acciona Energy

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April 12, 2010

Public Service Commission
State of North Dakota
600 East Boulevard Ave., Dept. 408
Bismark, North Dakota 58505-0480
Attn. Janet Marquart, Public Utilities Division

Re: Velva Wind Farm Decommissioning Study
North Dakota Administrative Code Chapter 69-09-09

Ms. Janet Marquart:

In compliance with Administrative Rule Section 69-09-0906, Velva Windfarm LLC, as owner of the Velva wind farm located in McHenry County, North Dakota hereby submits its Decommissioning Plan with the Commission.

Velva Windpower, LLC also provides the following information for ease in the Commission's review for compliance with the Administrative Rules.

1) The Velva wind farm went into Commercial Operation on January 19, 2006.

2) The wind turbines, which are the primary component of the wind farm, are estimated to have a useful life between 20 and 25 years.

3) The Decommissioning Plan being filed is a comprehensive plan prepared by Fehr-Graham and Associates and includes all decommissioning costs (including site restoration) required under Section 69-09-09-06. It also includes decommissioning costs of the related collection system and substation and removal of ancillary equipment and turbine foundations to a minimum depth of 3 feet.

4) As detailed on Page 9 of the Decommissioning Plan, the decommissioning cost per turbine approximates $39,750. With 18 turbines, the total decommissioning cost is estimated at $715,330 after value of salvage (scrap steel and copper only; no resale value assumed for wind energy conversion system components).

5) Velva Windfarm LLC intends to fund decommissioning activities with corporate funding from its parent company, Acciona Wind Energy USA LLC. Acciona Wind Energy USA LLC, as a developer, owner and operator of renewable energy facilities, has sufficient corporate assets and tangible net worth to fund its obligations.

Best regards,

Velva Windfarm LLC

VELVA WIND FARM
DECOMMISSIONING REPORT

Prepared For:

Acciona Wind Energy USA LLC
333 West Wacker Drive, Suite 1500
Chicago, Illinois 60606

Prepared by:

Fehr-Graham & Associates, LLC
221 East Main Street, Suite 200
Freeport, IL 61032

Project No.: 09-246C

April 2009

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VELVA WIND ENERGY CONVERSION SYSTEM (WECS)

System Description

The Velva Wind Energy Conversion System (WECS) is an approximate 12 - Megawatt wind energy conversion system, which was constructed in McHenry County, North Dakota, (See Exhibit A) and consists of the following key components:

Wind Turbines	18	Each
Turbine Foundations	18	Each
Access Roadways	11,500	Linear Feet
Underground Collection System	18,600	Linear Feet
Meteorological Towers	1	Each

Decommissioning Sequence

In the event the Velva WECS requires decommissioning, the sequence for removal of the system components would be: wind turbines, turbine foundations, access roadways, collection cables, site substation equipment, and meteorological towers. The remainder of the decommissioning would involve earthwork and topsoil restoration. As such, this decommissioning plan will outline any removal and salvage activities in the same general sequence.

WIND TURBINES

Wind Turbine Technical Data

The Velva WECS was developed using eighteen (18) V47-660/200kW Wind Turbines, manufactured by Vestas Wind Systems, for a system capacity of approximately 12 Megawatts. A complete technical summary of the Vestas V47-660/200kW wind turbine is included as Exhibit B of this plan.

Wind Turbine Decommissioning

The modular nature of wind turbine towers, blades, and generators allows for relative ease in the removal and salvage of individual wind turbine components. Although there is an active resale market for wind energy conversion system components, reportedly in the range of 5-10% of the new turbine cost, this report is not considering any resale value for salvage as it is feasible that technology advancements may actually outpace the resale market potential. The only salvage value that has been considered within this report is the actual salvage of the tower and nacelle components of each wind turbine.

The Vestas V47-660/200kW wind turbines include steel components estimated at approximately 100 Tons of salvage weight and copper components estimated at approximately 2.5 tons of salvage weight per wind turbine. Based upon research into the current scrap steel market, it is estimated that the scrap steel can currently be salvaged at a rate of $200 per Ton, and copper at $2,400 per ton. As a result, the salvage value assigned to each wind turbine for this report is $26,000 per turbine. With a total of 18 wind turbines on this project, the total estimated salvage value with consideration for scrap steel value and scrap copper value is $468,000.

From this salvage value, the cost to dismantle and transport the wind turbine components to a suitable salvage location must be subtracted. Marino Crane Services was contacted in an effort to determine an estimated cost of crane services to complete the dismantling of the wind turbines. Marino Crane Services has experience in both the erection and dismantling of wind turbines. It was estimated that the wind turbine dismantling would result in a crane service unit cost estimated at approximately $15,000 per wind turbine.

ATS Wind Energy Services then was contacted to assist in estimating the costs associated with transportation of the wind turbine components to a suitable salvage location. ATS Wind Energy Services has experience in the transport of wind turbine components. The cost of transportation of all components is also estimated at approximately $25,000 per wind turbine. As a result, the cost to dismantle and transport each of the wind turbines is estimated at $40,000 per turbine.

There are very likely to be some ancillary costs associated with the removal and transportation of the wind turbines. These ancillary costs may include, but are not necessarily limited to, minor road improvements to facilitate transport and inefficiencies that may occur related to having to break the crane down in lieu of walking from site to site. To account for these ancillary costs, a factor of 10% was added to the removal and transportation costs for this report. As a result, the estimated cost to dismantle and transport each turbine is $44,000 for a total cost of $792,000 for 18 wind turbines.

Certainly, there are other items associated with the wind turbines that have some salvage or resale value. These costs were not considered in the completion of this report. The purpose of this decommissioning report is to assure that there is adequate financial assurance provided to cover any costs associated with potential wind farm decommissioning activities. By using the most conservative figure for salvage value, and including a reasonable safety factor in the estimated costs associated with dismantling and transporting the components to a salvage facility, it is felt that the estimates provided in this report are extremely conservative and represent a worst-case scenario. The remainder of this plan will address the estimated decommissioning costs for those remaining WECS components.

WIND TURBINE FOUNDATIONS

Wind Turbine Foundation Construction

A wind turbine foundation design, consisting of a solid concrete pedestal with dimensions of 14'–4" Diameter and 4'–6" in height over a roughly 35'x 35' x 3'–6" spread concrete footing, was constructed for the Velva WECS. There are 18 turbine foundations as part of the Velva Wind Farm project. The spread footing and pedestal foundation design is included in Exhibit C. The final design of the foundations was done by a licensed professional geotechnical engineer and based on specific site location conditions.

Wind Turbine Foundation Decommissioning

Due to the nature of turbine foundation construction proposed for this project, there is essentially no salvage value able to be determined. The decommissioning sequence for turbine foundations will consist of sufficiently excavating completely around the foundations to provide access to, and a working platform around, the foundation. Each foundation would be pulverized and removed to a minimum depth of 3'-0" and properly disposed of. The excavation would then be backfilled full-depth with native soils to complete the foundation decommissioning activity.

The decommissioning of wind turbine foundations would be very labor intensive, thus, two independent contractors, each with demolition experience, reviewed the foundation design and provided estimates of demolition costs. This plan has used the higher of these estimates with a unit cost of $15,000/turbine, or a total cost of $270,000 for the removal of concrete foundations should decommissioning occur.

Mobilization / Excavation	$ 2,000	/ foundation
Concrete Demolition	$ 10,000	/ foundation
Disposal / Backfill	$ 3,000	/ foundation
Subtotal	$ 15,000	/ foundation (18 foundations)
Total Cost	$ 270,000	

ACCESS ROADWAYS

Access Roadway Construction

The Velva Wind Farm WECS involves an estimated 11,500 lineal feet, or approximately 2.2 miles, of access roadway construction. The typical access roadway detail is included as Exhibit D of this report. The roadways are approximately 15 feet wide and widen slightly at the turbine, crane pad, and connecting roadway locations. The existing soils were excavated, shaped, and graded to a fairly level and compacted subgrade prior to constructing the roadways. The roadway construction consists of a geotextile fabric placed upon the prepared subgrade, with an eight (8) inch lift of compacted aggregate base course surfacing.

Calculations used to estimate the construction material requirements for the access roadways are included in Exhibit E of this report, and are summarized below:

Geotextile Fabric	19,167 S.Y.
Aggregate Base Course	4,259 C.Y.

Access Roadway Decommissioning

It is feasible that the landowners may elect to leave the access roadways in place in lieu of removal during decommissioning; however, this plan assumes that the access roadways will be completely removed and the site restored under decommissioning. The decommissioning process for access roadways will involve excavation and transportation of the gravel materials to a nearby quarry or aggregate preparation site for reprocessing. The geotextile fabric will be removed and properly disposed. After reviewing the roadway decommissioning activities with two independent contractors, the following unit prices were used to estimate the access roadway decommissioning costs:

Geotextile Fabric Removal	$ 0.50/SY
Aggregate Base Course Removal	$ 8.00/CY

Although there is no foreseen salvage value in the removal of the geotextile fabric, there is some salvage value in the removal of the aggregate materials if provided they are reprocessed for future use. For purposes of evaluating the value of materials recovered from access roadways, a base material value of $ 8.50/CY was used and a salvage recovery value factor of 50% applied. As a result, the following salvage values were determined for the access roadway materials to be removed during access roadway decommissioning:

Geotextile Fabric Salvage	$ 0/SY
Aggregate Base Course Salvage[1]	$ 4.25/CY

[1] Salvage recovery factors based upon experience and actual bids for similar work on other projects.

