NEK
Nuklearna elektrarna Krško
Vrbina 12
8270 Krško

KRŠKO NUCLEAR POWER PLANT

TECHNICAL SPECIFICATION

For the Turn-Key Project

1282-AS-L

Modernization of AS system

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1. BACKGROUND AND DESCRIPTION OF THE PROBLEM

1.1 Purpose

Nuklearna elektrarna Krško (Nuclear Power Plant Krško) hereafter referred to as "NEK" intends to modify its current central alarming system – AS system.

This specification defines the requirements for modernization / replacement of NEK's Krško AS system. The project shall be implemented as a **turn-key** project.

1.2 Background

The installed Central Alarm System (NEK AS SYSTEM) is manufactured by Qualitrol, the SER4100 system, which NEK modified in the year 2004. The system was subsequently expanded with the installation of additional scanner cards in 2008 and 2018. Due to the system's size and insufficient data processing speed, internal communication errors occurred, particularly during maintenance, leading to occasional breakdowns in system communication.

Additional problems arise from the unavailability of spare parts for the SER4100 series, including logical and communication cards, as well as UMUX filters. In RE19, several deviations involving the incorrect display of specific alarms are recorded, with half alarms being present.

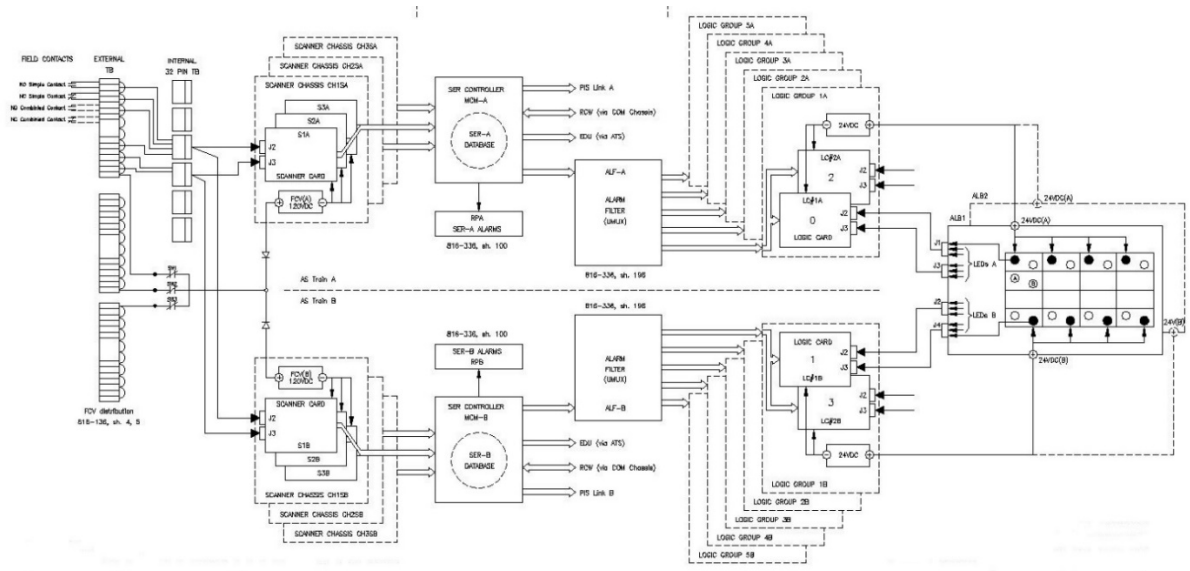


Figure 1 - Overall structure of existing AS

Another system operation issue was identified, where a firmware error on both SER units of the AS system led to an incorrect year change from 31.12.2019 23:59 to 01.01.2000 00:00. In 2020, the alarm ALB15-A5 ALARM SYSTEM VITAL FAILURE LOSS OF TRAIN frequently occurs.

In last few years NEK opened great number of corrective actions due to various problems and errors.

For the current NEK AS system, there are no longer original parts available on the market, such as Positive Input Scanner cards, UMUX units, SER4100 processors, RLU cards, Betalarm

BL1500 Windows Display Unit, and so on, from the same generation as the originally installed components. However, newer hardware versions with questionable or non-existent compatibility with the NEK AS system are now available.

Additionally, over time, the number of errors on both AS system channels has started to increase, particularly on the new scanner cards. These errors manifest as ">AS System Vital Failure<" and are typically caused by the failure of an individual scanner.

We can group all recorded issues and errors in the indents below and tag them as potential vulnerabilities:

- Reduced System Reliability by Aging
- Obsolescence of Spare Parts
- Increasing Maintenance Cost
- New Cyber Security requirements.

Summarized background - conclusion:

The NEK AS system at Krško NPP was introduced in 2004. Over the past 17 years of operation, there have been no major failures, i.e. system shut-down, etc.... However, the system's reliability has diminished due to aging. In the coming years, it is expected that the NEK AS system will no longer be able to function properly due to the obsolescence of spare parts. Therefore, it is necessary to improve the NEK AS system by implementing the latest technology to enhance safety at the Krško Nuclear Power Plant. It is highly unlikely that NEK can support operation of existing NEK AS system until the end of current expected plant lifetime 2043.

1.3 Implementation

The scope of this turn-key modernization project for the AS system involves replacing both the hardware and software platforms. All functionalities related to alarm responses and behaviour must adhere to the same guidelines and principles as the existing AS system (ISA 18.1, NUREG0700, etc.). Additionally, the Contractor will be responsible for the design, procurement, installation work, and system testing.

The AS system stands as a critical component for plant operations, necessitating maximum system availability (as described in section 5). The project will be executed in a single phase (one outage) to optimize system availability. During the modernization / replacement, efforts will be made to minimize system inoperability to the shortest feasible time frame. The specific duration of inoperability will be determined later in the detailed scheduling outlined in work orders.

During this inoperable period, a temporary AS system capable of handling expected 50 top priority ALARMS will be installed to ensure constant availability for operating personnel (see chapter 3.2.3.).

The implementation plan is thoroughly detailed in Section 34 and corresponding Appendix 3.

1.4 Current AS System Overview

Existing system description / manuals / drawings are available in Appendix 1 and 2.

2. DEFINITIONS AND ABBREVIATIONS

2.1 Definitions

AUGMENTED QUALITY (AQ): The term used in procurement process of Non-Safety Related equipment, parts or services, when special quality requirements exist that demand higher quality requirements than usual for similar kind of equipment, parts and services. Augmented Quality as a term can be applied to any equipment, part or service item classified as Non-Safety Related that has special requirements imposed by NEK (seismic, tests, analysis reports, cyber security, electromagnetic compatibility commercial QA program, manufacturing and inspection plan, etc.). Augmented Quality determination is applicable for all equipment, parts and services items that are specific for NEK, complex, or are important for availability and reliability of the plant operation. Refer to the section 16 of this specification for details.

ALARM ANNUNCIATOR BOX/PANEL (ALB): represent remote LED housings with LEDs behind engraved nameplates - tiles. These indicators will be controlled by the main controller through the output cards.

BIDDER/CONTRACTOR as used in this specification refers to the same company. The Contractor will be named as a Bidder until the contract is signed; however, only the title "Contractor" is used in the Specification. The bidder/contractor may represent a single company; nevertheless, responsibilities and areas/activities can be subcontracted to address specific activities required by the specification to achieve all project goals. The entire organization of the project team shall be explained in detail in the PMM; however, the overall responsibility for the project implementation remains with the Contractor (see also subcontractor).

COMMON CAUSE FAILURES: Failures resulting from the same cause affecting equipment or systems are referred to as common cause failures. This term is commonly associated with redundant equipment or systems, as well as the utilization of identical equipment in multiple systems. Common cause failures may arise from various factors, including design, operations, environment, or human factors. These failures are significant to consider because they can compromise the benefits of redundancy. Redundancy is affected when common cause failures are concurrent or when multiple failures occur over a period during which it is not possible to rectify the issues. It is the direct responsibility of the parties (companies) involved in the project to manage specific project aspects. While alternative approaches may deviate from the specifications, they will not be treated as non-compliance; instead, both approaches should be listed for NEK approval. Ultimately, the project must achieve the goal of ensuring a fully operable system as described in this specification.

COMMON MODE FAILURE: A failure of a system caused by an unknown design or manufacturing fault in a hardware or software module in such way that by a triggering by an internal or external event all modules of this type fail at the same time. Redundancy by identical means may be a suitable countermeasure against common mode failure, only if by additional design measures, the effect of possible events is reduced to one channel of the system. Random common cause failures are equivalent to a single failure.

DETAILED SOFTWARE FUNCTIONAL SPECIFICATION (DSFS): One of the design documents in the software life cycle of PCS that defines detailed functional characteristics of the PCS software not specifically related to the particular HW and/or SW platform. DSFS document should be developed for each PCS application (including all types of programmable digital

devices) or for each application software package. Minimum requirement is that DSFS document should cover functional characteristics of the software functionality: input signals (scope, source, type, and accuracy), algorithms (including input signals, constants, and operator entered values), output signals (scope, type, intended usage, accuracy) and HSI. It is also good practice that the DSFS document states the main or top-level acceptance criteria. DSFS prepared for more complex PCS' also addresses other functional characteristics like reliability, robustness, safety, security, timing, data communication protocols and other. Is worth of noting that for the existing software the DSFS are available and will be given for the revision if needed within the scope of the project.

ELECTROMAGNETIC COMPATIBILITY (EMC): The ability of the equipment to function satisfactorily in its electromagnetic environment without introducing intolerable disturbances to that environment or other equipment.

ELECTROMAGNETIC INTERFERENCE (EMI): Electromagnetic disturbance that manifests itself in the performance degradation, malfunction, or failure of electrical or electronic equipment.

EXTERNAL SYSTEM: Systems not the part of the AS system but being connected to the AS system by the data or other type of link or connection. Some kind of data flow is established either to or from the AS system to the External systems.

FAT: Factory Acceptance test is a comprehensive test of the particular part of the system normally (if not mutually agreed) planned to be implemented at the Contractor site. FAT procedure shall be written as requested per this technical specification. Due to the specific reasons (e.g. transfer of data from AS system to PIS) some FAT's can be implemented in NEK, upon the proposal of Contractor and acceptance by NEK.

FIRMWARE: Firmware is a program intended for use in programmable digital device. Firmware is kept in the semi-permanent storage such as various types of read-only memories. Firmware is used in conjunction with hardware and software, sharing the characteristics of both.

GRAPHIC PAGE (MIMICS) - Graphic representation of a system, panel or system with dynamics: colors, readouts, etc.

HUMAN-SYSTEM INTERFACE (HSI): The system through which the operating or maintenance staff interacts with the AS system, or the features through which user, administrator or maintenance staff interacts with the configuration of the AS system.

HUMAN-MACHINE INTERFACE (HMI): It refers to a user interface or dashboard that allows humans to interact with machines or devices, typically in industrial settings. In case of AS system HMI stand for components in MCB: ALBs, horns and pushbuttons.

REMOTE CONFIGURATION WORKSTATION (RCW): Is the primary maintenance tool for system configuration and control of system operation. RCW enables users to configure AS system functions, store device configuration data for easy retrieval in case of issues, transfer data seamlessly between storage systems, and view, edit, and print configurations. It also supports event archiving for analysis and provides annunciator status information for convenient viewing and printing.

OPERATOR INTERFACE WORKSTATION (OIW): It's a standalone or web-based application, installed on existing personal computers at operators' desks. It offers read-only access to alarm event logs with timestamps, redundant status display for each alarm on ALBs, and advanced filtering and prioritization customizable by NEK. The OIW interface allows

graphical presentation of ALBs with live status and is accessible on all designated workstations (thru application).

PARAMETER - Modifiable attribute or setting. It may imply a database variable, description, min/max, range, units, etc.

PROCESS COMPUTERS: Computers used to control real time processes, to monitor, log, distribute or simulate process data. Computers that collect data, perform calculations on the basis of predefined algorithms, store, transmit to other location and present to users' data that originate from technological processes or environment. Process computer systems manipulate either data that are acquired in real time or data that have been retrieved and collected earlier. Process computer systems are used for technological process protection, technological process control, monitoring, data logging, simulations of technological processes and transmission of process data to remote locations.

PROGRAMMABLE LOGIC CONTROLLER (PLC): Programmable Logic Controller is a digital device ("similar to PROCESS COMPUTER") designed and used for automatic process control based on predefined, pre-programmed and preloaded control algorithms which function on the basis of very strictly defined sequential logic scheme.

PROCESS INFORMATION SYSTEM (PIS): Process Information System is a common description for all the hardware (data acquisition systems, computer, and network equipment) and software used for the process data acquisition, distribution, data processing and presentation used as support for monitoring of the plant safe and reliable operation. PIS is a separate NEK system which will be used as an EXTERNAL system for distribution of AS system data.

PROVEN STATE-OF-ART EQUIPMENT: as a such the following equipment can be accepted. That equipment is manufactured by the recognized Company and it is at the latest designed, however there are reference project (facilities) already using that platform/equipment.

REDUNDANCY: Redundancy involves providing additional identical or diverse elements or systems beyond the minimum required, aimed at preventing the loss of necessary functionality. This ensures that the failure or loss of elements or systems within the specified failure tolerance does not lead to the complete loss of required functionality. It also includes the provision of alternative identical or diverse equipment or systems, allowing any of them to perform the required function independently, irrespective of the operational state or failure of others.

