit	Feeder Amp Rating	Feeder Number	Conductors (3 phase, 4 wire) with ground	Raceway Size Conduit
1	3#4, 1#10G	1"	60	2	4#4, 1#10G	1-1/4"
3	3#4, 1#8G	1"	70	4	4#4, 1#8G	1-1/4"
5	3#1, 1#8G	1-1/4"	100	6	4#1, 1#8G	1-1/2"
7	3#1/0, 1#6G	1-1/2"	125	8	4#1/0, 1#6G	2"
9	3#1/0, 1#6G	1-1/2"	150	10	4#1/0, 1#6G	2"
11	3#2/0, 1#6G	2"	175	12	4#2/0, 1#6G	2"
13	3#3/0, 1#6G	2"	200	14	4#3/0, 1#6G	2"
15	3#4/0, 1#4G	2"	225	16	4#4/0, 1#4G	2-1/2"
17	3#250MCM, 1#4G	2-1/2"	250	18	4#250MCM, 1#4G	2-1/2"
19	3#350MCM, 1#4G	3"	300	20	4#350MCM, 1#4G	3"
21	3#500MCM, 1#3G	3"	350	22	4#500MCM, 1#3G	3-1/2"
23	3#500MCM, 1#3G	3-1/2"	400	24	4#500MCM, 1#3G	3-1/2"
25	6#250MCM, 2#2G	(2) 2-1/2"	500	26	8#250MCM, 2#2G	(2) 2-1/2"
27	6#350MCM, 2#1G	(2) 3"	600	28	8#350MCM, 2#1G	(2) 3"
29	6#500MCM, 2#1/0G	(2) 3-1/2"	800	30	8#500MCM, 2#1/0G	(2) 3-1/2"
31	9#400MCM, 3#2/0G	(3) 3"	1000	32	12#400MCM, 3#2/0G	(3) 3"
33	9#500MCM, 3#2/0G	(3) 3-1/2"	1140	34	12#500MCM, 3#2/0G	(3) 3-1/2"
35	12#500MCM, 4#3/0G	(4) 3-1/2"	1520	36	16#500MCM, 4#3/0G	(4) 3-1/2"

37	12#600MCM, 4#2/0G	(4) 3-1/2"	1600	38	16#600MCM, 4#2/0G	(3) 4"
39	15#600MCM, 5#250MCMG	(5) 3-1/2"	2000	40	20#600MCM, 5#250MCMG	(5) 4"
41	18#600MCM, 6#350MCMG	(6) 3-1/2"	2500	42	24#600MCM, 6#350MCMG	(6) 4"

Distribution Voltages

The following list of distribution voltages for the concourse B are provided in accordance with general industry practice for electrical equipment and devices:

1. 13,200 volts, 3 phase for service distribution for substation primary feeder.
2. 480 volts, 3 phase for motors rated at 2 horsepower and above.
3. 120 volts, single phase - motors rated 1/3 horsepower and below.
4. 277 volts, single phase for HID and fluorescent lighting.
5. 120 volts, single phase for incandescent lighting.
6. 480 volts, 3 phase for electric heating equipment rated at 3.6 kW or more.
7. 277 volts, single phase for electric heating equipment rated above 1 kW but less than 3.6 kW.
8. 120 volts, single phase for electric heating equipment rated 1 kW or less.
9. 480 volts aircraft fixed ground power units

Equipment Locations

Substations, switchboards, transformers and panelboards are installed in dedicated electrical rooms or closets, located strategically to limit feeder or branch circuit runs to less than 250 feet and are sized in accordance with code to provide clear space around the equipment and safe egress. Rooms are ventilated to maintain temperatures no greater than 104 degree Fahrenheit and no less than 45 degree Fahrenheit. Additional spaces are provided for future conduits and equipment. In special cases panel boards are placed outside of dedicated closets where near loads served.
Outdoor equipment are rated NEMA 3R[*] and NEMA 4[†], and located to be protected against physical damage. Motor control centers are located in the mechanical equipment rooms in Level 2 Mezzanine Level.

Voltage Drop

Feeders and branch circuits are sized for voltage drop in accordance with code where the total voltage drop is 5% from power source to load served. In the Concourse B, the voltage drop for feeders is limited to 2.5%. Motor starting voltage drop are limited to 15 percent at the motor terminals.

