PS01 COOLING SYSTEMS P&ID

SHEET	SCK CEN DRAWING NUMBER	DESCRIPTION	REV	DATE
-	=NA.PS01_PFB503A	NA.PS01.PAB11 - ADIABATIC COOLING SUBSYSTEM - LOW TEMPERATURE	01	23/07/07
-	=NA.PS01_PFB503B	NA.PS01.PGB20 - CHILLED WATER SUBSYSTEM	01	23/07/07
-	=NA.PS01_PFB503C	NA.PS01.PCB30 - GEOTHERMAL COOLING SUBSYSTEM	01	23/07/07
-	=NA.PS01_PFB503D	NA.PS01.PGB30 - INTERMEDIATE GEOTHERMAL COOLING LOOP	01	23/07/07
-	=NA.PS01_PFB503E	NA.PS01.PGB31 - PCO & SSA COOLING LOOP	01	23/07/07
-	=NA.PS01_PFB503F	NA.PS01.PJB31 - LOW ACT. INJECTOR MAGNETS COOLING LOOP	01	23/07/07
-	=NA.PS01_PFB503G	NA.PS01.PJB32 - LOW ACT. INJECTOR NC-RF CAVITIES COOLING LOOP	01	23/07/07
-	=NA.PS01_PFB503H	NA.PS01.PJB33 - LOW ACT. DUMP-I COOLING LOOP	01	23/07/07
-	=NA.PS01_PFB503I	NA.PS01.PJB34 - LOW ACT. SC LINAC / BTT COOLING LOOP	01	23/07/07
-	=NA.PS01_PFB503J	NA.PS01.PUA10 - PROPYLENE GLYCOL SUPPLY SUBSYSTEM	00	23/04/14
-	=NA.PS01_PFB503K	NA.PS01.PAB12 - ADIABATIC COOLING SUBSYSTEM - MEDIUM TEMPERATURE	01	23/07/07

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PUD	MBK
0	23/04/14	FOR APPROVAL	MUI/MIU	AJD	MBK

sck cen

MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

PS01 COOLING SYSTEMS P&ID

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12300

Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503

Scale: N/A

Format: A0

Sheet: -

P&ID
ADIABATIC COOLING SUBSYSTEM - LOW TEMPERATURE
NA.PS01.PAB11

SHEET	SCK CEN DRAWING NUMBER	DESCRIPTION	REV	DATE
00	=NA.PS01_PFB503A	=NA.PS01.PAB11 - ADIABATIC COOLING SUBSYSTEM - LOW TEMPERATURE. COVER SHEET	01	23/07/07
01	=NA.PS01_PFB503A	=NA.PS01.PAB11 - ADIABATIC COOLING SUBSYSTEM - LOW TEMPERATURE	01	23/07/07
02	=NA.PS01_PFB503A	=NA.PS01.PAB11 - ADIABATIC COOLING SUBSYSTEM - LOW TEMPERATURE	01	23/07/07
03	=NA.PS01_PFB503A	=NA.PS01.PAB11 - ADIABATIC COOLING SUBSYSTEM - LOW TEMPERATURE	01	23/07/07
04	=NA.PS01_PFB503A	=NA.PS01.PAB11 - ADIABATIC COOLING SUBSYSTEM - LOW TEMPERATURE	01	23/07/07

NOTES :

1. GENERAL NOTE: FOR SYMBOLOGY, REFER TO APPENDIX B OF DOCUMENT =NA.AC_BDC501 "DESIGN ENGINEER INTEGRATION PLAN - BIM PROTOCOL".
2. GENERAL NOTE: THIS DRAWING IS PRELIMINARY AND IT IS NO VALID FOR CONSTRUCTION. THIS DRAWING IS SUBJECT TO REVISION DURING THE DETAIL ENGINEERING PHASE, BASED ON THE PIPING ARRANGEMENT AND THE INFORMATION PROVIDED BY THE MAIN EQUIPMENT SUPPLIERS.
3. GENERAL NOTE: FOR THE P&ID TYPICALS, REFER TO =NA.CN_ETA503.
4. GENERAL NOTE: ADITIONAL DRAINS AND VENTS WILL BE LOCATED AT LOW AND HIGH POINTS.
5. THE FLOW INDICATORS AND TRANSMITTERS WILL HAVE A MINIMUM STRAIGHT LENGTH OF TUBES OF METERS 10 TIMES THE DIAMETER UPSTREAM AND 5 TIMES THE DIAMETER DOWNSTREAM AND WILL BE INSTALLED IN HORIZONTAL SECTIONS.
6. MANUAL SAMPLING.
7. FILLING CONNECTION OF WATER-PROPYLENE GLYCOL (40%WT.) MIXTURE. THE FILLING OF THE LOOP FROM A TANK TRAILER OR FROM A MOBILE GLYCOL/WATER CUBITAINER WILL BE DONE BY THE CONNECTION OF A TEMPORARY HOSE.
8. WATER GLYCOL DRAINS WILL BE COLLECTED IN PORTABLE COLLECTION BINS (NA.PS03.GMB10).
9. CLOSED THREADED CONNECTION FOR THE INSTALLATION OF A REMOVABLE PIPE / HOSE FOR BYPASSING THE SCC DURING THE CLEANING OF THE LOOP.
10. CHECK VALVE AND ISOLATION VALVE WILL BE SITED AS CLOSE AS POSSIBLE TO THE INJECTION POINTS.
11. THE NUMBER OF ADIABATIC COOLERS WILL DEPEND ON THE MANUFACTURER FINALLY SELECTED.
12. FLANGED SPOOL FOR COMMISSIONING PURPOSE. (1)

BRANCH	DESIGN	
	P barg	T °C
a	10	50 (1)
b	3,5	50 (1)
c	0,49	50 (1)
d	9	39
e	4,5 (1)	40

(1)

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MUMMIU	AJO	MBK

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID ADIABATIC COOLING SUBSYSTEM - LOW TEMPERATURE

NA.PS01.PAB11

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12301

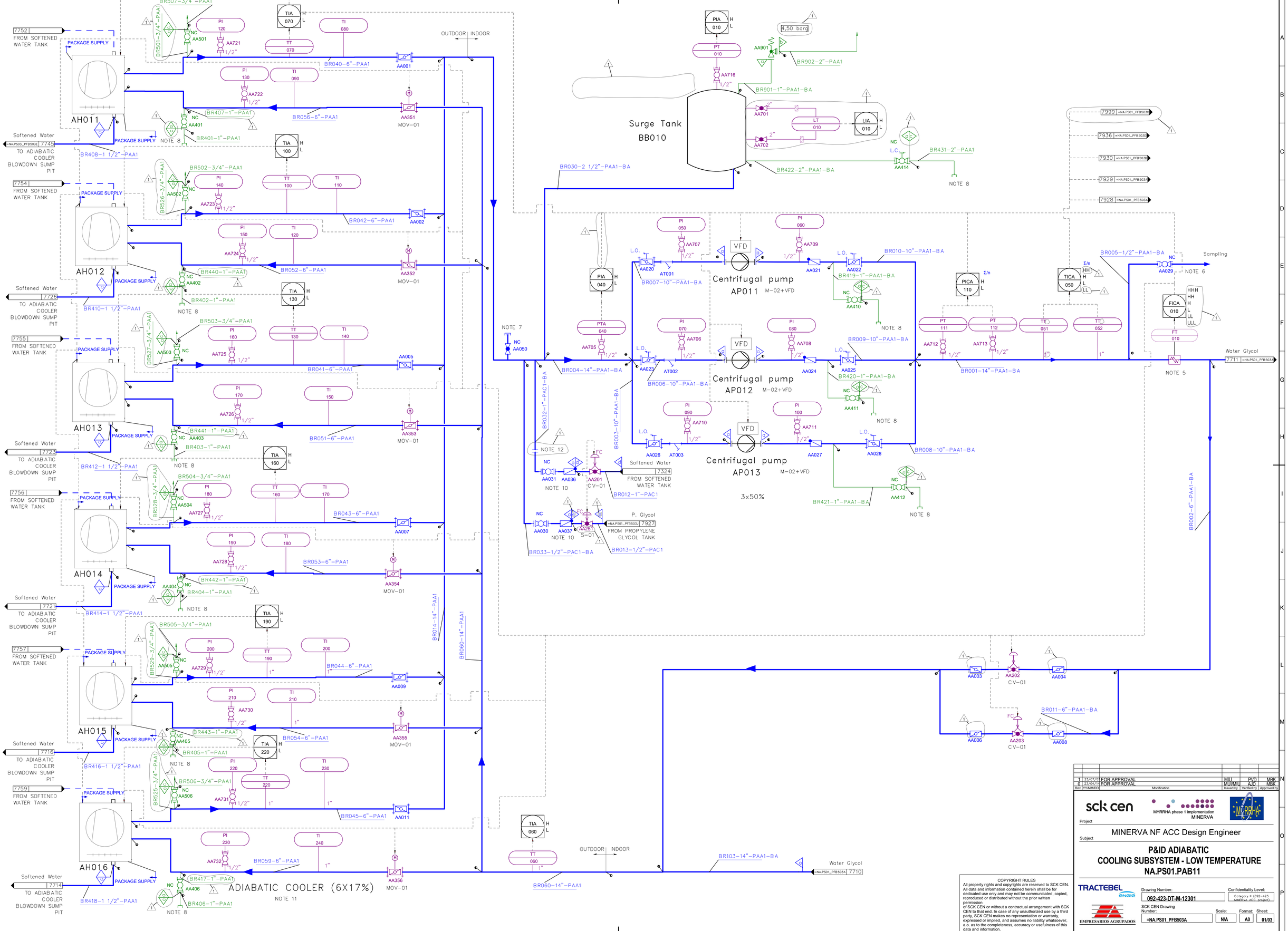
Confidentiality Level: Category II (092-423, MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503A

Scale: N/A

Format: A0

Sheet: 00/03



Rev	(YY/MM/DD)	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MUI/MIU	AJD	MBK

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID ADIABATIC COOLING SUBSYSTEM - LOW TEMPERATURE NA.PS01.PAB11

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12301

Confidentiality Level: Category II (092-423-MINERVA-ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503A

Scale: N/A

Format: A0

Sheet: 01/03

Water Glycol
=NA.PS01_PFB503A 7711
FROM PUMP DISCHARGE

BR001-14"-PAA1-BA

BR129-10"-PAA1-BA

Water Glycol
=NA.PS01_PFB503A 7637
FROM CHILLERS AND HEAT EXCHANGER OF CHILLED WATER SUBSYSTEM

BR120-10"-PAA1-BA

Water Glycol
7638 =NA.PS01_PFB503A
TO CHILLERS AND HEAT EXCHANGER OF CHILLED WATER SUBSYSTEM

BR111-12"-PAA1-BA

BR112-8"-PAA1

BR102-12"-PAA1-BA

BR108-8"-PAA1-BA

BR116-8"-PAA1

BR115-8"-PAA1

BR121-6"-PAA1

BR117-6"-PAA1-BA

BR118-6"-PAA1-BA

BR115-8"-PAA1-BA

BR125-6"-PAA1-BA

BR121-6"-PAA1-BA

BR103-14"-PAA1-BA

FICA 020 (H/L) — FT 020 — NOTE 5

AA062 — AA301 MOV-03 — AA061

BR301-6"-PAA1 — NC — AA063

AA066

=NA.PS01_PFB503A 7928

PI 300 — AA735 — 1/2"

TT 310 — 1" — TIA 310 (H/L)

BR508-3/4"-PAA1-BA

BR513-3/4"-PAA1

AA903 — BR906-1"-PAA1 — NOTE 8

NC — AA513

BR905-1"-PAA1-BA

BR109-6"-PAA1-BA

Water Glycol
=NA.PS01_PFB503C 7604
FROM NA.PS01.PCB30 AC011

TI 320 — 1"

PI 310 — AA736 — 1/2"

AA067

BR409-1"-PAA1-BA

NC — AA423

BR424-1"-PAA1

NOTE 8

Water Glycol
7605 =NA.PS01_PFB503C
TO NA.PS01.PCB30 AC011

FICA 030 (H/L) — FT 030 — NOTE 5

AA078 — AA310 MOV-03 — AA070

BR302-6"-PAA1 — NC — AA079

AA071

PI 320 — AA737 — 1/2"

TT 330 — 1" — TIA 330 (H/L)

BR509-3/4"-PAA1-BA

BR514-3/4"-PAA1

AA904 — BR908-1"-PAA1 — NOTE 8

NC — AA514

BR907-1"-PAA1-BA

BR110-6"-PAA1-BA

Water Glycol
=NA.PS01_PFB503C 7607
FROM NA.PS01.PCB30 AC012

TI 340 — 1"

PI 330 — AA738 — 1/2"

AA072

BR415-1"-PAA1-BA

NC — AA424

BR425-1"-PAA1

NOTE 8

Water Glycol
7606 =NA.PS01_PFB503C
TO NA.PS01.PCB30 AC012

FICA 040 (H/L) — FT 040 — NOTE 5

AA073 — AA308 MOV-03 — AA074 — AA076

BR321-8"-PAA1-BA — NC — AA075

PI 280 — AA739 — 1/2"

TT 290 — 1" — TIA 290 (H/L)

BR515-3/4"-PAA1

BR510-3/4"-PAA1-BA

AA905 — BR910-1"-PAA1 — NOTE 8

NC — AA515

BR909-1"-PAA1-BA

Water Glycol
=NA.PS01_PFB503C 7608
FROM NA.PS01.PCB30 AC020

TI 300 — 1"

PI 290 — AA740 — 1/2"

AA077

BR411-1"-PAA1-BA

NC — AA425

BR426-1"-PAA1

NOTE 8

Water Glycol
7609 =NA.PS01_PFB503C
TO NA.PS01.PCB30 AC020

=NA.PS01_PFB503B 7916

TIA 350 (H/L)

PI 340 — AA743 — 1/2"

TT 350 — 1"