SAT: The Site Acceptance Test (SAT) is a comprehensive examination of a specific part of the system as well as the system in its entirety. The SAT procedure should be documented according to the Technical Specification provided.

SLCP: The Software Life Cycle Process (SLCP) implemented in NEK for digital systems results in a series of software design output documents, including: Detailed Software Functional Specification (DSFS), Software Source Code (SSC) files, system Build documents, Installation Configuration tables, Operations Manuals, Maintenance Manuals, and User Guides (UG). However, this comprehensive list of software design documents represents the maximum possible documentation set. In certain instances, this set might be smaller, and some documents may be combined (e.g., merging all manuals into a single document).

For this project, a similar Software Life Cycle Process will be integrated, tailored to the specifics of the Project. Emphasis will be placed on adapting the SLCP to the unique

requirements of this Project. A well-defined and detailed SLCP is expected to be established and outlined.

SOURCE CODE - The set of instructions expressed in a non-machine language from which the software's object code is derived.

SUBCONTRACTOR - Either an entity contracting directly with Contractor to furnish any part of the Work including materials and/or services, or an entity contracting with the Contractor's subcontractors of any tier to furnish any part of the Work including materials and services.

2.2 Abbreviations

ALB	Annunciator Light Box/Panel
AQ	Augmented Quality
AS	Alarm System
CB	Control Building
CDA	Critical Digital Asset (See SP-3 for definition)
CFR	Code of Federal Regulations
CPU	Central Processing Unit
DCS	Distributed Control System
DA	Digital Assets (See SP-3 for definition)
DE	Digital Equipment (See SP-3 for definition)
DI	Design Inputs (per ESP-2.604)
DMP	Design Modification Package
ECR	Emergency Control Room
ECB	Electrical Control Board
EMC	Electromagnetic Compatibility
EMCB	Emergency Control Board
DAP	Delivery at Place
CoC	Certificate of Compliance
DCM	Document Control Module
DI	Design Inputs
DIW	Document Information Worksheet
DMP	Design Modification Package
DRPI	Digital Rod Position Indication
DSFS	Detailed Software Functional Specification
DUR	Document Update Record
ECR	Emergency Control Room
ECB	Electrical Control Board
EMCB	Emergency Control Board (in ECR)
EMI	Electromagnetic Interference
FAT	Factory Acceptance Testing
FDCR	Field Design Change Request
H9	Plant mode window (i.e. FUEL out of the reactor vessel)
HP	Health Physics
HSI	Human-System Interface
HW, H/W	Hardware
HMI	Human-Machine Interface
I&C	Instrumentation and Control
IEEE	Institute of Electrical and Electronics Engineers
I/O	Input/Output
IP	Installation Package
I&C	Instrumentation and Control
KFSS	Krško Full Scope Simulator
MCR	Main Control Room
MCB	Main Control Board
MECL	Master Equipment Component List
N/A	Not Applicable
NCR	Non-Conformance Report

NPP	Nuclear Power Plant
NEK	Nuklearna Elektrarna KRŠKO (Krško NPP)
NSR	Non-Nuclear Safety Related
NTP	Network Time Protocol
OEM	Original Equipment Manufacturer
OIW	Operator Interface Workstation
OJT	On-the-Job Training
OS	Operating System
P&ID	Process and Instrumentation Drawings
PIS	Process Information System
PC	Personal Computer
PCN	Process Computer Network
PPC	Plant Process Computer
RCW	Remote Configuration Workstation
RFP	Request for Proposal
RFT	Ready for Training
RMS	Radiation Monitoring System
RLU	Remote logic unit
S/W	Software
SAT	Site Acceptance Test
SR	Safety Related
PCS	Process Computer Systems
PDR	Problem or Deficiency Report
PIS	Plant Information System
PLC	Programmable Logic Controller
PM	Project Manager
PMM	Project Management Manual
PQP	Project Quality Plan
P/S	Power Supply
QA	Quality Assurance
QC	Quality Control
QRP	Quality Record Package
RE	Responsible Engineer
SAT	Site Acceptance Tests
SE	Safety Evaluation
SES	Safety Evaluation Screening
SSC	Systems structures and components
SNSA	Slovenian Nuclear Safety Administration
SW	Software
TOP	Turn-Over Package
TS	Technical Specifications
UCP	USAR Change Package
USAR	Updated Safety Analyses Report
VCB	Ventilation Control Board
WO	NEK Work order
WSP	Work Sequence Plan

3. SCOPE OF SERVICES AND DELIVERY

Summarized scope of services and deliverables:

- Project documentation (PMM, PQP, etc)
- Preparation of design documentation (DMP, Installation package, documentation according to NEK procedures)
- Manufacturing and purchasing of Hardware (controllers, I/O cards, networking equipment, ALBs, etc…)
- Preparation of new AS system software (configuration, GUI, etc…)
- Execution of FAT
- Delivery on Site
- Supply of recommended spare parts and consumables
- Implementation of temporary AS system (expected 50 top priority ALARMS)
- Disassembly of the existing AS system and transport to NEK warehouse
- Installation of new Hardware and Software
- Execution of SAT
- Preparation of Project turnover and closeout documentation according to NEK procedures

3.1 General

This technical specification defines requirements for the design, procurement, manufacturing, programming, assembly, testing, delivery and installation of new AS system in NEK.

This Technical Specification defines scope terms and conditions for the design, procurement and delivery of hardware and software equipment for AS system modernization / replacement.

The Contractor or subcontractor shall be responsible for compliance with all the detailed requirements presented in this Specification.

The selection and purchasing of the equipment and components according to the NEK design inputs, as specified in Section 5 of this specification is the Contractors responsibility. They must ensure that all specified features and system performance, as outlined in this Specification, are met.

Generally, the manufacturer of the main equipment proposed for supply should be identified in the proposal to obtain NEK's approval (suppliers with references). The pricing for the equipment and materials should be offered separately, with the equipment cost being evaluated independently from the service price. NEK will only approve suppliers with positive references from industry for the main equipment.

All supplied parts and assemblies must be procured using proven state-of-the-art technology with the aim of providing a service life of at least twenty (20) years or more. The Contractor is responsible for incorporating all necessary design features to ensure optimal availability of critical system components and to support a design life of at least twenty (20) years.

A vital and significant aspect of the project involves replication of existing functionalities related to ALARM responses and behaviour in accordance with referenced standards such as ISA18.1, NUREG0700, etc.

The software, calculations, applications, and visual representations (mimics) of the new system must be provided in open-source code, i.e. NEK shall be allowed to customize GUI, adding or removing alarms, etc.

For all delivered and installed equipment and services per this project the Contractor shall provide at least:

- Overall project management, planning, scheduling and reporting,
- Site walk-down, acquisition of data and preparation of walk-down report,
- The Contractor shall ensure that the Project is implemented on schedule and within budget, while meeting quality and safety aspects,
- Preparation of detailed documentation including design modification package, temporary modification package, FDCRs (if changes to approved design are needed), changes to licensing documents, installation package, turn over package, as built documentation, etc., based on NEK ESD procedures,
- All other services as requested per thit specification (programming, engineering, etc.),
- Preparation of QA documentation package,
- Preparation of documents necessary to support NEK required licensing in front of SNSA (URSJV) as detailed in section 3.5,
- Active participation in licensing meetings with SNSA,
- Creation and revision of affected maintenance and operation procedures,
- Preparation of equipment environmental qualification reports,
- Material/Equipment procurement, manufacturing, inspection and testing (including Factory and Site Acceptance Tests)
- Recommended spare parts and consumables (for at least 20 years of operation),
- All required licenses for full operability of whole system (applications, OS, equipment support e.g. Firewalls etc.),
- Modification implementation,
- Training of NEK maintenance and operation personnel,
- Integrating all Project documents into NEK plant databases (DCM, MECL),
- Transfer of the Warranties of all goods to the End User (NEK),
- Project turn over and close out.

The Contractor is fully responsible for proper AS system design, equipment sizing and selection, performance, materials selection, quality assurance, testing, packing, shipping, technical support during installation, commissioning, and final set up with start-up.

The Contractor holds the responsibility to perform, beyond the established scope, analyses, tests, inspections, startup, and additional activities as needed in the process to ensure the modernization of the AS system, guaranteeing intended system service and the required functions by design.

It is the Contractor's duty to comply with all detailed requirements outlined in this specification and its referenced documents. If the Contractor is unable to ensure full compliance, a table indicating non-compliance shall be prepared and included in the offer. Any instances of non-compliance must be explained, and acceptance will only be granted upon NEK's agreement with the specific exception.

Deviation from this specification or its references may be considered if the proposed alternative technical solution is reasonable, justifiable, and results in benefits. However, such deviations will be accepted solely at NEK's discretion. Potential deviations (alternatives) will be deliberated and accepted or rejected by NEK during the negotiation phase.

The Contractor is required to participate in periodic technical and management meetings, promptly inform NEK about any changes in the project's contractual scope or schedule, ensure personnel familiarization with NEK procedures, and deliver the following: periodic project status reports, reproduction services for drawings and documents upon request, project planning and scheduling, project management, implementation of a quality assurance program encompassing a corrective action plan, coordination with equipment vendors to acquire essential vendor data and drawing information aligning with Contractor-furnished designs, reviews of qualification reports, and other specified tasks integral to the work effort.

The installation and commissioning of the new AS system will be conducted as a single phase. Further details regarding the project's scheduling can be found in Section 34, 'Schedule Requirements,' and its corresponding appendices.

The final installation and final operability of AS system is scheduled for the Outage 2025 (October 2025) or as agreed after the final alternative schedule will be discussed in the negotiation phase of the Project.

Warranty shall be given by the Contractor to all delivered goods including delivered software. In general, 3-5 years or more of Warranty is expected, but NEK recognize that some goods are commercial of the shelf items and the OEM Warranty policy will have to be accepted.

3.2 Scope of Services and Delivery

This specification aims to offer a comprehensive level of information regarding the project's scope, schedule, design requirements, and acceptance criteria for the new AS system. The proposal must include a thorough and complete list detailing all necessary materials, equipment, and services to fulfil NEK's expected functionalities.

While the specification provides suggestions for the number and placement of equipment, Bidders are encouraged to propose detailed solutions or alternatives that can justify meeting the specification's requirements. Any such alternative solution should be listed in the document 'Conformance to the NEK Technical Specification,' as outlined in the Bidding documentation.

The project schedule will be finalized during the negotiation phase. The Contractor is expected to develop a realistic plan in the Proposal, considering factors such as procurement, design, available workforce, and other relevant aspects. For a comprehensive understanding of the project's organization, it is recommended to review Section 3 and 34.

An essential aspect of the project is ensuring continuous alarming capability for operators, accommodating expected 50 top priority alarms. To facilitate this, a temporary modification should be implemented before the demolition of the existing system (chapter 3.2.3.).

3.2.1 General concept of new AS System

NEK decided to reduce potential functionality and maintenance problems for the existing AS system, which also has a significant impact on main control room operations and alarm response consequences.

The main reasons for the NEK AS system modernization are:

- System obsolescence (mainly unavailability of system original spare parts)

- Problems with regular maintenance and system modifications (such as continuous challenges with annual reconfigurations, complication with modifications or expansions of the system)
- Absence of system advanced functions and features (supporting alarm management, optimization, suppression, grouping, prioritization, etc.)

Due to continuous challenges and shortcomings of the existing NEK AS system, NEK is concerned about functionality, reliability, availability and maintenance of this system in the upcoming years.

The replacement of NEK AS system will completely remove all existing components, starting from field input terminal blocks, which will be the only equipment to be left as is, and finishing on the MCB ALB alarm annunciator panels.

Due to the wide variety of hardware and software available on the market, various approaches could be implemented. Nevertheless, the listed equipment below will undoubtedly be replaced with newer, modernized solutions:

- termination cabinets equipment / internal cables and connectors, power supply

- scanner cabinets equipment / terminal blocks, internal cables, scanner system equipment, GPS interface, PIS interface

- logic output cabinets equipment / patch panels, internal communication cables, logic system equipment, internal hardwired cables, connector panels

- logic output cabinet to alarm box prefabricated cables

- operator interface / configuration workstation, operator workstation

- alarm panels on MCB (ALBs) and annunciators (ECB, VCB, PC100CAB)

New Alarm system will be configured as a fully redundant system, equipped with controllers and associated I/O modules, serving functionality and calculation purposes, field contact acquisition, and driving alarm box devices. Modern technology utilizes hot-swappable dual or triple redundant components, as the new AS system shall implement.

The new NEK AS system will primarily mirror the current AS system's exact functional (HMI and signal logic) attributes. As stated in this specification, all requests (changes to existing system) which are not yet implemented, shall be included into the new AS system design.

The listed regulations and technical standards, including NUREG-0700, NUREG-0711, REGULATORY GUIDE 5.71, REGULATORY GUIDE 1.180, ISA 18.1, and others, will serve as references. These codes and standards will be referenced solely in cases of discrepancies or undefined areas. Otherwise, the new NEK AS system will strictly replicate the old HMI.

The general block design, illustrating the general concept for the new NEK AS system, is depicted in the following figure. The first significant difference is the utilization of a modern redundancy approach with hot-swappable components, departing from the independent AS train A and train B currently in use. The second difference from the existing system pertains to the output stage—specifically, the alarm panels. These panels will be transformed into smart alarm panels, facilitating communication with the system through modbus or a similar protocol. This design is already used on existing VCB ALBs.