[*] National Electrical Manufacturers Association (NEMA) enclosure ratings type 3R - enclosures are intended for outdoor use primarily to provide a degree of protection against falling rain; and to be undamaged by the formation of ice on the enclosure.

[† †] National Electrical Manufacturers Association (NEMA) enclosure ratings type 4 - enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, and hose directed water; and to be undamaged by the formation of ice on the enclosure.

Short Circuit Current

Three phase fault calculations are performed from the service to the panelboard level to determine the ratings of the electrical distribution system equipment. Service equipment is fully rated; downstream panelboards are series rated with upstream equipment for the available short circuit current. If closed transition secondary switching is required, the substation short circuit current ratings will be adequate for the combined available fault currents.

Power factor

Equipment are selected to provide the maximum power factor provided for readily available ballasts and motors. Spaces are provided for future capacitors in case of operating system power factor is not within permitted utility limits.

Total Harmonic Distortion Design Considerations

Ballasts, drives, uninterruptible power system (UPS) systems and other equipment that can generate non-linear loads are selected with readily available filters to limit the contribution of non linear loads into the electrical distribution system. The generators are sized to handle the anticipated non linear load on the system. Transformers serving non-linear loads are k-rated. Panels and feeders are provided with oversized neutrals, and circuits serving computer equipment are provided with dedicated neutrals. The specifications for variable speed drives has include a harmonic distortion study to insure that the cumulative effect of all drives provided on the system does not exceed the limits of IEEE 519.

Transient Voltage Surge Suppression Design

Transient voltage surge suppression is provided at the service switchgear, substations, and local panels within the Concourse B. All computer outlets are provided with transient voltage surge suppression at the outlet or on the circuit serving the load.

- Service Protection
    - Provided transient voltage surge suppression on the incoming 13.2kV circuits entering the building. This is especially for the overhead services to protect electrical system components from external surges such as lighting. For underground systems the protection is used for utility switching surges. Surge arrestors is also provided on the load side of the substation transformers
- Panel Protection
    - Provided transient voltage surge suppression at local panels serving sensitive load types, electronic equipment.

Energy Conservation

The largest factor in the energy consumption of the Concourse B is the lighting load. Therefore, a lighting control strategy is designed which eliminates lighting in unoccupied spaces and reduces it where day lighting is available. This is achieved through a combination of Low Voltage Lighting Control System, Daylight Sensors and Occupancy Sensors. Energy efficient motors, transformers and lighting fixtures are all specified and will be in compliance with local rebate programs on taxation.

Tenant Area Design

Feeders serving tenant areas(retail) are separately metered. Meters can be provided by the tenant in spaces provided in the electric closet. Empty 2-inch conduit from each tenant area to electrical closets is also provided.

Aircraft Services – Fixed Ground Power Units

Each commuter loading bridge is served by two feeders for pre-conditioned air PCA[‡] and 400 Hz system accordingly. The capacity for each feeder is based on requirements for narrow body aircraft B757-200: PCA – 60 HP Units; 400 Hz system – 90 kVA. This load level is adequate to serve the narrow body fleet of B757, B737, A320 and Region Jets(RJ) that represents 97% of the aircraft forecast[§]. Two gates in Federal Inspection Station(FIS) area are provided with electric service to support capacity required for widebody aircraft with 40 tons for PVA and 140 kVA for 400 Hz.

Typical Lighting Systems

General circulation, corridors, waiting areas, closets as well as bathrooms of the Concourse B are illuminated using continuous linear fluorescent lighting utilizing T8 strips that are either wall mounted or suspended. HID Metal Halide lamps that are operated at 277V are placed in open concourse spaces as well as extensive daylight usage. Emergency lighting are all operating at 277V.

Primary Lamps and Ballasts

Designation	Lamp Type	Quantity	CCT	Volts	Ballast	BF	Input Watts	PF	Amps
LF01	25 Watt 3' T8 Flourescent	114	3500 K	277	Lutron HL3-T432-277-1-S (dimming)	>0.95	36	>0.95	0.13
LF02	32 Watt 4' T8 Flourescent	387	3500 K	277	Centium VCN-132-MC	0.98	30	0.98	0.11
LM02	70Watt Metal Halide T6 G12	462	3000 K	277	Advance 72C5281	N/A	94	0.9	0.37

[‡] Propulsion Controlled Aircraft (PCA)
[§] Aircraft forecast report provided by R.W. Armstrong & Associates, Inc.