As aggregate materials are relatively abundant in the region of the Velva WECS, the use of these materials as inert fill material may be selected in lieu of the actual recovery and reconditioning of these aggregates. The salvage value noted above would be offset by more economical removal techniques, lesser transportation costs, and some nominal value for the fill material. In our opinion, there appears to be essentially no appreciable difference in the ultimate decommissioning costs under either scenario. As a result, the following estimate is provided for the access roadway decommissioning:

Removal Item	**Quantity**	**Removal**	**Salvage**	**Net Cost**
Geotextile Fabric	19,167 SY	$ 9,584	$ 0	$ 9,584
Aggregate Base Course	4,259 CY	$ 34,072	$ 18,101	$ 15,971
Totals		$ 43,656	$ 18,101	$ 25,555

COLLECTION CABLES

Collection Cable Trench Construction

The collection system diagram is included as Exhibit F of this plan. In all instances, the cable trenches provide for a minimum of 40 inches of cover over the cables, with at least 36 inches of earthen materials and topsoil in all areas other than road crossings. Conduit is provided for the cable trenches at road crossings only. Additional details regarding the type and lengths of cable runs are also included in Exhibit F. Collection cables consist of 18,600 linear feet (3.5 miles) of trenches.

Cable Trench Decommissioning

Due to the nature and depth of the cable trenches, the physical removal of the cabling is not viewed as a required activity in the decommissioning of the Velva WECS.

PROJECT SUBSTATION ELECTRICAL COMPONENTS

Project Substation Construction

The project substation details are included as Exhibit G of this plan. The project substation consists of a 103' by 60' fenced-in area with a gravel base and the necessary substation equipment. The equipment is supported by concrete foundations. There is an electrical building between the substation and the O&M building which houses various electrical switchgear and controls.

Project Substation Electrical Components Decommissioning

The project substation decommissioning will be performed after disconnecting the transmission line. The main transformer, circuit breakers and switch gear equipment within the area will be removed, although buried wiring may be abandoned in place, and the concrete foundations will be removed to a depth of 3'–0" below existing grade. There will be a salvage value for the steel structures and electrical equipment. The cost to dismantle the project substation is estimated to be $78,000 less the salvage value of the equipment. The estimated salvage value of electrical equipment to be $27,000.

As a result the decommissioning and salvage values associated with the project substation are estimated as follows:

Disassemble electrical equipment and demolish foundations	$	78,000
Salvage of electrical equipment and structural steel	$	(27,000)
Net Decommissioning Cost	$	51,000

METEOROLOGICAL TOWER

Meteorological Tower Construction

The one (1) 65m high meteorological tower is a cable stabilized tower built with steel truss members. The cables are anchored to three (3) separate anchor foundations and a base foundation. The anchor foundations consist of approximately two (2) cubic yards of concrete buried 5' below grade. The tower foundation is a 6' x 6' x 18" footing buried 5'-6" deep with a 3'-0" diameter pier.

Meteorological Tower and Foundation Decommissioning

The towers would be decommissioned by lowering the towers and disconnecting the cables and tower from the foundations. Due to the truss framework of the towers these would be of little to no salvage value. The foundations would be uncovered and removed from the site to be disposed at a landfill. Their size is such that no breaking would be required for the cable footings and very little for the tower foundation. The estimated cost for the removal of the tower and disposal of them, including site restoration, would be $7,500 per Met Tower for a total of $7,500.

EARTHWORK AND TOPSOIL RESTORATION

With all of the above ground and surface components removed, all that would remain in the decommissioning of the Velva Wind Farm would be the necessary earthwork and topsoil restoration to return the areas occupied by the project improvements to as near as practicable the same condition that existed prior to construction of the WECS. Per the calculations in Exhibit E, it is estimated that approximately 2,130 CY of earthwork and 2,130 CY of topsoil restoration will be required. Based upon experience with earthwork activities and bid amounts received on prior projects, the following estimate is provided for the earthwork and topsoil restoration needed at the conclusion of the decommissioning of this project:

Item	**Quantity**	**Unit Cost**	**Total Cost**
Earthwork	2,130	$ 7.50 /CY	$ 15,975
Topsoil Restoration	2,130	$ 10.00 /CY	$ 21,300
Totals			$ 37,275

SUMMARY OF DECOMMISSIONING COSTS

The following summary represents the total decommissioning cost less any salvage value for the WECS:

DECOMMISSIONING COSTS:		
Turbine Removal (excluding salvage values)*	$	792,000
Turbine Foundation Removal	$	270,000
Access Roadway Removal	$	25,555
Project Substation Removal	$	51,000
Meteorological Towers	$	7,500
Earthwork & Topsoil	$	37,275
Subtotal	$	1,183,330
SALVAGE VALUE:		
Turbine Component Salvage Value (18 Turbines x $26,000/turbine)	$	468,000
DECOMMISSIONING LESS SALVAGE:	**$**	715,330
Total Decommissioning Cost per Turbine (18)	Approx. $	39,750 / Turbine

FINANCIAL ASSURANCE

Financial assurance in an amount sufficient to adequately perform the required decommissioning per this plan and all local, state, and federal environmental regulations will be secured by Acciona Wind Energy USA, LLC. The mechanism for financial assurance should be either a corporate guarantee, letter of credit, bond, or insurance policy. At the time financial assurance documents are provided, the triggering events for decommissioning and the procedures for the County to access the financial assurance for that purpose should be identified. The financial assurance should further provide that the terms of the Decommissioning Plan be binding upon Acciona Wind Energy USA, LLC and any successors, assigns, or heirs; and that the County will have access to the site, pursuant to reasonable notice, to effect or complete the decommissioning, if required.

CONCLUSION

I certify that this report is an accurate representation of the anticipated decommissioning costs (including salvage values) and was prepared in accordance with industry standard of good engineering principals, and contains no intentional false statements or misrepresentations.

Signed: Richard T. Weegens P.E.

Richard T. Weegens, P.E.

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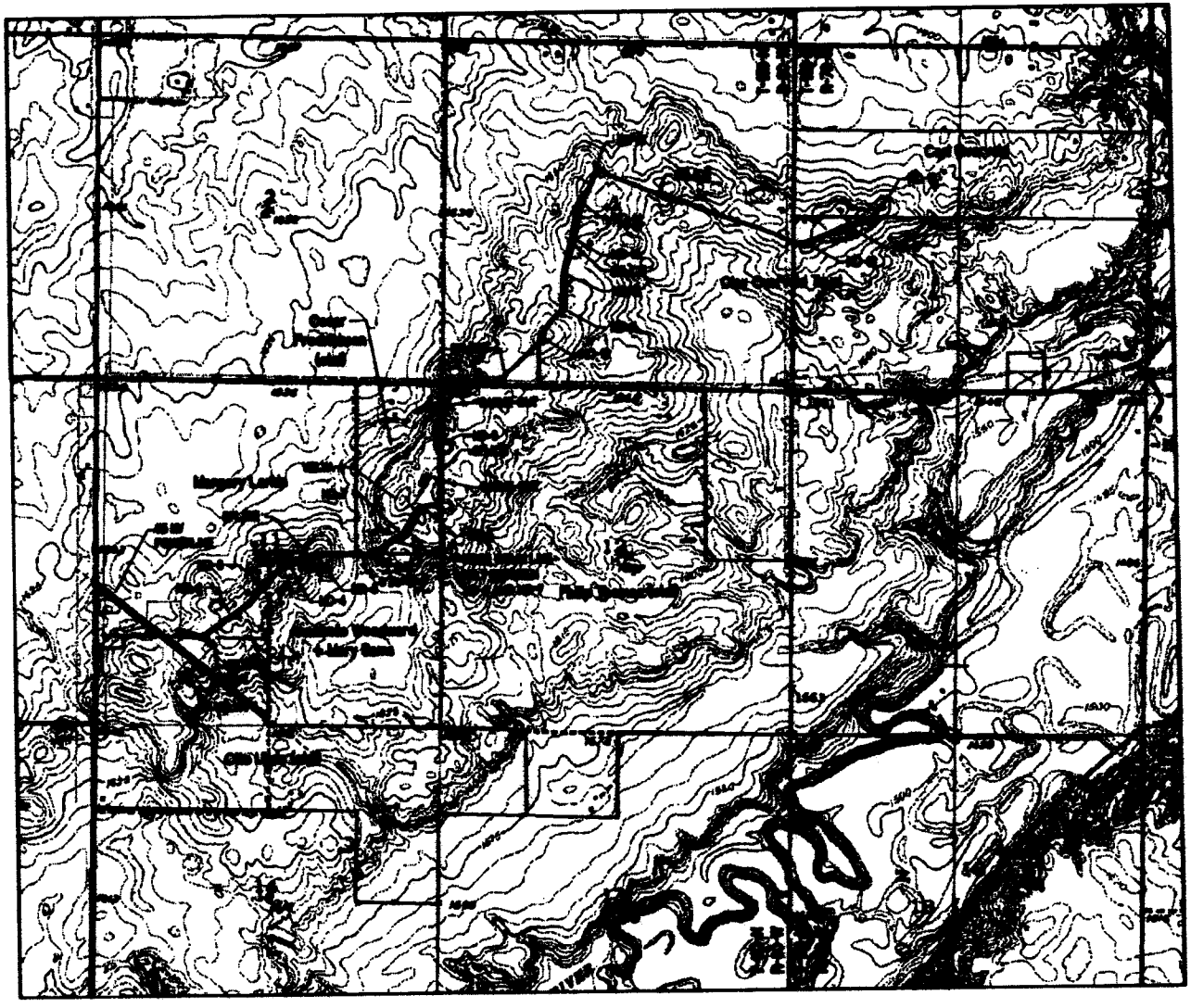
Exhibits