The other components of the new system will consist of modern industrial components, including I/O cards, controllers, network equipment and adapters, servers, operator and

maintenance workstations. Redundancy for key components will be implemented to eliminate single points of vulnerability.

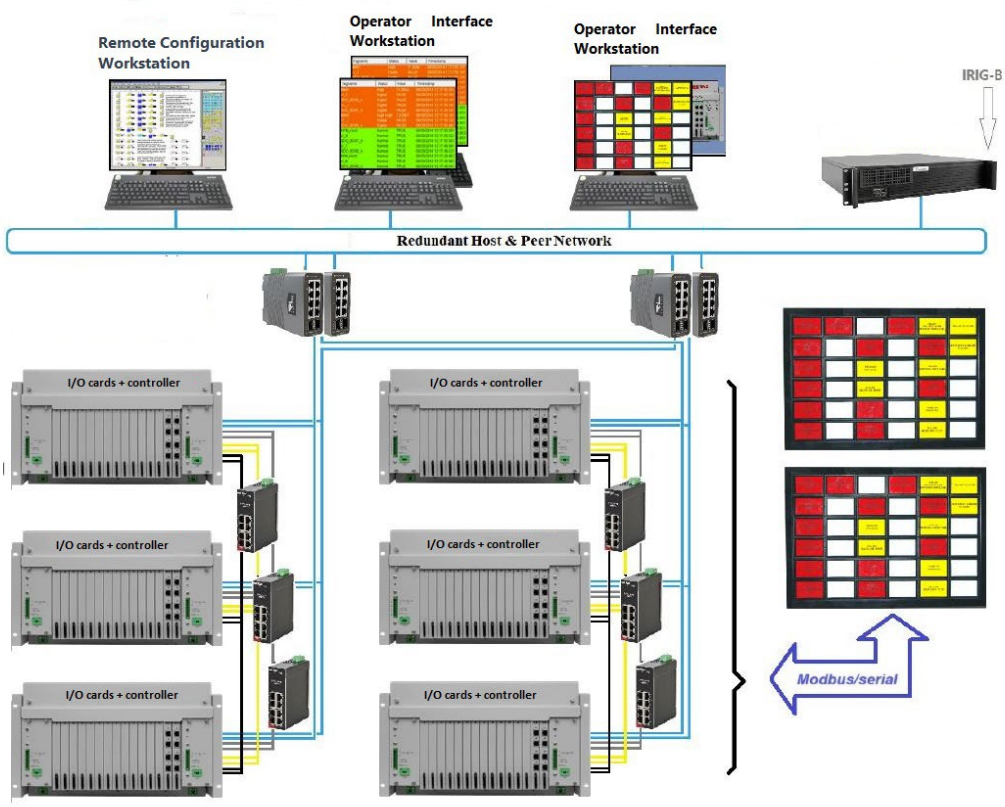


Figure 2 – general concept of new AS system

3.2.2 Functional description of the new AS System

The prerequisite for this modification is to install new state of the art Alarm System with as few changes to existing HMI features as possible, which would minimize impact to Operations (procedures, training, etc.). Advanced functionalities shall be implemented (but shall be partially enabled – only agreed and confirmed segments) in new system (filtering, prioritization, etc.). Existing ALBs will be replaced by contemporary ALBs with similar technology, i.e. engraved tiles backlit by LEDs, although with possibility to be controlled digitally.

To resolve the obsolescence and reliability of existing system, and to enable the new system to be operated for at least 20 years, complete hardware and software platform must be replaced. In a simple block diagram, we can represent basic building blocks of new AS system:

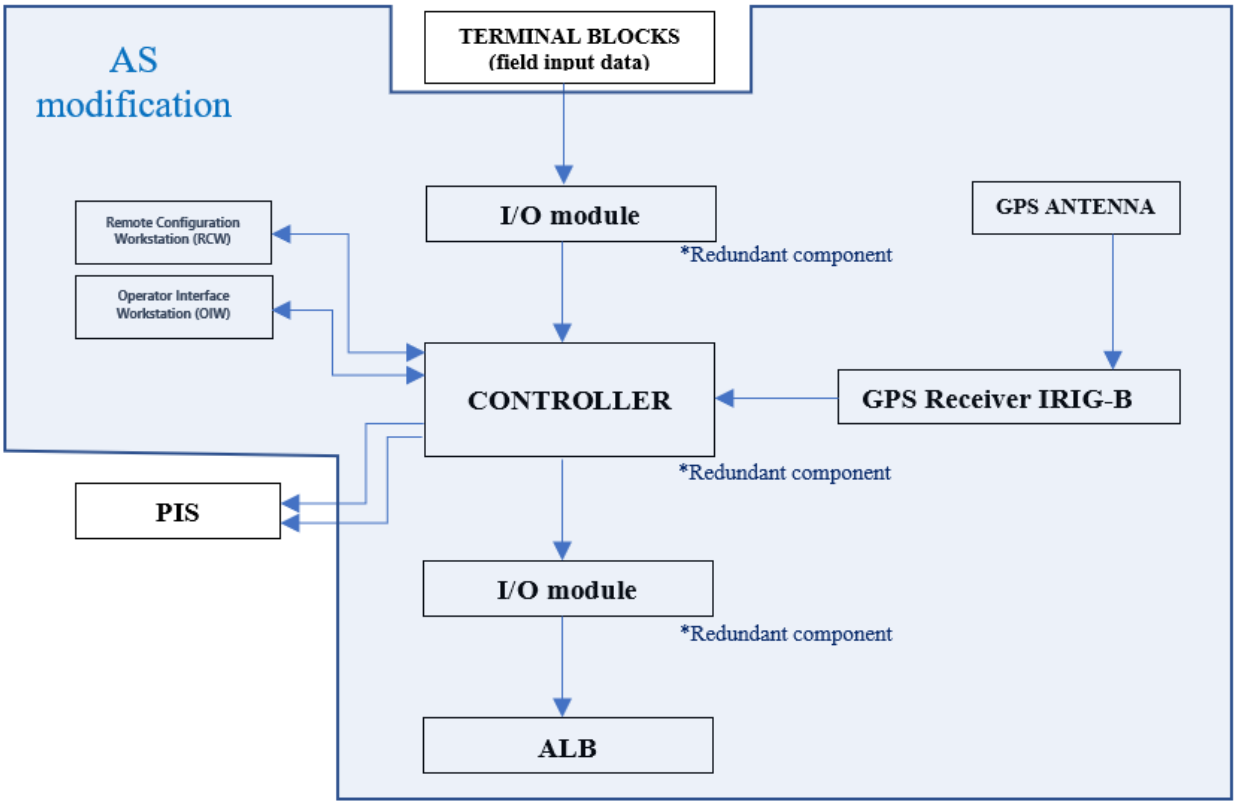


Figure 3 - Main components of new AS system

Currently, system components shown on figure 3 are distributed among several cabinets in MCR (CB el.115) and cable spreading room (CB el.111). The location of components of new system shall be determined by designer, however there are some limits due to distributed location of input data terminal blocks and the presence of multiple cabinets with alarm panels.

An overview of components that should be replaced is presented, with a focus on alarm annunciator cabinets and input terminal blocks. Some of these components are parts of functional alarm groups, others are individual main building segments (explained in next paragraphs):

- Main Control Board alarm system (MCB) – 19 alarm panels*
- Ventilation Control Board alarm system (VCB) – 6 alarm annunciator panels*
- Electrical Control Board alarm system (ECB + SY) – 5 alarm panels + 2 annunciator panels*
- Fire Protection Board (FP) – 1 alarm annunciator panel*

Alarm annunciator panels will remain on location, but will be replaced with newer models

Main Control Board (MCB) Alarm Annunciation System:

- 19 Alarm light boxes
- 5 Horns (unique for each of the 5 sections)
- 5 sets of Operator Pushbuttons (one for each of the 5 sections); the set includes Silence, Acknowledgement, and Test Pushbuttons
- The total capacity of the MCB alarm system to handle and present alarms is 721 (current).

Note1: Alarm Box ALB10 in MCB section C (consisting of ALB6 through ALB11) is unique as it provides information about First Out alarms. For this reason, MCB section C is equipped

with an additional pushbutton "First Out Acknowledge" to prevent the Acknowledge pushbutton from turning off the First Out annunciator when acknowledging other alarms in this section. This additional pushbutton is protected by a transparent cover to prevent accidental and unwanted acknowledge actions. Similar solution shall be implemented into the new design.

Note2: The Alarm Boxes ALB20 and ALB21 (MCB section F), used for alarming purposes for DEC equipment, shall remain unchanged and are not within the scope of this modification (as they are fully controlled only from ECR alarm system).

Ventilation Control Board (VCB) alarm annunciation system segment includes:

- 6 Alarm light boxes
- 1 Horn (common for all VCB alarms)
- 1 set of Operator Pushbuttons (common for all VCB alarms); the set includes Silence, Acknowledgement, Test Pushbuttons
- Total capacity of VCB alarms the system can handle and present is currently 258 (current).

Electrical Control Board (ECB) alarm annunciation system segment includes:

- 5 Alarm light boxes and 2 alarm annunciators
- 1 Horn (common for all ECB alarms)
- 3 sets of Operator Pushbuttons (common for all ECB alarms); the set includes Silence, Acknowledgement, Test Pushbuttons
- Total capacity of ECB alarms the system can present and handle is currently 186 (current).

Fire Protection Board (FP) alarm annunciation system segment includes:

- 1 Alarm Annunciator
- 1 Horn
- 1 set of Operator Pushbuttons; the set includes Silence, Acknowledgement, Test Pushbuttons
- Total capacity of FP alarms the system can handle and present is 80 (current).

AS Status Board (AS STATUS) alarm annunciation system segment includes:

- 1 Alarm light box
- This system uses its own notification and set of Operator Pushbuttons
- Total capacity of AS STATUS alarms the system can handle and present is 50 (current).

It is up to designer if this AS Status ALB should remain reused for the new system, e.g. a screen with error codes could be installed instead of this ALB.

However, the new AS system should be capable of notifying operators and maintenance personnel of an internal system error. Details regarding internal system errors should be accessible to maintenance personnel and operators through RCW and OIW.

The concept of the segments described above will be maintained as is, considering the request for the new system to have no impact on operational functionalities.

Functional groups and individual main segments of the NEK AS system, both in its current state and future configuration, are depicted in the figure below. This figure is an extract from PIS mimics:

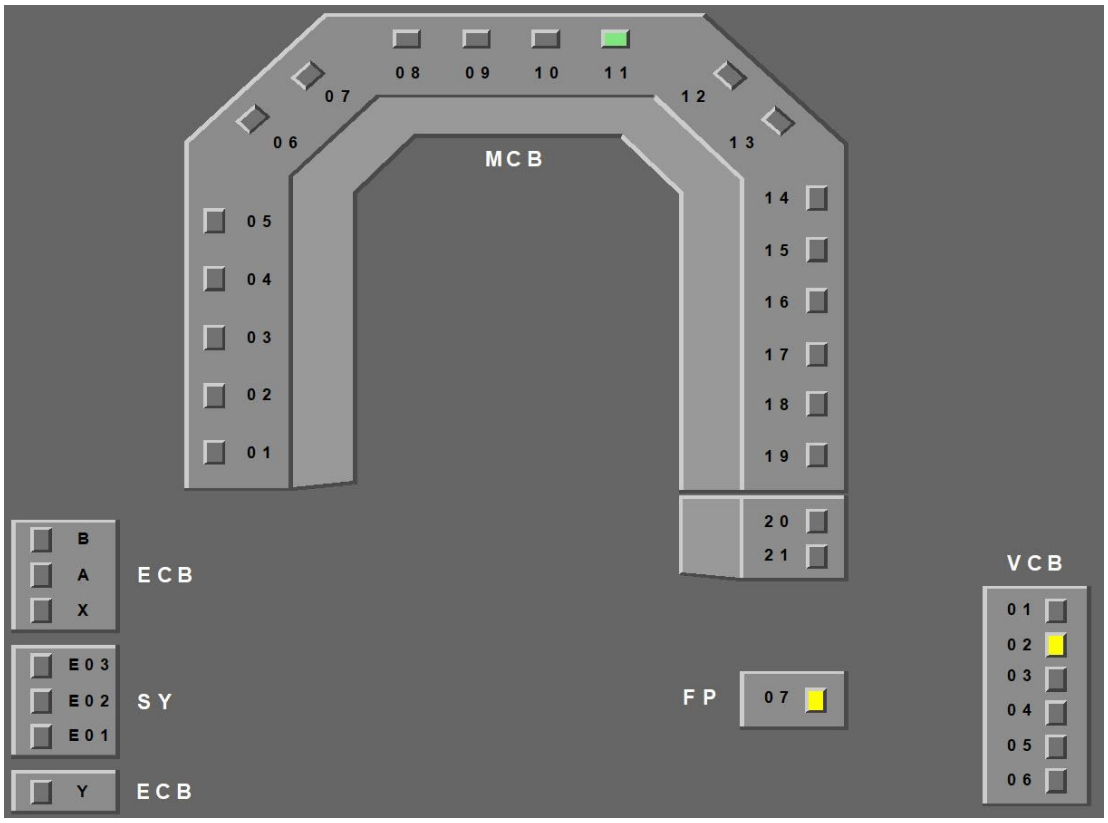


Figure 4 - AS functional groups and individual main segments

Cabinets with existing system components will be mostly emptied since all components from existing AS system shall be removed. Cabinets will remain in their current locations and will be utilized for the new arrangement of components defined by the designer of new AS system. The goal is to avoid installing any new cabinets, if feasible as per the design. If this is not possible, the contractor shall propose an alternative solution and present it in a technical part of the bid.