Overall Concourse Lighting Loads

Designation	Floor Area (s.f)	VA/s.f	Total VA	
Hold Rooms	56057	1	56057	
Circulation	76647	1	76647	
Toilets	9067	1	9067	
EDS Equipment Room	2070	0.25	518	
Egress Stair	4068	0.5	2034	
Gate Lobby	110125	0.5	55063	
Retail Storage	1324	0.25	331	
Airline Club	3295	2	6590	
Total	262653		**206306**	**206.3 KVA**

Unit Load based on National Electrice Code 2002, Table 220.3A.

Overall Concourse Electrical Loads

Designation	Floor Area (s.f)	VA/s.f	Total VA
Hold Rooms	56057	3.125	175178
Circulation	76647	3.125	239522
Toilets	9067	2.5	22668
EDS Equipment Room	2070	3.125	6469
Egress Stair	4068	1.5	6102
Gate Lobby	110125	1.5	165188
Retail Storage	1324	0.25	331
Airline Club	3295	3.125	10297
Total	**262653**		**625.8 kVA**

Unit Load based on Unit Load figures/criteria provided by Syska Hennesy's Electrical Narrative

Equipment Loads

Area	Load	Notes
HVAC Pumps	200kVA	
Plumbing	80kVA	
Vertical Transportation	500kVA	
EDS Screening	20kVA x 12 stations	240 kVA
Aircraft Fixed Power (400hz)	90kVA/gate @20 gates/concourse	1800 kVA
Aircraft Fixed Power (PCA)	60hp/gate @20 gates/concourse	895.2 kW/0.8 power factor = 1120 kVA
Communications, Security	80kVA	
Total	**3570 kVA**	

Equipments Loads are provided by Syska Hennesy's Electrical Analyst in person. Actual mechanical equipments locations are not shown on obtained floor plans nor would it be discussed in detail due to security clearance issue.

Receptacle Loads

	Normal	Normal kVA
Level 2 Apron	410	73.8
Level 3	175	31.5
Total KVA:	**585**	**105.3**
KVA with demand factor		**57.65 kVA**

Receptacle Demand Factor: 1.0 for first 10 KVA, 0.5 for >10 KVA

Total Loads

Load Type	Load (kVA)
Receptacle	57.65
Mechanical	3570
Electrical	625.8
Lighting	206.3
Total	**4460**

Load Calculation for feeders leaving Main switch gear T1B

Load Current: 4460kVA/sqrt(3)*0.48kV = 5364.5A
Total Load: 4460 kVA
Feeder: 16 sets of (3)500 MCM in a 3-inch conduit.

NEC Table 310.16

Utility Rate Structure

See attached document, “Indianapolis Power & Light Company, I.U.R.C. No. E-16”

RATE SL
SECONDARY SERVICE (LARGE)

AVAILABILITY:
Available to any alternating current Customer for lighting and/or power service who will contract for not less than fifty (50) kilowatts of demand.

CHARACTER OF SERVICE:
Sixty cycle alternating current energy, ordinarily delivered and measured at 120/240 volts single phase three wire, 120/240 volts three phase four wire, 120/208 volts three phase four wire or 277/480 volts three phase four wire, which voltage will be designated by the Company, and through a single metering installation. If the Company, at its option, measures all the energy at the primary side of the transformers (4160 volts or 13,200 volts), the following deductions will be made in the meter readings: Two and one-half percent (2½%) will be deducted from the KW of demand established by the Customer during the month and two and one-half percent (2½%) will be deducted from the KWH consumed. No discount will be allowed where any part of energy is utilized at primary voltage.

TRANSFORMER OWNERSHIP:
All transformers and supplementary equipment will be owned, installed, operated and maintained by the Company. No discount will be allowed for Customer ownership of transformation facilities.

RATE:
The Customer Charge; plus the sum of the Demand Charge and the Energy Charge adjusted according to the "Power Factor" clause shown hereafter; plus the DSM Lost Revenue Adjustment, the Fuel Cost Adjustment and the Environmental Compliance Cost Recovery Adjustment calculated in accordance with Rider No. 3, Rider No. 6 and Rider No. 20, respectively.