Exhibit A

Velva Wind Power Location Map



1 WIND FARM OVERALL SITE PLAN
1" = 80'

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PROJECT

VELVA
WIND FARM

WIND FARM OVERALL
SITE PLAN - TOPO

C0-B

Exhibit B

Technical Summary Vestas V47 Wind Turbine

7. General specification

7.1 Structure of machinery

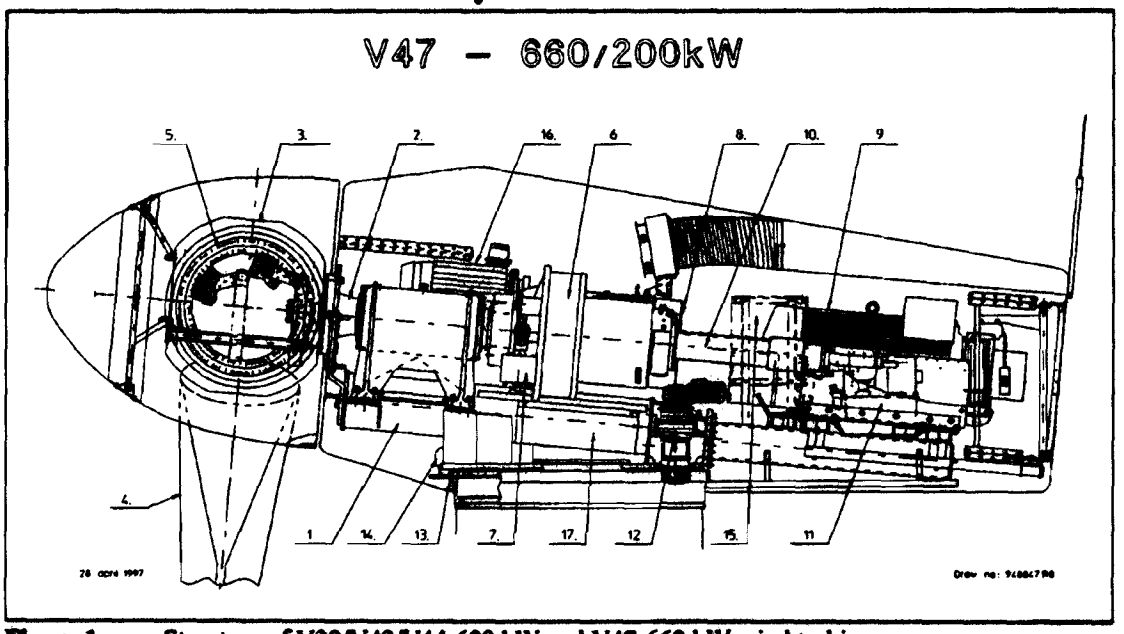


Figure 1 Structure of V39/V42/V44-600 kW and V47-660 kW wind turbine.

1.	Base frame	9.	Generator
2.	Main shaft	10.	Cardan shaft
3.	Blade hub	11.	Hydraulic unit
4.	Blade	12.	Yaw gear motor
5.	Blade bearing	13.	Yaw ring
6.	Gearbox	14.	Yaw control
7.	Gear tie rod	15.	VMP top control unit
8.	Disc brake	16.	Small generator
		17.	Generator shift box

8.Technical specifications

8.1.1 Rotor

	V47-660 kW	V47-660/200 kW
Diameter:	47 m	47 m
Swept area:	1735 m²	1735 m²
Rotational speed, rotor:	28.5 rpm	26/20 rpm
Rotational direction:	Clockwise (front view)	

8.1.2 Tubular tower

Top diameter (for all towers): 2.0 m

Type	Exact Hub Height	Bottom diameter	Weight
2-parted, modular tower (40 m)	40.7 m	3.0 m	approx. 28900 kg
2- parted, modular tower (45 m)	45.7 m	3.0 m	approx. 33000 kg
2- parted, modular tower (50 m)	50.1 m	3.3 m	approx. 38000 kg
2&3- parted, modular tower (55 m)	55.1 m	3.3 m	approx. 50700 kg
3- parted, modular tower (60 m)	59.7 m	3.6 m	approx. 58600 kg
3- parted, modular tower (65 m)	64.6 m	3.6 m	approx. 66400 kg

The exact hub height includes 0.4 m (distance from foundation section to earth).

Paint system, outside	
Surface treatment:	Metallizing + painting
Sand blasting:	SA 3 ISO 8501-1
Metallizing:	DSI/ISO 2063, 60 µm Zn
Sealing with twocomponent epoxyprimer:	Approx. 20 µm
Primer:	Min. 90 µm
Top coat:	UV resistant, min. 50 µm
Corrosion class (DS/R 454):	3
Paint system, inside	
Surface treatment:	Paint
Sand blasting:	SA 2.5 ISO 8501-1
Zinciferous primer:	Min. 40 µm
Top coat:	Min. 100 µm
Corrosion class (DS/R 454):	2

8.1.3 Foundation sections

Type	Height	Max. diameter	Weight
For 35, 40, 45 m modular tower	2.1 m	3.2 m	approx. 3100 kg
For 50, 55 m modular tower	2.1 m	3.5 m	approx. 3400 kg
For 60, 65 m modular tower	2.1 m	3.75 m	approx. 4500 kg

8.1.4 Gear, V47-660 kW

Type:	Planetary/helical gear
Ratio:	52.6514

8.1.5 Gear, V47-660/200 kW

Type:	Planetary/helical gear
Ratio:	58 & 75

8.1.6 Large generator

Type:	Asynchronous, variable slip
Rated power:	660 kW
Voltage:	690 VAC
Frequency:	50 Hz
Class of protection:	IP54
Number of poles:	4
Rotational speed:	1515-1650 rpm
Rated current:	628 A
Power factor:	0.88
Resultant power factor:	0.98
Resultant current:	564 A

8.1.7 Small generator

Type:	Asynchronous, cons. slip (1.1%)
Rated power:	200 kW
Voltage:	690 VAC
Frequency:	50 Hz
Class of protection:	IP54
Number of poles:	4
Rotational speed:	1500-1516 rpm
Rated current:	190 A
Power factor:	0.89
Resultant power factor:	0.99
Resultant current:	171 A

8.1.8 Controller:

Electrical data:	
Voltage:	3x690 V, 50 Hz
Lockable circuit breaker:	630 A
Power supply for light:	1x10 A/230 V
Generator cut in:	By thyristors
Power factor correction:	250 kVAr
Top processor:	
Supervision/Control:	Yawing
	Hydraulic
	Surroundings (Wind, temperature)
	Rotation
	Generator
	Pitch system
Bottom processor:	
Supervision/Control:	Grid
	Power factor correction
	Thyristors
	Remote monitoring
Operator panel:	
Information:	Operating data
	Production
	Operation log
	Alarm log
Commands:	Run/Pause
	Manual yaw start/stop
	Maintenance routine

8.1.9 Remote monitoring:

Possibility of connection of serial communication e.g. Vestas Remote Panel.

8.1.10 Weight:

The listed masses is maximum values

Complete nacelle:	Approx. 20400 kg
Rotor V47, (incl. hub):	Approx. 7200 kg

Exhibit C

Foundation Designs for V47 Wind Turbine

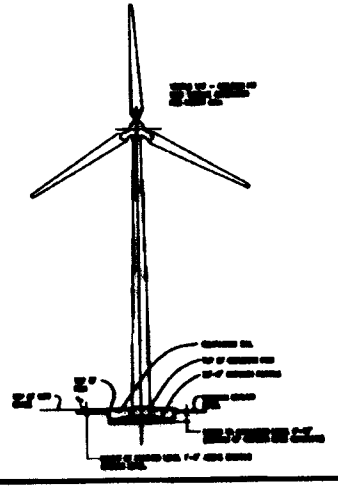
VELVA, ND WIND FARM-VELVA WIND FARM LLC
VELVA, NORTH DAKOTA
VESTAS V47 - 660/220 KW WIND TURBINE GENERATOR
65m HUB HEIGHT

ALLOWABLE SOIL PRESSURE = 4000 PSF

LIST OF DRAWINGS

DRAWING NO.	DESCRIPTION
1	TITLE SHEET & NOTES
S1	FOOTING PLAN & DETAILS
S2	FOUNDATION DETAILS
S3	BILL OF REINFORCING & PIER PLAN