Cabinets that contain equipment which is anticipated to be removed entirely:

Main control room / CB el.115

- CB103RCKK802
- ASELAL01A04
- CB102BRDK201 (remains location for PC100CME001, PC100CME002)
- CB102BRDK401 (remains location for PC100CME003, PC100CME004)
- CB102BRDK801 (remains location for PC100CME005, PC100CME006)
- CB102BRDK701 (remains location for ALB-E01, ALB-E02, ALB-E03)
- CB102BRDK503 (remains location for ECBA, ECBB, ECBX, ECBY)
- FP101CAB (remains location for PC100CME007)
- ASELMB01A to E (remains location for ALB01 – ALB19)

Cable spreading room / CB el.111

- ASELAL01A06 (based on final design, this cabinet could be removed entirely)
- ASELAL01A05 (based on final design, this cabinet could be removed entirely)

Cabinets containing input terminals with field wiring (terminals and field cables shall stay as they are):

Main control room / CB el.115

- ASELAL01A01 (remains location for terminal blocks - input field cables)
- ASELAL01A02 (remains location for terminal blocks - input field cables)
- ASELAL01A03 (remains location for terminal blocks - input field cables)
- CB103RCKK804 (remains location for terminal blocks - input field cables)

Cable spreading room / CB el.111

- ASELAL01A07 (remains location for terminal blocks - input field cables)
- EIT358 (remains location for terminal blocks - input field cables)
- EIT359 (remains location for terminal blocks - input field cables)

Therefore, existing field cables and terminal blocks shall not be replaced. The reason for this is to reduce complexity and duration of the project so that installation can fit into standard outage time frame. This way we avoid testing of the complete alarm loops including all triggering devices and components in the field. However in case the designer recognizes that significant improvement would be achieved if field cabling would be rearranged to a limited extend, this shall also be allowed.

The new AS system, just like the existing one, will be designed to provide visual and audible annunciation of off-normal conditions to MCR crew for any process by monitoring the state of field switches/relays. These switches/relays will change state when annunciation is required.

Annunciation will be accomplished through visual presentation on alarm annunciator panels (ALBs) that light up corresponding engraved tiles, supplemented by sound generated by alarm horn.

The horn sound and its location will remain unchanged - the same frequency, pitch, and loudness. Additionally, the location of the acknowledge, test and silence buttons will also remain unchanged.

The capacity of alarms and concept of each of the previously defined segments will remain unchanged (except if described in this specification) and will be designed to allow for future extensions.

3.2.3 Main components considerations, description and prerequisites

Field Input Terminal Blocks and wetting voltage

Field cables are terminated at the Field Input Terminal Blocks. These cables carry field signals representing state of the field contacts, either closed or open. The wetting voltage for field contacts shall be supplied by redundant floating **120VDC** power distribution, as in the existing system. Lower wetting voltage might be acceptable provided that contractor proves by analysis or by testing that lower voltage level will work reliably with 60 years old field cables (end of current plant operation licence) up to 250m in length. **A ground fault detection system shall be incorporated**, preferably for each input signal. Design features should be included to enable quick identification of cable with ground fault.

Input cards

Input cards shall be organized in a redundant configuration as a crucial part of the system. Each field contact shall be continuously scanned by redundant digital input cards. The scanning cycle shall have a time resolution of **at least 1ms**, allowing for the storage of at

least **4500 events** in the local buffer. All events shall be assigned with unique time-stamp which shall be synchronized across devices and with **accuracy of at least 1ms**.

For this purpose, an IRIG-B signal specific for AS system shall be utilized for which new hardware shall be supplied (GPS antenna, cable, GPS Receiver IRIG-B time with NDT outputs) and full connectivity with new AS system established within the scope of this project.

The acknowledge, test, and silence pushbuttons are considered inputs to the AS system and should be processed in the same manner as all other signals. The processing times from pressing the pushbuttons to AS system response shall not exceed 1 second.

It is necessary that the new I/O cards have a **self-diagnostic feature** to ensure constant monitoring of system operability and an alarming mechanism in case of errors. Automatic switching to redundant operational cards shall be included in basic design of the system.

Possibility to expand the input side of the system with extra digital or analogue cards shall be considered for future flexibility, see chapter 3.2.4.

Redundant configuration shall be consistent with the requirements described in section 5.

Data processing, System Functions and Advanced Features

General data processing pre-requisites:

- Scan time resolution: at least 1ms,
- Events time stamping: 1ms,
- All events shall be scanned and stored in SOE logs,
- Historical Archiving (permanent storage to dedicated storage device) at regular intervals.

The new NEK AS system shall be equipped with following signal processing features: anti-chattering, time delay, filtering, alarm suppression and alarm grouping. Re-flash functionality shall also be replicated. Currently re-flash functions in such a way that when local common alarm contact changes state to non-alarm position by more than 500ms and then changes state back to alarm position, AS system performs re-flash of that specific alarm (flashing of specific tile supplemented by horn alarm). The purpose of this is for example if an alarm is already present on local alarm panel and then another local alarm actuates so that MCR staff is aware of new local alarm. Local re-flash functionality is out of the scope of this project.

Wherever these features are currently configured and utilized, they will be retained and replicated in the new system software configuration.

The guiding principle for the new system remains based on **ISA18.1** 'Annunciator Sequences and Specifications,' which delineates various alarm sequences deployed in the Main Control Room (MCR) annunciators, as detailed in section 5.2.

For processing of field contact states into alarms the system logic will be implemented at the PLC/controller level, utilizing fundamental **Boolean logic** functional building blocks (algorithms). Wherever Boolean logic is applied into different combinations of field input contact and alarms on existing system, it must be replicated in new software configuration.

Controller

PLC/Controller module shall be fully redundant part of the system, capable of utilizing fundamental Boolean logic functional building blocks (algorithms) as described above. The controller processor speed and capability should enable the scanning of all data and the execution of functionalities within the requested time cycles. Internal self-diagnostic feature

shall be implemented to ensure constant monitoring of system operability and an alarming mechanism in case of errors. Automatic switching to redundant operational module shall be included in basic design of the system.

Output cards

Output cards shall be organized in a redundant configuration, serving as a crucial component of the system. The objective is to minimize the introduction of cables into the MCB, allowing for installation within the standard outage timeframe. This can be achieved either by establishing digital serial communication with the new "smart" ALBs and installing digital output cards. Or alternatively, digital output cards can be installed in the MCB area, in proximity to ALBs, facilitating direct hard-wired short connections with connectors internally. In this scenario, ALBs will function solely as LED boxes without higher-level communication capabilities.

Active circuit testing shall be implemented to detect open and short circuits on each output line, conducting on-and-off tests to identify stuck conditions and evaluating channel readback values. In case of "smart" ALBs complete self-checking shall be implemented. Any detected faults shall be reported as an internal system error.

Output cards redundant configuration shall be consistent with the requirements described in section 5.

Alarm annunciator panels (ALBs)

The new system will manage 33 alarm annunciator panels, consisting of 19 MCBs, 6 VCBs, 7 ECBs, and 1 FP. New annunciator panels (ALBs) shall either support digital serial communication, reducing the overall requirement for wiring and cabling during the replacement process, or they should function solely as LED boxes fed from digital output units (cards) installed near the ALBs (in the MCB area). This is a crucial aspect for optimizing the installation timeframe.

Currently, the ALBs connect to two multicore cables (40 cores) leading to RLU cabinets for both Train A and Train B. These cabinets are situated in the room below the MCR and within the MCR itself. If the old cables are reused, the new system could not undergo a full Factory Acceptance Test (FAT) but only during the outage, consequently increasing installation time and the likelihood of hidden system errors.

Therefore, these **existing cables shall not be reused** and **shall be removed**.

To allow project completion within standard outage window, a digital communication between new system output and ALBs is requested. This concept is implemented with existing VCB and ECB ALBs. The other possibility is to install remote I/O units close to ALBs location (i.e. inside the MCB), thereby minimizing multicore cable length and allowing the use of connectors. This also allows full testing of the system at FAT. The goal is to install and test the new AS system during defueled reactor time-frame of the outage. The new ALBs shall be of a modular type, enabling the replacement of potentially malfunctioning segments, such as LED windows. These segments will be delivered to the warehouse as spare parts.

The new ALBs shall be sized to fit into the existing MCB cut-outs. To install new ALBs without impacting the mechanical construction of the MCB, the designer must take precise measurements of the existing cut-outs.

The window/tile colors and **height-to-width ratios** should be replicated to match the existing design. In addition, **all tiles shall be fully engraved prior installation.**

The flashing of multiple windows (when different alarms are active/flashing on different ALBs) shall be synchronized, i.e., all windows shall flash simultaneously. Also, the start of window flashing and sound activation from horns shall be synchronized, in a way that both start at the same time.

Considering all the points mentioned above, and incorporating a crucial requirement as requested by Operations, it is imperative that the interface of the new annunciator alarm panels remains the same or undergoes minimal visual changes. Contractor shall demonstrate to NEK the exact look and feel (preferably with sample ALB) of the new ALBs front section. Based on this NEK shall approve the new ALB design and only then contractor shall continue with ALB procurement process. This is essential to minimize the impact on training efforts and to ensure a smooth transition for NEK operations.



Figure 5 - Current alarm annunciator panel (ALB) design

Remote Configuration Workstation (RCW)

The system shall be equipped with the Remote Configuration Workstation (RCW). RCW shall be primary maintenance tool for system configuration and control of system operation. Possible location for RCW is computer room 1 (CB room 022). Functionalities of RCW shall be at least but not limited to:

- To provide means of configuring AS system functions and features,
- To store device configuration data on a hard disk for convenient downloading in AS system of device memory failure or replacement,
- To upload and download configuration data between the RCW hard disk storage and AS PLC device configuration memory system,
- To allow configuration data to be viewed, edited, and printed,
- To archive all events to the computer hard disk for analysis,
- To retrieve annunciator status information for viewing and printing.

The Graphic User Interface (GUI) intended for configuring the new AS system should be designed to be user-friendly, preferably employing block diagram programming or a similar intuitive approach.

Operator Interface Workstation (OIW)

The Operator Interface Workstation will be designed as standalone application. An IP-KVM accessible interface for operators shall be implemented on operators' desks, similar to existing solution. OIW shall provide read-only access to alarm event logs (including time-stamp of each event), and shall provide redundant graphical status of each alarm on each ALB. Additionally this interface must allow advanced filtering (plant mode based alarms), prioritization, which should be fully customizable by NEK. OIW interface shall enable graphical presentation of each ALB with live status of each window including status of all inputs for combined alarms. An IP-KVM designated workstation connected to the local network is expected to fulfill upper requests (considering all cyber security requirements). Operating with OIW shall be possible on the workstation itself, using a keyboard, mouse, and LCD screen.

PIS System Interface - connection

The communication between the AS system and the PIS system shall be incorporated using protocols that allow the transmission of input/output data with timestamp information. Details and pre-requisites regarding AS–PIS communication can be found in Chapter 5.8, Communication with PIS.

Locations for new equipment

As already described above, cabinets with existing system components will be mostly emptied since all components from existing AS system shall be removed. Cabinets will remain in their current locations and will be utilized for the new arrangement of components defined by the designer of new AS system.

Preferable location for Remote Configuration Workstation (RCW) and Operator Interface Workstation (OIW) is MCR or computer room 1.

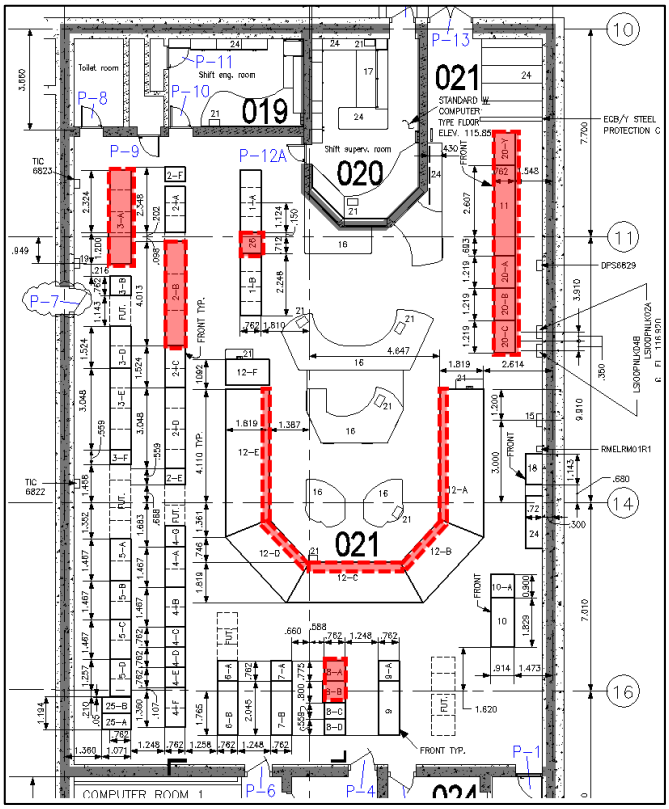


Figure 6 - AS system cabinets arrangement in MCR

All new equipment shall be installed in existing cabinets. Only functional description of each cabinet may change.