BR516-3/4"-PAA1

BR520-3/4"-PAA1-BA

AA910 — BR914-1"-PAA1

NC — AA516

NOTE 8

BR913-1"-PAA1-BA

AA305 MOV-03

AA101 — AA102 — AA104

BR326-6"-PAA1-BA — NC — AA103

BR125-6"-PAA1-BA

BR125-6"-PAA1-BA

Water Glycol
=NA.PS01_PFB503B 7640
FROM NA.PS01.PGB20 AC010

TI 360 — 1"

PI 350 — AA744 — 1/2"

AA105

BR413-1"-PAA1-BA

NC — AA421

BR427-1"-PAA1

NOTE 8

Water Glycol
=NA.PS01_PFB503B 7641
TO NA.PS01.PGB20 AC010

Water Glycol
8005 =NA.PS01_PFB503A
TO NA.PS01.PGB30 AC021/022

Water Glycol
=NA.PS01_PFB503A 8004
FROM NA.PS01.PGB30 AC021/022

Water Glycol
=NA.PS01_PFB503A 7710
TO ADIABATIC COOLERS

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1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MUIMIU	AJD	MBK

Project: MYRRHA phase 1 implementation MINERVA

Subject: MINERVA NF ACC Design Engineer

P&ID ADIABATIC COOLING SUBSYSTEM - LOW TEMPERATURE NA.PS01.PAB11

TRACTEBEL ENGIE
EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12301
Confidentiality Level: Category II (092-423 MINERVA ACC project)
SCK CEN Drawing Number: =NA.PS01_PFB503A
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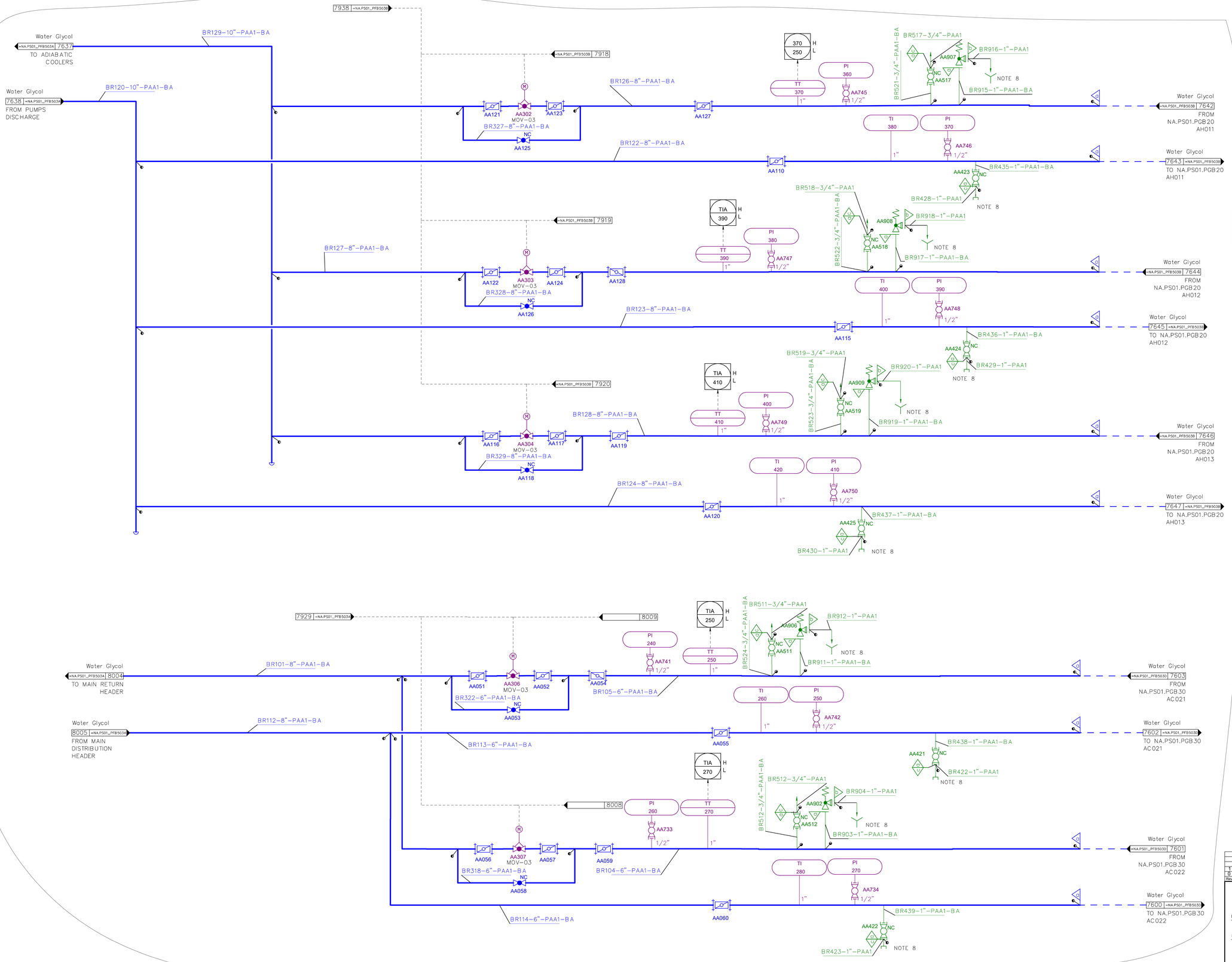

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MU/MIU	AJD	MBK

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID ADIABATIC COOLING SUBSYSTEM - LOW TEMPERATURE

NA.PS01.PAB11

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12301

Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503A

Scale: N/A

Format: A0

Sheet: 03/03

P&ID
CHILLED WATER SUBSYSTEM
NA.PS01.PGB20

SHEET	SCK CEN DRAWING NUMBER	DESCRIPTION	REV	DATE
00	=NA.PS01_PFB503B	NA.PS01.PGB20 - CHILLED WATER SUBSYSTEM .COVER SHEET	01	23/07/07
01	=NA.PS01_PFB503B	NA.PS01.PGB20 - CHILLED WATER SUBSYSTEM	01	23/07/07

NOTES :

1. GENERAL NOTE: FOR SYMBOLOGY, REFER TO APPENDIX B OF DOCUMENT =NA.AC_BDC501 "DESIGN ENGINEER INTEGRATION PLAN - BIM PROTOCOL".
2. GENERAL NOTE: THIS DRAWING IS PRELIMINARY AND IT IS NO VALID FOR CONSTRUCTION. THIS DRAWING IS SUBJECT TO REVISION DURING THE DETAIL ENGINEERING PHASE, BASED ON THE PIPING ARRANGEMENT AND THE INFORMATION PROVIDED BY THE MAIN EQUIPMENT SUPPLIERS.
3. GENERAL NOTE: FOR THE P&ID TYPICALS, REFER TO =NA.GN_ETA503.
4. GENERAL NOTE: DRAINS AND VENT WILL BE LOCATED AT LOW AND HIGH POINTS.
5. THE FLOW INDICATORS AND TRANSMITTERS WILL HAVE A MINIMUM STRAIGHT LENGTH OF TUBES OF METERS 10 TIMES THE DIAMETER UPSTREAM AND 5 TIMES THE DIAMETER DOWNSTREAM AND WILL BE INSTALLED IN HORIZONTAL SECTIONS.
6. MANUAL SAMPLING
7. FILLING CONNECTION OF WATER - PROPYLENE GLYCOL (40%WT.) MIXTURE. THE FILLING OF THE LOOP FROM A TANK TRAILER OR FROM A MOBILE GLYCOL/WATER CUBITAINER WILL BE DONE BY THE CONNECTION OF A TEMPORARY HOSE.
8. WATER - GLYCOL DRAINS WILL BE COLLECTED IN PORTABLE COLLECTION BINS (NA.PS03.GMB10)
9. CURRENT PIPE SERVICES TO MAC CONSIDERS THE ROUTING THROUGH THE EAST GALLERY, WITH THE TERMINAL POINT AT THE EAST WALL OF THE MAC (PRELIMINARY, TO BE CONFIRMED).
10. FLANGED SPOOL FOR COMMISSIONING PURPOSE. 1

BRANCH	DESIGN	
	P barg	T °C
a	12	40
b	3,5	40
c	0,49	40
d	9	39
e	4,5/1	40

1

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MUI/MIU	AJD	MBK

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
CHILLED WATER SUBSYSTEM
NA.PS01.PGB20

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12302

Confidentiality Level: Category 1 (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503B

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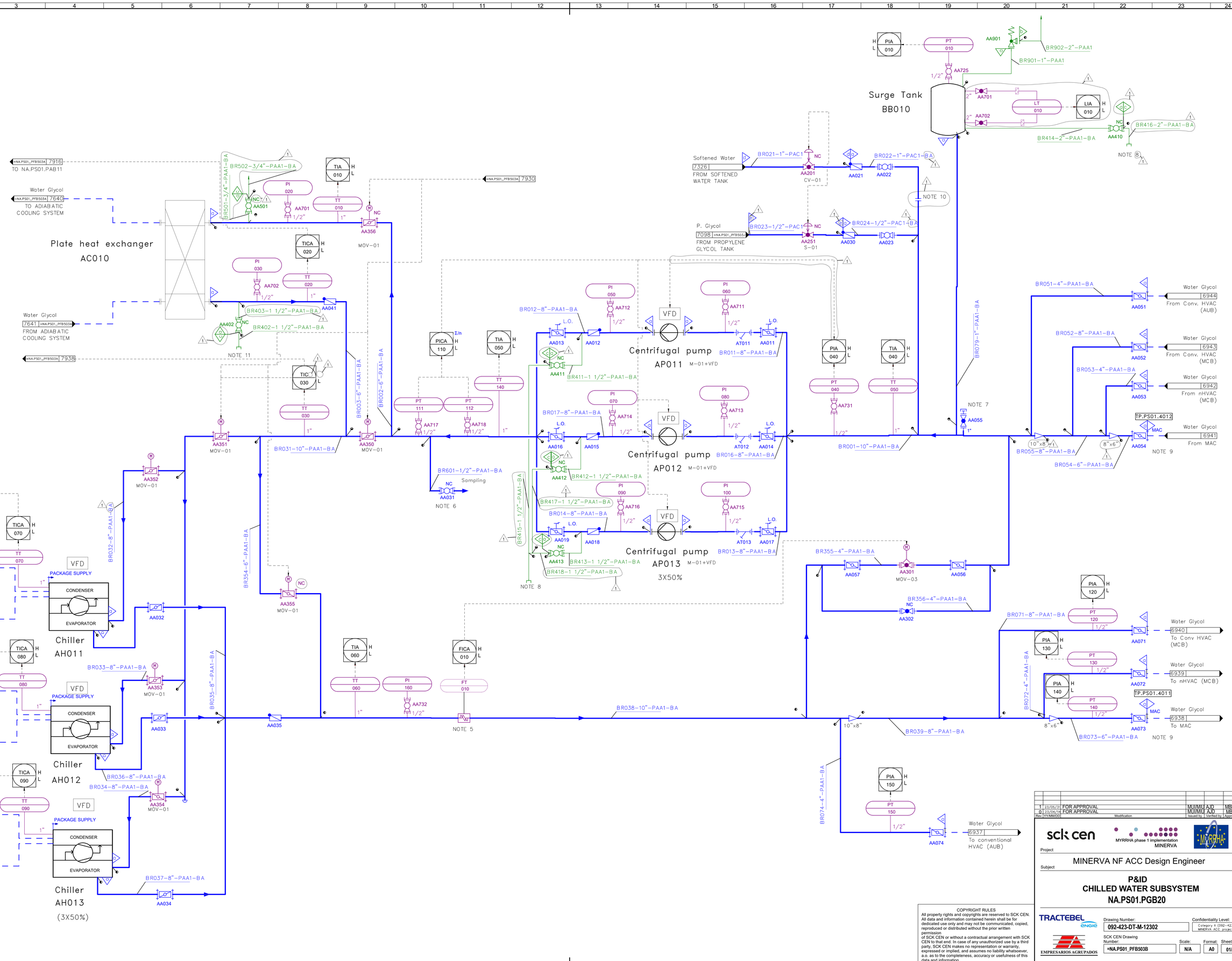

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/05/31	FOR APPROVAL	MUIMUI AJD		MBK
0	23/03/14	FOR APPROVAL	MUIMUI AJD		MBK

Project: MINERVA NF ACC Design Engineer

Subject: **P&ID**
CHILLED WATER SUBSYSTEM
NA.PS01.PGB20

TRACTEBEL ENGIE
EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12302
Confidentiality Level: Category II (092-423 MINERVA ACC project)
SCK CEN Drawing Number: =NA.PS01_PFB503B
Scale: N/A
Format: A0
Sheet: 01/01

P&ID
GEOTHERMAL COOLING SUBSYSTEM
NA.PS01.PCB30

SHEET	SCK CEN DRAWING NUMBER	DESCRIPTION	REV	DATE
00	=NA.PS01_PFB503C	NA.PS01.PCB30 - GEOTHERMAL COOLING SUBSYSTEM. COVER SHEET	01	23/07/07
01	=NA.PS01_PFB503C	NA.PS01.PCB30 - GEOTHERMAL COOLING SUBSYSTEM	01	23/07/07

NOTES :

1. GENERAL NOTE: FOR SYMBOLOGY, REFER TO APPENDIX B OF DOCUMENT =NA.AC_BDC501 "DESIGN ENGINEER INTEGRATION PLAN - BIM PROTOCOL".
2. GENERAL NOTE: THIS DRAWING IS PRELIMINARY AND IT IS NO VALID FOR CONSTRUCTION. THIS DRAWING IS SUBJECT TO REVISION DURING THE DETAIL ENGINEERING PHASE, BASED ON THE PIPING ARRANGEMENT AND THE INFORMATION PROVIDED BY THE MAIN EQUIPMENT SUPPLIERS.
3. GENERAL NOTE: FOR THE P&ID TYPICALS, REFER TO =NA.CN_ETA503.
4. GENERAL NOTE: DRAINS AND VENT WILL BE LOCATED AT LOW AND HIGH POINTS.
5. THE FLOW INDICATORS AND TRANSMITERS WILL HAVE A MINIMUM STRAIGHT LENGHT OF TUBERS OF METERS 10 TIMES THE DIAMETER UPSTREAM AND 5 TIMES THE DIAMETER DOWNSTREAM AND WILL BE INSTALLED IN HORIZONTAL SECTIONS. (1)
6. HEAT RECOVERY FROM GROUNDWATER BY A HEAT PUMP UNDER THE SCOPE OF HVO6 HEATING SYSTEM. (1)
7. DETAIL DESIGN OF THIS SUBSYSTEM UNDER THE SCOPE OF THE GEOTHERMAL SUBSYSTEM TECHNOLOGIST.
8. AQUIFER THERMAL ENERGY STORAGE (ATES) CONFIGURATION WITH COLD STORAGE/RECIRCULATION (CS/R) VARIANT CONSIDERED FOR THE GEOTHERMAL COOLING (ONE WAY SYSTEM). WHEN THE OUTSIDE TEMPERATURE IS LOW ENOUGH, THE ADIABATIC COOLERS WILL PROVIDE THE REGENERATION OF THE HEATED GROUNDWATER. THE POSITION OF THE CONTROL AND ISOLATING VALVES ARE SEASONALLY DEPENDANT. MAIN CONTROL LOOPS OF THE SYSTEM TO BE LATER DETAILED BY THE GEOTHERMAL SUBSYSTEM TECHNOLOGIST.

