

**Dan Rusnack**  
**Lighting / Electrical Option**  
**Hall Corporate Headquarters**  
**Virginia Beach, Virginia**  
**Date of report 10/29/03**  
**Primary Faculty Consultant: Dr. Mistrick**  
**Electrical Systems Existing Conditions**



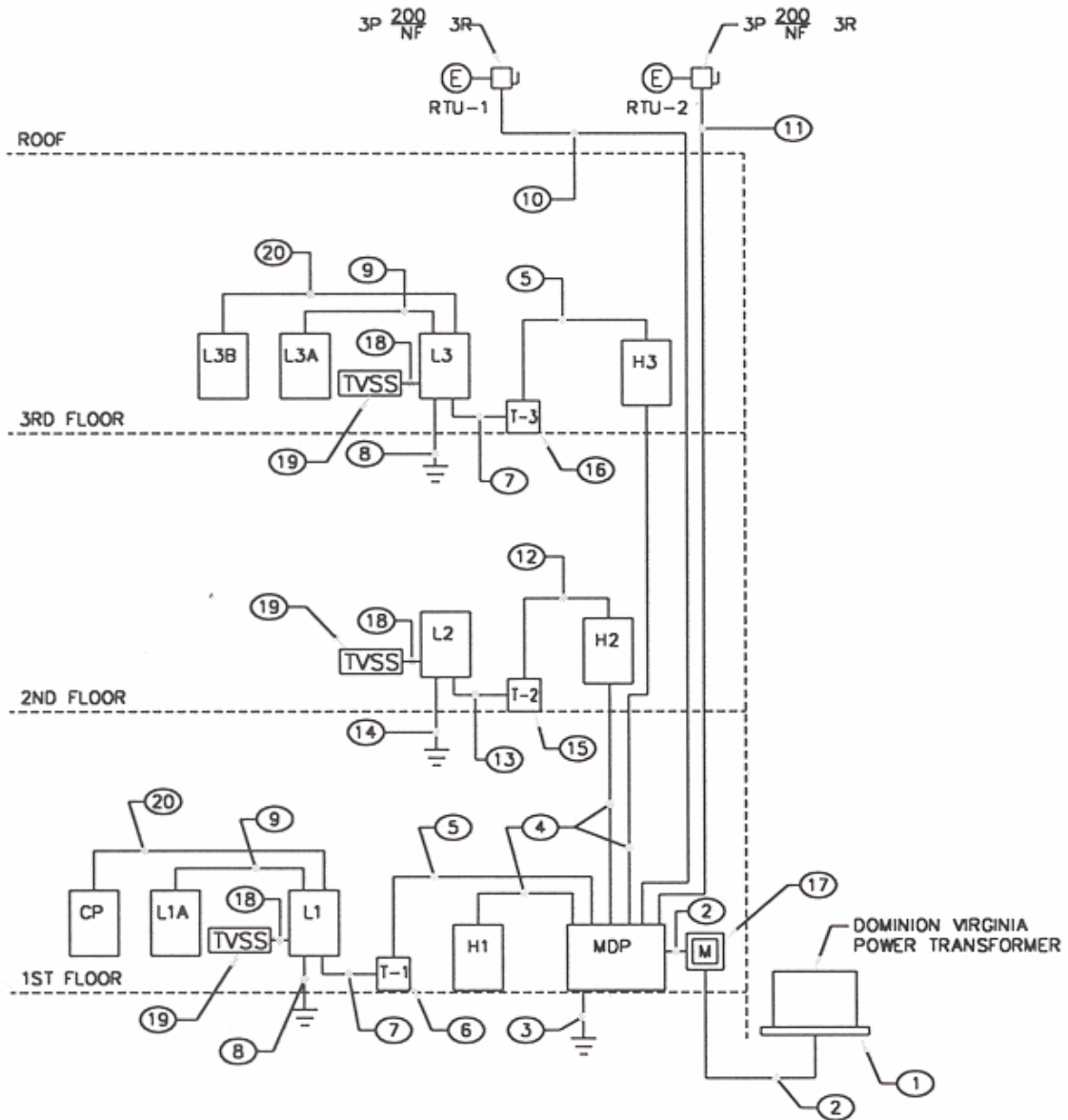
### **Electrical Systems Existing Conditions and Building Load Summary**

