AIR LIQUIDE INGENIERIE	vúje

Customer:	**AIR LIQUIDE.** 57, Ave Carnot - B.P. 313 94503 Champigny Cedex FRANCE
Contractor:	**AREVA ENERGIETECHNIK, Gmbh.** Königsbrücker Straße 124 010 99 Dresden GERMANY
Designer:	**VUJE, a.s., divízia 1200** Okružná 5 918 64 Trnava SLOVAKIA
Name of building	

ASU No.9 -USS Košice/SK

Realization project
Electricparts

Documentation:	Index:
PART A – SWITCHGEARS 110 KV –T01 AND T02	**A5**
	Annex No. **17**

Designed:	Approved:	Date:	Sheets
Ing.Adler V.Ľ. Kuchta	Ing.Detko V. Ľ. Kuchta	08/2005	11

TECHNICAL REPORT

Building part

2

Order number VUJE:	Order number Air Liquide::	Revision:	Sheet No.:
V02-1240/2005/9738/A/17 en		0	1

Construction part and steel contruction

Backgrounds:

Project was worked out according to the requirements of executor of technical section and according to these backgrounds:
T01 pole č. 21 – drawing No. V02-1240/2005/9738/A/06 (page no. 1)
T01 pole č. 21 – drawing No. V02-1240/2005/9738/A/06 (page no. 2)
T02 pole č. 15 – drawing No. V02-1240/2005/9738/A/09
and meterages direct on site.

Construction part T01, bay No.21

Basis for each steel constructions are made of concrete C16/20 typical according to individual equipment as follows :
Below the power switch - Basis ZM1 drawing no.26
Below PTP a MTP – basis ZM2 drawings no.27
Under the disconnector, safety fence of voltage and isolator – basis ZM42 drawings no.28
Total dispozition of basis is on drawing no.37

Erection instruction:

Typical basis ZM1, ZM2 a ZM42 are necessary to stock on the coast of the priming concrete C10/16 width 100 mm. Footing bottom is necessery to be massive for original measure of concretion, min. 90% PS for cohesive soil, and I_D=0,9 for non-cohesive soil. Top edge of basis must exceed the level of grade level ±0,000m o 200 mm for disconnector and for other equipments. The height of the top edge of grade level does not change and the lenght is the same according to the lenght of the existing switchgear – it is necessary to make a measurement before commencemet of building.
Humusing by original humus coat will be the finishing of the ground.
Remark: according to project for the remaining bays (erector ELV) fitting ground elevation ±0,000m height above sea level +230,500 m.n.m

Building part T02, bay no.15

Steel construcions will be guyed on the exesting building basis, there is no need to revise them.

Steel construction T01, bay no.21
The auxiliary steel constructions are anchored into the steel grate by means of steel screws on the new built basis ZM1, ZM2, ZM42 as follows :
- below the power switch Q0 – drawing no.19
- below the disconnector and the ground conductor Q8,Q9 - drawing no.20
- below disconnector Q7 – drawing no.21
- below the measuring transformer of current TA - drawing no 22
- below lighting arrester FA - drawing no.23

- below spreader insulator I - drawing no 24
- below the measuring transformer of voltage TV - drawing no.25

Suitable built extisting steel box is below the disconnectors Q1, Q2, and it is necessary to revise it according to drawing No.39

Appended sheet gives the loading of basis POK (Konstruction below equipment) according to specified equipments. (see addendum No.1 technical report)

We suggest all parts below the construciton weld and screwed for zincing. Steel constructions are necessery to connect to the common grounding network of switchgear, drawing No.07.

Steel constructions T02, bay No.15

The auxiliary steel constructions of eqiupment are caught to the project basis frame. This frame is caught to the existing concrete basis according to drawing No.29. Solving of steel construction is as follows:

- below power switch QM1 – drawing No.30
- below disconnector with grounding blades – drawing No 31
- below measuring transformer of current - drawing No.32
- below measuring transformer of voltage - drawing No.33
- below lighting arrester - drawing No.34

Appended sheet gives the loading of basis POK (Konstruction below equipment) according to specified equipments. (see addendum Noč.1 technical report)

We suggest all parts below the construciton weld and screwed for zincing. Steel constructions are necessery to connect to the common grounding network of switchgear, drawing No.10.