BRANCH	DESIGN	
	P barg	T °C
a	10	40
b	3,5	40
c	0,49	40

(1)

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MJ/MIU	AJD	MBK

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
GEOTHERMAL COOLING SUBSYSTEM
NA.PS01.PCB30

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12303

Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503C

Scale: N/A

Format: A0

Sheet: 00/01

PACKAGE SUPPLY

NOTES 7, 8

Water Glycol
=NA.PS01_PFB503A 7604
TO ADIABATIC COOLING SYSTEM

Water Glycol
7605 =NA.PS01_PFB503A
FROM ADIABATIC COOLING SYSTEM

AC011

Water Glycol
=NA.PS01_PFB503A 7607
TO ADIABATIC COOLING SYSTEM

Water Glycol
7606 =NA.PS01_PFB503A
FROM ADIABATIC COOLING SYSTEM

AC012

HEAT EXCHANGER HX3
(2 X 50%)

Water Glycol
=NA.PS01_PFB503A 7608
TO ADIABATIC COOLING SYSTEM

Water Glycol
7609 =NA.PS01_PFB503A
FROM ADIABATIC COOLING SYSTEM

AC020

HEAT EXCHANGER HX4
(1 X 100%)

Groundwater
=NA.HV_MFB504 7550
FROM HV06 HEAT PUMP

NOTE 6

Groundwater
7551 =NA.HV_MFB504
TO HV06 HEAT PUMP

BR502-3/4"-PAC1
BR503-3/4"-PAC1-BA
BR504-3/4"-PAC1
BR505-3/4"-PAC1-BA
BR506-3/4"-PAC1
BR507-3/4"-PAC1-BA
BR508-3/4"-PAC1
BR509-3/4"-PAC1-BA

NC AA501 AA502 AA503 AA504

TT PI FT

AA715 AA716 AA714 AA713 AA712 AA710 AA718 AA717

1" 1/2"

BR040-6"-PAC1-BA
BR042-6"-PAC1-BA
BR041-6"-PAC1-BA
BR043-6"-PAC1-BA
BR015-8"-PAC1-BA
BR014-6"-PAC1-BA
BR016-6"-PAC1-BA

AA020 AA021 AA022 AA024 AA011

BR402-1"-PAC1-BA
BR403-1"-PAC1
BR404-1"-PAC1-BA
BR406-1"-PAC1
BR013-8"-PAC1-BA
BR018-8"-AM1z
BR405-PAC1-BA
BR407-1"-PAC1
BR017-6"-AM1z
BR408-PAC1-BA
BR409-1"-PAC1

NC AA401 AA402 AA403 AA404

AA023

BR053-16"-AM1z

PT AA709 1/2"

SURGE TANK BB010

AP021 AP022 AP023 AP024

AA026 AA027 AA028 AA029

BR054-8"-AM1z BR055-8"-AM1z BR056-8"-AM1z BR057-8"-AM1z

INJECTION WELLS
4x25%

BR050-8"-PAC1-BA
BR051-10"-AM1z
BR052-14"-AM1z

AA351 MOV-01

BR032-8"-PAC1-BA
BR031-10"-AM1z

AA303 MOV-01
AA304 MOV-01

BR013-8"-PAC1-BA
BR014-6"-PAC1-BA
BR008-6"-AM1z

INDOOR OUTDOOR

BR030-6"-PAC1-BA
BR006-12"-AM1z
BR012-8"-PAC1-BA
BR010-6"-PAC1-BA
BR009-8"-PAC1-BA
BR005-16"-AM1z

AA001 AA002 AA003 AA004 AA005 AA006 AA007 AA008

L.O.

AA704 AA703 AA702 AA701

AP011 AP012 AP013 AP014

EXTRACTION WELLS
4x25%

NOTES 7, 8

AA301 MOV-01
AA014 AA015 AA013
BR301-6"-PAC1-BA
BR022-6"-PAC1-BA
AA012

AA302 MOV-01
AA017 AA016 AA018
BR302-6"-PAC1-BA
BR021-6"-PAC1-BA
AA025

AA009
BR011-6"-PAC1-BA

AA010

BR511-3/4"-PAC1-BA
BR512-3/4"-PAC1
BR501-3/4"-PAC1-BA
BR510-3/4"-PAC1

AA901 AA902 AA411 AA412 AA502 AA505

BR902-1"-PAC1
BR901-1"-PAC1-BA
BR904-1"-PAC1
BR903-1"-PAC1-BA
BR411-1"-PAC1-BA
BR413-1"-PAC1
BR412-1"-PAC1-BA
BR410-1"-PAC1

NOTE 8

AA706 AA707 AA708 AA705

Groundwater
7568 =NA.PS01_PFB5030
FROM NA.PS01.PGB30 AC011

Groundwater
7564 =NA.PS01_PFB5030
TO NA.PS01.PGB30 AC011

Groundwater
7567 =NA.PS01_PFB5030
TO NA.PS01.PGB30 AC012

Groundwater
7566 =NA.PS01_PFB5030
FROM NA.PS01.PGB30 AC012

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MIU/MIU	AJD	MBK

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
GEOTHERMAL COOLING SUBSYSTEM
NA.PS01.PCB30

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12303

Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503C

Scale: N/A

Format: A0

Sheet: 01/01

P&ID
INTERMEDIATE GEOTHERMAL COOLING LOOP
NA.PS01.PGB30

SHEET	SCK CEN DRAWING NUMBER	DESCRIPTION	REV	DATE
00	=NA.PS01_PFB503D	NA.PS01.PGB30 - INTERMEDIATE GEOTHERMAL COOLING LOOP. COVER SHEET	01	23/07/07
01	=NA.PS01_PFB503D	NA.PS01.PGB30 - INTERMEDIATE GEOTHERMAL COOLING LOOP	01	23/07/07
02	=NA.PS01_PFB503D	NA.PS01.PGB30 - INTERMEDIATE GEOTHERMAL COOLING LOOP	01	23/07/07

NOTES :

1. GENERAL NOTE: FOR SYMBOLOGY, REFER TO APPENDIX B OF DOCUMENT =NA.AC_BDC501 “DESIGN ENGINEER INTEGRATION PLAN - BIM PROTOCOL”.
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3. GENERAL NOTE: FOR THE P&ID TYPICALS, REFER TO =NA.CN_ETA503.
4. GENERAL NOTE: DRAINS AND VENT WILL BE LOCATED AT LOW AND HIGH POINTS.
5. THE FLOW INDICATORS AND TRANSMITTERS WILL HAVE A MINIMUM STRAIGHT LENGTH OF TUBES OF METERS 10 TIMES THE DIAMETER UPSTREAM AND 5 TIMES THE DIAMETER DOWNSTREAM AND WILL BE INSTALLED IN HORIZONTAL SECTIONS.
6. MANUAL SAMPLING
7. GENERAL NOTE: FOR P&IDS TYPICALS, REFER TO =NA.CN_ETA503
8. SOFTENED WATER DRAINS COLLECTED IN THE INDUSTRIAL WASTEWATER SUM PIT. (NA.PS03.GMB40)
9. COOLING IS PERFORMED DIRECTLY FROM THE ADIABATIC COOLING SUBSYSTEM WHEN THE OUTSIDE TEMPERATURE IS LOW ENOUGH.
10. IN CASE OF HIGH RADIATION LEVEL, THE NON-ACTIVATED SUBSYSTEM IS ISOLATED FROM DEFECTIVE HEAT EXCHANGER.
11. CURRENT PIPE SERVICES TO MAC CONSIDERS THE ROUTING THROUGH THE EAST GALLERY, WITH THE TERMINAL POINT AT THE EAST WALL OF THE MAC (PRELIMINARY, TO BE CONFIRMED).

BRANCH	DESIGN	
	P barg	T °C
a	12	40
b	3,5	40
c	0,49	40
d	9	39

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MIU/MIU	AJD	MBK

sck cen

MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
INTERMEDIATE GEOTHERMAL COOLING LOOP
NA.PS01.PGB30

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12304

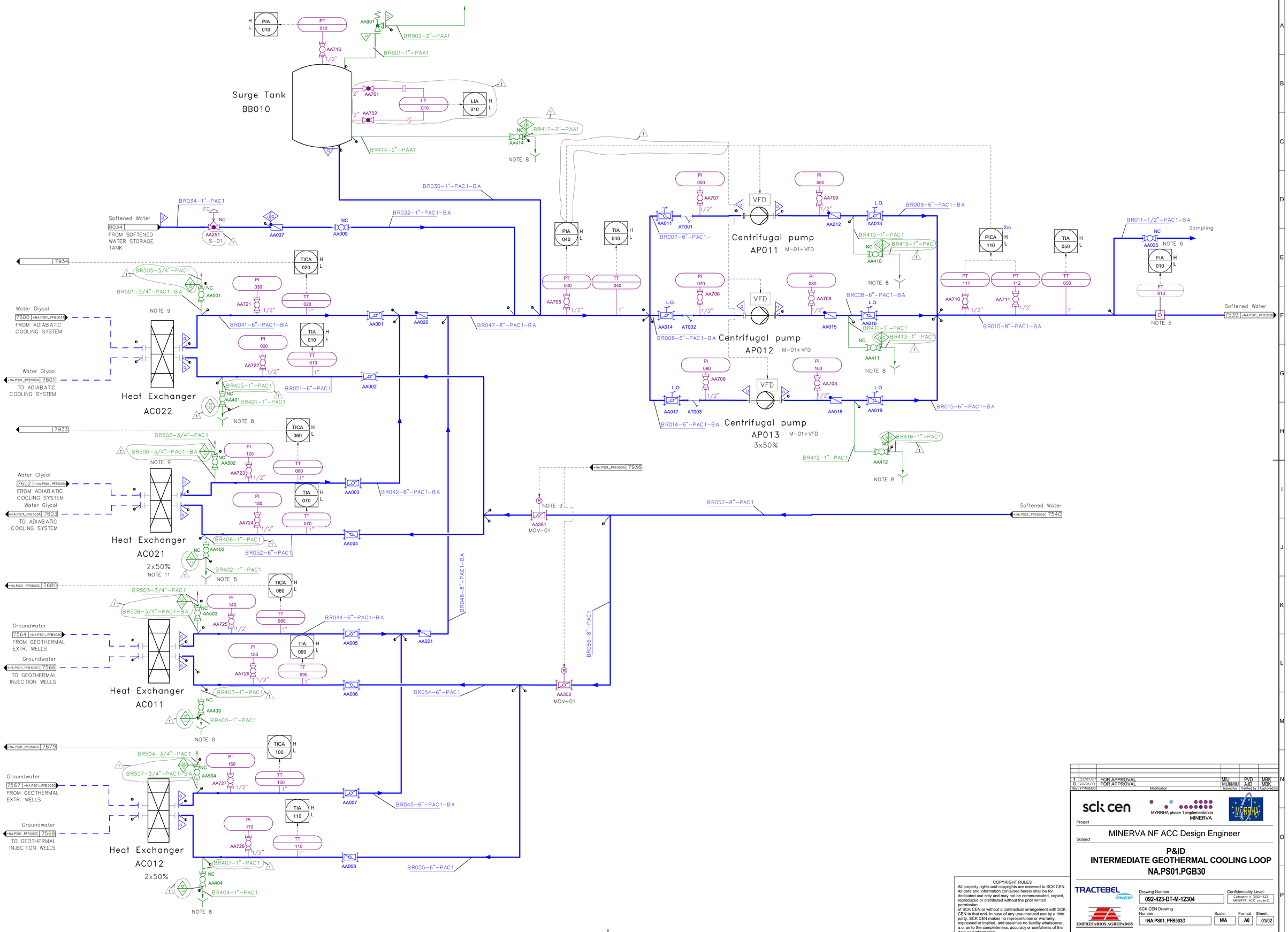
Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503D