DESIGN CRITERIA



GENERAL NOTES & SPECIFICATIONS

CAST-IN-PLACE CONCRETE & REINFORCING STEEL

PRODUCTS

REINFORCEMENT

ANCHOR BOLTS AND EMBEDMENT PLATE

GENERAL

PRODUCTS

ADDITIONAL DRAWINGS

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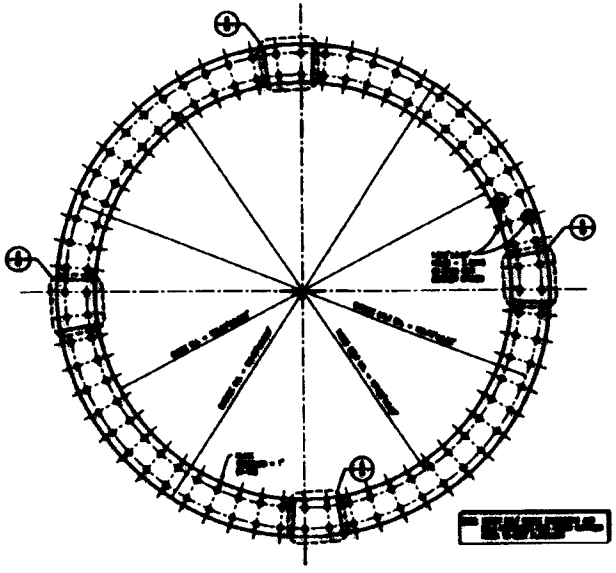
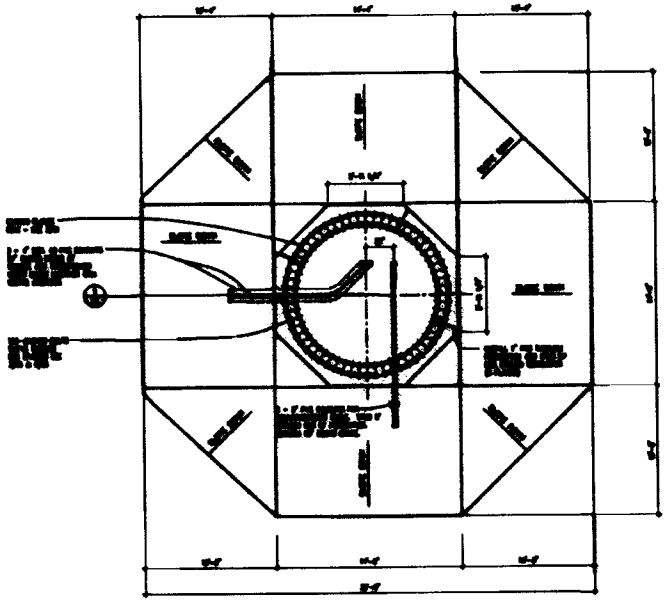
VELVA WIND FARM LLC
VELVA, ND

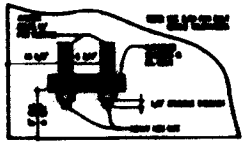
VELVA, ND
FOUNDATIONS

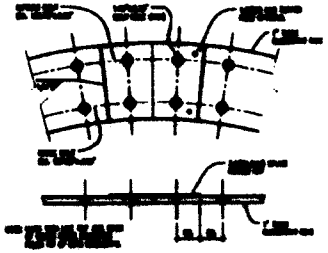
TITLE & NOTES

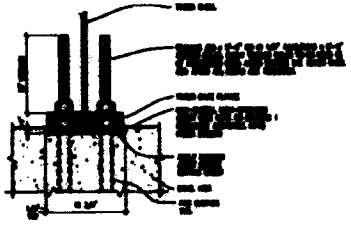
1

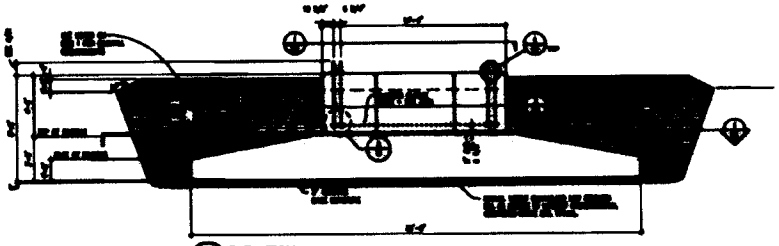












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...making your vision a reality.

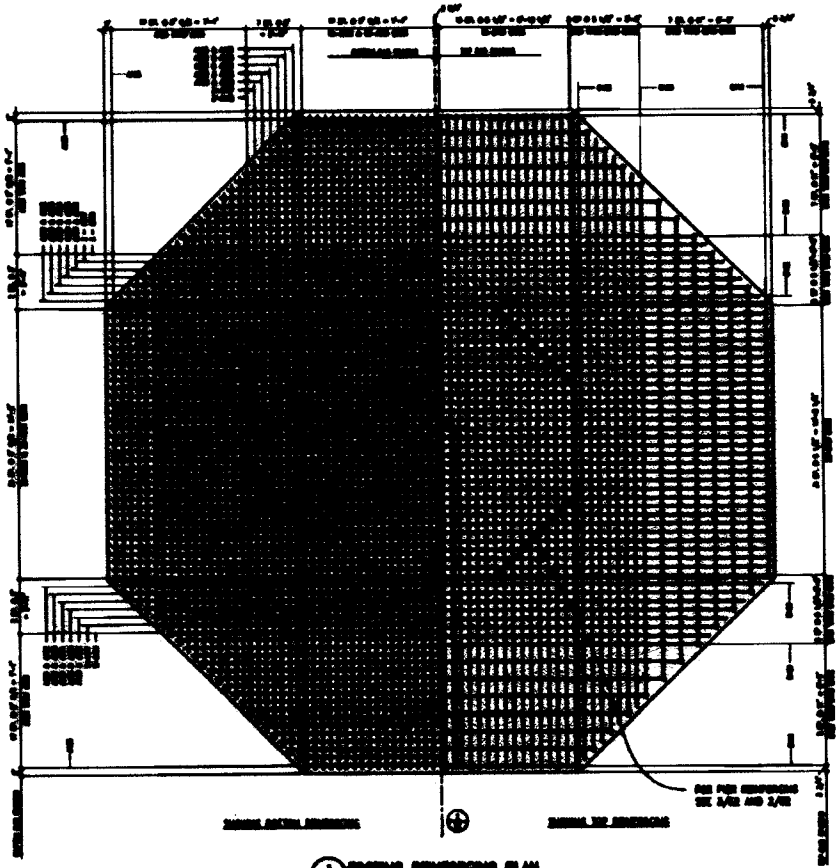
PROJECT

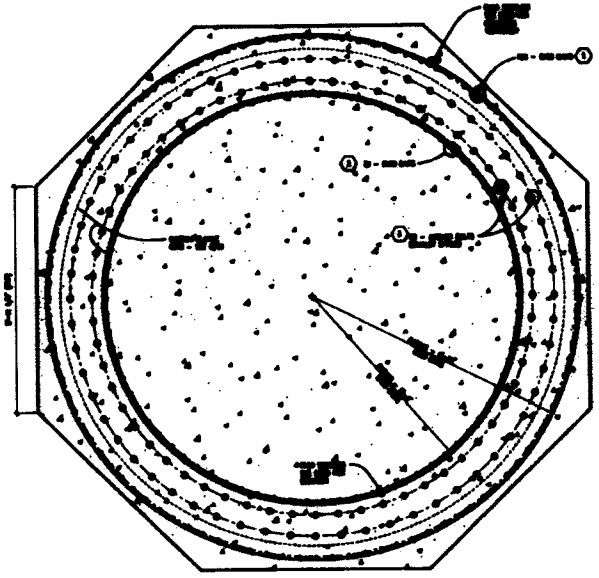
VELVA WIND FARM LLC
VELVA, ND

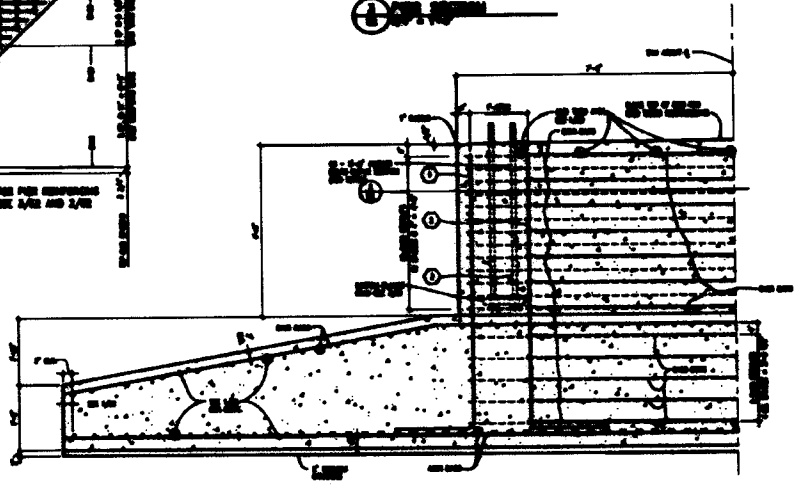
VELVA, ND
FOUNDATIONS

FOUNDATION PLAN
& DETAILS

S1







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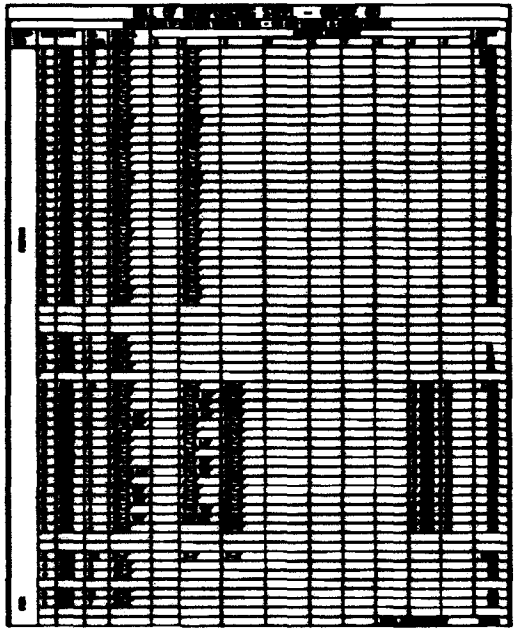
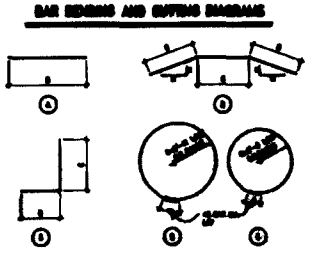
VELVA WIND FARM LLC
VELVA, ND