Customer Charge		$103.33
Demand Charge		
First	500 KW of billing demand per month @	$10.55 net per KW
Over	500 KW of billing demand per month @	$10.18 net per KW
Energy Charge		2.68¢ net per KWH

DETERMINATION OF BILLING DEMAND:
The billing demand shall be the average of the three (3) highest fifteen (15) minute interval demands, expressed in kilowatts, established by the Customer during the billing month under consideration, but not less than sixty percent (60%) of the highest billing demand that has been established in any of the immediately preceding eleven (11) months, and in no case upon less than fifty (50) kilowatts.

RATE SL (Continued)

POWER FACTOR:
The Customer's bill will be adjusted by multiplying the sum of the demand and energy charges by the multiplier set out in the table below whenever the average monthly power factor of his operation varies from eighty-five percent (85%) lagging, as determined by suitable instruments connected at the point where the energy and the demand are measured for billing purposes. In determining the average power factor for the month, no credit will be given for leading power factor. Any equipment installed to control or to correct the power factor shall be of such design, and it shall be so controlled and operated at all times, that its use will not create any undesirable operating characteristics (including voltage rise) in the supply circuits, beyond the limits of good practice.

POWER FACTOR	MULTI-PLIER	POWER FACTOR	MULTI-PLIER	POWER FACTOR	MULTI-PLIER	POWER FACTOR	MULTI-PLIER
1.00	.951	.87	.9919	.74	1.0563	.61	1.1661
.99	.9535	.86	.9958	.73	1.0627	.60	1.1785
.98	.9562	.85	1.0000	.72	1.0694	.59	1.1897
.97	.9590	.84	1.0041	.71	1.0764	.58	1.2025
.96	.9618	.83	1.0085	.70	1.0835	.57	1.2159
.95	.965	.82	1.0131	.69	1.0913	.56	1.2300
.94	.9677	.81	1.0178	.68	1.0992	.55	1.2455
.93	.9709	.80	1.0230	.67	1.1075	.54	1.2607
.92	.9741	.79	1.0277	.66	1.1161	.53	1.2773
.91	.9774	.78	1.0330	.65	1.1255	.52	1.2950
.90	.981	.77	1.0386	.64	1.1347	.51	1.3136
.89	.9844	.76	1.0442	.63	1.1447	.50	1.3335
.88	.9881	.75	1.0500	.62	1.1551		

MINIMUM CHARGE PER MONTH:
The Demand Charge to be in no case for less than fifty (50) kilowatts - $527.50 net per month.

STANDARD CONTRACT RIDERS APPLICABLE:

No. 1	see Page 150
No. 2	see Page 152
No. 3	see Page 153
No. 4	see Page 154
No. 5	see Page 156
No. 6	see Page 157
No. 8	see Page 160
No. 16	see Page 172
No. 20	see Page 179.2

PAYMENT:
The above rates and charges are net. If the net bill is not paid within seventeen (17) days after its date of issue, a collection charge will be added in the amount of ten percent (10%) of the first Three Dollars ($3.00) plus three percent (3%) of the excess of Three Dollars ($3.00).

RATE SL (Continued)

STANDARD TERM:
Three years.

RULES:
Service hereunder shall be subject to the Company's Rules and Regulations for Electric Service, and to the Rules and Standards of Service for the Electrical Public Utilities of Indiana prescribed by the Indiana Utility Regulatory Commission, as the same are now in effect, and as they may be changed from time to time hereafter.

RATE PL
PRIMARY SERVICE (LARGE)

AVAILABILITY:
Available for power and lighting delivered at primary distribution voltage. Minimum contract five hundred (500) kilowatts of demand. Not for resale.

CHARACTER OF SERVICE:
Standard Characteristics: Three phase, sixty cycle alternating current supplied from overhead lines through transformers and other substation equipment owned by the Company, delivered at one point on Customer's premises, and at primary distribution voltage, approximately 4160 or 13,200 volts. All distribution transformers, lines and other equipment on the Customer's side of the point of delivery shall be installed, owned, operated and maintained by the Customer.

Non-Standard Characteristics: If the Customer desires service necessitating transformers (including circuit breakers, supporting structure and supplementary equipment) which do not conform to the standard of the Company as to design, voltage ratio or capacity; or if the Customer desires the exclusive use and/or control of the transformers of standard or non-standard characteristics, energy will be delivered in either case at the high tension side of such transformers, which, however, shall be installed, owned, operated and maintained by the Customer.