Scale: N/A

Format: A0

Sheet: 00/02



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1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MUIMIU	AJD	MBK

sck cen

MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
INTERMEDIATE GEOTHERMAL COOLING LOOP
NA.PS01.PGB30

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: **092-423-DT-M-12304**

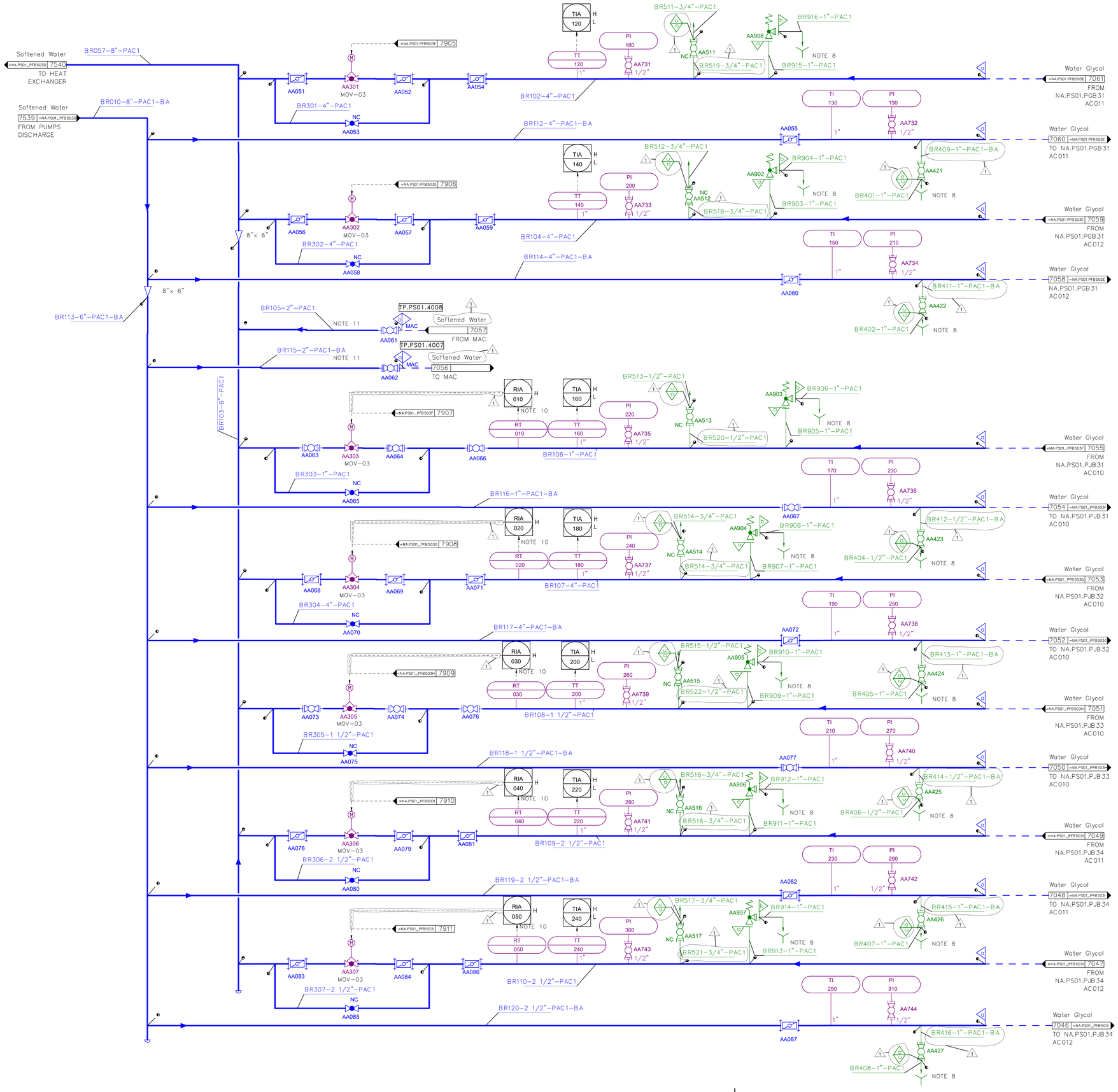
Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: **=NA.PS01_PFB503D**

Scale: **N/A**

Format: **A0**

Sheet: **01/02**



Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MU/MIU	AJD	MBK

sck cen

MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
INTERMEDIATE GEOTHERMAL COOLING LOOP
NA.PS01.PGB30

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12304

Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503D

Scale: N/A

Format: A0

Sheet: 02/02

P&ID
PCO & SSA COOLING LOOP
NA.PS01.PGB31

SHEET	SCK CEN DRAWING NUMBER	DESCRIPTION	REV	DATE
00	=NA.PS01_PFB503E	NA.PS01.PGB31 - PCO & SSA COOLING LOOP. COVER SHEET	01	23/07/07
01	=NA.PS01_PFB503E	NA.PS01.PGB31 - PCO & SSA COOLING LOOP	01	23/07/07
02	=NA.PS01_PFB503E	NA.PS01.PGB31 - PCO & SSA COOLING LOOP (CONT.)	01	23/07/07

NOTES :

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3. GENERAL NOTE: FOR THE P&ID TYPICALS, REFER TO =NA.CN_ETA503.
4. GENERAL NOTE: DRAINS AND VENT WILL BE LOCATED AT LOW AND HIGH POINTS.
5. DEMINERALIZED WATER DRAINS AT THE WEST SIDE OF THE RF GALLERY WILL BE COLLECTED IN A BLIND PIT THAT WILL BE EMPTIED BY PORTABLE MEANS.
6. SODIUM BASED MIXED BED AND PARTICLE FILTERING (< 10 MICRONS) TO ELEVATE PH=9 AND REMOVE DISSOLVED COPPER IONS (PRELIMINARY).
7. LEAKTIGHT CONTAINMENT PIT.
8. GENERIC NUMBERING AND GROUPING OF THE TERMINAL POINTS FOR THE DIFFERENT ACC EQUIPMENT, BASED ON THE HIGH LEVEL INTERFACE LIST OF THE ACC (ID2558). DETAILS OF FINAL CONNECTION TO THE DIFFERENT ACC EQUIPMENT ARE PENDING.
9. THE FLOW INDICATORS AND TRANSMITTERS WILL HAVE A MINIMUM STRAIGHT LENGTH OF TUBES OF METERS 10 TIMES THE DIAMETER UPSTREAM AND 5 TIMES THE DIAMETER DOWNSTREAM AND WILL BE INSTALLED IN HORIZONTAL SECTIONS.
10. HOSE CONNECTIONS WIL BE CONSIDERED FOR THE FINAL CONNECTION TO THE ACC EQUIPMENT, TO BE DEFINED IN A LATTER STAGE IN ACCOCORDANCE WITH THE EQUIPMENT CONNECTION DETAILS.
11. TEMPERATURE CONTROL OF THE LOOPS TO BE LOCATED AS CLOSE AS POSSIBLE TO THE ACC EQUIPMENT.
12. CLOSED THREADED CONNECTION FOR THE INSTALLATION OF A REMOVABLE PIPE / HOSE FOR BYPASSING THE SCC DURING THE CLEANING OF THE LOOP.
13. MANUAL SAMPLING
14. REVERSE RETURN SETUP TO ENSURE AN EQUAL PRESSURE DIFFERENCE OVER THE COMPONENTS ALONG THE ENTIRE LENGHT OF THE COLLECTOR.
15. COOLING WATER DISTRIBUTION IN INJECTOR UTILITIES ROOM TO BE CONFIRMED BASED ON CABINETS DISTRIBUTION INSIDE THE ROOM.

BRANCH	DESIGN	
	P	T
	barg	°C
a	14	50
b	3,5	50
c	0,49	50
d	9	39

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
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0	23/04/14	FOR APPROVAL	MUI/MIU	AJD	MBK

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
PCO & SSA COOLING LOOP
NA.PS01.PGB31

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12305

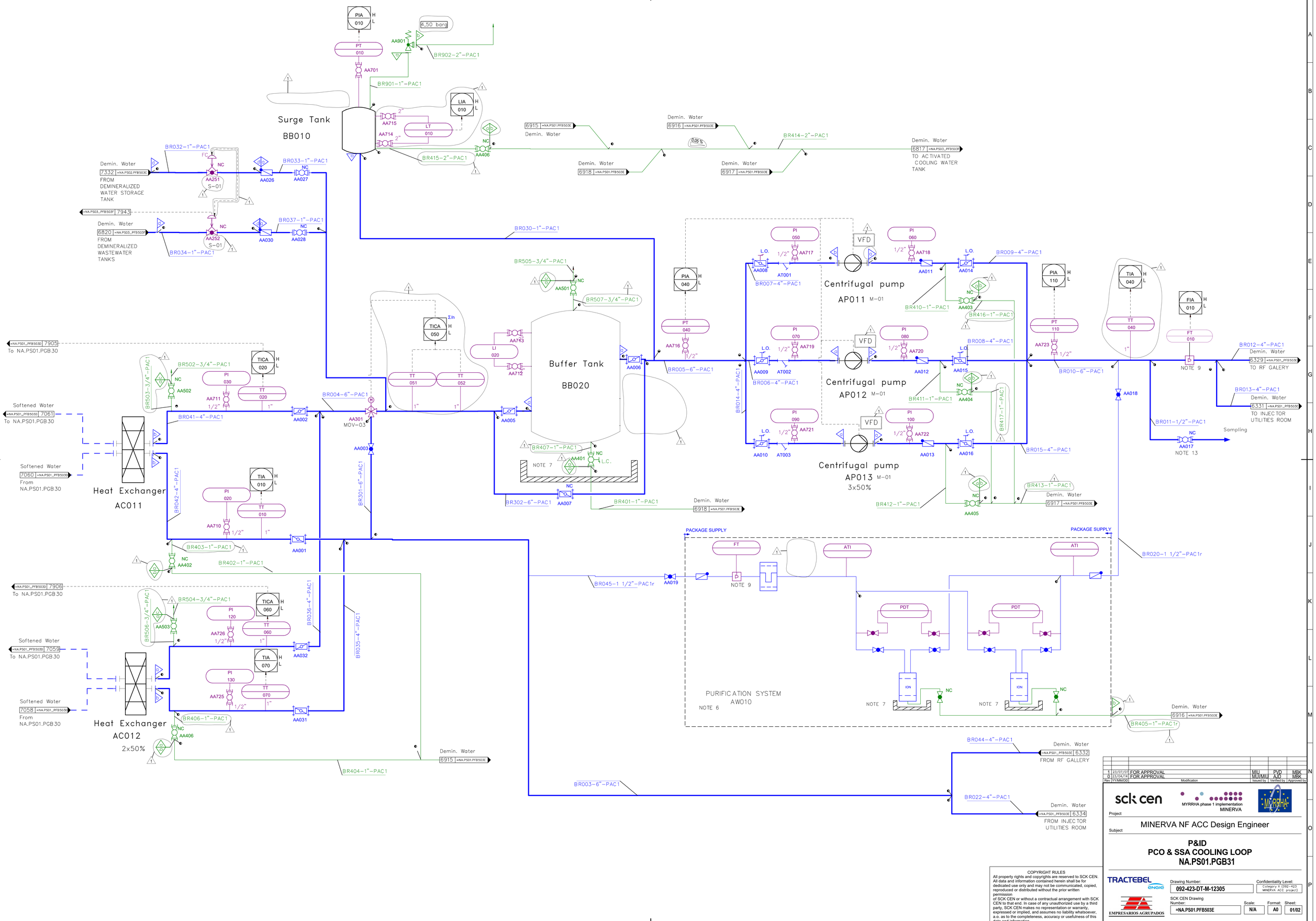
Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503E

Scale: N/A

Format: A0

Sheet: 00/02



Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MUMMU	AJD	MBK

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
PCO & SSA COOLING LOOP
NA.PS01.PGB31

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12305

Confidentiality Level: Category 6 (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01.PFB503E

Scale: N/A | Format: A0 | Sheet: 01/02

RF GALLERY

Demin. Water
6329 =NA.PS01.PFB503E
FROM PUMPS DISCHARGE

BR050–4"–PAC1

PI 140 — AA740 — 1/2" — NOTE 12 — NC AA041 — AA040

BR054–2 1/2"–PAC1

PDIA 150 H — PDT 150 — 1/2" AA750 — 1/2" AA751 — AT004

BR00*–1/2"–PAC1 — AA00*

NOTE 8 — TP.PS01.3200 — Demin. Water 6260 PCO & SSA
TP.PS01.3201 — Demin. Water 6261 PCO & SSA
TP.PS01.3299 — Demin. Water 6837 PCO & SSA

NOTE 10 — RACK N°1 — (xN)

NOTE 8 — TP.PS01.3300 — Demin. Water 6321 PCO & SSA
TP.PS01.3301 — Demin. Water 6322 PCO & SSA
TP.PS01.3399 — Demin. Water 6836 PCO & SSA

BR055–2 1/2"–PAC1

NOTE 14

BR056–2 1/2"–PAC1

AA042

PDIA 180 H — PDT 180 — 1/2" AA752 — 1/2" AA753 — AT005

PI 170 — AA742 — 1/2" — NOTE 12 — NC AA046 — AA045

BR057–2 1/2"–PAC1

NOTE 8 — TP.PS01.3400 — Demin. Water 6842 PCO & SSA
TP.PS01.3401 — Demin. Water 6841 PCO & SSA
TP.PS01.3499 — Demin. Water 6838 PCO & SSA

NOTE 10 — RACK N°2 — (xN)

NOTE 8 — TP.PS01.3500 — Demin. Water 6840 PCO & SSA
TP.PS01.3501 — Demin. Water 6839 PCO & SSA
TP.PS01.3599 — Demin. Water 6843 PCO & SSA

BR058–2 1/2"–PAC1

NOTE 14

BR046–2 1/2"–PAC1

AA047

PDIA 210 H — PDT 210 — 1/2" AA754 — 1/2" AA755 — AT006

PI 200 — AA744 — 1/2" — NOTE 12 — NC AA051 — AA050

BR047–2"–PAC1

NOTE 8 — TP.PS01.3600 — Demin. Water 6901 CIRCULATORS
TP.PS01.3662 — Demin. Water 6904 CIRCULATORS
TP.PS01.3800 — Demin. Water 6908 RF LOADS
TP.PS01.3862 — Demin. Water 6906 RF LOADS

NOTE 10 — (x62)