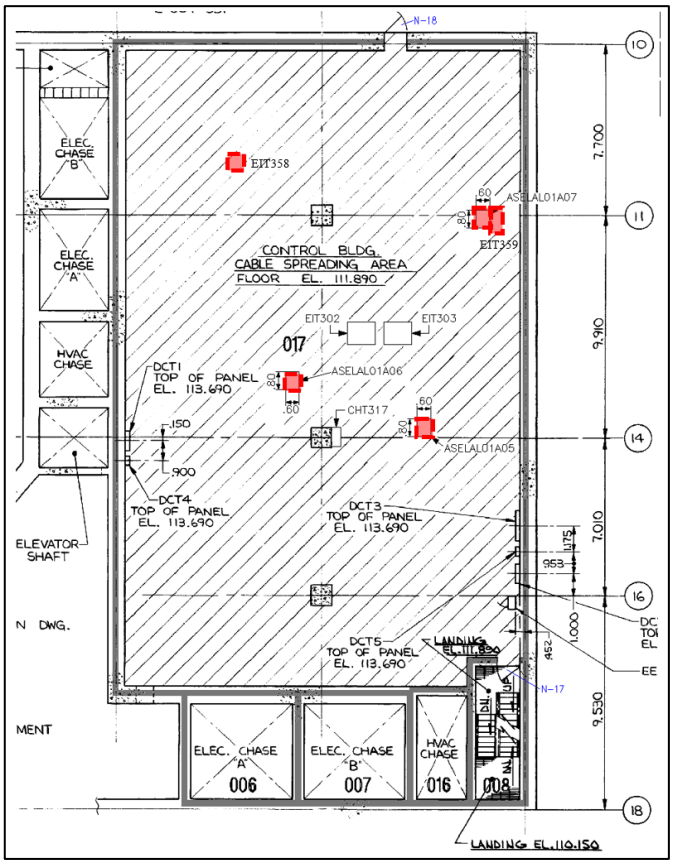


Figure 7 - AS system cabinets arrangement in CB111

All existing internal AS system cabling, down to the field level (to the field terminal blocks), shall be removed and replaced with new cables as per the newly designed specifications. Cables shall be selected according to the standards and specifications stated in section 5.

KFSS

Upon the request to install new ALBs in the Main Control Room (MCR), there is a consequential impact on the Krško Full scope Simulator (KFSS). The Contractor is required to provide a full set of ALBs for installation in the KFSS control board, and these ALBs must mirror those intended for the MCR. Special attention should be given to account for variations in power supply levels specific to the KFSS. The ALBs (LEDs) are driven by simulator output cards, which use 24VDC with + as a common and - as an activation pole for each window.

Temporary AS system

As the AS system must remain operable at all times, especially for critical alarms, a temporary alarm system shall be designed and installed to facilitate the annunciation of critical alarms to operators during the replacement of the NEK AS system. A detailed list of these critical alarms will be established in the DMP phase of this project (expected 50 top priority alarms).

The chosen critical alarms, i.e. their respective input terminal blocks, will be wired with temporary cabling into the new temporary alarm system. This temporary system shall perform scanning of inputs in accordance with all prerequisites and requirements, mirroring the functionality of the main new AS system. In the event of an alarm, the operator will be

promptly notified. The method of annunciation can be selected by the contractor, with a preference of using a mobile LCD screen placed in a visible location in the MCR, which will be defined by NEK operations department.

3.2.4 Expansion Capacity

All new AS system shall be provided with expansion capacity for future addition of new alarm inputs. The minimum expansion capacity at maximum system load shall be:
• Inputs: + 20% expansion capacity (input terminal blocks and input cards)
• Outputs: + 10% expansion capacity (number of ALB windows).

3.3 Engineering and design activities

The Contractor bears the overarching responsibility of meeting the objectives outlined by NEK, ensuring the delivery of high-quality engineering solutions for the contracted work.

Technically qualified engineering firms under contract are obliged to adhere to NEK's engineering and design change procedures. They are accountable for producing meticulously checked and verified detailed engineering and design documents within specified timelines.

The preparation of Design Modifications must align with ESP-2.602 Design Modification Package guidelines. Throughout the design phase, adherence to all applicable NEK ESD (Engineering Standards and Data) and ADP (Administrative Procedures) Procedures, as well as the QA Manual tailored for this Project, is mandatory.

Full compliance with the detailed requirements outlined in this specification is the Contractor's responsibility. Approval of any drawings, documents, or specifications by NEK does not exempt the Contractor from these responsibilities. Deviation from this specification or its references requires prior written approval from NEK.

Finalizing the design inputs (DI) falls within the Contractor's scope of work. NEK will provide the Contractor with original design documents, alongside information specified in this document, for review and use, adhering to proprietary policies. The design input document shall adhere to NEK procedure ESP-2.604. Design Input document must undergo review and approval by both the Contractor and NEK as the purchaser. The Contractor is responsible for checking and verifying each design input against the original design basis. After DIs are approved ,contractor shall submit Basic Design document to NEK for approval as a prerequisite for continuation of work on the detailed design in DMP.

At least the following list of documents shall be prepared and submitted for the Project:

- Project Management Manual (PMM)
- Integrated Project Schedule
- Project Quality Plan (PQP)
- Design Input Document (DI) in accordance to ESP-2.604 NEK Procedure
- Basic design
- Equipment Specifications
- Analysis Report for equipment generic features
- Design calculations specific to the NEK Site
- Design Modification Package in accordance with ESP-2.602 NEK procedure
- Safety Evaluation and USAR/TS/changes (10CFR50.59) in accordance with ESP-2.301, ESP-2.302, ESP-2.303 and ESP-2.306 NEK procedures
- Factory testing reports for equipment

- SAT procedures
- Installation Package (IP) in accordance with ESP-2.619 NEK procedure
- Turnover package (TOP) in accordance with ESP-2.611 NEK procedure
- Drawings (outline, assembly, detailed, as-built)
- Equipment Data Report
- Technical manuals
- FME Plan in accordance with NEK procedures

Design documentation is prepared within DMP package.

Other important analysis that must be performed within the scope of this project:

- Single point vulnerability analysis, no single point is acceptable (except field terminal blocks and ALB LED lights),
- Failure Modes and Effects Analysis (FMEA),
- During the design special care shall be given to the power supply scheme. All vital AS system loads are powered from the instrument inverter buses. Whole AS system shall be recalculated (from the prospective of the available sources) and selectivity shall be ensured. Additional measures (or features) shall be built into the distribution system to ensure the system switch off and consequential power on will not cause main breakers (due to the in-rush current) to open. Some delay shall be incorporated as necessary,
- The Contractor shall prepare FAT and SAT procedures that shall be reviewed, commented and approved by NEK before FAT and SAT execution. Scope of the Site Acceptance Testing shall envelope full scope of FAT already performed at Contractors facilities with the differences related to the full system configuration. SAT shall exercise full scope of AS system functional testing (see section 15 of this specification for more details). Within the proposal the draft Testing Program shall be delivered to NEK to understand (and comment) the Contractor approach to testing. That plan shall be part of the Contractor Approach to Work as requested in Section 40.
- The Contractor shall provide programming and software verification and validation (V&V) documentation. Detail plan regarding the Software Quality Assurance shall be integral part of the PQP or as submitted as an-stand-alone document,
- The Contractor shall provide AS system software documentation in accordance with requirements of the NEK procedures ESP-2.912, ESP-2.913 and ESP-2.951. Detailed Software Functional Specification (DSFS) and other documents required per these procedures shall be prepared and provided for NEK review and approval,
- The Contractor shall provide users guides for operation, installation and configuration, as well as procedures for software maintenance, system security and administration,
- Configuration and test software shall be licensed to NEK.

3.4 Licensing according to the Slovenian Nuclear Code

NEK operational license is based on the following documentation: USAR, TS, DECTS and RETS, which contains vital information regarding nuclear safety. In general, plant modifications may potentially have an impact on the former. Therefore, the effect on nuclear safety and the documentation, which is the basis for the plant license, is evaluated through 10CFR50.59 process for any modification on SSC.

For the new AS system modification the Contractor shall perform assistance for 10CFR50.59 evaluation of the modification using NEK plant procedure ESP-2.303. This includes the preparation of Safety Evaluation Screening (SES), Safety Evaluation (SE) if required and supporting analyses. Within the 10CFR50.59 evaluation the Contractor shall review USAR, TS, and RETS and if required prepare change packages for these documents according to NEK plant procedures ESP-2.301, ESP-2.302 and ESP-2.306. All mentioned licensing documents (SES, SE and change packages) are a part of standard DMP.

The required schedule for the completion of the licensing documents (including KOC and KSC Review) is defined in the plant procedure ESP-2.602 , requiring the completion of the licensing documents 90 days before the desired approval by the URSJV.

The Contractor shall also provide necessary support during the licensing process at URSJV. This includes providing iterative answers on questions raised by either regulator or Expert Reviewer (if applicable), attend meetings and presentation as requested by the Purchaser and provide overall technical support for the licensing activities. The Purchaser will be responsible for arranging and conducting any management, regulatory, licensing or other presentations.

To summarize, the Contractor shall prepare the following documents within its scope of licensing activities:

- SES according the plant procedure ESP-2.303
- SE according the plant procedure ESP-2.303 (if applicable)
- USAR Change Package according the plant procedure ESP-2.302 (if applicable)
- TS Change Package according the plant procedure ESP-2.301 (if applicable)
- documented analyses necessary to support the above-mentioned documentation.

3.5 Purchasing, packing, shipping and storage services

The Contractor shall suitably pack, ship and deliver all equipment to the NEK site from the manufacturing facility, carry out unloading at the mutually agreed temporary storage location on the NEK property, and provide all necessary means, but storage building itself, for temporary storage. The Contractor shall also carry out all site transportation to the installation locations.

The Contractor shall unpack, inspect for transportation damage, and perform any other activity necessary to fully prepare delivered equipment for installation and storage of the spare parts at the NEK warehouse.

3.6 Procurement Manufacturing and Supply

Procurement and manufacturing shall consist of fabrication and delivery of the new AS system equipment. It is the Contractor's responsibility to supply all ancillary equipment required to implement the modification.
Procurement/supply consists of at least the following activities:

1. Preparation of material/equipment specification for the procurement of required material/equipment
2. Review and approval of drawings, tests and qualification reports
3. Informing Purchaser of Factory Acceptance Tests
4. Witness at Factory Acceptance Tests

5. Preparation and transfer of manufacturers documentation to NEK
6. Verification that contracted test requirements are met and tests demonstrate equipment & component capabilities performance requirements.
7. Ensuring that suppliers compile properly the required reports and manufacturing certificates.
8. Contractor/Purchaser will participate at the inspections and testing during the equipment manufacturing.
9. All ancillary equipment if required to manipulate, install and maintain new AS system
10. Inspections, examinations, and testing as required
11. Documentation as required.
12. All components shall be shipped in necessary racks, cradles, frames, containers, etc. furnished by the Contractor.
13. Shipping configurations shall be provided in accordance with standard industry practice, specified quality assurance requirements (section 30) and Certificate of Compliance.
14. Appropriate working facilities shall be provided for the Purchaser's Resident Inspector at any fabrication facility employed by the Contractor. Facilities shall include a standard desk, chair, locking file cabinet, free access to internet and private telephone circuit.

3.7 Site activities (demolition, installation, commissioning and testing)

Demolition, installation, commissioning, and testing of the equipment included in this project shall occur within the timeframe specified in Section 34 Schedule and Appendix 3. It is the Bidder's obligation to submit a project plan (associated with the PMM) in accordance with Appendix 3. While some deviations (changes) can be proposed, the implementation plan must be submitted for acceptance or rejection by NEK. In any case, the planning of the implementation must consider, at a minimum, the following:

- Fix dates and duration for the planned activities, which shall be aligned to plant refuelling outage in October 2025.
- Real number of workers for the implementation (especially during the periods when the work will be the most demanding (outages).
- Locations of work area. Work in MCR and the rooms associated with the MCR shall not request to many persons. Delivered Implementation plan will have to be reviewed and accepted by NEK.

The Contractor will be obligated for all work associated with the implementation of the project. Any deviation from that shall be highlighted but in general only the specific activities will be supported by NEK like scaffolding, but only if exposed and being approved before the signature of the Contract. The site installation shall be performed in accordance with the section 14.2 of this specification.

Per by Contractor developed 1282-AS-L DMP's documentation package (in accordance with ESP-2.602 procedure), the Contractor is responsible for overall AS system installation and testing (under NEK supervision).

The Contractor shall make all alterations, permanent or temporary, to the site installation location in order to be able to properly install the new AS system equipment.

The Contractor shall provide all necessary labour, supervision, tools, equipment, spare parts and consumables needed to successfully disassemble old equipment, as well as to assemble and test new equipment on site.

The Contractor shall prepare all necessary testing procedures to perform SAT and final equipment set up prior to the equipment initial release into operation. All procedures shall be updated with any previously provided markups. SAT will be performed jointly by the Contractor and NEK following commissioning plan and testing procedures instructions prepared by the Contractor and approved by NEK.

NOTE: Installation documentation package(s) shall be provided and approved by the NEK QA/QC department and responsible RE before any demolition/installation work would be started by the Contractor!