The Hall Corporate Headquarters is supplied electrical service by Dominion Virginia Power. The incoming secondary is 480/277 V serving an 800 amp (MDP) Main Distribution Panel. The wiring system used is a 3 phase, 4 wire configuration. The Main Distribution Panel is rated at 25 KAIC. The wiring will mainly be THHW and THHN throughout the building. The MDP serves the 480/277 V panelboards on the first, second and third floors. The 480/277 V panels serve 3 transformers one on each floor that step down the voltage to 208/120 V. The transformers used in the building are listed as follows. The first floor transformer is 75 KVA, 3 Phase, 480-208/120 V, K-4 rated and is floor mounted. The second floor transformer is 45 KVA, 3 Phase, 480-208/120 V, K-4 rated and is floor mounted. The first floor transformer is 75 KVA, 3 Phase, 480-208/120 V, K-4 rated and is floor mounted. There are 3 panels run on 408/277 V and 7 panels run on 208/120 V for a total of 10 panels used in the buildings. The 208/120 V panels are mainly used for power to receptacles and other equipment in the building. The following will be described in further detail and further important information on the buildings electrical system will be provided. The next page shows the buildings single line riser diagram.

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Single Line Diagram of the Electrical distribution system for the Hall Corporate Headquarters



Sizes of electrical elements located in the Single Line Diagram are listed below

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## Electric Service

Electric power supplied by Dominion Virginia Power

Dominion Virginia Power transformer located on south-east corner of property on Guardian lane

4 - 4" Conduit with pull wire supplied for Dominion Virginia Power incoming primary to building buried 24" below grade

Service entrance to Hall Corporate Headquarters is located east wall of building coming into electrical room #115 on the first floor of the building where the MDP is located

## System Type

The electrical system in the building is classified as a "Radial" system. The main electric feed comes in from the utility service transformer to the main distribution panel where the power is then distributed throughout the building. The power to all the buildings panelboards radiates or has its source at the main distribution panel thus it is a radial system.

## Main Distribution Panel

800 amp bus, 800 amp main circuit breaker, 480Y/277 V, 3 phase, 4 wire, minimum 25 KAIC rating

## The Building Utilization Voltage

The building is supplied 480Y/277 Volts for service of mechanical equipment and lighting. There are 3 step-down transformers 208Y/120 for service mainly to receptacles and other small equipment.

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## Transformers

- T-1: 75 KVA, 3 Phase, 480-208/120 V, K-4 rated and is floor mounted.
- T-2: 45 KVA, 3 Phase, 480-208/120 V, K-4 rated and is floor mounted.
- T-3: 75 KVA, 3 Phase, 480-208/120 V, K-4 rated and is floor mounted.

Configuration of the transformers is as follows: primary is 480/277 Volts to Wye connection to secondary of 208/120 Volts. The utility incoming connection is a Delta connection to the 480 V Wye connection of building transformers

## Wire Sizes

### First Floor

From MDP to 480Y/277 panelboards H1, H2, H3 is 4#4/0 1#4Ground in 2 1/2" Conduit

Ground wire on MDP is 1#2/0 in 1" Conduit grounding electrode conductor bonded to the structural steel, metallic cold water line and driven ground rod.

From MDP to T-1 3#2, 1#8Ground in 1-1/4" Conduit

From T-1 to Panelboard L1 4#4/0, in 2-1/2" conduit

From Panelboard L1 to Transient Voltage Surge Suppressor (TVSS) 3#2, 1#2Ground in 1-1/2" conduit

From Panelboard L1 to Panelboard L1A 4#2, 1#8Ground in 1-1/4" conduit

From Panelboard L1 to CP 4#4, 1#8Ground, in 1-1/2" Conduit

### Second Floor

From Panelboard H2 to T-2 3#4, 1#8Ground, in 1-1/4" conduit

From T-2 to Panelboard L2 4#1/0, in 1-1/2" Conduit

From Panelboard L2 to Transient Voltage Surge Suppressor (TVSS) 3#2, 1#2Ground in 1-1/2" conduit

Panelboard L2 has a ground that is 1#6, 1/2" Ground electrode conductor

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### Third Floor

From Panelboard H3 to T-3, 3#2, 1#8Ground in 1-1/4" Conduit

From T-3 to Panelboard L3, 4#4/0, in 2-1/2" conduit

From Panelboard L3 to Transient Voltage Surge Suppressor (TVSS) 3#2,  
1#2Ground in 1-1/2" conduit