NOTE 8 — TP.PS01.3700 — Demin. Water 6905 CIRCULATORS
TP.PS01.3762 — Demin. Water 6902 CIRCULATORS
TP.PS01.3900 — Demin. Water 6907 RF LOADS
TP.PS01.3962 — Demin. Water 6903 RF LOADS

BR048–2"–PAC1

NOTE 14

BR049–2"–PAC1

AA052

INJECTOR UTILITIES ROOM

PDIA 240 H — PDT 240 — 1/2" AA756 — 1/2" AA757 — AT007

PI 230 — AA746 — 1/2" — NOTE 12 — NC AA056 — AA055

Demin. Water
6331 =NA.PS01.PFB503E

BR051–4"–PAC1

NOTE 15

NOTE 8 — TP.PS01.3000 — Demin. Water 6911 PCO & SSA
TP.PS01.3001 — Demin. Water 6912 PCO & SSA
TP.PS01.3099 — Demin. Water 6913 PCO & SSA

NOTE 10 — (xN)

NOTE 8 — TP.PS01.3100 — Demin. Water 6910 PCO & SSA
TP.PS01.3101 — Demin. Water 6909 PCO & SSA
TP.PS01.3199 — Demin. Water 6914 PCO & SSA

BR069–4"–PAC1

NOTE 14

BR022–4"–PAC1

AA057

BR941–1"–PAC1 — AA902 — BR942–1"–PAC1

NOTE 12 — NC AA044 — AA043 — NC AA441 — BR402–1"–PAC1 — BR404–1"–PAC1

TIA 080 H L — TT 080 — PI 160 — AA741 — 1/2" — FI 020 — FT 020 — 1" — NOTE 9

NOTE 5

BR961–1"–PAC1 — AA903 — BR962–1"–PAC1

NOTE 12 — NC AA049 — AA048 — NC AA461 — BR405–1"–PAC1 — BR406–1"–PAC1

TIA 090 H L — TT 090 — PI 190 — AA743 — 1/2" — FI 030 — FT 030 — 1" — NOTE 9

NOTE 5

BR971–1"–PAC1 — AA904 — BR972–1"–PAC1

NOTE 12 — NC AA054 — AA053 — NC AA461 — BR407–1"–PAC1 — BR408–1"–PAC1

TIA 100 H L — TT 100 — PI 220 — AA745 — 1/2" — FI 040 — FT 040 — 1" — NOTE 9

NOTE 5

BR981–1"–PAC1 — AA905 — BR982–1"–PAC1

NOTE 12 — NC AA058 — AA059 — NC AA481 — BR409–1"–PAC1 — BR410–1"–PAC1

TIA 110 H L — TT 110 — PI 250 — AA747 — 1/2" — FI 050 — FT 050 — 1" — NOTE 9

Demin. Water
6936 =NA.PS03_PFB503
TO DEMINERALIZED WASTEWATER TANKS

INJECTOR UTILITIES ROOM

BR044–4"–PAC1

Demin. Water
6334 =NA.PS01.PFB503E
TO COOLING LOOP HEAT EXCHANGER

RF GALLERY

Demin. Water
6334 =NA.PS01.PFB503E
TO COOLING LOOP HEAT EXCHANGER

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1	23/07/03	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MUIMIU	AJD	MBK

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MYRRHA phase 1 implementation
MINERVA

Project
MINERVA NF ACC Design Engineer

Subject
P&ID
PCO & SSA COOLING LOOP (CONT.)
NA.PS01.PGB31

TRACTEBEL ENGIE
EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12305
Confidentiality Level: Category II (092-423 MINERVA ACC project)
SCK CEN Drawing Number: =NA.PS01_PFB503E
Scale: N/A
Format: A0
Sheet: 02/02

P&ID
LOW ACTIV. INJECTOR MAGNETS COOLING LOOP
NA.PS01.PJB31

SHEET	SCK CEN DRAWING NUMBER	DESCRIPTION	REV	DATE
00	=NA.PS01_PFB503F	NA.PS01.PJB31 - LOW ACTIV. INJECTOR MAGNETS COOLING LOOP. COVER SHEET	01	23/07/07
01	=NA.PS01_PFB503F	NA.PS01.PJB31 - LOW ACTIV. INJECTOR MAGNETS COOLING LOOP	01	23/07/07

NOTES :

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3.- GENERAL NOTE: FOR THE P&ID TYPICALS, REFER TO =NA.CN_ETA503.

4.- GENERAL NOTE: DRAINS AND VENT WILL BE LOCATED AT LOW AND HIGH POINTS.

5.- PURIFICATION SYSTEM INCLUDING ION EXCHANGE RESINS AND PARTICLE FILTERING (< 5 MICRONS).

6.- GENERAL NOTE: LOW ACTIVATED WATER PIPES WILL BE JACKETED IN PENETRATIONS.

7.- LEAKTIGHT CONTAIMENT PIT.

8.- GENERIC NUMBERING AND GROUPING OF THE TERMINAL POINTS FOR THE DIFFERENT ACC EQUIPMENT, BASED ON THE HIGH LEVEL INTERFACE LIST OF THE ACC (ID2558). DETAILS OF FINAL CONNECTION TO THE DIFFERENT ACC EQUIPMENT ARE PENDING.

9.- THE FLOW INDICATORS AND TRANSMITTERS WILL HAVE A MINIMUM STRAIGHT LENGTH OF TUBES OF METERS 10 TIMES THE DIAMETER UPSTREAM AND 5 TIMES THE DIAMETER DOWNSTREAM AND WILL BE INSTALLED IN HORIZONTAL SECTIONS.

10.- HOSE CONNECTIONS WILL BE CONSIDERED FOR THE FINAL CONNECTION TO THE ACC EQUIPMENT, TO BE DEFINED IN A LATTER STOPE IN ACCORDANCE WITH THE EQUIPMENT CONNECTION DETAILS. FINAL COOLING WATER DISTRIBUTION TO ACC COMPONENTS TO BE CONFIRMED.

11.- TEMPERATURE CONTROL OF THE LOOPS TO BE LOCATED AS CLOSE AS POSSIBLE TO THE ACC EQUIPMENT.

12.- CLOSED THREADED CONNECTION FOR THE INSTALLATION OF A REMOVABLE PIPE / HOSE FOR BYPASSING THE SCC DURING THE CLEANING OF THE LOOP.

13.- MANUAL SAMPLING

14.- REVERSE RETURN SETUP TO ENSURE AN EQUAL PRESSURE DIFFERENCE OVER THE COMPONENTS ALONS THE ENTIRE LENGHT OF THE COOLECTOR.

BRANCH	DESIGN	
	P barg	T °C
a	13	55
b	3,5	55
c	0,49	55
d	9	39
e	14 (1)	39 (1)

(1)

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1	23/07/07	FOR APPROVAL	MIU	PJD	MBK
0	23/04/14	FOR APPROVAL	MUI/MIU	AJD	MBK

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
LOW ACTIV. INJECTOR MAGNETS COOLING LOOP
NA.PS01.PJB31

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12306

Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503F

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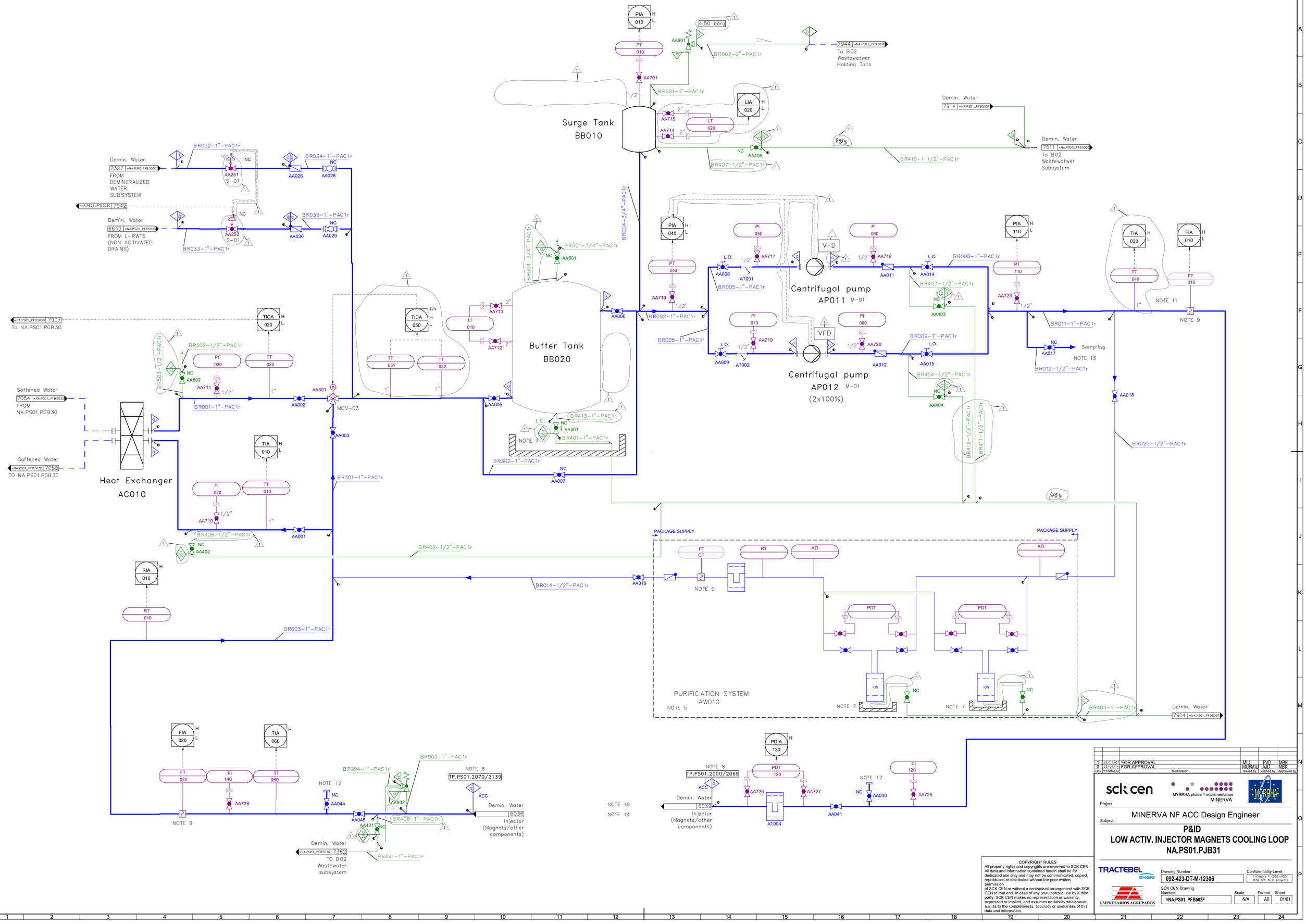

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0	23/04/14	FOR APPROVAL	MUMMU	AJO	MBK

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
LOW ACTIV. INJECTOR MAGNETS COOLING LOOP NA.PS01.PJB31

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12306

Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503F

Scale: N/A | Format: A0 | Sheet: 01/01

P&ID LOW ACTIV. INJECTOR NC-RF CAVITIES COOLING LOOP NA.PS01.PJB32

SHEET	SCK CEN DRAWING NUMBER	DESCRIPTION	REV	DATE
00	=NA.PS01_PFB503G	NA.PS01.PJB32 - LOW ACTIV. INJECTOR NC-RF CAVITIES COOLING LOOP. COVER SHEET	01	23/07/07
01	=NA.PS01_PFB503G	NA.PS01.PJB32 - LOW ACTIV. INJECTOR NC-RF CAVITIES COOLING LOOP	01	23/07/07

NOTES :

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4.- GENERAL NOTE: DRAINS AND VENT WILL BE LOCATED AT LOW AND HIGH POINTS.

5.- PURIFICATION SYSTEM INCLUDING ION EXCHANGE RESINS AND PARTICLE FILTERING (< 5 MICRONS).

6.- GENERAL NOTE: LOW ACTIVATED WATER PIPES WILL BE JACKETED IN PENETRATIONS.

7.- LEAKTIGHT CONTAINMENT PIT.

8.- GENERIC NUMBERING AND GROUPING OF THE TERMINAL POINTS FOR THE DIFFERENT ACC EQUIPMENT, BASED ON THE HIGH LEVEL INTERFACE LIST OF THE ACC (ID2558). DETAILS OF FINAL CONNECTION TO THE DIFFERENT ACC EQUIPMENT ARE PENDING.

9.- THE FLOWMETER WILL BE INSTALLED IN A STRAIGHT RUN OF PIPE 15 DIAMETRER UP STREAM AND 5 DIAMETER DOWNSTREAM.

10.- HOSE CONNECTION WILL BE CONSIDERED FOR THE FINAL CONNECTION TO THE ACC EQUIPMENT, TO BE DEFINED IN A LATTER STOPE IN ACCORDANCE WITH THE EQUIPMENT CONNECTION DETAILS. FINAL COOLING WATER DISTRIBUTION TO ACC COMPONENTS TO BE CONFIRMED.

11.- TEMPERATURE CONTROL OF THE LOOPS TO BE LOCATED AS CLOSE AS POSSIBLE TO THE ACC EQUIPMENT.

12.- CLOSED THREADED CONNECTION FOR THE INSTALLATION OF A REMOVABLE PIPE / HOSE FOR BYPASSING THE SCC DURING THE CLEANING OF THE LOOP.

13.- MANUAL SAMPLING

14.- REVERSE RETURN SETUP TO ENSURE AN EQUAL PRESSURE DIFFERENCE OVER THE COMPONENTS ALONG THE ENTIRE LENGHT OF THE COLLECTOR.