Railing in T01, bay No.21 and T02, bay No.15

Safety railing against the touch will be made of steel welded tube in switchgear T01.21 anchored to the project concrete basis, in T02.15 will be anchored into the existing concrete proof.

general solving :

- for T01.21 - drawing No.35
- for T02.15 - drawing No.36

Cable conduit in T01, bay No.21

General solving of cables conduits is in drawing No.37, project cable conduit is in bay No. 21 and he is monolitic with internal parameter 400x300mm, he is upper lep with cover plate Prefa width 50mm. PVC tubes with internal area of pipe DN160mm will be stepped from the conduit to each basis of equipments. Existing cable conduit 200x200mm will be used to disconnectors Q1 and Q2, which are connected from the main cable conduit.

Cable trough in v T02, bazy No.15

General solving of cables trough in on drawing no.38. Cables troughs are made of print element by firm BAKS.

Steel constructions in T02.15 for disconnecters Q1, Q2 – extra works

It is necessary to create auxiliary steel constructions for gripping electric drive of disconnecters, by reason of changing pneumatic drive of bus disconnecters Q1 and Q2 to electric drive. General solving is on drawing No. 40.

Safety and operating instructions

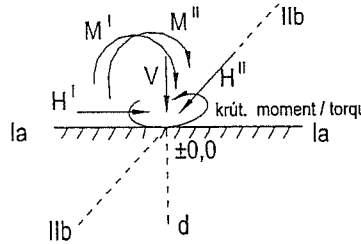
All regulations and health protections instructions must be observed during all works, making of basis and assembly of steel construction with the use of available devices which are used by assembling crew.

In Trnava, 08/2005

Ing.Jaroslav Detko
Authorization 0529*A*4-1 building construction
Authorization 0529*A*3-1 static of building

Annex No.1:The load of base for steel construction
Annex No.2: Static control foundations :-bus-bar disconnection schwitch,disconnection schwitch with earth knives,support isolant,transformer current,circuit breaker,lighting arrester

STOŽIAR MAST	l [m]	V [kN]	KRÚTIACI MOMENT TORQUE [kNm]	SMER VETRA I WIND DIRECTION I H^I [kN]	H^{II} [kN]	M^I [kNm]	M^{II} [kNm]	SMER VETRA II WIND DIRECTION II H^I [kN]	H^{II} [kN]	M^I [kNm]	M^{II} [kNm]	OTVOR [cm] HOLE SIZE FOR CAPPING d	a	b
PODPERNÝ IZOLÁTOR SUPPORT ISOLANT	2,9	1,6 +1,48	-	0,03 (1,22)	2,59 (3,78)	0,13 (2,213)	5,0 (6,0)					KOTVENÉ DO ZÁMKU		
ODPOJOVAČ VÝVODOVÝ DISCONNECTING SWITCH	2,4	3,0 +8,02	-	0,042 (1,772)	0,675 (2,535)	0,172 (3,83)	2,77 (6,59)					GUID IN THE LOCK		
ODPOJOVAČ PRÍPOJNICOVÝ BUS-BAR DISCONNECTING SWITCH	2,4	2,2 +4,65	-	0,02 (1,12)	0,68 (2,38)	0,082 (2,222)	3,526 (6,674)						- " -	
PRÍSTROJOVÉ TRANSFORMÁTORY TRANSDUCER TRANFORMERS	1,3	1,4 +11,27	-	0,015 (1,685)	0,447 (2,117)	0,064 (4,65)	1,89 (6,48)						- " -	
ZVODIČ PREPÄTIA LIGHTNING ARRESTER	1,45	1,4 +1,71	-	0,02 (0,861)	0,45 (1,291)	0,072 (1,355)	1,62 (2,9)						- " -	
VÝKONOVÝ VYPÍNAČ CIRCUIT BREAKER	1,577	1,32 +13,19	-	2,92 (3,83)	3,9 (7,26)	13,0 (15,4)	17,36 (24,61)	F = 12					- " -	



POZNÁMKA: HODNOTY UVEDENÉ V ZÁTVORKÁCH SÚ OD STÁLEHO AJ NÁHODILÉHO ZAŤAŽENIA VRÁTANE. ZAŤAŽENIA SÚ VÝPOČTOVÉ.