From Panelboard L3 to Panelboard L3A, 4#2, 1#8Ground in 1-1/4" conduit

From Panelboard L3 to Panelboard L3B, 1#8Ground, in 1-1/2" Conduit

### Roof Top

From MDP to RTU-1, 3#1, 1#6Ground, in 1-1/2" Conduit

From MDP to RTU-2, 3#3/0, 1#6Ground, in 2" Conduit

### Panelboard sizes

Panelboard H1: 225 amp bus, 225 amp MLO, 480Y/277 V, 3 phase, 4 wire,  
minimum 22 KAIC rating, surface mounted

Panelboard L1: 225 amp bus, 225 amp MCB, 480Y/277 V, 3 phase, 4 wire,  
minimum 22 KAIC rating, surface mounted

Panelboard L1A: 100 amp bus, 100 amp MCB, 208Y/120 V, 3 phase, 4 wire,  
minimum 22 KAIC rating, surface mounted

Panelboard CP: 100 amp bus, 100 amp MLO, 208Y/277 V, 3 phase, 4 wire,  
minimum 22 KAIC rating, surface mounted

Panelboard H2: 225 amp bus, 225 amp MLO, 480Y/277 V, 3 phase, 4 wire,  
minimum 22 KAIC rating, surface mounted

Panelboard L2: 225 amp bus, 150 amp MCB, 208Y/120 V, 3 phase, 4 wire,  
minimum 22 KAIC rating, surface mounted

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Panelboard H3: 225 amp bus, 225 amp MLO, 480Y/277 V, 3 phase, 4 wire,  
minimum 22 KAIC rating, surface mounted

Panelboard L3: 225 amp bus, 225 amp MCB, 208Y/120 V, 3 phase, 4 wire,  
minimum 22 KAIC rating, surface mounted

Panelboard L3A: 100 amp bus, 100 amp MLO, 208Y/120 V, 3 phase, 4 wire,  
minimum 10 KAIC rating, surface mounted

Panelboard L3B: 100 amp bus, 100 amp MLO, 480Y/277 V, 3 phase, 4 wire,  
minimum 10 KAIC rating, surface mounted

## Emergency Power Systems

There is no generator or back-up power supply for the Hall Corporate Headquarters. The emergency lighting is run on battery power packs located in each fixture that is designated as an emergency light. The Batteries are circuited before the switch so that the power packs will always sense that there is power. If normal power is lost and emergency egress light is needed the batteries will power the emergency lights for approximately 90 minutes.

## Over Current Protective Devices

Molded-Case Circuit Breakers are used through out the Building. The ratings will follow UL 489, with interrupting capacity to meet available fault currents. Thermal-Magnetic Circuit Breakers with inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breakers with frame sizes 250 A and larger will be used. Some of the Features and Accessories of the Circuit breakers will be Standard frame sizes, trip ratings, and number of poles. The Lugs will be Mechanical style, suitable for number, size, trip ratings, and conductor materials. Type SWD for switching fluorescent lighting loads and type HACR for heating, air-conditioning, and refrigerating equipment shall be used. For Ground-Fault Protection integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

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## Location of Switchgears, Panelboards and Motor control centers

The Main Distribution Panel is located on the first floor in room #115 which is the main electrical room for the building. The room is on the east wall of the building. The panelboards H1, L1, L1A, Transformer T-1, Dominion Virginia Power CT meter, 2 TVSS's, 1 lighting contactor and 2 astronomic time clocks are also located in electrical room #115. The second floor electrical space room #224 is located above the first floor electrical room. Electrical room #224 houses panelboards H2, L2, transformer T-2, and 1 TVSS. The third floor electrical room #316 is located above the second floor electrical room. Electrical room #316 houses panelboards H3, L3, L3A, L3B, transformer T-3, and 1 TVSS. All panelboards and accessories will be installed according to NEMA PB 1.1

## Typical Lighting System

The lighting in the Hall Corporate Headquarters is run mainly on 277 V. A small amount of the lighting is run on 120 V only 3 of the 25 fixtures used in the building are run on 120 V. The lighting includes very general lighting used in buildings with an office type setting. The fixture schedule for the Hall Corporate Headquarters can be located on my website as a separate file under the technical assignment link.