BRANCH	DESIGN	
	P barg	T °C
a	13	50
b	3,5	50
c	0,49	50
d	9	39
e	14 (1)	39 (1) (1)

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MUIMIU	AJO	MBK

sck cen

MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
LOW ACTIV. INJECTOR NC-RF CAVITIES COOLING LOOP
NA.PS01.PJB32

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12307

Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503G

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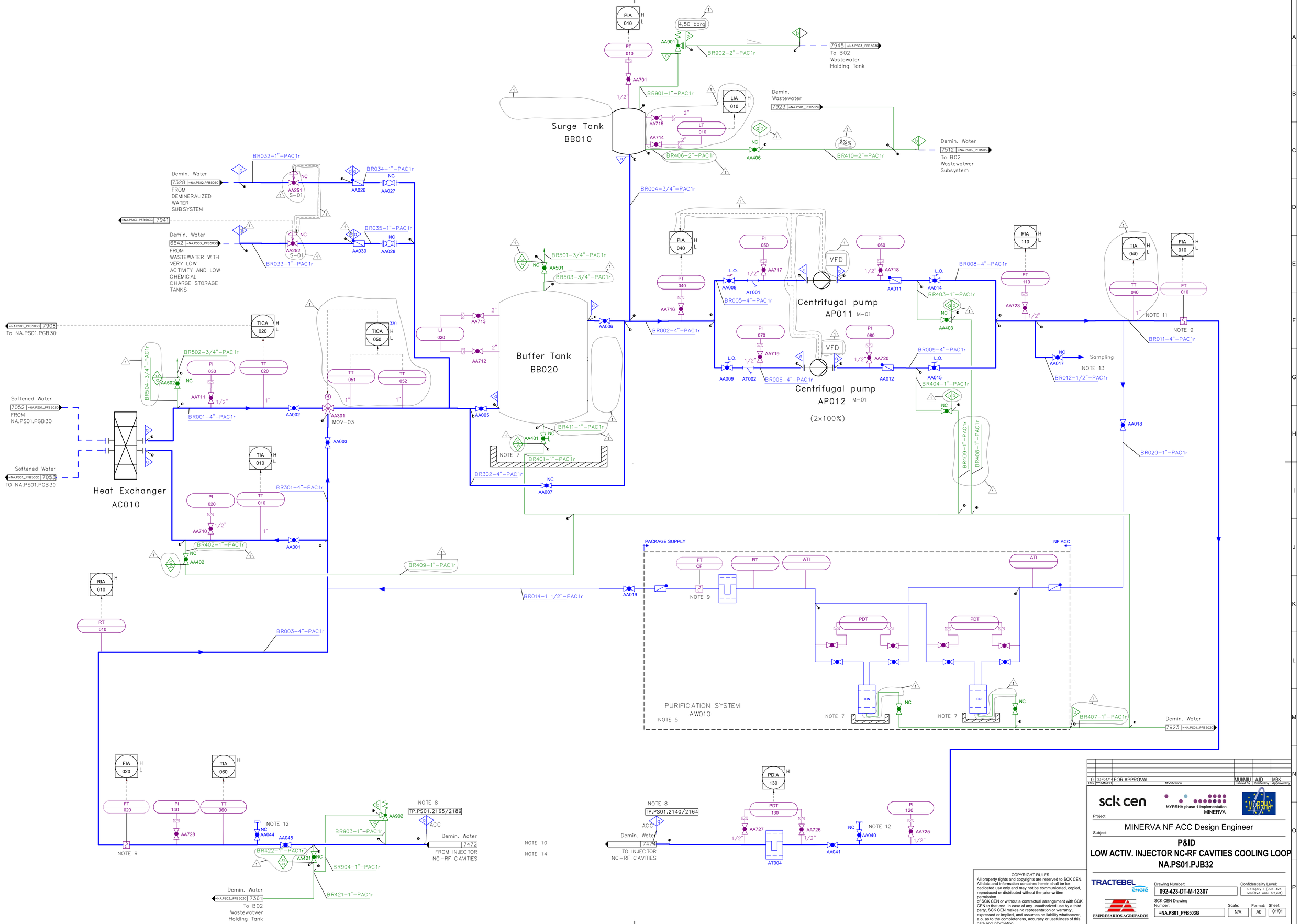

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
LOW ACTIV. INJECTOR NC-RF CAVITIES COOLING LOOP
NA.PS01.PJB32

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12307

Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503G

Scale: N/A

Format: A0

Sheet: 01/01

P&ID
LOW ACTIV. DUMP-I COOLING LOOP
NA.PS01.PJB33

SHEET	SCK CEN DRAWING NUMBER	DESCRIPTION	REV	DATE
00	=NA.PS01_PFB503H	NA.PS01.PJB33 - LOW ACTIV. DUMP-I COOLING LOOP COVER SHEET	01	23/07/07
01	=NA.PS01_PFB503H	NA.PS01.PJB33 - LOW ACTIV. DUMP-I COOLING LOOP	01	23/07/07

NOTES :

1. GENERAL NOTE: FOR SYMBOLOGY, REFER TO APPENDIX B OF DOCUMENT =NA.AC_BDC501 “DESIGN ENGINEER INTEGRATION PLAN - BIM PROTOCOL”.
2. GENERAL NOTE: THIS DRAWING IS PRELIMINARY AND IT IS NO VALID FOR CONSTRUCTION. THIS DRAWING IS SUBJECT TO REVISION DURING THE DETAIL ENGINEERING PHASE, BASED ON THE PIPING ARRANGEMENT AND THE INFORMATION PROVIDED BY THE MAIN EQUIPMENT SUPPLIERS.
3. GENERAL NOTE: FOR THE P&ID TYPICALS, REFER TO =NA.CN_ETA503.
4. GENERAL NOTE: DRAINS AND VENT WILL BE LOCATED AT LOW AND HIGH POINTS.
5. PURIFICATION SYSTEM INCLUDING ION EXCHANGE RESINS AND PARTICLE FILTERING (< 5 MICRONS).
6. GENERAL NOTE: LOW ACTIVATED WATER PIPES WILL BE JACKETED IN PENETRATIONS.
7. LEAKTIGHT CONTAINMENT PIT.
8. GENERIC NUMBERING AND GROUPING OF THE TERMINAL POINTS FOR THE DIFFERENT ACC EQUIPMENT, BASED ON THE HIGH LEVEL INTERFACE LIST OF THE ACC (ID2558). DETAILS OF FINAL CONNECTION TO THE DIFFERENT ACC EQUIPMENT ARE PENDING.
9. THE FLOWMETER WILL BE INSTALLED IN A STRAIGHT RUN OF PIPE 15 DIAMETRER UP STREAM AND 5 DIAMETER DOWNSTREAM.
10. DUMP-I COOLING LOOP (PJB33) DESIGNED FOR THERMAL LOAD OPERATION (10 KW), WITH FUTURE HEAT SINK CONECTION POINT TO INCORPORATE THE FULL LOAD THERMAL POWER (70 KW, THAT WILL REQUIRE THE REPLACEMENT OF PUMPS AND HEAT EXCHANGER).
11. TEMPERATURE CONTROL OF THE LOOPS TO BE LOCATED AS CLOSE AS POSSIBLE TO THE ACC EQUIPMENT.
12. CLOSED THREADED CONNECTION FOR THE INSTALLATION OF A REMOVABLE PIPE / HOSE FOR BYPASSING THE SCC DURING THE CLEANING OF THE LOOP.
13. MANUAL SAMPLING
14. CLOSED THREADED CONNECTION FOR THE CONNECTION TO A N2 PORTABLE BOTTLE FOR DUMP-I DRYING.

BRANCH	DESIGN	
	P barg	T °C
a	12	50
b	3,5	50
c	0,49	50
d	9	39
e	14 (1)	39 (1)

(1)

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MU/MIU	AJD	MBK

sck cen

MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
LOW ACTIV. DUMP-I COOLING LOOP
NA.PS01.PJB33

TRACTEBEL ENGIE

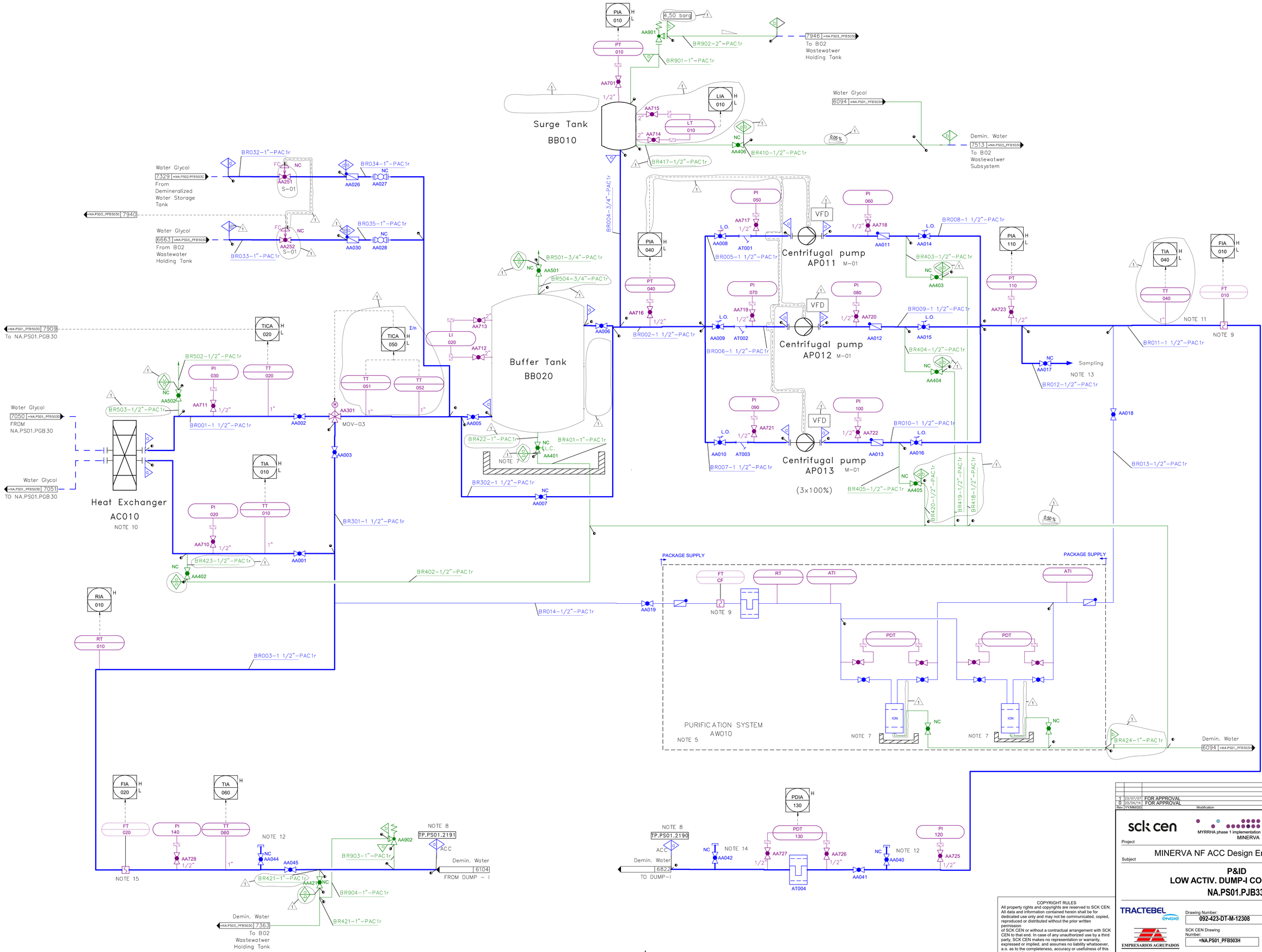
EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12308

Confidentiality Level: Category A (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503H

Scale: N/A | Format: A0 | Sheet: 00/01



Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MUMMU	AJD	MBK

Project: MYRRHA phase 1 implementation MINERVA

Subject: MINERVA NF ACC Design Engineer

P&ID
LOW ACTIV. DUMP-I COOLING LOOP
NA.PS01.PJB33

Drawing Number: 092-423-DT-M-12308

Confidentiality Level: Category 1: 092-423 MINERVA ACC project

SCK CEN Drawing Number: =NA.PS01_PFB503H

Scale: N/A

Format: A0

Sheet: 01/01

P&ID
LOW ACTIV. SC LINAC / BTT COOLING LOOP
NA.PS01.PJB34

SHEET	SCK CEN DRAWING NUMBER	DESCRIPTION	REV	DATE
00	=NA.PS01_PFB503I	NA.PS01.PJB34 - LOW ACTIV. SC LINAC / BTT COOLING LOOP. COVER SHEET	01	23/07/07
01	=NA.PS01_PFB503I	NA.PS01.PJB34 - LOW ACTIV. SC LINAC / BTT COOLING LOOP	01	23/07/07
02	=NA.PS01_PFB503I	NA.PS01.PJB34 - LOW ACTIV. SC LINAC / BTT COOLING LOOP	01	23/07/07

NOTES :

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3. GENERAL NOTE: FOR THE P&ID TYPICALS, REFER TO =NA.CN_ETA503.
4. GENERAL NOTE: DRAINS AND VENT WILL BE LOCATED AT LOW AND HIGH POINTS.
5. PURIFICATION SYSTEM INCLUDING ION EXCHANGE RESINS AND PARTICLE FILTERING (< 5 MICRONS).
6. GENERAL NOTE: LOW ACTIVATED WATER PIPES WILL BE JACKETED IN PENETRATIONS.
7. LEAKTIGHT CONTAINMENT PIT.
8. GENERIC NUMBERING AND GROUPING OF THE TERMINAL POINTS FOR THE DIFFERENT ACC EQUIPMENT, BASED ON THE HIGH LEVEL INTERFACE LIST OF THE ACC (ID2558). DETAILS OF FINAL CONNECTION TO THE DIFFERENT ACC EQUIPMENT ARE PENDING.
9. THE FLOWMETER WILL BE INSTALLED IN A STRAIGHT RUN OF PIPE 15 DIAMETRER UP STREAM AND 5 DIAMETER DOWNSTREAM.
10. HOSE CONNECTIONS WILL BE CONSIDERED FOR THE FINAL CONNECTION TO THE ACC EQUIPMENT, TO BE DEFINED IN A LETTER STAGE IN ACCORDANCE TO THE EQUIPMENT CONNECTION DETAILS. FINAL COOLING WATER DISTRIBUTION TO ACC COMPONENTS TO BE CONFIRMED.
11. TEMPERATURE CONTROL OF THE LOOPS TO BE LOCATED AS CLOSE AS POSSIBLE TO THE ACC EQUIPMENT.
12. CLOSED THREADED CONNECTION FOR THE INSTALLATION OF A REMOVABLE PIPE / HOSE FOR BYPASSING THE SCC DURING THE CLEANING OF THE LOOP.
13. MANUAL SAMPLING
14. REVERSE RETURN SETUP TO ENSURE AN EQUAL PRESSURE DIFFERENCE OVER THE COMPONENTS ALONG THE ENTIRE LENGHT OF THE COLLECTOR.