Other obligations and responsibilities:

1. Development of Installation Package per NEK ESP-2.619 procedure in accordance with by the Contractor developed and approved 1282-AS-L DMP,
2. New AS system shall be installed in one phase – in outage 2025. System installation, testing and finalization activities shall be timely scheduled and implemented by the Contractor not to jeopardize overall project implementation and refuelling outage schedule. Detailed plan shall be prepared by the Contractor and shall be approved by NEK. See more about the project schedule in section 34 and Appendix 3 of this specification,
3. The Contractor is fully responsible for overall AS project coordination and finalization under coordination and direct supervision of the NEK representatives,
4. The Contractor's site manager responsible for overall AS project shall closely cooperate and coordinate activities with its subcontractors responsible for mechanical, I&C, electrical and civil portions of installation Work on this project. Any dissidence between the different parties shall be resolved and coordinated with the NEK RE,
5. The Contractor's QA/QC department is responsible for overall quality delegated by this specification and 1282-AS-L DMP. Moreover, they shall closely cooperate with NEK QA representatives and NEK RE,
6. At the end of the project the Contractor shall develop detailed and accurate mark-up drawings and other updated documents that shall be incorporated into the TOP per NEK procedure ESP-2.611,
7. AS system operability checklist shall be signed off by the Contractor representative(s) and NEK project team including RE and QA/QC personnel upon completion of all demolition/installation activities and system operationally test verification,
8. A final walk-down and accuracy verification of by the Contractor developed mark-up documents/drawings shall be performed,
9. If necessary, the Contractor's responsibility is to initiate, develop and implement by NEK approved FDCR(s) following instructions defined in the ESP-2.609 procedure,
10. The Contractor's obligation is to develop final AS project installation / commissioning report in accordance with the NEK ESP-2.619 procedure requirements.

3.8 Spare parts

Within the Bid, the Contractor shall deliver recommended spare parts (as a part of the final bid) for the equipment delivered, to cover at least twenty (20) years of the system operation. Spare part unit pricing shall be provided. At least the following recommended spare parts shall be listed in the table:

- 15 % spare I/O cards (in relation with the number of installed cards)
- 10% spare CPU controller cards (in relation with the number of installed CPUs)
- 10% spare networking equipment (in relation with the number of installed parts)
- 5% spare LED Yellow window modules (in relation with number of installed modules)
- 10 pcs od spare ALB LED window modules in different color: Orange
- 10 pcs od spare ALB LED window modules in different color: Green
- 10 pcs od spare ALB LED window modules in different color: Red
- 2 sets of complete 19" chasses including redundant CPU controller with redundant PS. Each slot shall be equipped with the spare I/O cards (respectively to design needs)
- 20% spare Power Supply Modules (in relation with the number of installed modules)

For the workstations (RCWs and OIWs) the Contractor shall also provide a list of recommended spare parts in a bid (including, but not limited to computer systems, computer components, network equipment, special tools, peripherals, etc.).

Required/recommended spare parts shall include:

- Monitors: at least one spare monitor per each workstation (including power supply adapters),
- Hard Disks: at least one spare disk per each workstation if applicable,
- PCI Cards: at least one graphics card and network card per each workstation if applicable,
- Network Components (including network switches, external I/O devices, video cards, media converters, etc.): at least two spares for each type of network components,
- At least one keyboard and mouse per each workstation,
- Fans: sufficient number of fans for network switches and servers. If applicable,
- Sufficient number of spares for other active components that will be used, based on the design and their MTBF (Mean time between failures).

All components, including spares, must come with supplementary data, including item description, part number, serial number, manufacturer details, reference documents, shelf life, storage requirements, recommended replacement frequency, and pricing. This information should adhere to the NEK MECL data requirements.

If NEK decides to procure more spare parts than included in the contractually anticipated scope and pricing, additional spare parts could be procured based on the scope change request issued by NEK, with the original pricing provided within this bid.

Contacts for the purchase of spare parts in the future (via the manufacturer or Contractor) shall be provided within the Bid. The Contractor shall ensure technical (software and hardware) support and spare parts for at least fifteen (15) years of operation after system delivery. Spare parts shall be provided with the Certificate of Compliance or demonstrated by the same part numbers for particular item. NEK will decide which spare parts and quantities will be purchased.

3.9 Revision of the documentation and project closure

NEK provides available preliminary Design Inputs (DI) per Section 5 of this specification. However, the overall collection, validation, and use of any required input data, regardless of its form, are entirely the Contractor's responsibility. In any case, the submitted DIs shall be used by the Contractor but upgraded to cover the overall project.

The Contractor shall provide all applicable documentation requested in this specification. The Contractor shall make available all necessary field and inspection procedures, drawings, and written instructions, as applicable for the project. This documentation shall be available for NEK's review.

The Contractor shall fulfill NEK Design Modification Control Program requirements, defining how to prepare documentation packages, process, and control modifications and design changes to NEK structures, systems, and components through three major phases: design, installation, and closure.

The revision of the documentation and project closure shall include the following Contractor activities:

1. Preparation of As-Built essential drawings (before the new AS system start-up)
2. As-built update of the DCM,
3. As-built update of the EAM-MECL,
4. Test and maintenance procedures markups based on the new system architecture as well as alarm response procedures based on the new alarm origins, alarm causes and required operator actions,
5. Update or removal of the original documents (AS system technical manual, drawings, calculations, design criteria, etc.),
6. Signing of Handover Protocol,
7. Preparation of all other As-Built drawings,
8. USAR change package (based on the new system architecture),
9. Revision/development of the System Design Description,
10. Preparation of the TOP and project closeout per NEK procedure ESP-2.611.

3.10 Training

The Contractor shall provide required session of the classroom and required session of the hands-on training for NEK technical stuff of sufficient duration to provide complete and detailed end user operation and maintenance program. Full training for at least six (6) persons shall be included in the Contract scope. Trainings segments shall be divided on general and specialist training for different levels. It is highly desirable to schedule this training during the FAT visit to contractor facilities.

The Contractor shall provide training materials to cover principles of the new system operation and system interfaces for the NEK MCR licensed operators (OIW). Operators training itself will be carried out by the NEK personnel.

For details refer to the section 32 of this specification.

3.11 Project Management

3.11.1 General

Project management should encompass all personnel and other resources necessary to plan, organize, direct, and control the AS system modernization project. They shall be responsible for:

a) Engineering and Design of the New AS system
b) Developing the Project plan & schedule
c) Working with NEK to approve the plan & schedule
d) Coordinating all main subprojects of the AS system modernization project if applicable

The Contractor shall provide the necessary personnel and equipment to successfully design and manage the AS system modernization project as identified and described elsewhere in this specification. The Contractor shall be responsible for the selection and supervision of all personnel within the project organization under the Contractor's control. Various elements to be included in the Contractor's Project management are described herein.

As part of the proposal, the Contractor shall identify and describe the organization under which the work will be performed, identify the resources (number and types of personnel with their background and experience on similar projects) available to carry out the work associated with the Scope of Services and Delivery.

The Contractor shall also identify the executive who will have the responsibility and authority for the completion of the work Scope. The Contractor shall provide a competent Project management staff capable of managing the implementation and completion of the Scope of Services and Delivery.

The Contractor shall provide home office and site project organization charts (including subcontractors) that correspond to the following phases of the Project:

a) Engineering and management prior to Site mobilization
b) Site mobilization in the year 2025

The Contractor shall provide technical staff with specifically defined duties, responsibilities, and authorities to support timely resolution of all design and other deficiencies in the design documentation identified during the installation phase of the Project and prepare all necessary FDCRs. The personnel shall be defined as key personnel. The key personnel shall be assigned full-time to the Project, and their names and titles shall be clearly depicted on any and all organization charts when applicable. The Contractor will not change personnel assigned to key positions without the prior approval by the Purchaser.

The Contractor shall appoint an Authorized Representative to act on behalf of the Contractor in all matters related to the Contract. This includes:

a) Receiving all communications from the Purchaser
b) Providing all approvals, consents, authorizations, and proposals
c) Transmitting all communications to the Purchaser
d) Acting for and committing on behalf of the Contractor

Throughout the AS system modernization project, regularly scheduled and special meetings will be required between the Purchaser and the Contractor. These meetings will serve to review progress, establish and review schedule requirements, and discuss other items (modifications) concerning the status of the AS system modernization project work. The Purchaser shall schedule these meetings at their facilities, and they will be attended by

appropriate Purchaser and Contractor personnel. The Purchaser may, at their discretion, take minutes of the meeting.

3.11.2 Planning, Scheduling and Reporting – Project Management Manual

The NEK AS system modernization project is targeted for completion by the end of the outage in 2025.

Upon contract award, the Contractor is required to finalize the Project Management Manual (PMM), incorporating a detailed schedule with milestones and reports for the Purchaser's approval of the overall schedule, covering the design, fabrication, and delivery of major equipment.

The Contractor assumes responsibility for preparing and submitting the Project Management Manual (PMM) outlined in Appendix E to the Purchaser for approval. The purpose of this document is to establish business guidelines and serve as a reference for specific administrative procedures affecting work activities between the Contractor and the Purchaser. The PMM will define project-level interfaces, overall project operation, and leverage existing NEK communication infrastructure using Microsoft SharePoint 2010 application on NEK Portal "Projektne mape."

The PMM will address key aspects such as Project organization, interfaces between the Purchaser, Contractor, Subcontractors, and Major Equipment Suppliers. It will also cover correspondence and communication control, record-keeping, and describe the process required to permit the Contractor to utilize the existing Purchaser procedures during the project's execution.

Given the dynamic nature of the PMM, it is intended to be a 'living document,' requiring the Contractor to maintain and revise it as the Project progresses, with all revisions requiring approval by the Purchaser. The PMM is designated as a plant lifetime document and will be managed through NEK's document control program.

Within the PMM, a straightforward process for classifying certain sets of documentation as safeguard information will be defined. This classification will be recognized based on the content of the included information, determined before the issue of such documentation. The required process will identify the classification of the information and define the individuals responsible for handling such documents.

Project Control encompasses the provision of personnel, supplies, software, and equipment necessary to execute all planning and schedule functions for the Project. The objectives of the Project Control functions are:

a) Ensuring overall Project control from contract award to TOP handover to NEK,

b) Performing all project scheduling on Project management software (PRIMAVERA P-6 or equivalent).

The Contractor's Project Controls scope includes providing personnel, supplies, software, and equipment necessary for all schedule functions related to the Contractor's Scope of supply. This scope also involves integrating suppliers' and construction sub-contractors' activities into a master schedule, covering the following major provisions:

a. Developing and maintaining an integrated Project Schedule based on schedules provided by the Contractors and the Purchaser,
b. Providing schedule requirements to contractors (schedule software, template coding structure, etc.),

c. Offering schedule updates,
d. Conducting critical path analyses and what-if scenarios,
e. Recommending planning corrective actions.

4. SAFETY CLASSIFICATION OF THE CONTRACTED WORK

The AS system is classified as Augmented Quality. Quality requirements specified in this specification shall be followed and fulfilled throughout the whole project. The system itself (vital components) is treated as Important to Safety due to its significance for stable operation. Specific requirements are included in the specification regarding Seismic classification and the installation of particular equipment (anti-fall down), along with Cybersecurity requirements prescribed for such a Critical digital System as recognized by NEK SP-3 Cyber Security Program based on RG 5.71.

Special requirements are also mandated in the areas of Man-Machine Interface (see NUREG 0700) and high availability, which shall be ensured by a fully redundant configuration (excluding input field terminal blocks and ALB LED lights).

5. DESIGN INPUTS AND REQUIREMENTS

5.1 General

The project will install new state of the art alarm system with as few changes to existing HMI features as possible, which would minimize impact to Operations (procedures, training, etc.). Limited or no advanced functionalities shall be enabled in new system (filtering, prioritization, plant mode recognition, etc.) but shall be available. Existing ALBs will be replaced by contemporary ALBs with similar technology, i.e. engraved tiles backlit by LEDs.

The new NEK AS system, just like the existing one, will be designed to provide visual and audible annunciation of off-normal conditions to MCR crew for any process by monitoring the state of field switches/relays. These switches/relays change state when annunciation is required (field switches / relays are not in scope of this project). Annunciation will be accomplished through visual presentation on alarm annunciator boxes that light up corresponding engraved tiles, supplemented by sound generated by alarm horn. The horn sound and its location will remain unchanged - the same frequency, pitch, and loudness. Additionally, the location of the acknowledge buttons will also remain unchanged.

Since operation of new AS system is very important to plant reliability, and because installation will be performed on or near safety related SSC, the modification 1282-AS-L is designated as Augmented Quality (AQ).

5.2 Objectives, Criteria & Consideration

New alarm system shall be following required regulation and technical standards, same as existing system:

- **NUREG-0700**
  Human-System Interface Design Review Guidelines,
- **NUREG-0711**
  Human Factors Engineering Program Review Model,
- **NUREG/CR-6684 (Nov.2000)**
  Advanced Alarm System-Revision of Guidance and Its Technical Basis,

- **NUREG-6105 (1994)**
  Human Factor Engineering Guidance for Advanced Alarm System,
- **REGULATORY GUIDE 1.180**
  Guidelines for evaluating electromagnetic and radio-frequency interference in Safety-Related instrumentation and control systems,
- **REGULATORY GUIDE 5.71**
  Cyber security programs for nuclear facilities,
- **IEEE Std. 344-2004**
  Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations,
- **ISA 18.1-1979 (R2004)**
  Annunciator Sequences and Specifications,
- **IEC 61000-4**
  Electromagnetic Compatibility Testing and Measurement,
- **MIL-STD-461E**
  Requirements for The Control of Electromagnetic Interference Characteristics of Subsystems and Equipment,
- **TR-102872 (EPRI 1994)**
  Functional Specif. Requirements for Microprocessor based Annunciator System,
- **TR1000838 (EPRI 1992)**
  Alarm Processing and Diagnostic System Program,
- **TR1000584 (EPRI 1992)**
  Control Room Alarm System Upgrade.