Typical 2' X 2' parabolic troffer fixtures are located in the meeting rooms, private offices and open office spaces. Downlights are used throughout the building to add to the light given by the parabolic troffers in certain areas. Recessed 1' x 4' troffers are used for the lighting in the restrooms. The lobby is mainly lit with pendant and recessed downlights. Wall sconces are also used to light the lobby. The exterior is lit with vertically mounted wall washers and flood lamps directed towards the buildings facade. The parking lot is lit using 17 pole mounted exterior fixtures. The buildings side and rear façade is lit with 14 vertically wall washers. The front façade is lit with 4-100W metal halide flood lamps and the entry canopy is lit with 2-2 lamp 42W CFL recessed downlights.

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### Primary lamps and ballasts

Number and type of lamp	Voltage	Ballast used	Input watts	Power Factor	Amps	THD %
2-F32T8U/SP35	277	yes	80	0.97	0.3	10
3-F32T8/SP35	277	yes	75	0.98	0.28	10
3-F32T8/SP35	277	yes	75	0.98	0.28	10
2-CFQ26W	277	yes	16	0.98	0.21	10
2-F32T8/SP35	277	yes	59	0.98	0.21	10
2-F32T8/SP35	277	yes	59	0.98	0.21	10
2-CFQ26W	277	yes	16	0.98	0.21	10
2-CFQ26W	277	yes	16	0.98	0.21	10
1-F32T8/SP35	277	yes	30	0.98	0.11	10
1-F32T8/SP35	277	yes	30	0.98	0.11	10
1-70W PAR38	277	none	none	none	none	none
1-F17T8/SP35	277	yes	17	0.89	0.07	20
2-CFTT42W	277	yes	20	0.98	0.36	10
1-T10 250W-E26	120	none	none	none	none	none
1-T10 250W-E26	120	none	none	none	none	none
1-CFQ26W	277	yes	8	0.98	0.11	10
1-CFQ26W	277	yes	8	0.98	0.11	10
1-CFQ26W	120	yes	8	0.98	0.26	10
1-100W MH	277	yes	118	1		
1-100W MH	277	yes	118	1		
2-70W MH	277	yes	170	1		
LED	277	none	none	none	none	none
1-250W MH	277	yes	272	1		
1-250W MH	277	yes	272	1		
2-250W MH	277	yes	544	1		

The data for the ballasts was obtained from [www.advancetransformer.com](http://www.advancetransformer.com)  
 Since the building is currently under construction the exact ballast used in the building aren't known yet. This ballast data will be similar the actual ballast data used in the building.



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NEC Lighting Load Calculation

Type of space	Area	Unit load VA / Sq.Ft.	Total VA
Corridors	1414	0.5	707
Stairways	1284	0.5	642
Office	16497	3.5	57740
Storage	847	0.25	212
Lobby	2105	0.5	1053
Bathroom	1486	1	1486
<b>Total lighting load</b>			<b>61.84 KVA</b>

NEC 2002 code book Table 220.3(A) was used to calculate lighting load

Major Mechanical Equipment operating conditions

Equipment	Voltage	Phase	HP	Amps	Corrected Amps	KVA
RTU-1						
supply fan motor RTU-1	480	3	20	27	30	14.40
exhaust fan RTU-1	480	3	5	7.6	8.4	4.05
VAV fan 1.101	277	1	0.25	4.4	4.9	1.35
VAV fan 1.102	277	1	0.167	1.9	2.1	0.58
VAV fan 1.103	277	1	0.167	1.9	2.1	0.58
VAV fan 1.104	277	1	0.167	1.9	2.1	0.58
VAV fan 1.105	277	1	0.167	1.9	2.1	0.58
VAV fan 1.201	277	1	0.167	1.9	2.1	0.58
VAV fan 1.202	277	1	0.167	1.9	2.1	0.58
VAV fan 1.203	277	1	0.167	1.9	2.1	0.58
VAV fan 1.204	277	1	0.167	1.9	2.1	0.58