BRANCH	DESIGN	
	P barg	T °C
a	13	50
b	3,5	50
c	0,49	50
d	9	39
e	14 - 1	39 - 1

1

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MUMIU	AJO	MBK

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
LOW ACTIV. SC LINAC / BTT COOLING LOOP
NA.PS01.PJB34

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12309

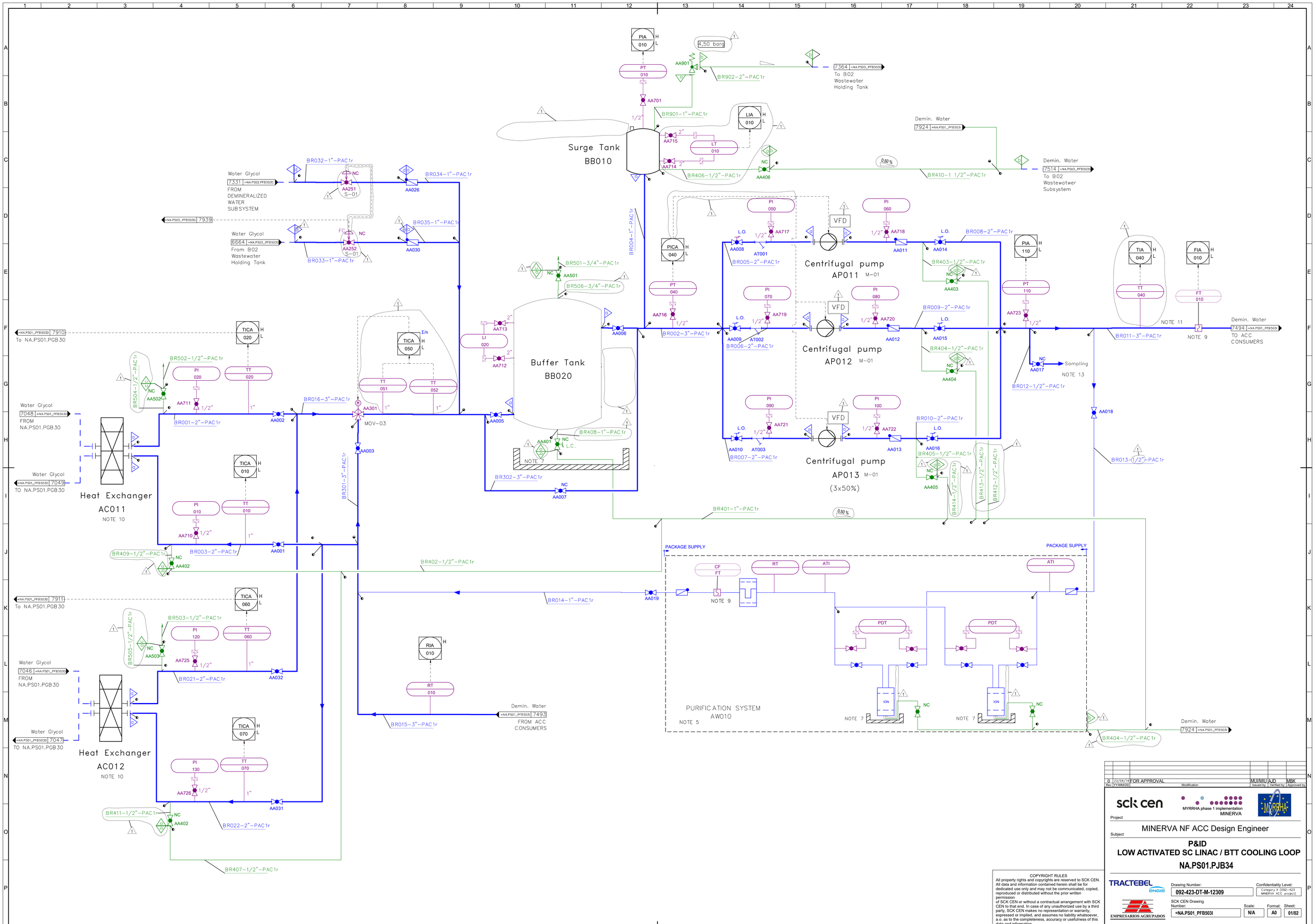
Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503I

Scale: N/A

Format: A0

Sheet: 00/02



Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
0	23/04/14	FOR APPROVAL	MUI	MIU	AJD	MBK

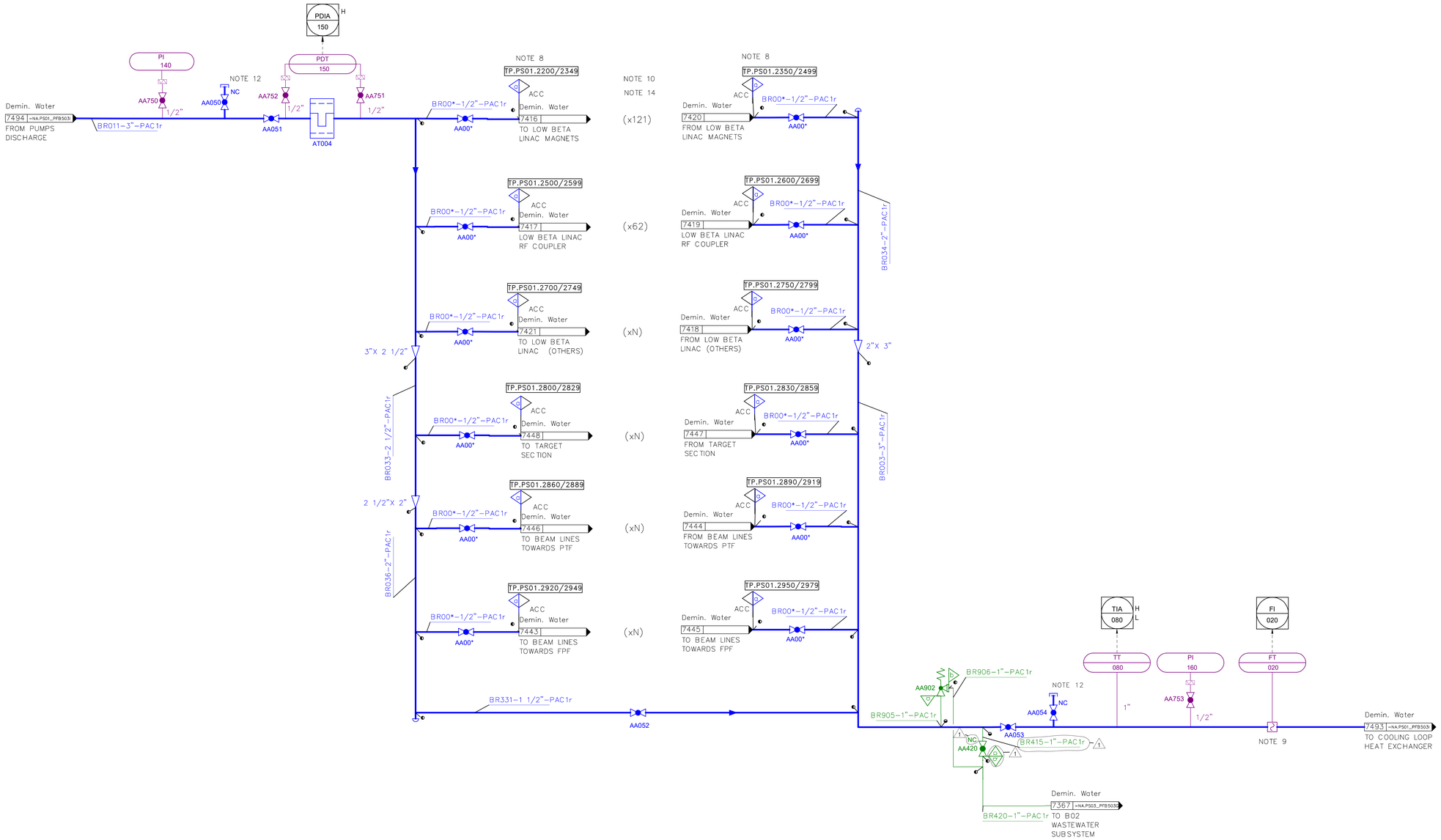
Project: MYRRHA phase 1 implementation MINERVA

Subject: MINERVA NF ACC Design Engineer

P&ID
LOW ACTIVATED SC LINAC / BTT COOLING LOOP
NA.PS01.PJB34

TRACTEBEL ENGIE
EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12309
Confidentiality Level: Category II (092-423 MINERVA ACC project)
SCK CEN Drawing Number: =NA.PS01_PFB503I
Scale: N/A
Format: A0
Sheet: 01/02



Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MUI/MIU	AJD	MBK

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
LOW ACTIV. SC LINAC / BTT COOLING LOOP
NA.PS01.PJB34

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12309

Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503I

Scale: N/A

Format: A0

Sheet: 02/02

P&ID
PROPYLENE GLYCOL SUPPLY SUBSYSTEM
NA.PS01.PUA10

SHEET	SCK CEN DRAWING NUMBER	DESCRIPTION	REV	DATE
00	=NA.PS01_PFB503J	NA.PS01.PUA10 - PROPYLENE GLYCOL SUPPLY SUBSYSTEM. COVER SHEET	00	2023/04/14
01	=NA.PS01_PFB503J	NA.PS01.PUA10 - PROPYLENE GLYCOL SUPPLY SUBSYSTEM	00	2023/04/14

NOTES :

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3. GENERAL NOTE: FOR P&IDS TYPICALS, REFER TO =NA.CN_ETA503.
4. GENERAL NOTE: DRAINS AND VENT WILL BE LOCATED AT LOW AND HIGH POINTS.
5. LEAKTIGHT CONTAINMENT PIT.
6. PROPYLENE GLYCOL / WATER - GLYCOL DRAINS WILL BE COLECTED IN PORTABLE COLLECTION BINS (NA.PS03.GMB10).
7. TANK TRAILER CONNECTION.
8. FILLING CONNECTION OF WATER-PROPYLENE GLYCOL (40%) MIXTURE FROM A TANK TRAILER BY THE CONNECTION OF A TEMPORARY HOSE.

BRANCH	DESIGN	
	P	T
	barg	°C
a	4,5	40

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
0	23/04/14	FOR APPROVAL	MUI/MIU	AJD	MRK

sck cen

MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID
PROPYLENE GLYCOL SUPPLY SUBSYSTEM
NA.PS01.PUA10

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12310

Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503J

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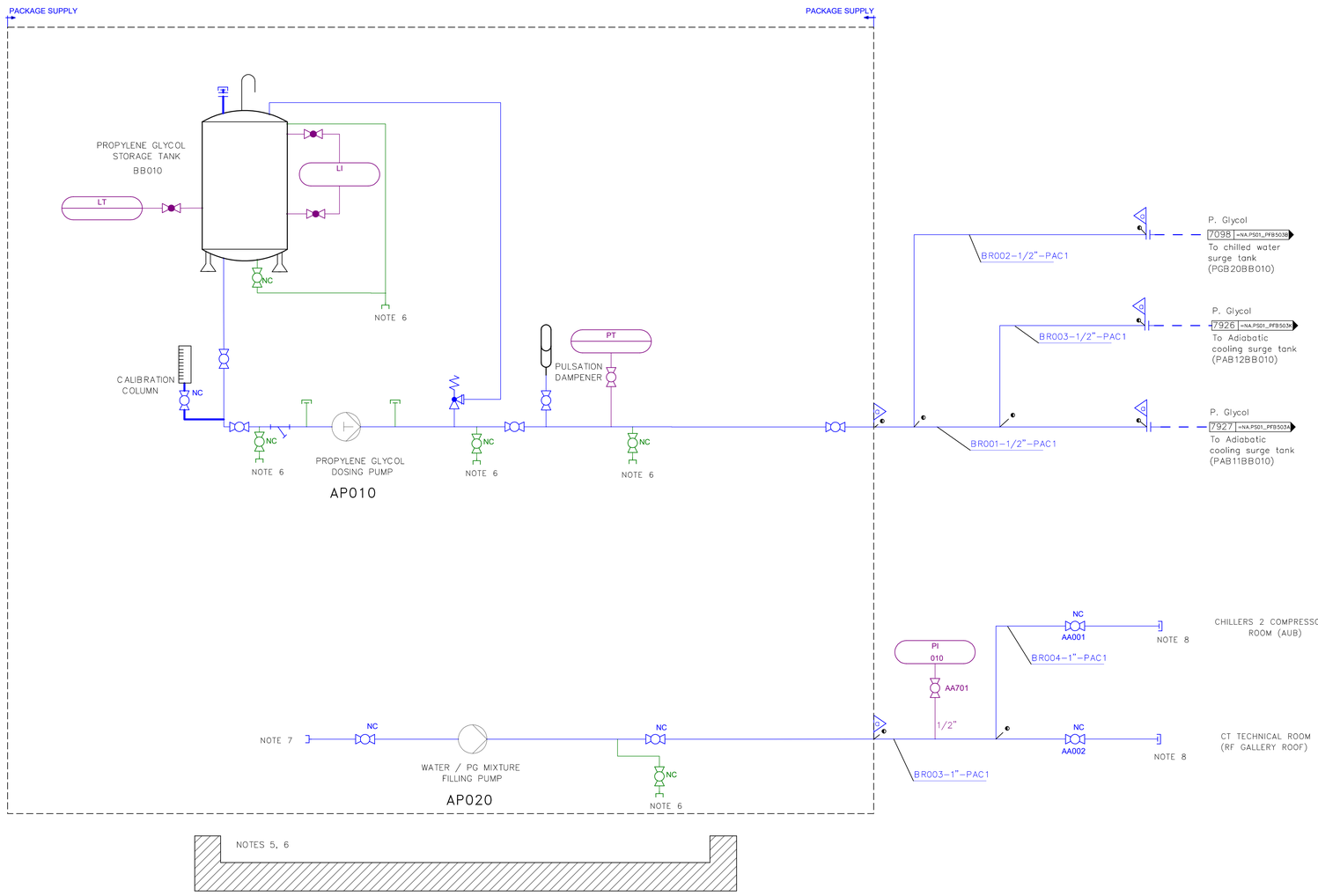