Demand and energy measurements may be made at either the high tension (input) or low tension (load) side of the transformers, but, if measured at the high tension side, will be adjusted before billing by the deduction of one-half percent (½%), so that they will be equivalent to measurement at a standard primary distribution voltage, approximately 4160 or 13,200 volts. The Company, for engineering or other practical reasons, may at its option supply and measure service at sub-transmission voltage.

RATE:
The Customer Charge; plus the sum of the Demand Charge and the Energy Charge adjusted according to the "Power Factor" clause shown hereafter; plus the DSM Lost Revenue Adjustment, the Fuel Cost Adjustment and the Environmental Compliance Cost Recovery Adjustment calculated in accordance with Rider No. 3, Rider No. 6 and Rider No. 20, respectively.

Customer Charge		$310.67
Demand Charge		
First	2000 KW of billing demand per month @	$11.28 net per KW
Over	2000 KW of billing demand per month @	$11.19 net per KW
Energy Charge		2.07¢ net per KWH

RATE PL (Continued)

DETERMINATION OF BILLING DEMAND:
The billing demand shall be determined as being the average of the three (3) highest fifteen (15) minute interval demands, expressed in kilowatts, established by the Customer during the billing month under consideration but with the further provision that the demand charge shall be based upon not less than sixty percent (60%) of the highest billing demand that has been established in any of the immediately preceding eleven (11) months, and in no case upon less than five hundred (500) kilowatts.

MINIMUM CHARGE PER MONTH:
The Demand Charge to be in no case for less than five hundred (500) kilowatts - $5,640.00 net per month.

POWER FACTOR:
The Customer's bill will be adjusted by multiplying the sum of the demand and energy charges by the multiplier set out in the table below whenever the average monthly power factor of his operation varies from eighty-five percent (85%) lagging, as determined by suitable instruments connected at the point where the energy and the demand are measured for billing purposes. In determining the average power factor for the month, no credit will be given for leading power factor. Any equipment installed to control or to correct the power factor shall be of such design, and it shall be so controlled and operated at all times, that its use will not create any undesirable operating characteristics (including voltage rise) in the supply circuits, beyond the limits of good practice.

POWER FACTOR	MULTI-PLIER	POWER FACTOR	MULTI-PLIER	POWER FACTOR	MULTI-PLIER	POWER FACTOR	MULTI-PLIER
1.00	.951	.87	.9919	.74	1.0563	.61	1.1661
.99	.9535	.86	.9958	.73	1.0627	.60	1.1785
.98	.9562	.85	1.0000	.72	1.0694	.59	1.1897
.97	.9590	.84	1.0041	.71	1.0764	.58	1.2025
.96	.9618	.83	1.0085	.70	1.0835	.57	1.2159
.95	.965	.82	1.0131	.69	1.0913	.56	1.2300
.94	.9677	.81	1.0178	.68	1.0992	.55	1.2455
.93	.9709	.80	1.0230	.67	1.1075	.54	1.2607
.92	.9741	.79	1.0277	.66	1.1161	.53	1.2773
.91	.9774	.78	1.0330	.65	1.1255	.52	1.2950
.90	.981	.77	1.0386	.64	1.1347	.51	1.3136
.89	.9844	.76	1.0442	.63	1.1447	.50	1.3335
.88	.9881	.75	1.0500	.62	1.1551		

RATE PL (Continued)

STANDARD CONTRACT RIDERS APPLICABLE:

No. 1	see Page 150
No. 2	see Page 152
No. 3	see Page 153
No. 4	see Page 154
No. 5	see Page 156
No. 6	see Page 157
No. 8	see Page 160
No. 14	see Page 166
No. 16	see Page 172
No. 20	see Page 179.2

PAYMENT:
The above rates and charges are net. If the net bill is not paid within seventeen (17) days after its date of issue, a collection charge will be added in the amount of ten percent (10%) of the first Three Dollars ($3.00) plus three percent (3%) of the excess of Three Dollars ($3.00).

STANDARD TERM:
Three years.

RULES:
Service hereunder shall be subject to the Company's Rules and Regulations for Electric Service, and to the Rules and Standards of Service for the Electrical Public Utilities of Indiana prescribed by the Indiana Utility Regulatory Commission, as the same are now in effect, and as they may be changed from time to time hereafter.

Single Line Diagram