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VAV fan 1.205	277	1	0.167	1.9	2.1	0.58
VAV fan 1.206	277	1	0.167	1.9	2.1	0.58
VAV fan 1.301	277	1	0.167	1.9	2.1	0.58
VAV fan 1.302	277	1	0.167	1.9	2.1	0.58
VAV fan 1.303	277	1	0.167	1.9	2.1	0.58
VAV fan 1.304	277	1	0.25	4.4	4.9	1.35
VAV fan 1.305	277	1	0.167	1.9	2.1	0.58
VAV fan 1.306	277	1	0.167	1.9	2.1	0.58
VAV fan 1.307	277	1	0.167	1.9	2.1	0.58
VAV fan 1.308	277	1	0.167	1.9	2.1	0.58
RTU-2						
supply fan motor RTU-2	480	3	25	34	37.8	18.13
exhaust fan RTU-2	480	3	5	7.6	8.4	4.05
VAV fan 2.101	277	1	0.25	4.4	4.9	1.35
VAV fan 2.102	277	1	0.25	4.4	4.9	1.35
VAV fan 2.103	277	1	0.167	1.9	2.1	0.58
VAV fan 2.104	277	1	0.167	1.9	2.1	0.58
VAV fan 2.105	277	1	0.25	4.4	4.9	1.35
VAV fan 2.106	277	1	0.167	1.9	2.1	0.58
VAV fan 2.201	277	1	0.25	4.4	4.9	1.35
VAV fan 2.202	277	1	0.167	1.9	2.1	0.58
VAV fan 2.203	277	1	0.167	1.9	2.1	0.58
VAV fan 2.204	277	1	0.167	1.9	2.1	0.58
VAV fan 2.205	277	1	0.167	1.9	2.1	0.58
VAV fan 2.206	277	1	0.167	1.9	2.1	0.58
VAV fan 2.207	277	1	0.167	1.9	2.1	0.58
VAV fan 2.208	277	1	0.167	1.9	2.1	0.58
VAV fan 2.209	277	1	0.167	1.9	2.1	0.58
VAV fan 2.301	277	1	0.167	1.9	2.1	0.58
VAV fan 2.302	277	1	0.167	1.9	2.1	0.58
VAV fan 2.303	277	1	0.167	1.9	2.1	0.58
VAV fan 2.304	277	1	0.25	4.4	4.9	1.35
VAV fan 2.305	277	1	0.25	4.4	4.9	1.35
VAV fan 2.306	277	1	0.167	1.9	2.1	0.58
VAV fan 2.307	277	1	0.167	1.9	2.1	0.58
VAV fan 2.308	277	1	0.167	1.9	2.1	0.58
FCU-1	208	1	0.25	4.4	4.9	1.02
FCU-2	115	1	0.25	4.4	4.9	0.56
EF-1	460	3	0.75	1.6	1.8	0.82
EF-2	120	1	21W	1	1.1	0.13

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EF-3	120	1	21W	1	1.1	0.13
EF-4	120	1	0.333	7.2	8.0	0.96
Elevator	480	3	25	34	37.8	18.13
water cooler 1stFloor	120	1	0.2	3.1	3.4	0.41
water cooler 1st Floor	120	1	0.2	3.1	3.4	0.41
water cooler 2ndFloor	120	1	0.2	3.1	3.4	0.41
water cooler 2nd Floor	120	1	0.2	3.1	3.4	0.41
water cooler 3rdFloor	120	1	0.2	3.1	3.4	0.41
water heater	277	1	8.04	42	46.7	12.93
recirculation pump RP-1	120	1	0.5	9.8	10.9	1.31
sump pump SP-1	120	1	0.5	9.8	10.9	1.31
					Equipment total KVA	110.72
					Equipment total KVA with design factor load of 125%	138.4

NEC 2002 code book was used to calculate the Full-load Amps of the mechanical equipment. Tables 430.148 was used for single phase motors and table 430.150 was used for three phase motors. All equipments total amps was corrected be a 0.9 power factor.

### NEC Receptacle Load Calculation

Area of Building	Number of Receptacles	Total VA
First Floor	142	25,560
Second Floor	129	23,220
Third Floor	139	25,020
Exterior	2	236
Totals	412	74,160 VA
With Demand Factor		42,080 VA = 42.08 KVA

Demand Factor from NEC for receptacle load  
 First 10,000 VA at 100%, then remaining VA at 50%

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### Total Electrical Load for the Building

Load	Total Load in KVA
Lighting	61.84 KVA
Equipment w/demand factor	138.4 KVA
Receptacle	42.08 KVA
Total Building Load	242.32 KVA

A demand factor of 125 % was added to the equipment load this will account for the increased start up load of the motors.