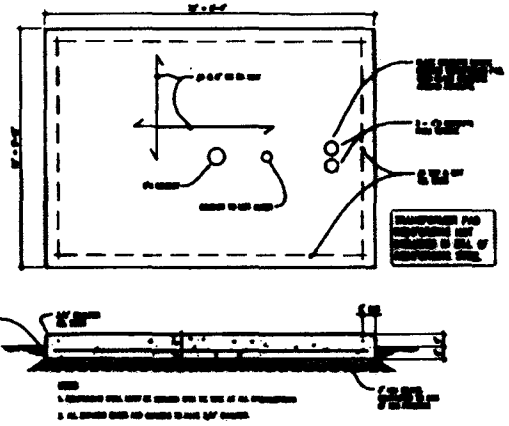
VELVA, ND
FOUNDATIONS

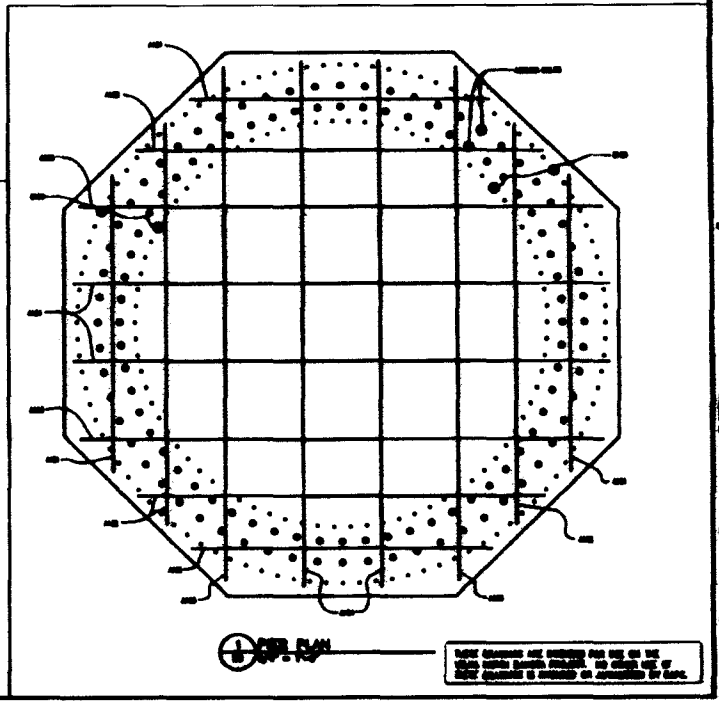
FOUNDATION DETAILS

S2









EAPC
ARCHITECTS
ENGINEERS

PROJECT

VELVA WIND FARM LLC
VELVA, ND

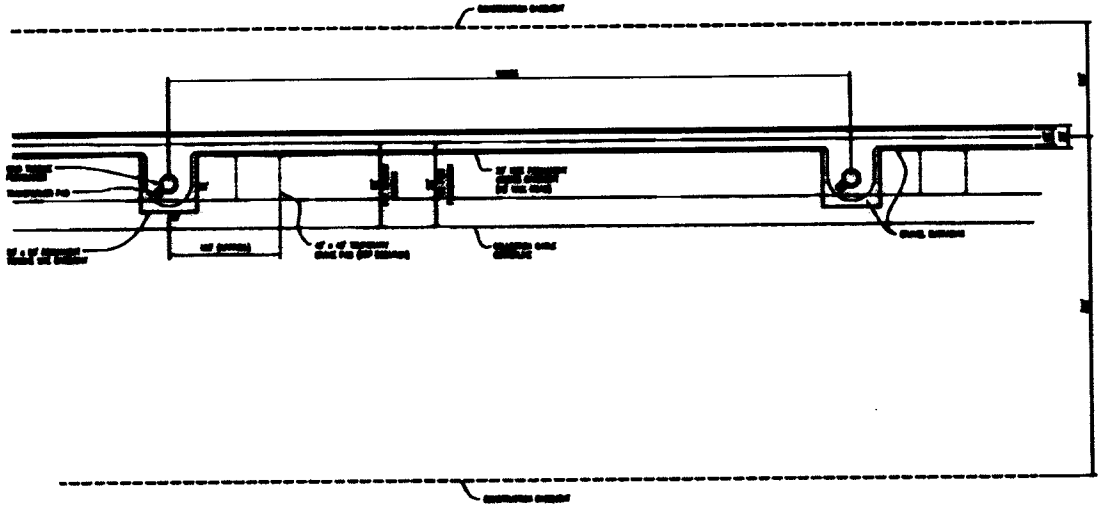
VEVLA, ND
FOUNDATIONS

BILL OF REINFORCING,
PIER PLAN & XFMR PAD
DETAIL

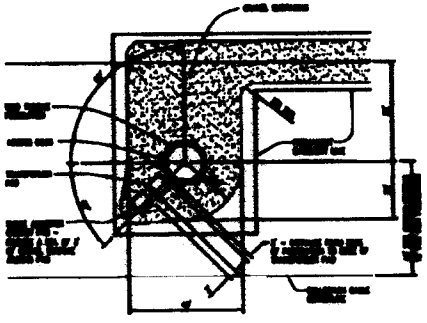
S3

Exhibit D

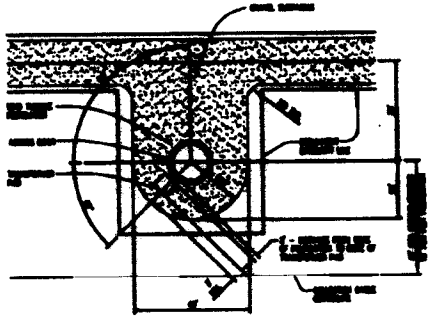
Access Roadway Details



TYPICAL TURBINE SITE LAYOUT



TYPICAL TURBINE SITE LAYOUT ENLARGEMENT



TYPICAL TURBINE SITE LAYOUT ENLARGEMENT

EAPC

ARCHITECTS
ENGINEERS

PROJECT

VELVA
WIND FARM

TYPICAL TURBINE SITE LAYOUT

C200

Exhibit E

Access Roadways / Construction Material Requirements

Area of Access Roadways

$Area_{AR}$ = Length x Width
Length of Access Roadways = 11,500 feet
Width of Access Roadways = 15 feet
$Area_{AR}$ = 11,500' x 15' = 172,500 SF (19,167 SY)

Geotextile Fabric

Area of Fabric = Area of Access Roadway
$Area_{GF}$ = 19,167 SY

Aggregate Base Course

Volume of Aggregate Base = (Area of Access Roadway) x (Depth of Aggregate Base)
$Volume_{CG}$ = 19,167 SY x 8 inches (yd/36 inches) = 4,259 CY

Earthwork and Topsoil (Each)

