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F	<div><div><div>PREPARED BY:</div><div><div>مونenco ایران</div><div>Monenco Iran</div><div></div></div></div><table><tr><td>C</td><td>DESIGN PROGRESS</td><td>NIL</td><td>AZM</td><td>AKS</td><td>JVN</td><td>03.06.2021</td><td>DESIGNED BY</td><td>NIL</td><td>SIGNATURE</td></tr><tr><td>B</td><td>ACC. TO CLIENT COMMENT SHEET DATED:18 JAN 2021</td><td>NIL</td><td>AZM</td><td>AKS</td><td>JVN</td><td>31.01.2021</td><td>DRAWN BY</td><td>AZM</td><td></td></tr><tr><td>A</td><td>SECOND ISSUE</td><td>NIL</td><td>AZM</td><td>AKS</td><td>JVN</td><td>05.12.2020</td><td>CHECKED BY</td><td>AKS</td><td></td></tr><tr><td>0</td><td>FIRST ISSUE</td><td>NIL</td><td>AZM</td><td>AKS</td><td>JVN</td><td>28.09.2020</td><td>APPROVED BY</td><td>JVN</td><td></td></tr><tr><td>REV</td><td>DESCRIPTION</td><td>DESIGN</td><td>DRAW</td><td>HEAD</td><td>APPR.</td><td>DATE</td><td>DATE:</td><td>22.11.2020</td><td>(DD.MM.YYYY)</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>SCALE:</td><td></td><td></td></tr></table><div><div>KIMUKA 400/220KV SUBSTATION</div><div>PROJECT:</div><div>DWG. TITLE:</div><div>CLIENT:</div><div><div><div>KIMUKA 400/220KV SUBSTATION COVER</div><div>DWG. NO.: MT-TLD-KETCO-5393-DD-00-SA-145</div><div>SHEET: 1 OF: 4</div></div><div><div><div>KETRACO</div><div>Kenya Electricity Transmission Co. Ltd.</div></div><div><div><div>THE WORLD BANK</div><div>IBRD . IDA   WORLD BANK GROUP</div></div></div></div></div></div></div>							C	DESIGN PROGRESS	NIL	AZM	AKS	JVN	03.06.2021	DESIGNED BY	NIL	SIGNATURE	B	ACC. TO CLIENT COMMENT SHEET DATED:18 JAN 2021	NIL	AZM	AKS	JVN	31.01.2021	DRAWN BY	AZM		A	SECOND ISSUE	NIL	AZM	AKS	JVN	05.12.2020	CHECKED BY	AKS		0	FIRST ISSUE	NIL	AZM	AKS	JVN	28.09.2020	APPROVED BY	JVN		REV	DESCRIPTION	DESIGN	DRAW	HEAD	APPR.	DATE	DATE:	22.11.2020	(DD.MM.YYYY)								SCALE:			F
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DESIGNATION OF	TITLE	REVISION			
1	COVERING SHEET	0	A	B	C
2	LIST OF DRAWINGS	0	A	B	C
3	LEGEND & NOTE	0	A	B	C
4	SAS CONFIGURATION	0	A	B	—

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Monenco Iran



C	DESIGN PROGRESS	NIL	AZM	AKS	JVN	03.06.2021	DESIGNED BY	NIL	SIGNATURE
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PROJECT:

KIMUKA

400/220KV SUBSTATION

DWG. TITLE:


KIMUKA 400/220KV SUBSTATION

LIST OF DRAWINGS

DWG. NO.: MT–TLD–KETCO–5393–DD–00–SA–145


SHEET: 2 OF: 4

CLIENT:



KETRACO

Kenya Electricity Transmission Co. Ltd.