All codes and standards that are applicable for existing NEK AS system will still be applicable for new NEK AS system. Complete list of codes and standards will be defined in design inputs document.

ISA-18.1

The primary standard governing electrical annunciators, which serve to alert operators to abnormal process conditions through individual illuminated visual displays and audible signals, is **ISA-18.1**, titled 'Annunciator Sequences and Specifications.' ISA-18.1 defines various alarm sequences that are employed in the Main Control Room (MCR) annunciators.

In the context of Krško Nuclear Power Plant (NPP), two specific alarm sequences, denoted as A-1 and F3A-1, have been applied. The details of these sequences are described below:

- **Alarm Sequence A-1**

  The Alarm Sequence A-1, defined in ISA 18.1, is applied to MCB, VCB, and ECB ALBs. It's a combination of basic sequence A with automatic reset and option 1, allowing silencing without affecting visuals.

- **Alarm Sequence F3A-1**

  The F3A-1 alarm sequence is used in ALB 10 on the MCB Section C, providing First Out alarms. These alarms help identify the initial cause of a reactor or turbine trip. Advanced alarm systems should include this First Out feature and additional processing for better event identification. The F3A-1 sequence combines F3 First Out designation with A-1 sequence. ISA 18.1 describes F3 with specific flashing for new and acknowledged first

alarms, and a reset pushbutton. However, ALB10 uses a first out acknowledge pushbutton instead of the reset pushbutton defined in ISA 18.1.

NUREG-0700

Another important document to be followed in the construction of the new system is **NUREG-0700**, which the U.S. Nuclear Regulatory Commission (USNRC) published for the review of human factors engineering (HFE) aspects of nuclear power plants following the TMI accident. It provides guidelines necessary to evaluate whether interfaces between operators and plant systems comply with HFE guidelines. The latest revision of NUREG-0700, Revision 3, was published in 2020.

Compared to NUREG-0700 Revision 2, several changes were made concerning the alarm system. These changes pertain to alarms integrated into other displays, routing of alarms, alarm recording, and timestamping of alarms. Notably, these changes are related to computer-based screen alarms. Consequently, it appears that the application of NUREG-0700 Revision 3 to the NEK AS system in Krško NPP may not need to be considered, therefore NUREG-0700 Revision 2 shall be used as a guideline.

The major contents related to the alarm system of NUREG-0700 Revision 2 are Alarm selection, Alarm Processing, Alarm Display, Alarm control & management, etc. These contents shall be followed and replicated from the existing system.

5.3 Performance requirements

Operability of alarm system is not required per NEK Technical Specification. Alarm system is not credited in USAR chapter 15. Analyses for design basis accidents mitigation. As a result, EOP procedures also don't use any features of alarm system for operators' guidance.

However, inoperability of AS system will cause declaration of ALERT (začetna nevarnost) as per EIP-17.001 "Določitev stopnje nevarnosti". In case of plant transient AND NEK AS system inoperability SITE EMERGENCY including site evacuation will have to be declared. Therefor it is evident that reliable operation of AS system is necessary and can influence nuclear safety. This will be achieved thru redundancy requirements.

The response time for MCB pushbuttons (i.e. test, acknowledge, silence) shall be at least 0,5s.

5.4 Material requirements

All components shall be installed in existing cabinets in MCR el.115 (room 021) and CB el.111 (room 017). A standard 19" racks shall be used to mount the equipment. If cabinet is not equipped with 19" mounting rack, one shall be installed.
All installed cables shall have insulation requirements consistent with the description in USAR chapter 8.3.1.1.5.6 and applicable cable specifications in item 5.13.

5.5 Redundancy, diversity and separation requirements

The new NEK AS system shall be non-nuclear safety (AQ), and all components must be physically separated from safety-class equipment.

Full redundancy for all active components (PLC, networking equipment, I/O cards, etc.) in the new AS is a requirement.

Regarding I/O cards, the Contractor shall implement an algorithm or software program to validate and select correct values in case of discrepancy or error (two redundant input cards with different signal values). At least the flashing of designated window with different

frequency shall be incorporated. If such an algorithm cannot be implemented, then the Contractor shall install triple redundancy (three redundant components), where a 2-of-3 decision logic shall be used when a discrepancy occurs.

Self-validation algorithm shall be implemented for all other redundant modules also. The designer is responsible for conducting an analysis to ensure that no single point of vulnerability exists within the new system that could lead to the inoperability of the entire AS system. Individual ALBs are typically designed without internal redundancy.

In case of a complete single ALB failure, operators can rely on the operator interface workstation and PIS for redundant and reliable alarm information until the ALB is replaced. All necessary spare parts will be delivered and kept in stock at NEK as part of this project.

The current AS system is powered from two independent UPS power sources (118VAC inverter bus 4 for electrical train B and 118VAC inverter bus 5 for electrical train A). These power sources will remain unchanged for the new system. Internal power supplies within the new AS system will be configured to ensure that a complete loss of train A or train B inverter bus does not lead to the inoperability of any component or system function.

A ground fault detection system shall be incorporated, and design features should enable quick identification of cables with ground faults.

5.6 Operational requirements under various conditions

Operators rely on the alarm system for abnormal parameter annunciation in all plant operation modes, including the defueled reactor mode. Therefore, the NEK AS system must be always fully operable. However, the NEK AS system shall not be designed as a post-accident system, meaning the design will not include seismic qualification.

Single fault tolerance shall be provided by fully logical and physical redundancy of the systems (single failure of any component shall not affect or even jeopardize the overall operation of the system).

5.7 Required/Needed HMI Changes

Main interface of the existing alarm system towards MCR crew is thru alarm panels (ALB) and annunciators. They currently consist of transparent tiles with engravings backlit by LEDs. Although we found examples of replacing these ALBs with LCD screens in industry, NEK decided to replace existing ALBs with contemporary ALBs with similar technology, i.e. engraved tiles backlit by LEDs. The main reason for this is to minimize training efforts and influence to NEK operations.

However, the ALBs shall have the capability to change the tile windows with different colors (yellow, orange, red, green) to allow for potential future flexibility.

The second impact to ALBs is the addition of two new windows on ALB-XX and ALB-YY, for custom alarm purposed triggered from PIS. Therefore, a new additional input shall be prepared to be able to read this info.

Existing alarm horns shall be also replaced by contemporary units. The horn sound and its location will remain unchanged - the same frequency, pitch, and loudness. Additionally, the location of horns will also remain consistent. List of all AS horn MECL tags:

- ASELMB01A-HRN (MCB)
- ASELMB01B-HRN (MCB)
- ASELMB01C-HRN (MCB)

- ASELMB01D-HRN (MCB)
- ASELMB01E-HRN (MCB)
- ALBE01-HRN (SY)
- CB102BRDK801-HRN (VCB)
- CB102BRDK503/A-HRN (ECB)
- PC100CME007 (FP)

Alarms acknowledge, silence and test pushbuttons shall be replaced by contemporary units without changing the location and/or purpose of this buttons. MCB section C pushbuttons will additionally have first-out acknowledge pushbutton which will be protected from unintentional activation, similar to existing configuration.

The acknowledge, test, and silence pushbuttons are considered as inputs to the AS system and should be scanned and processed in the same manner as all other signals. Minimum or no delay in system response times shall be introduced while scanning and responding to pushbuttons activation.

Additionally, there is currently an inhibit red pushbutton installed in MCB section C with the function of silencing all AS system horns. This function was implemented to 'resolve the annoying and confusing inrush of audible alarms following the plant trip,' as stated in the design input section of project documentation of existing AS system. The new AS system modernization shall remove this functionality as it is no longer in use and is not requested by operators.

Operator Interface Workstation shall be application or web based graphical interface accessible from existing shift foreman personal computer thru KVM principle. This functionality must allow view-only access to graphical presentation of all ALBs including active alarms, timestamp of these alarms, alarm log, grouped alarms, errors, etc. Operator interface workstation shall also have possibility to enable programming of advanced functionalities such as alarm prioritization and filtering. It is important to note that regardless of this functionality, neither prioritization nor filtering shall be applied to alarms shown on ALBs.

Similar as today all alarm events will be transferred to PIS, so that PIS can maintain exact replica of all ALBs with currently lit or flashing alarms. Within the scope of this project only data transfer must be implemented from AS side to PIS. All other works will be performed within NEK PIS group or within PIS replacement project.

Alarm tiles layout will generally remain the same as it is today, with limited exceptions (as requested by operations):

- Limited amount of alarm locations on ALBs will be changed for more logical grouping of the alarms (example: BD panel trouble alarm to section B ALB, where BD system controls are located),
- Removal of duplicated RB ventilation smoke and fire alarms from AS system,
- Two new alarm location shall be reserved on presumably ALB06 and ALB12, which will be controlled by PIS digital outputs. These shall be two groups (primary and secondary side of the plant) of user defined PIS parameters that will have common alarm annunciated on mentioned ALBs.

KFSS

Upon the request to install new ALBs in the Main Control Room (MCR), there is a consequential impact on the Krško Full scope Simulator (KFSS). The Contractor is required to provide a full set of ALBs for installation in the KFSS control board, and these ALBs must

mirror those intended for the MCR. Special attention should be given to account for variations in power supply levels specific to the KFSS. The ALBs (LEDs) are driven by simulator output cards, which use 24VDC with + as a common and - as an activation pole for each window.

5.8 Communication with PIS

The existing NEK AS Annunciator (AS) system is connected to the PIS system via communication which uses Beta annunciator system vendor proprietary (BPA) protocol for data transfer over a RS232 serial data line. As both systems are redundant, also the communication between the SER units of AS system and PIS is redundant, including two separate communication lines via optical cables and FO/RS232 media converters to two serial terminal servers located in different rooms.

The data is transferred from AS system to the PIS system. In the opposite direction, PIS only sends the requests for data uploads. PIS uploads all the AS alarm inputs from SER scanners. PIS also gets the state of acknowledge and test pushbuttons as well as the status of each SER scanner.

Since PIS receives the alarm status directly from both SER acquisition units, any of special logic configured at a higher level in AS controller (such as reflash logic and specific calculation logic) must be programmed also on PIS side, so that the alarm windows on PIS annunciator mimics act the same as those on AS system. AS alarms are also stored into special PIS alarm list and event log, where the sequence of alarm appearance can be easily tracked. Advantage of having AS alarm signals on PIS is also that it links every alarm to its corresponding digitalized alarm response procedures that can be shown on every PIS workstation display.

Taking into consideration the information provided above, the new NEK AS system shall be designed to maintain similar functionality in communication with the PIS, with a few exceptions.

Since all inputs and outputs from the AS system will be directed to the PIS, there will no longer be a need for PIS to perform duplicated logical functions and operations. The data flow remains unidirectional (except for sending the requests for data uploads), moving from the AS system to the PIS. As both systems are redundant, the communication channel between them will also be redundant, utilizing two optical cables.

A data diode shall be implemented only if all functionalities and requirements bellow can be achieved.

Summarized technical functionalities and requirements for AS system – PIS system communication:

- Redundancy in communication (redundant PIS system clients are connecting to redundant AS system data services via redundant communication lines),
- Uni-directional communication for data packages (from AS system to PIS system),
- Connectivity between AS system and PIS system is a single port point-to-point TCP/IP connection over Ethernet network. Connection is initiated by the client,
- Network traffic between AS system and PIS system is routed thru a firewall, allowing only this specific communication to pass thru,
- In case of non-standard communication protocol is used, Contractor shall provide software, containing a library of functions to realize the data traffic. Documentation describing the available library calls, data structures, and definitions shall be included,

- SOE (sequence of event) messages shall be supported, with high-speed-resolution up to 1 millisecond.
- SOE signal values must be timestamped and provided with validity status at AS system. The same timestamp must be utilized as for events in AS,
- SOE data must be provided to PIS system in time sequential order. Any SOE data not arriving to PIS in correct time sequence will be discarded by PIS system,
- The AS system shall store (buffer) a predefined number of SOE events on its side, since it is expected that PIS will read data in about 1-second cycle (the actual reading cycle will depend on the chosen communication protocol). This buffer is also needed in case of slow data traffic or when failed communication is re-established.
- In addition to SOE event-based data transfer, which shall be used as the primary method, the communication protocol shall also provide a backup method of data transfer which sends a snapshot of all AS data to PIS, to ensure that state of PIS signals is equal to the state of AS signals all the time and especially after disturbance in communication. This backup method shall be based on sending complete status of AS alarms (and other AS system events if applicable) on general inquiry request from PIS. Such a request is expected at least in the following cases: (1) initially when client starts communication, (2) after reestablishing of a failed line, (3) after test button is released, (4) after adding new PIS signals (associated with this data connection) or reconfiguring an existing one, and (5) cyclically every few minutes (current PIS data link has 2-minute cycle).
- Sending SOE must have priority over any the backup reading. The response to general inquiry request can be delayed until the SOE buffer is empty.
- data sent with backup general inquiry method, are time-stamped by PIS (only for the points which alarm states differ from AS).

AS system shall be able to send statuses of field contacts (inputs) and statuses of each individual ALB window (outputs) to PIS system. AS shall also send states of each Acknowledge and Test button. AS shall send reflash impulse (short zero state) when reflash of ALB window occurs.