Volume = Area x Depth
Volume = 19,167 SY x 4 inches (yd/36 inches) = 2,130 CY

Exhibit F

Collection System Diagram

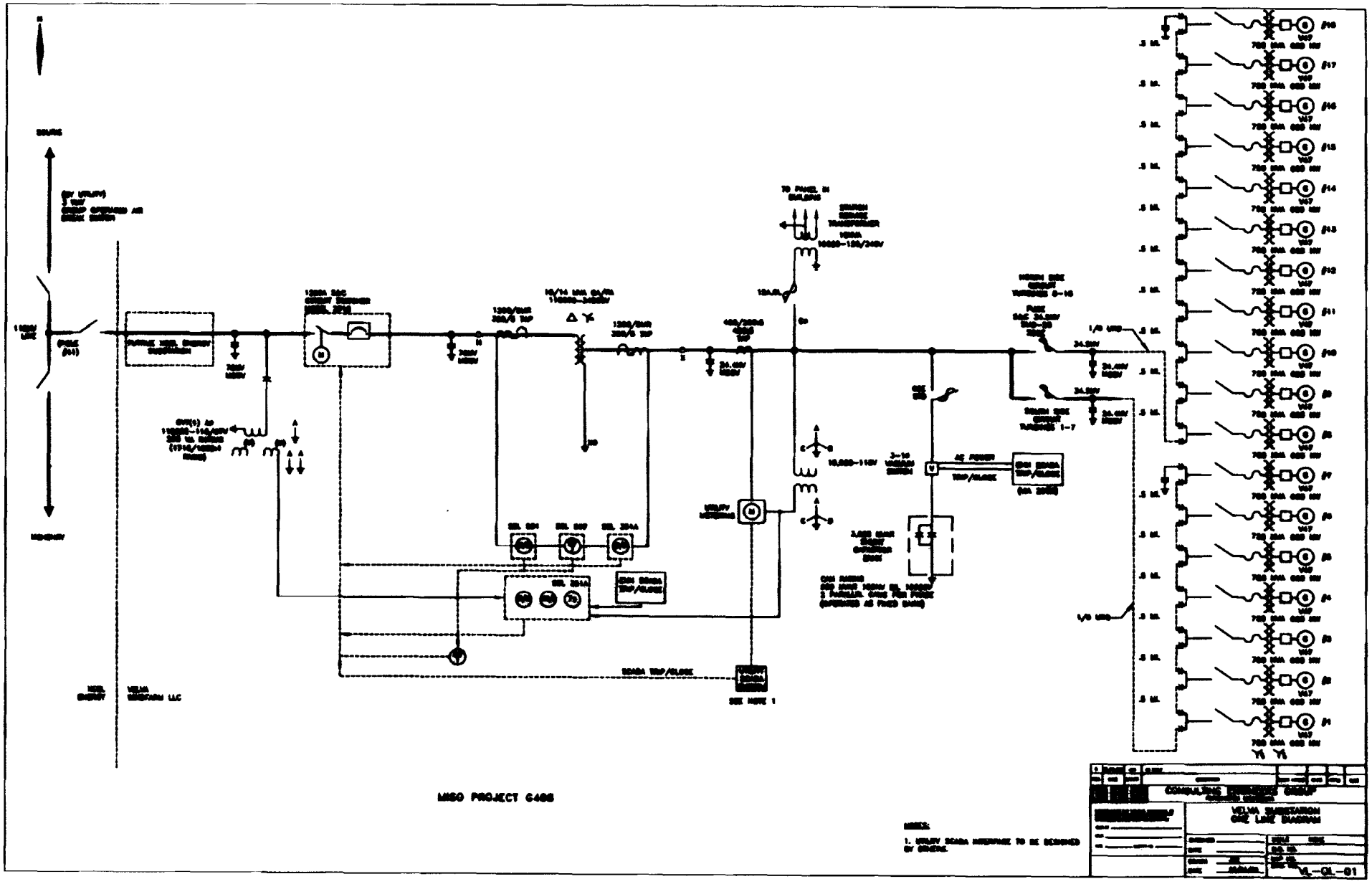
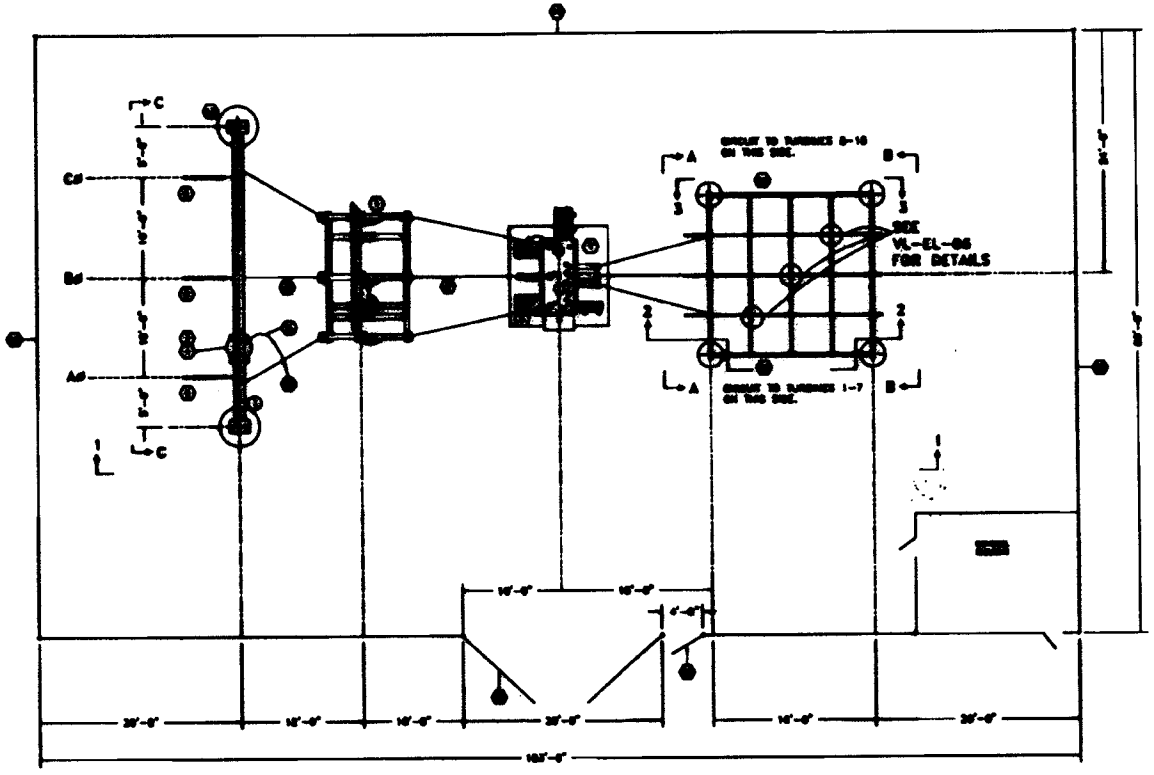

MISO PROJECT G408
VELVA SUBSTATION
ONE LINE DIAGRAM
VL-OL-01

Exhibit G

Project Substation Details



MAJOR MATERIAL LIST

ITEM	QTY	DESCRIPTION
1	1	
2	1	RELAY PANEL - SEE DWG. VL-EL-05.
3	1	
4	1	
5	3	
6	3	
7	3	
8	200'	4/0 AGSR, 6/1, CONDUCTOR.
9	24	
10	3	
11	3	
12	7	
13	1	
14	1	
15	8	
16	3	
17	3	
18	*	
19	9	
20	1	

GENERAL NOTES

1.
2.

LEGEND

1.
2.

A							
B							
C							
D							
E							

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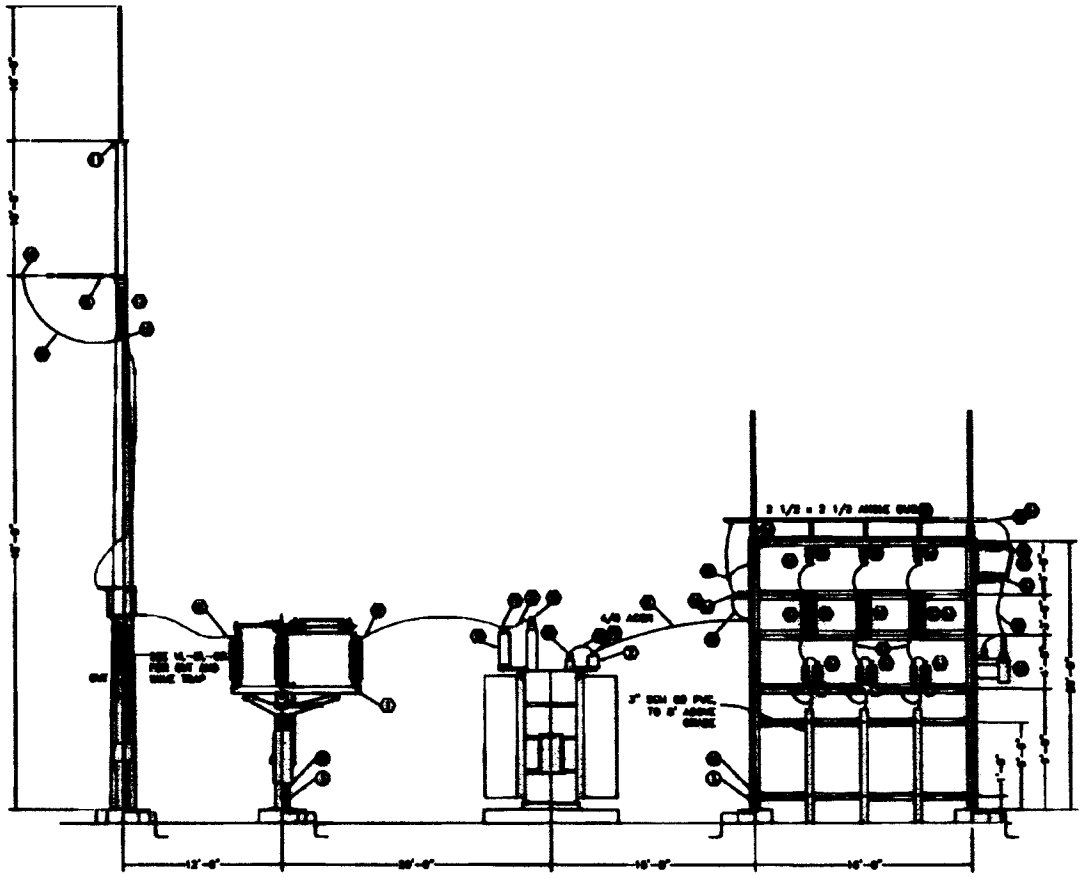
VELVA SUBSTATION
ELECTRICAL LAYOUT PLAN