Then an over all factor of 125 % was added to the load to account for any future additions possible added to the building

$$242.32 \text{ KVA} / 0.8 = 302.9 \text{ KVA total design KVA load}$$

The Electrical Load per Sq.Ft. is as follows

$$242.32 \text{ KVA} / 30,000 \text{ Sq.Ft.} = 8.07 \text{ VA} / \text{Sq.Ft.}$$

Main Distribution Panel sizing calculation

Total design load = 302.9 KVA  
 Incoming voltage to building = 480 V  
 3 phase use 1.732 adjustment

$$302.9 \text{ KVA} / (1.732 \times 480 \text{ V}) = 364.33 \text{ A}$$

Main distribution panel was sized at 800 Amp this is greater then the 364.33 Amp so it is ok. This value is well under the rated Amp value so the system is a little over sized. The larger size panel chosen will account for future additions that may be added to the building.

Power factor correction

There is no power factor correction used in the building electrical system.

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## Voltage drop consideration

The NEC section 210.19 recommends for conductors and branch circuits not to have a voltage drop exceeding 3 % of the voltage from the service to the source. For lighting, power, heating and combinations of these loads a voltage drop of less than 5% will allow for reasonable efficiency of the loads.

Ex)

Longest distance from panelboard on first floor = 118ft

Wire sized used for lighting is AWG #12

Lighting run on 277 V =  $V_s$

Power factor of 0.9 was assumed

Typical load was 11A      % Voltage drop =  $(V_s - V_l) / V_s \times 100$

Table 11.5 in the book Electrical Systems in Buildings by S. David Hughes  
 Gives the voltage drop/1000 ampere feet of a #12 wire in conduit to be 1.749

Ampere feet:  $11 \text{ A} \times 118 \text{ ft} = 1298 = 1.3 \times 1000 \text{ Ampere feet}$

Voltage drop (line to neutral) =  $1.3 \times 1.749 = 2.27 \text{ V} = (V_s - V_l)$

$2.27 / 277 \text{ V} = 0.82 \%$  very low drop and well below acceptable value of 3 %

## The utility rate structure

The Hall Corporate Headquarters is currently under construction so there is no data on electric utility load cost. An approximate value of \$0.08 per KWH is used by the engineers to calculate the buildings electrical load cost.

The utility (Dominion Virginia Power) offers two categories of service rates for its customers one is called bundled and the other is called unbundled. The bundled category includes both the supply (generation and transmission) and the delivery (distribution) by Dominion. The unbundled category includes only delivery (distribution) by Dominion with the supply coming on from another source. This information was obtained by Dominion Virginia Power website at <http://www.dom.com> further information about rates and tariffs can be located on the site under the customer service tab and then under the State of Virginia. There is also a rate structure attached below that is available on the utilities website.

Schedule GS-2  
INTERMEDIATE GENERAL SERVICE

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I. APPLICABILITY

Except as modified herein, this schedule is applicable only to a non-residential Customer who elects to receive Electricity Supply Service and Electric Delivery Service from the Company and who has within the current and previous 11 billing months at least three peak measured demands of 30 kW or more and not more than two peak measured demands of 500 kW or more.

For a Customer served under this schedule whose peak measured demand has decreased to less than 30 kW, this schedule shall remain applicable to the Customer and the Customer shall not have the option to purchase electricity under Schedule GS-1 until such time the maximum measured demand has remained at less than 30 kW during all billing months within the current and previous 11 billing months.

At such time the Customer no longer meets the above applicability requirements, the Customer will remain on this schedule for the period (not exceeding two additional billing months) required to achieve an orderly transfer to the applicable schedule.

For new service, this schedule is applicable when the anticipated kW demand meets the above criteria.

II. 30-DAY RATE

A. Non-Demand Billing

1. Distribution Service Charges

a. Basic Customer Charge

Basic Customer Charge \$21.17 per billing month.

b. Plus Distribution kWh Charge

All kWh @ 2.433¢ per kWh

2. Electricity Supply Service Charges

a. Electricity Supply kWh Charge

1) For the billing months of June – September

All kWh @ 4.795¢ per kWh

2) For the billing months of October – May

All kWh @ 4.075¢ per kWh

(Continued)

Schedule GS-2  
INTERMEDIATE GENERAL SERVICE

(Continued)

II. 30-DAY RATE (Continued)

2. Electricity Supply Service Charges (Continued)

- b. Each Electricity Supply kilowatthour used is subject to Fuel Charge Rider A.