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
0	23/04/14	FOR APPROVAL	MUIMIU	AJD	MBK

Project

MYRRHA phase 1 implementation
MINERVA

Subject

MINERVA NF ACC Design Engineer

P&ID
PROPYLENE GLYCOL SUPPLY SUBSYSTEM
NA.PS01.PUA10

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12310

Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503J

Scale: N/A

Format: A0

Sheet: 01/01

P&ID
ADIABATIC COOLING SUBSYSTEM
MEDIUM TEMPERATURE
NA.PS01.PAB12

SHEET	SCK CEN DRAWING NUMBER	DESCRIPTION	REV	DATE
00	=NA.PS01_PFB503K	NA.PS01.PAB12 - ADIABATIC COOLING SUBSYSTEM - MEDIUM TEMPERATURE. COVER SHEET	01	23/07/07
01	=NA.PS01_PFB503K	NA.PS01.PAB12 - ADIABATIC COOLING SUBSYSTEM - MEDIUM TEMPERATURE	01	23/07/07
02	=NA.PS01_PFB503K	NA.PS01.PAB12 - ADIABATIC COOLING SUBSYSTEM - MEDIUM TEMPERATURE	01	23/07/07

NOTES :

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3. GENERAL NOTE: FOR THE P&ID TYPICALS, REFER TO =NA.CN_ETA503.
4. GENERAL NOTE: ADDITIONAL DRAINS AND VENTS WILL BE LOCATED AT LOW AND HIGH POINTS.
5. THE FLOW INDICATORS AND TRANSMITTERS WILL HAVE A MINIMUM STRAIGHT LENGTH OF TUBES OF METERS 10 TIMES THE DIAMETER UPSTREAM AND 5 TIMES THE DIAMETER DOWNSTREAM AND WILL BE INSTALLED IN HORIZONTAL SECTIONS.
6. MANUAL SAMPLING.
7. FILLING CONNECTION OF WATER - PROPYLENE GLYCOL (40%WT.) MIXTURE. THE FILLING OF THE LOOP FROM A TANK TRAILER OR FROM A MOBILE GLYCOL/WATER CUBITAINER WILL BE DONE BY THE CONNECTION OF A TEMPORARY HOSE.
8. WATER GLYCOL DRAINS WILL BE COLLECTED IN PORTABLE COLLECTION BINS (NA.PS03.GMB10).
9. CLOSED THREADED CONNECTION FOR THE INSTALLATION OF A REMOVABLE PIPE / HOSE FOR BYPASSING THE SCC DURING THE CLEANING OF THE LOOP.
10. GENERIC NUMBERING AND GROUPING OF THE TERMINAL POINTS FOR THE DIFFERENT ACC EQUIPMENT, BASED ON THE HIGH LEVEL INTERFACE LIST OF THE ACC (ID2558), TO BE DEFINED AND DETAILED IN A LATER STAGE.
11. THE NUMBER OF ADIABATIC COOLERS WILL DEPEND ON THE MANUFACTURER FINALLY SELECTED.
12. CURRENT PIPE SERVICES TO MAC CONSIDERS THE ROUTING THROUGH THE EAST GALLERY, WITH THE TERMINAL POINT AT THE EAST WALL OF THE MAC (PRELIMINARY, TO BE CONFIRMED).
13. FLOW SETTING BASED ON OPERATIONAL STATE OF NA.CP CRYOGENIC SUPPLY SYSTEM.
14. CHECK VALVE AND ISOLATION VALVE WILL BE SITED AS CLOSE AS POSSIBLE TO THE INJECTION POINTS.
15. FLANGED SPOOL FOR COMMISSIONING PURPOSE. (1)

BRANCH	DESIGN	
	P barg	T °C
a	15	55
b	3,5	55
c	0,49	55
d	9	39
e	4,5	40

Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/07/07	FOR APPROVAL	MIU	PVD	MBK
0	23/04/14	FOR APPROVAL	MIU/MILL	AJD	MBK

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID ADIABATIC COOLING SUBSYSTEM - MEDIUM TEMPERATURE NA.PS01.PAB12

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12311

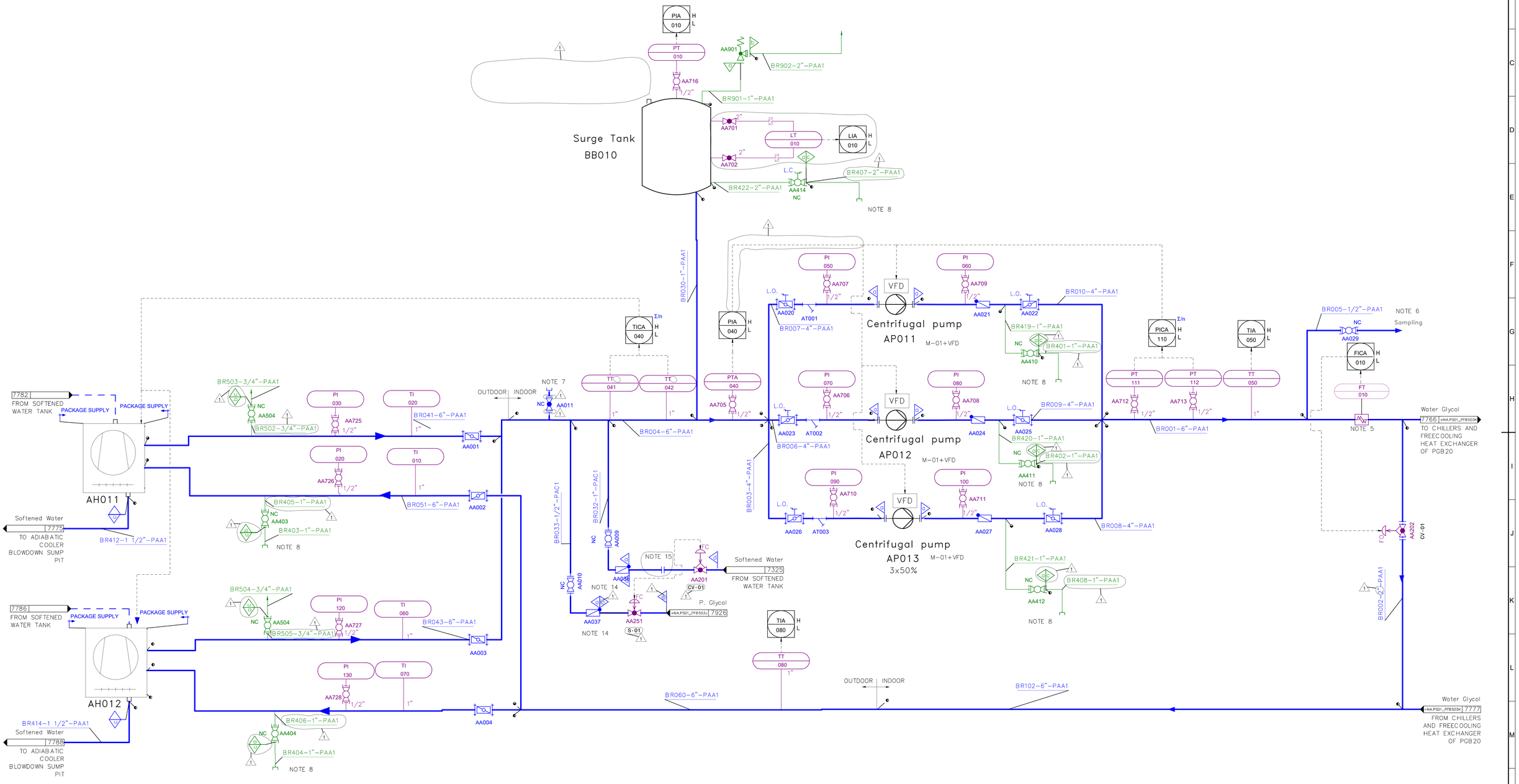
Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503K

Scale: N/A

Format: A0

Sheet: 00/02



Rev (YYMMDD)	Modification	Issued by	Verified by	Approved by
1 23/07/07	FOR APPROVAL	MIU	PVD	MBK
0 23/04/14	FOR APPROVAL	MIU/MIU	AJD	MBK

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID ADIABATIC COOLING SUBSYSTEM - MEDIUM TEMPERATURE NA.PS01.PAB12

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12311

Confidentiality Level: Category II (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503K

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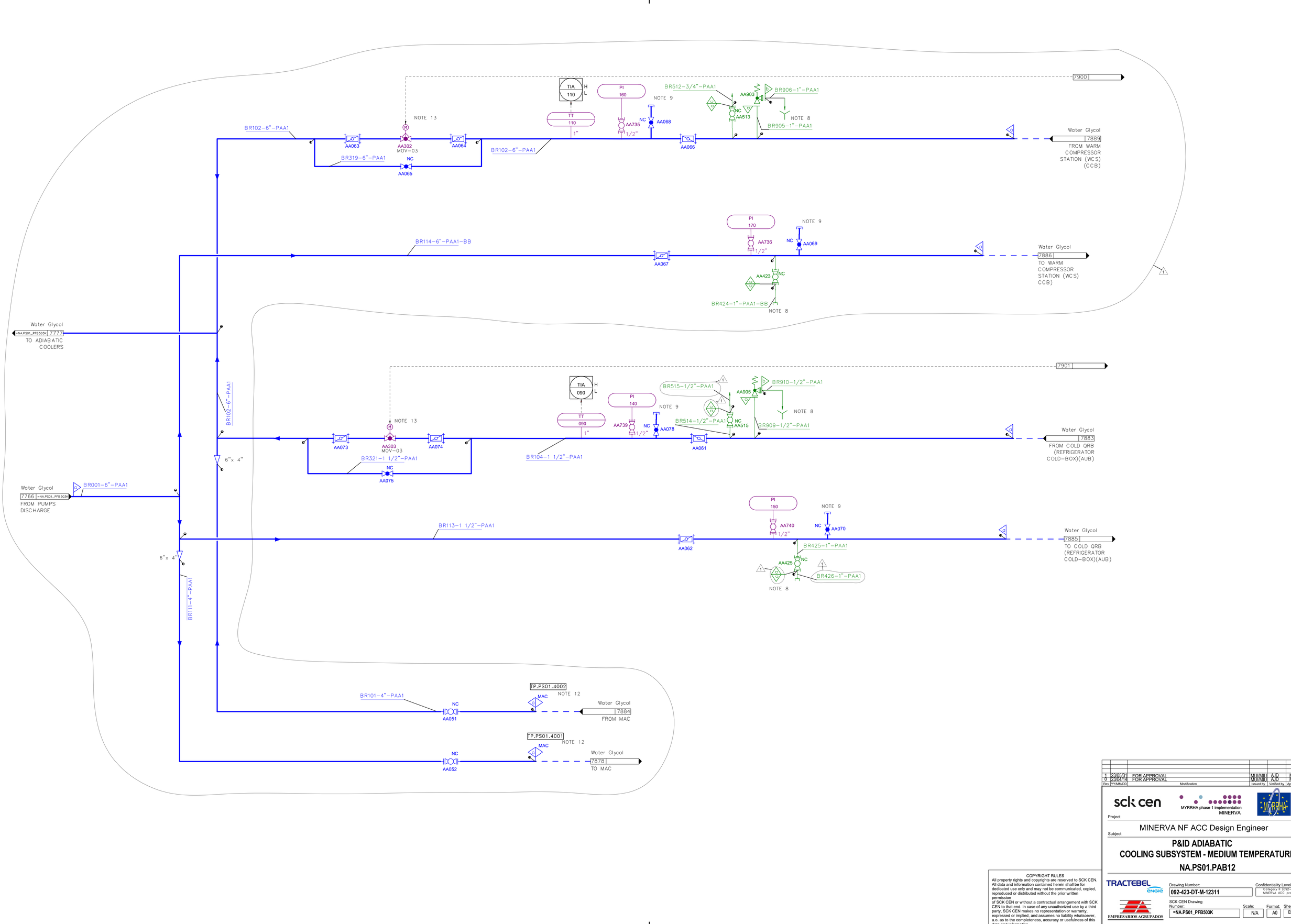
Sheet: 01/02



Rev	YY/MM/DD	Modification	Issued by	Verified by	Approved by
1	23/05/31	FOR APPROVAL	MUI/MIU	AJD	MBK
0	23/04/14	FOR APPROVAL	MUI/MIU	AJD	MBR

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MYRRHA phase 1 implementation
MINERVA

Project

MINERVA NF ACC Design Engineer

Subject

P&ID ADIABATIC COOLING SUBSYSTEM - MEDIUM TEMPERATURE

NA.PS01.PAB12

TRACTEBEL ENGIE

EMPRESARIOS AGRUPADOS

Drawing Number: 092-423-DT-M-12311

Confidentiality Level: Category B (092-423 MINERVA ACC project)

SCK CEN Drawing Number: =NA.PS01_PFB503K

Scale: N/A

Format: A0

Sheet: 02/02