REMARK: ATTRIBUTES IN BRACKETS INCLUDE FIXED AND CASUAL LOAD THE LOADS ARE COMPUTING

Part A, USS Košice, ASU no.9, Substations 110kV T01 and T02

Príloha č.1 ZAŤAŽENIE ZÁKLADOV POK R 110 kV TO1 A TO2

Annex No1. THE LOAD OF BASIS FOR STEEL CONSTRUCTION R 110 kV TO1 AND TO2

Order number VUJE: V02-1240/2005/9738/A/17 en

Order number Air Liquide::

Revision: 0

Sheet No.: 5

AIR LIQUIDE INGENIERIE

vúje

Annex No.2 Static control foundations

Basement-bus-bar disconnection switch

L =	1,20 m	Lk =	0,0 m
B =	1,00 m	Bk =	0,0 m
V =	1,10 m	Vk =	0,0 m

G min.= 30,360 kN
G max. = 33,396 kN

Load

V max =	6,850 kN	V min =	2,200 kN
H1 =	0,020 kN	M1 =	0,082 kNm
H1w =	1,120 kN	M1w =	2,222 kNm
H2 =	0,680 kN	M2 =	3,526 kNm
H2w =	2,380 kN	M2w =	6,674 kNm

Stability

Wind direction 1-1

E1 = 0,106 m
0,008 + 0,017 = 0,025 < 0,111

E2 = 0,131 m

Tension on footing bottom

Lo = 0,988 m

Bo = 0,737 m

SIGMA z = 44,69 kPa

Wind direction 2-2

E1 = 0,003
0,000 + 0,081 = 0,081 < 0,111

E2 = 0,285

Tension on footing bottom

Lo = 1,194 m

Bo = 0,429 m

SIGMA z = 63,55 kPa

Tension on footing bottom - max V+G

Wind direction 1-1

E1 = 0,086 m
Lo = 1,028 m

E2 = 0,106 m
Bo = 0,788 m

SIGMA z = 49,69 kPa

Wind direction 2-2

E1 = 0,003 m
Lo = 1,195 m
SIGMA z = 62,58 kPa

E2 = 0,231 m
Bo = 0,538 m

Basement-disconnection schwitch earth knives

Odpojovač vývodový

L =	1,20 m	Lk =	0,0 m
B =	1,00 m	Bk =	0,0 m
V =	1,10 m	Vk =	0,0 m

G min. = 30,360 kN
G max. = 33,396 kN

Load

V max =	11,020 kN	V min =	3,000 kN
H1 =	0,042 kN	M1 =	0,172 kNm
H1w =	1,772 kN	M1w =	3,830 kNm
H2 =	0,675 kN	M2 =	2,770 kNm
H2w =	2,535 kN	M2w =	6,590 kNm

Stability

Wind direction 1-1

E1 = 0,173 m E2 = 0,105 m

0,021 + 0,011 = 0,032 < 0,111

Tension on footing bottom

Lo = 0,854 m Bo = 0,789 m

SIGMA z = 49,51 kPa

Wind direction 2-2

E1 = 0,007 E2 = 0,281

0,000 + 0,079 = 0,079 < 0,111

Tension on footing bottom

Lo = 1,187 m Bo = 0,438 m

SIGMA z = 64,21 kPa

Tension on footing bottom - max V+G

Wind direction 1-1

E1 =	0,130 m	E2 =	0,079 m
Lo =	0,940 m	Bo =	0,842 m

SIGMA z = 56,14 kPa

Wind direction 2-2

E1 =	0,005 m	E2 =	0,211 m
Lo =	1,190 m	Bo =	0,578 m

SIGMA z = 64,60 kPa

Basement-support isolant

L =	1,20 m	Lk =	0,0 m
B =	1,00 m	Bk =	0,0 m
V =	1,10 m	Vk =	0,0 m

G min. = 30,360 kN
G max. = 33,396 kN

Load

V max =	3,100 kN	V min =	1,600 kN
H1 =	0,030 kN	M1 =	0,130 kNm
H1w =	1,220 kN	M1w =	2,213 kNm
H2 =	2,590 kN	M2 =	5,000 kNm
H2w =	3,780 kN	M2w =	6,000 kNm