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NOTE:

- 1- THIS DOCUMENT IS PRELIMINARY AND FOR BIDDING PURPOSE ONLY.
- 2- THE SACS ARCHITECTURE SHALL BE SCALABLE TO ALLOW FUTURE BAY EXTENSIONS. EACH ETHERNET SWITCH AND OTHER NETWORK COMPONENTS SHALL HAVE 20% SPARE PORTS AND DATA CAPACITY TO ACCOMMODATE EXPANSIONS.
- 3- ETHERNET SWITCHES SHALL BE IN RING TOPOLOGY AND SUPPORT PRP/RSTP PROTOCOL.
- 4- GATEWAY SHALL BE ABLE TO OPERATE IN ABSENCE OF THE SERVERS.
- 5- THE TELE-PROTECTION CONFIGURATION TO REMOTE ENDS SHALL BE EXTENDED.
- 6- FOR EACH PRINTER, A SEPARATE PRINTER SERVER MUST BE SUPPLIED. PRINTERS WITH INTERNAL PRINTER SERVER ARE PREFERRED.
- 7- ALL BAY LEVEL COMMUNICATION SHALL BE BASED ON "IEC-61850" PROTOCOL.
- 8- ALL OF EQUIPMENT (SERVERS,OWS,EWS) MUST BE INDUSTRIAL TYPE.
- 9- THE CONTRACTOR SCOPE OF WORK FOR COMPLETE FUNCTIONALITY, INCLUDES BUT NOT LIMITED TO:

• PROVISION/INSTALLATION OF ALL NECESSARY HARDWARE AND SOFTWARE TO CONTROL AND MONITOR THE ENTIRE SUBSTATION FROM BOTH NCC AND RCC LOCALLY AND REMOTELY.

• PROVISION OF ALL FACILITIES FOR A COMPLETE INTEGRATION OF SUBSTATION AUTOMATION & CONTROL SYSTEM (SACS).

• INCORPORATION OF STATIONS INTO THE SCADA/EMS SYSTEM AT THE NCC/RCC.

• PROVISION OF A MAINTENANCE LAPTOP WITH ALL THE SUBSTATION SOFTWARE USED AND THEIR CONFIGURATION REQUIRED LICENSES.

• PROVISION OF ALL NECESSARY WORKS, DESIGN, SUPPLY AND IMPLEMENTATION AT THE INTERFACING STATION(S) FOR COMPLETE FUNCTIONALITY OF STATIONS.

• ANY OTHER FACILITIES REQUIRED FOR COMPLETE FUNCTIONALITY.

ALL SUCH WORKS TO BE CARRIED OUT BY THE CONTRACTOR AFTER THE APPROVAL OF BOTH KETRACO AND KPLC.