VL-EL-01



VIEW 1-1

GENERAL NOTES

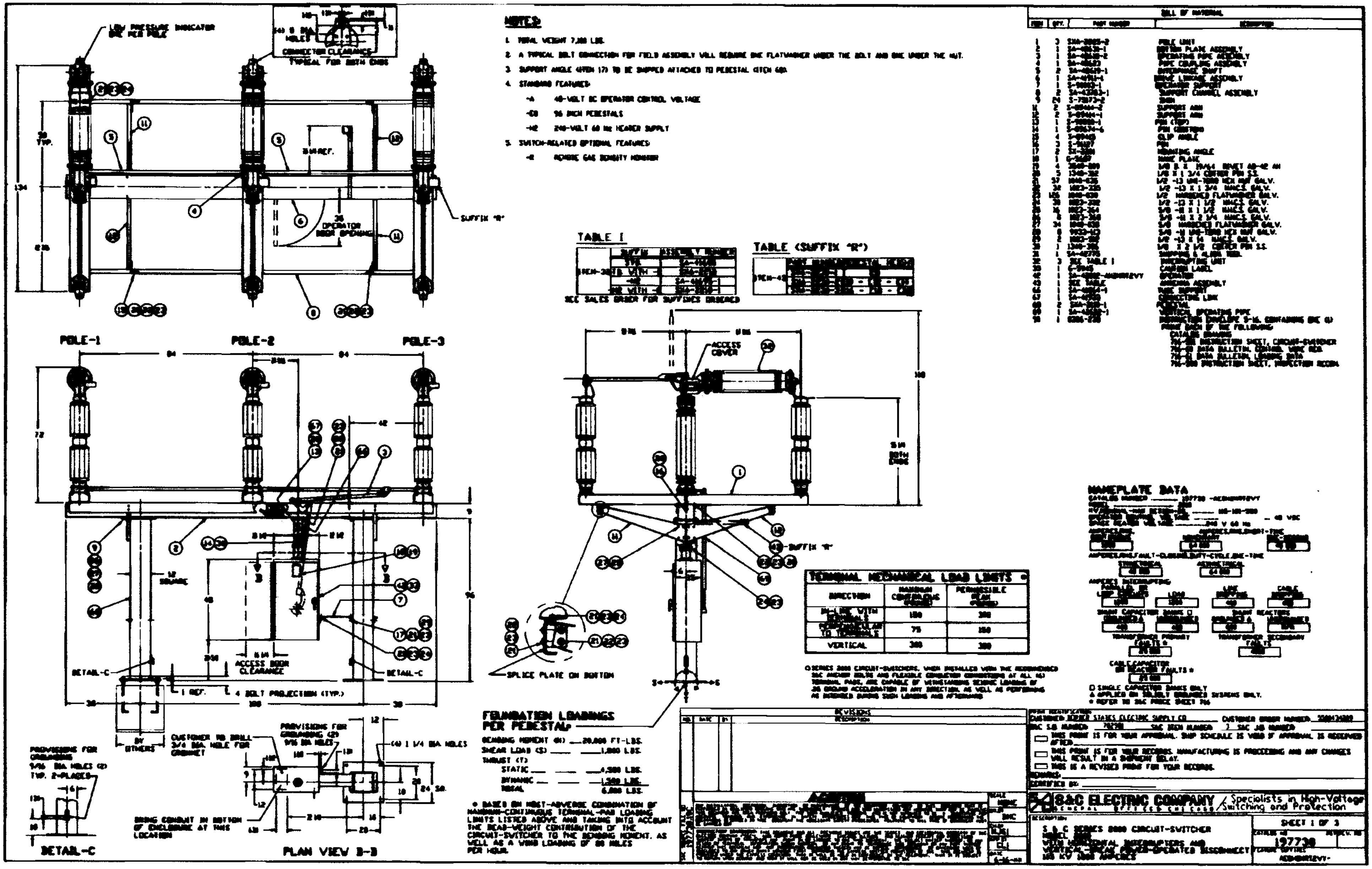
1. 35kV CABLE AND TERMINATIONS BY UNDERGROUND CABLE INSTALLER.
2. CONTRACTOR TO REFERENCE EXACT CONDUIT, PIPING, SUPPORT, ETC. ON ALL EQUIPMENT PADS.
3. GROUND FAULTED CONTROL BOX WITH #4 Cu RUN TO 1/0 Cu UP STEEL.
4. RUN 1/0 Cu GROUND LOOP UP HIGH SIDE STRUCTURE TO ARRESTORS AND SHIELD WIRE.
5. GROUND NO BUSHING OF 115kV POTENTIAL TRANSFORMER.

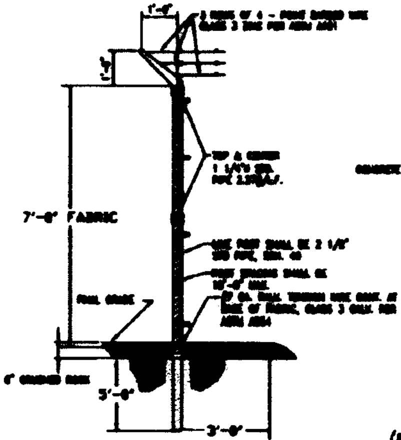
LEGEND

1. ● REFERENCE ITEM # ON MAJOR MATERIAL LIST ON VL-EL-01 & VL-EL-02.
2. ● REFERENCE ITEM # ON VL-EQ-01 MATERIAL LIST.

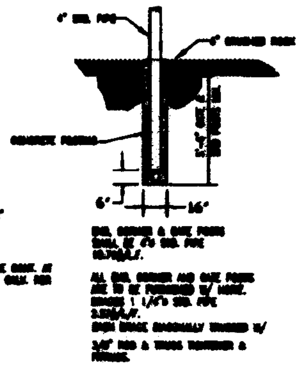
VELVA SUBSTATION
ELECTRICAL VIEW

VL-EL-02

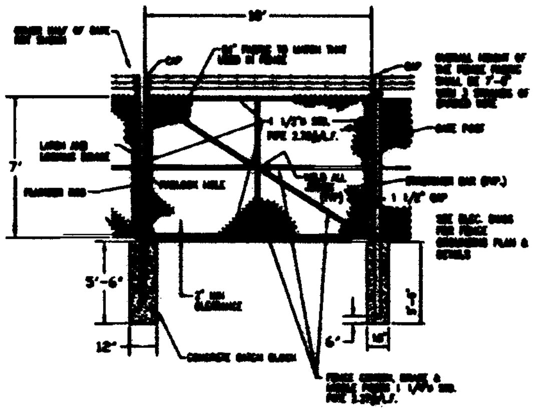

NOTES:
1. TOTAL WEIGHT 7,100 LBS.
2. A TYPICAL BOLT CONNECTION FOR FIELD ASSEMBLY WILL REQUIRE ONE FLATWASHER UNDER THE BOLT AND ONE UNDER THE NUT.
3. SUPPORT ANGLE (ITEM 17) TO BE SHIPPED ATTACHED TO PEDESTAL (ITEM 60)
4. STANDARD FEATURES:
-A 48-VOLT DC OPERATOR CONTROL VOLTAGE
96 INCH PEDESTALS
240-VOLT 60 Hz HEATER SUPPLY
5. SWITCH-RELATED OPTIONAL FEATURES:
-R REMOTE GAS DENSITY MONITOR
POLE-1
POLE-2
POLE-3
LOW PRESSURE INDICATOR ONE PER POLE
CONNECTOR CLEARANCE TYPICAL FOR BOTH ENDS
SUFFIX "R"
OPERATOR DOOR OPENING
ACCESS COVER
ACCESS DOOR CLEARANCE
4 BOLT PROJECTION (TYP.)
DETAIL-C
BY OTHERS
SPLICE PLATE ON BOTTOM
TABLE I
TABLE (SUFFIX "R")
SEE SALES ORDER FOR SUFFIXES ORDERED
CUSTOMER TO DRILL 3/4 DIA. HOLE FOR GROUNDING
PROVISIONS FOR GROUNDING
BRING CONDUIT IN BOTTOM OF ENCLOSURE AT THIS LOCATION
PLAN VIEW B-B
FOUNDATION LOADINGS PER PEDESTAL
BILL OF MATERIAL
NAMEPLATE DATA
TERMINAL MECHANICAL LOAD LIMITS
DIRECTION
VERTICAL
REVISIONS
DESCRIPTION
THIS PRINT IS FOR YOUR APPROVAL. SHIP SCHEDULE IS VOID IF APPROVAL IS RECEIVED AFTER
THIS PRINT IS FOR YOUR RECORDS. MANUFACTURING IS PROCEEDING AND ANY CHANGES WILL RESULT IN A SHIPMENT DELAY.
THIS IS A REVISED PRINT FOR YOUR RECORDS.
CERTIFIED BY:
S&C ELECTRIC COMPANY / Specialists in High-Voltage Switching and Protection
S & C SERIES 2000 CIRCUIT-SWITCHER
SHEET 1 OF 3
197730



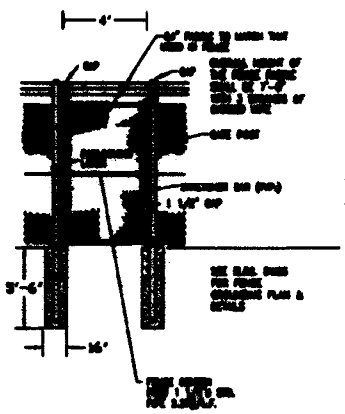
TYP. SECTION THRU LINE FENCE



BASE DETAIL (END, CORNER & GATEPOSTS)