Stability

Wind direction 1-1

E1 = 0,111 m
0,009 + 0,060 = 0,069 < 0,111

E2 = 0,246 m

Tension on footing bottom

Lo = 0,978 m

Bo = 0,509 m

SIGMA z = 64,26 kPa

Wind direction 2-2

E1 = 0,005
0,000 + 0,101 = 0,101 < 0,111

E2 = 0,318

Tension on footing bottom

Lo = 1,190 m

Bo = 0,364 m

SIGMA z = 73,73 kPa

Tension on footing bottom - max V+G

Wind direction 1-1

E1 =	0,097 m	E2 =	0,215 m
Lo =	1,005 m	Bo =	0,570 m

SIGMA z = 63,71 kPa

Wind direction 2-2

E1 =	0,004 m	E2 =	0,278 m
Lo =	1,191 m	Bo =	0,443 m

SIGMA z = 69,12 kPa

Basement- transformer current/voltage

L =	1,00 m	Lk =	0,0 m
B =	5,70 m	Bk =	0,0 m
V =	1,10 m	Vk =	0,0 m

G min. = 144,210 kN
G max. = 158,631 kN

Load

V max =	38,010 kN	V min =	4,200 kN
H1 =	0,045 kN	M1 =	0,192 kNm
H1w =	5,055 kN	M1w =	13,950 kNm
H2 =	1,341 kN	M2 =	5,670 kNm
H2w =	6,351 kN	M2w =	19,440 kNm

Stability

Wind direction 1-1

E1 = 0,131 m
0,017 + 0,000 = **0,017** < 0,111

E2 = 0,048 m

Tension on footing bottom

Lo = 0,737 m
Bo = 5,604 m

SIGMA z = 35,93 kPa

Wind direction 2-2

E1 = 0,002
0,000 + 0,001 = **0,001** < 0,111

E2 = 0,178

Tension on footing bottom

Lo = 0,997 m
Bo = 5,344 m

SIGMA z = 27,86 kPa

Tension on footing bottom - max V+G

Wind direction 1-1

E1 = 0,099 m
Lo = 0,802 m
E2 = 0,036 m
Bo = 5,627 m

SIGMA z = 43,59 kPa

Wind direction 2-2

E1 = 0,001 m
Lo = 0,998 m
E2 = 0,134 m
Bo = 5,431 m

SIGMA z = 36,29 kPa

Basement – circuit breaker

L =	1,70 m	Lk =	0,0 m
B =	5,00 m	Bk =	0,0 m
V =	1,50 m	Vk =	0,0 m

G min. = 293,250 kN
G max. = 322,575 kN

Load

V max =	67,530 kN	V min =	-20,040 kN
H1 =	8,760 kN	M1 =	39,000 kNm
H1w =	11,490 kN	M1w =	46,200 kNm
H2 =	11,700 kN	M2 =	52,080 kNm
H2w =	21,780 kN	M2w =	73,830 kNm

Stability

Wind direction 1-1

E1 = 0,232 m E2 = 0,255 m

0,019 + 0,003 = **0,021** < 0,111

Tension on footing bottom

Lo = 1,236 m Bo = 4,490 m

SIGMA z = **49,24** kPa

Wind direction 2-2

E1 = 0,191 E2 = 0,390

0,013 + 0,006 = **0,019** < 0,111

Tension on footing bottom

Lo = 1,318 m Bo = 4,220 m

SIGMA z = **49,10** kPa

Tension on footing bottom - max V+G

Wind direction 1-1

E1 =	0,163 m	E2 =	0,178 m
Lo =	1,375 m	Bo =	4,643 m

SIGMA z = **61,12** kPa

Wind direction 2-2

E1 =	0,134 m	E2 =	0,273 m
Lo =	1,433 m	Bo =	4,454 m

SIGMA z = **61,13** kPa

Basement-lighting arrester

L =	1,20 m	Lk =	0,0 m
B =	1,00 m	Bk =	0,0 m
V =	1,10 m	Vk =	0,0 m

G min. = 30,360 kN
G max. = 33,396 kN

Load

V max =	3,110 kN	V min =	1,400 kN
H1 =	0,020 kN	M1 =	0,072 kNm
H1w =	0,861 kN	M1w =	1,355 kNm
H2 =	0,450 kN	M2 =	1,620 kNm
H2w =	1,291 kN	M2w =	2,900 kNm

Stability

Wind direction 1-1

E1 = 0,072 m E2 = 0,067 m

0,004 + 0,004 = 0,008 < 0,111

Tension on footing bottom

Lo = 1,055 m Bo = 0,867 m

SIGMA z = 34,73 kPa

Wind direction 2-2

E1 = 0,003 E2 = 0,136

0,000 + 0,019 = 0,019 < 0,111

Tension on footing bottom

Lo = 1,194 m Bo = 0,728 m

SIGMA z = 36,54 kPa

Tension on footing bottom - max V+G

Wind direction 1-1

E1 =	0,063 m	E2 =	0,058 m
Lo =	1,074 m	Bo =	0,884 m

SIGMA z = 38,45 kPa

Wind direction 2-2

E1 =	0,003 m	E2 =	0,118 m
Lo =	1,195 m	Bo =	0,763 m

SIGMA z = 40,03 kPa