B. Demand Billing

1. Distribution Service Charges

- a. Basic Customer Charge  
Basic Customer Charge \$21.17 per billing month.

- b. Distribution Demand Charge  
All kW of Demand @ \$ 3.387 per kW

2. Electricity Supply Service Charges

a. Electricity Supply Demand Charge

- 1) For the billing months of June – September  
All kW of Demand @ \$ 2.844 per kW

- 2) For the billing months of October – May  
All kW of Demand @ \$1.406 per kW

b. Plus Electricity Supply kWh Charge

First 150 kWh per kW	@	4.617¢ per kWh
Next 150 kWh per kW	@	2.588¢ per kWh
Next 150 kWh per kW	@	1.119¢ per kWh
Additional kWh	@	0.272¢ per kWh

- c. Each Electricity Supply kilowatthour used is subject to Fuel Charge Rider A.

(Continued)

Schedule GS-2  
INTERMEDIATE GENERAL SERVICE

(Continued)

II. 30-DAY RATE (Continued)

C. The minimum charge shall be the highest of:

1. The Basic Customer Charge in Paragraph II.A.1.a. or II.B.1.a., whichever is applicable.
2. The amount as may be contracted for.
3. The sum of the charges in Paragraph II.A. or II.B., whichever is applicable, plus \$1.480 multiplied by the number of kW by which any minimum demand established exceeds the demand determined under Paragraph IV.
4. If the demand determined under Paragraph IV is 50 kW or greater, the minimum charge for Non-Demand Billing under Paragraph II. A. shall not be less than \$3.13 per kW of demand determined.

III. NON-DEMAND BILLING VS. DEMAND BILLING

- A. The non-demand billing charges of Paragraph II.A. apply to customers whose kWh usage for the current month does not exceed 200 kWh per kW of the demand as determined under Paragraph IV.
- B. The demand billing charges of Paragraph II.B. apply to customers whose kWh usage for the current month exceeds 200 kWh per kW of the demand as determined under Paragraph IV.

IV. DETERMINATION OF DEMAND

The kW of demand will be determined as the highest average kW load measured in any 30-minute interval during the billing month.

V. MINIMUM DEMAND

The minimum demand shall be such as may be contracted for, however:

- A. When the kW demand determined has reached or exceeded 500 kW during the current or preceding eleven billing months, the minimum demand shall not be less than the highest demand determined during the current and previous eleven billing months.

V. MINIMUM DEMAND (Continued)

(Continued)



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(Continued)

- B. When the Customer's power factor is less than 85 percent, a minimum demand of not less than 85 percent of the Customer's maximum kVA demand may be established.

VI. METER READING AND BILLING

- A. Meters may be read in units of 10 kWh and bills rendered accordingly.
- B. When the actual number of days between meter readings is more or less than 30 days, the Basic Customer Charge, the Distribution Demand Charge, the Electricity Supply Demand, the quantity of kWh in the first three blocks of the Demand Billing Electricity Supply kWh Charge and the minimum charge of the 30-day rate will each be multiplied by the actual number of days in the billing period and divided by 30.

VII. STANDBY, MAINTENANCE OR PARALLEL OPERATION SERVICE

A Customer requiring standby, maintenance or parallel operation service may elect service under this schedule provided the Customer contracts for the maximum kW which the Company is to supply. Standby, maintenance or parallel operation service is subject to the following provisions:

- A. Suitable relays and protective apparatus shall be furnished, installed, and maintained at the Customer's expense in accordance with specifications furnished by the Company. The relays and protective equipment shall be subject, at all reasonable times, to inspection by the Company's authorized representative.
- B. In case the maximum kW demand determined in Paragraph IV. or the minimum demand determined in Paragraph V. exceeds the contract demand, the contract demand shall be increased by such excess demand.
- C. The demand billed under Paragraph II.B.2.a.1) or II.B.2.a.2) shall be the contract demand.

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(Continued)

VIII. TERM OF CONTRACT

The contract shall be open order unless (a) standby, maintenance or parallel operation service is provided, or (b) the Customer or the Company requests a written contract. In such cases, the term of contract for the purchase of electricity under this schedule shall be as mutually agreed upon, but for not less than one year. During the minimum term of applicability, the Customer may be billed under the corresponding Unbundled Rate Schedule GS-2U, if applicable.