TYPICAL 20' DOUBLE GATE

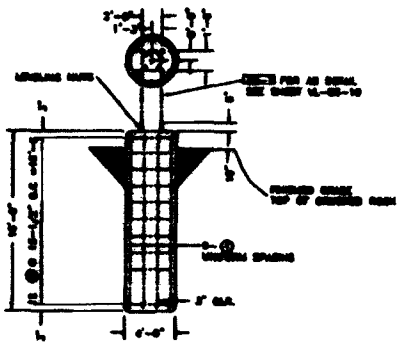


TYPICAL 4' GATE

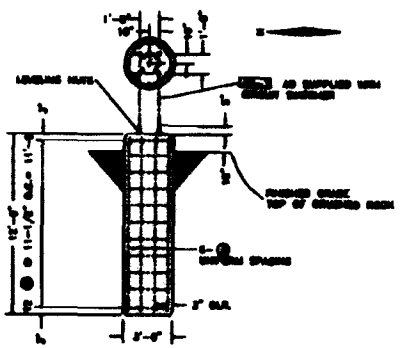
CONSULTING ENGINEERS GROUP

VELMA SUBSTATION FENCE DETAILS

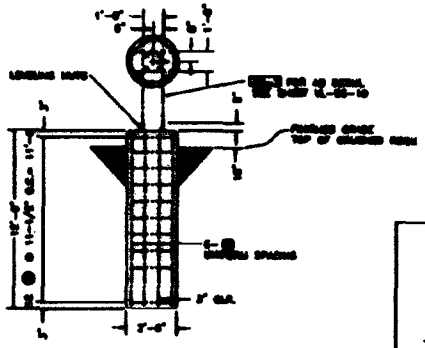
VL-FE-01



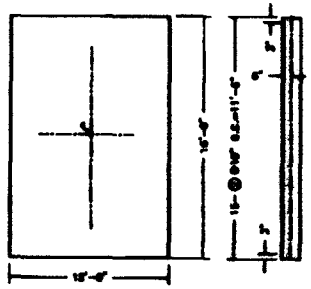
FOUNDATION F1
NTS

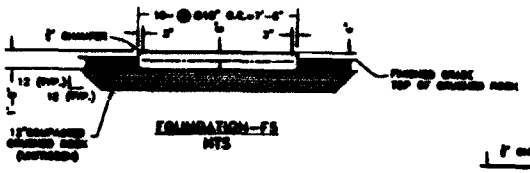


FOUNDATION F4
NTS

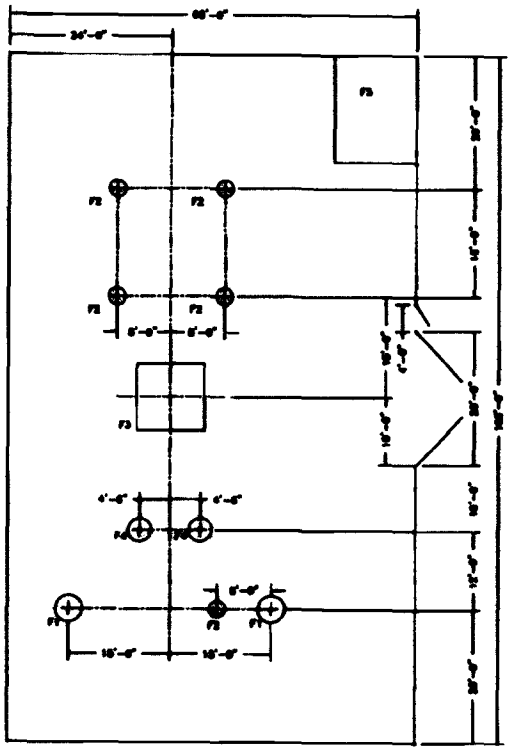


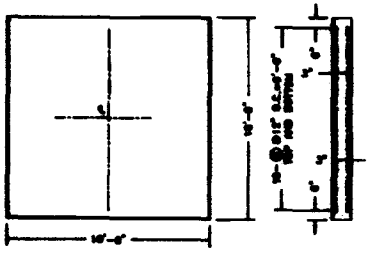
FOUNDATION F2
NTS

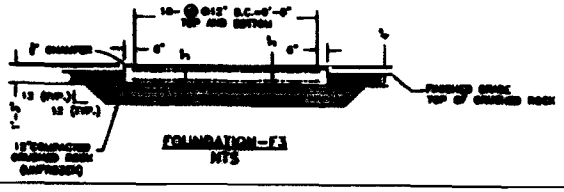




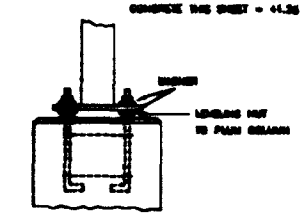
FOUNDATION–F5
NTS







FOUNDATION–F3
NTS



FOUNDATION DETAIL "A"
NTS

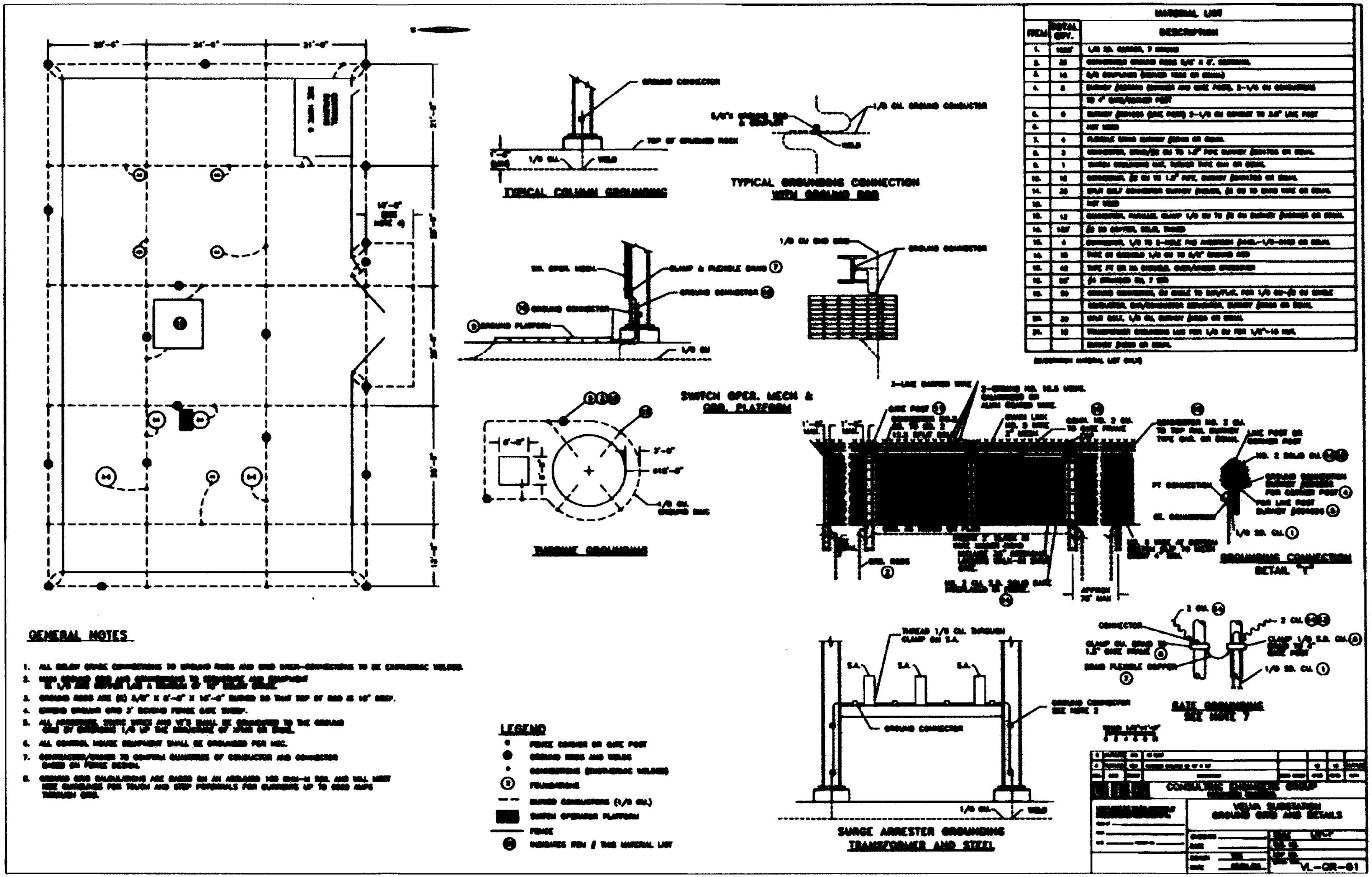
GENERAL NOTES

1. CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 4000 P.S.I. AT THE END OF 28 DAYS.
2. SOIL BEARING CAPACITY BENEATH FOOTING OR FOUNDATIONS SHALL BE NOT LESS THAN 4000#/SQ. FT.
3. CONCRETE PLACEMENT: NO CONSTRUCTION JOINTS PERMITTED UNLESS NOTED.
4. EDGES OF CONCRETE: ALL EXPOSED EDGES ABOVE GROUND CHAMFERED 3/4 MIN.
5. REINFORCING STEEL: ASTM A-615 GRADE 60.
6. UNDER THESE WORDS MINIMUM PROTECTIVE CONCRETE COVER OVER REINFORCING STEEL UNLESS NOTED.
7. REFER TO DETAILED SPECIFICATION ON CONCRETE.
8. AFTER ERECTION OF THE STEEL, ALL FOUNDATIONS HAVING LEVELING NUTS SHALL BE GROUTED BETWEEN THE BASE PLATE AND THE TOP OF FOUNDATION TO PROVIDE A UNIFORM BEARING AREA. (SEE DETAIL A.)
9. FINISH TOP SURFACE OF PIERS TO BE PERFECTLY LEVEL, TOWELED AND TROWELED. EXPOSED EQUIPMENT SLABS WOOD FLOATED, LIGHTLY TROWELED AND THEN BROOMED.
10. REINFORCING STEEL IS CONTRACTOR FURNISHED.
11. CONCRETE TEMPERATURES DURING COLD WEATHER SHALL COMPLY WITH ASTM C-94

CONSULTING ENGINEERS GROUP

VELMA SUBSTATION
FOUNDATION LAYOUT
AND DETAILS

VL-FD-01


MATERIAL LIST
TYPICAL COLUMN GROUNDING
TYPICAL GROUNDING CONNECTION WITH GROUND ROD
SWITCH OPER. MECH & GRD. PLATFORM
GROUNDING CONNECTION DETAIL "T"
GENERAL NOTES
LEGEND
SURGE ARRESTER GROUNDING TRANSFORMER AND STEEL
GATE GROUNDING SEE NOTE 7
CONSULTING ENGINEERS GROUP
VELMA SUBSTATION GROUND GRID AND DETAILS
VL-GR-01