- 10- EACH GATEWAY SHALL HAVE THREE COMMUNICATION CHANNELS: ONE FOR CONNECTION TO THE NSCC, ANOTHER FOR CONNECTION TO NCC AND ONE FOR CONNECTION TO THE RCC.
- 11- THE CUMULATIVE MWH AND MVARH VALUES SHALL BE DISPLAYED ON EACH BAY OVERVIEW SCREEN.
- 12- ENGINEERING WORKSTATION HARDWARE SHALL BE THE SAME AS HMI. ALSO, ALL SOFTWARES AND HARDWARE COMPONENTS OF ENGINEERING WORKSTATION SHALL BE CONSIDERED SAME AS SERVER.
- 13- TWO SEPARATE AND INDEPENDENT PORTS SHALL BE ASSIGNED FOR EACH PROTOCOL.
- 14- COMMUNICATION TO DISPATCH CENTERS SHALL BE ACCORDING IEC-60870-104 WITH TWO REDUNDANT PORTS TO NCC AND RCC.
- 15- THE FINAL LIST OF SIGNALS SHALL BE GENERATED DURING DETAILED DESIGN STAGE BY EPC CONTRACTOR CONSIST OF THE BINARY INPUTS/OUTPUTS AND THE ANALOGUE INPUTS OF PROTECTION IEDS. ALSO ALL DATA ENGINEERING AT THE GATEWAYS AND NCC AND POINT TO POINT TESTING OF THE SIGNALS FROM PROCESS TO GATEWAY AND TO THE NCC ARE IN SCOPE OF EPC CONTRACTOR.
- 16- ALL OUT OF PANEL FIBER OPTIC CABLES SHALL PASS THROUGH FLEXIBLE METALLIC TUBES.
- 17- PATCH CORD CONNECTORS AND PATCH PANELS SHALL BE CONSIDERED IN ALL NETWORK PANELS.
- 18- FOR DIRECT CONNECTION OF MCs/EMs TO SERVERS A FALL BACK SWITCH MUST BE USED. IN SUCH CASES MCs/EMs MUST BE CONNECTED TO GATEWAY THROUGH A SEPARATE COMMUNICATION PORT.
- 19- TWO INDEPENDENT GATEWAYS SHALL BE CONSIDERED WORKING AS MAIN AND HOT-STANDBY.
- 20- POWER SUPPLY TO ALL THE SACS COMPONENTS(SWITCHES, GATEWAYS, SERVERS, STATION HMI & ENGINEERING PCs, PROTOCOL CONVERTERS AND ETC.) SHALL DERIVED FROM THE SUBSTATION 110VDC/UPS POWER SYSTEM.
- 21- STATION COMPUTERS SHALL BE HOUSED IN PANEL WHILE THE DISPLAYS AND COMPUTER CONTROL PERIPHERAL SHALL BE LOCATED IN THE OPERATOR DESK.
- 22- THE CONTRACTOR SHALL SUBMIT ALL DETAIL DRAWINGS/CALCULATIONS INCLUDING INDUSTRIAL PCs INSTALLATIONS, FULL SAS LAYOUT CONTAINING ALL IEDs AND DEVICES, EQUIPMENT LIST CONTAINING MODEL, MANUFACTURER AND KEY FEATURES OF ALL EQUIPMENTS.
- 23- THE CONTRACTOR SHALL PROVIDE COMPLETE WORKPLACE FURNITURE.
- 24- ALL THE INDUSTRIAL/RUGGED PCs FOR THE GATEWAY, SERVER, ENGINEERING PC AND HMI SHALL BE HOUSED IN REQUIRED SEPARATE PANELS IN TELECOM ROOM WELL ENCLOSED AND FITTED WITH AIR CONDITIONING, ONLY THE MONITOR SHALL BE PRESENT IN THE OPERATOR'S DESK, FULLY EQUIPPED WITH A SEPARATE SUBSTATION AND AUTOMATION CONTROL SYSTEM (SACS) RUNTIME AND CONFIGURATION SOFTWARE LICENSE, AND ALL SACS COMPONENT CONFIGURATION FILES AND PASSWORDS.
- 25- THE ENERGY METERS SHALL BE IN ACCORDANCE WITH BOTH KETRACO AND KPLC REQUIREMENTS/SPECIFICATIONS.
- 26- THE PHASE MEASUREMENT UNITS SHALL BE CONNECTED TO SAS SYSTEM. ALL OTHER REQUIRED EQUIPMENT OF PMU SHALL BE CONSIDERED BASED ON KENYA'S TECHNICAL REQUIREMENT.

LEGEND:

- FIBER OPTIC CABLE (IEC-61850)
- ETHERNET CAT6 CABLE (IEC-61850)
- RS485/MODBUS CABLE
- REVISION MARK

ABBREVIATION:

- IED

INTELLIGENT ELECTRONIC DEVICE
- BCU

BAY CONTROL UNIT
- SAS(SACS)

SUBSTATION AUTOMATION & CONTROL SYSTEM
- F.O

FIBER OPTIC CABLE
- NSCC

KETRACO'S NATIONAL SYSTEM CONTROL CENTER A FUTURE PROJECT FOR THE CONTROL AND OPERATION OF KETRACO'S TRANSMISSION NETWORK AND FOR POWER DISPATCH.
- NCC

NATIONAL CONTROL CENTER OWN AND OPERATED BY KPLC FOR THE OPERATION OF THE COUNTRY'S TRANSMISSION GRID AND FOR POWER DISPATCH.
- RCC

REGIONAL CONTROL CENTER OWN AND OPERATED BY KPLC FOR THE OPERATION OF THE REGION'S DISTRIBUTION NETWORK AND MONITORING OF GRID.
- BCR

BAY CONTROL ROOM
- MC

MEASURING CENTER
- EWS

ENGINEERING WORK STATION
- OWS

OPERATOR WORK STATION

PREPARED BY:

موندکو ایران

Monenco Iran

C

DESIGN PROGRESS

NIL

AZM

AKS

JVN

03.06.2021

DESIGNED BY

NIL

SIGNATURE

B

ACC. TO CLIENT COMMENT SHEET DATED:18 JAN 2021

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31.01.2021

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SECOND ISSUE

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FIRST ISSUE

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JVN

28.09.2020

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CLIENT:

KETRACO

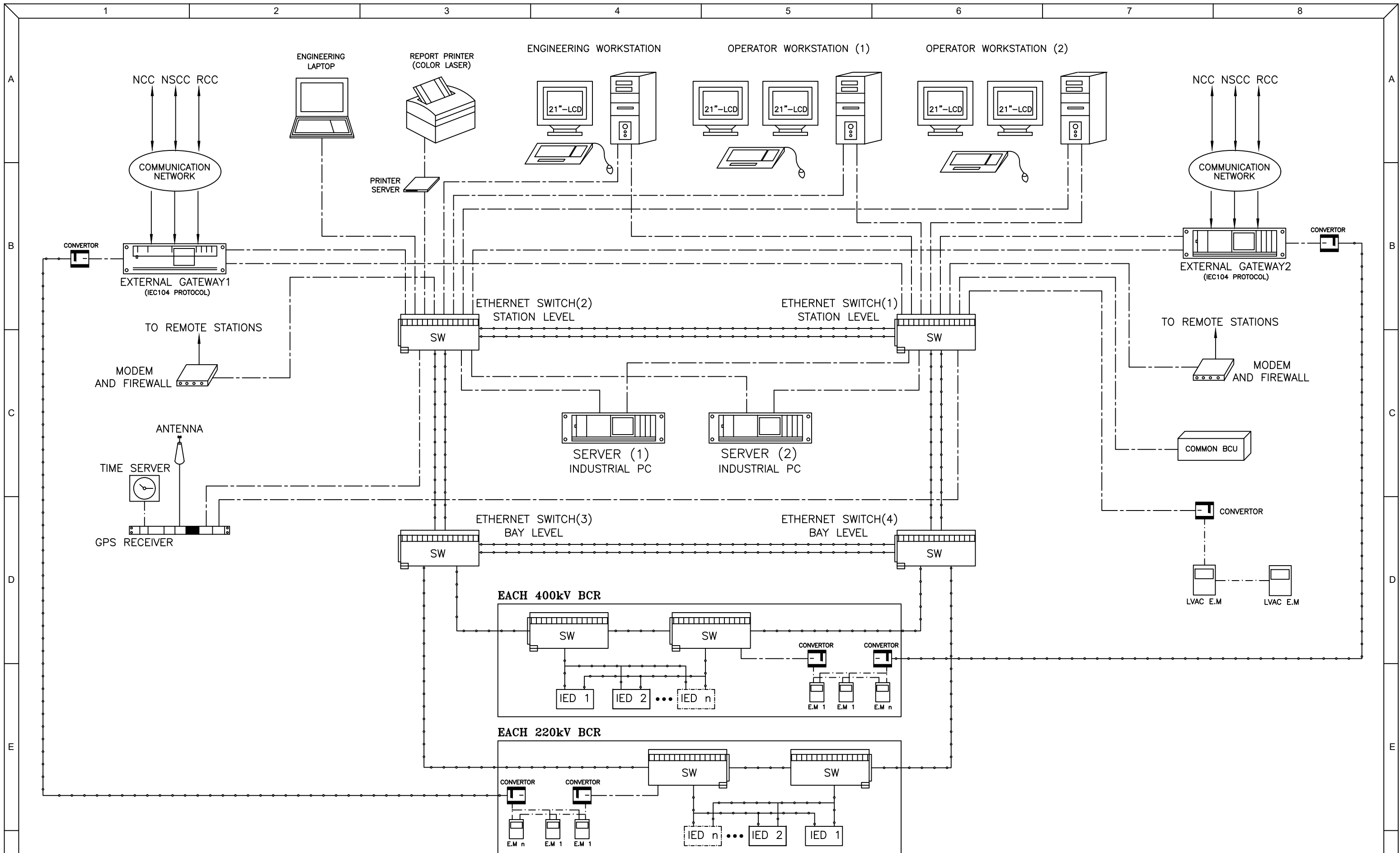
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SHEET: 3 OF: 4



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DWG. TITLE:

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SAS CONFIGURATION

DWG. NO.: MT-TLD-KETCO-5393-DD-00-SA-145 SHEET: 4 OF: 4

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