On AS side, it shall be possible to set the suppression of sending alarm by setting suppression flag either manually in a configuration or in real-time, based on the output of programmed suppression logic from certain inputs signals.

This modification shall only assure reliable and redundant data transfer to PIS with prerequisites described above, all other efforts shall be performed within modification 1253-CH-L. PIS shall no longer perform any data processing, since status of all, input data and output alarm statuses will be transferred from AS system.

As with the current interface from AS to PIS, also a new one will serve as a back-up solution if output part of new AS system (output cards and/or alarm light boxes) is not functioning.

5.9 AS system Power sources, cables and wiring

New AS system will be also powered with 118 VAC/50 Hz system (floating). The existing AS system is powered by two independent UPS sources: 118VAC inverter bus 4 (ESELIV04 – EE107PNLJ004 – BRKR 02) for electrical train B and 118VAC inverter bus 5 (EE10XFRJ005 - EE107PNLJ005 – BRKR 07) for electrical train A. These power sources will remain unchanged for the new system. The internal power supplies within the new NEK AS system will be configured to ensure that a complete loss of either train A or train B inverter bus does not render any component or function of the system inoperative. Redundant hot-swappable

power supplies with individual alarm indications will be utilized to minimize the risk of power loss to the equipment. Maintenance and replacement of a failed power supply will not disrupt the system's operation.

It is the Contractor's responsibility to choose and size cables, wires, fuses, etc., to establish full selectivity in power distribution. The cable and wire design should prevent electromagnetic interference that could cause fault signals. Existing cables will be retained as much as practical, with the consumption of specific distribution verified through a new load study (refer to Section 3.3). Existing power distribution fuses will be analyzed and redesigned as necessary.

5.10 Raceway requirements

Existing external raceways will remain unchanged, where applicable. All new raceways required shall adhere to the criteria outlined in E/EDC-4, "CABLE-TRAY; CABLE AND CONDUIT SEPARATION CRITERIA." The rules specified in PC-CKS for cable trays will be strictly observed. Any existing cable abandonment (VOID), for any reason, shall be removed in one of the project phases. Only the removed cables will be considered as completed tasks; otherwise, payment for this task will be cancelled.

5.11 Wiring

Internal and external wiring must adhere to accepted industry standards, maintaining a neat and organized appearance at both ends. Continuous wire pulling and termination at the appropriate terminal blocks are required, with no allowed wire extensions without termination. Spare contacts from relays and switches should also be wired to the terminals. Terminal boards and strips used for component interconnection shall have 10% extra unused terminals.

Incoming and outgoing wiring terminal blocks must be easily accessible for connection and testing. Proper mounting ensures adequate clearance for cable routing, fanning, and termination. The Contractor should position all connections, including jumpers, on one side of the terminal blocks, leaving the other side for field connections. Each terminal should terminate a maximum of two wires to minimize loop areas.

Maintaining separation between power, I&C, and AC/DC wiring is crucial. The accepted approach is to retain all field cables up to the terminal block in the Input Cabinets (as listed in section 5).

The use of line filters for electric power is mandatory. Cable shields must be terminated to minimize conductor exposure. Solid wires are not permitted. Cables must be shielded from sharp edges, and grommets are required in holes through metal partitions for mechanical protection. Careful wire running is essential to prevent bending around sharp corners or edges that may cut through insulation.

The contractor shall supply **all internal cables**, i.e. all connections from field terminal blocks into the new AS system. All connections shall be labels as per NEK procedures listed in chapter 7. Field cables shall stay as are (from input terminal blocks to the field equipment).

5.12 Time response requirements

Field contact signals will be scanned by redundant digital input cards. The scanning cycle will have a time resolution of a maximum of 1ms, allowing for the storage of at least 4500 events in its local buffer. All events will be synchronized across devices and time stamped

with accuracy of at least 1ms. For this purpose, an IRIG-B signal specific for AS system will be utilized for which new hardware will be supplied (GPS antenna, cable, GPS Receiver IRIG-B time with NDT outputs preferably, etc.).

5.13 Electrical insulation

All cables must be electrically insulated and must be composed of LS0H (Low Smoke 0-Zero Halogen) polymers which are self-extinguishing in the event of fire and halogen free (non-toxic). Electrical insulation requirements for cables and wires shall be consistent with technical specifications SP-E516 (600 VOLT POWER CABLE), SP-E517 (600-VOLT CONTROL CABLE), SP-E518 (INSTRUMENT CABLE) and qualified per the requirements of standards IEEE Std. 323-1974 and/or IEEE Std. 383-1974.

5.14 Operational and protective grounding

Protective equipment grounding shall be implemented in compliance with EDC-5 "Electrical Engineering Design Criteria for Grounding systems Design Criteria", I&C EDC-6 "Engineering Design Criteria for Instrument Installation". All mechanical assemblies, drawers, etc. shall be grounded to the single point ground (one link per grounded item). System shall be immune to the ground faults. When grounding of instrumentation cables or equipment is foreseen, a separated and insulated instrumentation ground shall be used.

5.15 Surveillance, test, maintenance and Software patching

No specific conditions or requirements for accessibility and maintenance activities are expected. The system will incorporate self-diagnostics, and data will be exported to the Remote Configuration Workstation (RCW). The RCW will facilitate all required maintenance activities on the system. However, a maintenance-friendly design will be implemented by isolating parts of the system, allowing for the replacement of AS system components while keeping the system operational.

New maintenance features shall enable troubleshooting, and the redundant configuration will ensure the absence of a single point of vulnerability, which will be designed and demonstrated during the system testing.

All troubleshooting shall be accessible through RCW; therefore, the old ALB22 shall be discarded. Nevertheless, as of now, a common ALARM indicating an AS system error shall be lit on the respective ALB on the MCB.

5.16 Cyber security measures

To replace the NEK AS SYSTEM, cyber security programs must be considered since the NEK AS SYSTEM is a digital based system. All requirements from SP-3 CYBER SECURITY PROGRAM rev.4 will be strictly followed. Various methods shall be applied:

- Firewalls (deep pocket inspection etc.)
- Data diodes
- User access management

System architecture shall be prepared including the list of all components where all digital equipment shall be evaluated per above specified ESP procedure.

The details regarding Cyber security measures are listed in chapter 16.4.

5.17 Engineering analyses, studies, calculations and other reports

The Contractor shall perform and submit searchable electronic copy (Adobe pdf, MS Word) of the analyses, studies, calculations and reports, which will be developed during engineering phase of the project as per section 6 of this specification.

5.18 Seismic test reports

Report on seismic qualification / design shall be written in accordance with IEEE344, 2004. The applicable seismic response spectra are attached in appendix 7.

5.19 Electromagnetic compatibility (EMC)

Regarding EMC, for the existing NEK AS system (Central Alarm System) qualification was achieved by adhering to IEC801 and IEC1000. For new NEK AS system adherence to Regulatory guide 1.180 (Rev.1) will be required, which supersedes mentioned IEC standards for use in nuclear industry. NEK ED-19 shall be considered also.

Since location of new AS components is primarily in MCR, which is catagorized (ESP-2.631 r1) as area with "High Emissions environment with Susceptibility equipment", Qualification Test Report for EMC testing shall be issued as part of design process.

5.20 Special acceptance testing, inspection, and witnessing requirements during fabrication, receipt, and installation.

The complete system, including hardware, software configuration, and components, will undergo extensive Factory Acceptance Testing (FAT) in two parts: basic hardware tests followed by software engineering tests and integrated system validation tests. The system shall remain fully powered and operational for at least 14 days as part of the FAT to test equipment failures (e.g., power supply) that may potentially occur in the first few days of operation. During this period of data processing and transfers, issues may also arise in processing, storage, synchronization, communication dropout, and overfilling of system buffers.

The FAT shall focus on demonstrating that the system meets contractual requirements and NEK expectations, with NEK personnel witnessing tests at the factory facility. Site Acceptance Testing (SAT) shall verify the system condition post-shipment and installation, covering power supply, network, integration tests and complete I/O verification (field input to specific alarm tiles).

Upon successful completion of SAT, the system shall be ready for handover to the NEK for plant operation. Detailed procedures for FAT, and SAT shall be included in the Detailed Modification Package (DMP).

5.21 Subassemblies

Whenever feasible, the equipment design should incorporate subassemblies to expedite service and maintenance. These subassemblies must be constructed and arranged to allow convenient access for inspection, maintenance, and repair purposes. Notably, subassemblies should not be potted, and all parts must be removable for ease of maintenance.

5.22 Twenty years of service life approach report

A summary report shall be provided to briefly explain the Contractor's design approach to fulfil a goal for the system lifetime of at least twenty (20) years.

6. APPLICABLE NEK-CONTRACTOR DESIGN CONTROL PROGRAM

For NEK quality-related topics, refer to the QA specification 'QS-610; Generic Quality Assurance Program Requirements' and Appendix 6, as well as the requirements in Section 43 of this specification.

For all design changes included in the scope of the project, the Contractor shall comply with the requirements of the NEK Design Modification Control Program and provide services according to its implementation procedures for preparing, processing, and controlling modifications and design changes to the NEK structures, systems, and components.

The following NEK modification implementation programs, procedures, and design criteria shall apply:

- ED-1 Design Modification Control Program
- ED-2 Document Control Program
- ED-3 NEK Records Control Program
- ED-11 NEK Process Computers Configuration Control Program
- ED-15 Program nadzora konfiguracije
- ED-19 NEK Electromagnetic Compatibility program
- ADP-1.2.116 Nadzor dokumentov v NEK
- ADP–1.2.003 Plant Design Modification and Control Process
- MD-23 Risk Assessment (Celovito upravljanje tveganj)
- ESP–2.301 TS Changes and Licensing Amendments
- ESP–2.607 Design Verification
- QD-1 Quality Assurance Plan
- QS 610, rev.2 Generic Quality Assurance Program Requirements
- QS 600, rev.1 Generic Software Quality Assurance Program Requirements

7. APPLICABLE CODES, STANDARDS, AND DESIGN CRITERIA

The design criteria, regulations, codes and standards listed below are applicable to the new AS system and are to be considered in the detailed design. They will apply to either the design of the new systems, supporting systems or components and their structures.

To the extent specified herein, the version and full identity of all codes, standards, and other documents applicable to this Specification are shown in Section 7. A later version of some of the dated documents may become mandatory under the regulations that have jurisdiction. If this develops, the newer version of each document shall be identified by means of a revision to the Specification. If there is a conflict between this Specification and a referenced document, the Contractor shall refer the matter in writing to the Purchaser to inform him of the conflict and to provide a proposal to resolve the conflict for Purchaser's approval. This process will also apply in the case of a conflict between codes and standards.

The code and standard dates are provided as a reference. The Contractor, unless otherwise stated by the Purchaser, shall use the appropriate codes and standards listed in this section in effect at the time of Contract signature.

Contractor will provide a detailed review of listed references in Sections 7.1 through 7.7 during the Project initiation phase. Any conflicts or contradictions between references will be addressed with proposed resolution by the Contractor to NEK.

7.1 Slovenian Codes

- Zakon o varstvu pred ionizirajočimi sevanji in jedrski varnosti (Ionising Radiation Protection and Nuclear Safety Act; Uradni list RS/Official Gazzete of the Republic of Slovenia, št. 76/17, 26/19, 172/21 in 18/23 – ZDU-1O)
- Pravilnik o fizičnem varovanju jedrskih objektov, jedrskih in radioaktivnih snovi ter prevozov jedrskih snovi (Rules on the physical protection nuclear facility and nuclear and radioactives material; Uradni list RS, št. 100/23)
- Uredba o zagotavljanju varnosti in zdravja pri delu na začasnih in premičnih gradbiščih,Ur- l. RS 83/05 (Decree on safety and health at work at temporary or mobile construction sites)
- Zakon o varnosti in zdravju pri delu (ZVZD-1), Ur. l. RS 43/11(Law on Safety and Health at Work)
- Pravilnik o varnosti strojev (Rules on machinery safety; Uradni list RS, št. 75/08, 66/10, 17/11 – ZTZPUS-1 in 74/11)
- Konvencija o jedrski varnosti, UL RS-MP, št. 16/1996
- Pravilnik o splošnih ukrepih in normativih za varstvo pri delu z dvigali (žerjavi),
- Other major SNSA legislations available at http://www.pisrs.si/Pis.web/cm?idStrani=prevodi
- All applicable standards SIST or EN for engineering and design

7.2 General US codes

- 10 CFR 50, Appendix A, "General Design Criteria"
- 10 CFR 50.48 "Fire Protection"
- 10CFR73 Physical protection of plants and materials
- 10CFR50.59 Changes, Tests and Experiments

7.3 Codes and Standards

- ANSI N45.2-77; Quality Assurance Program requirements for Nuclear Facilities
- EPRI 3002008023; Cyber Security Technical Assessment Methodology: Vulnerability Identification and Mitigation, Final Report
- NUREG-0700, "Human-System Interface Design Review Guidelines," U.S. Nuclear Regulatory Commission, May 2002.
- IEEE 344-2004, Standard for Seismic Qualification of Equipment for Nuclear Power Generating Stations
- IEEE 1050-2004; Guide for Instrumentation and Control Equipment Grounding in Generating Stations
- IEEE 336-1985; Installation, inspection and testing requirements for power, instrumentation and control equipment at nuclear facilities
- NRC, 10CFR73.54 Protection of digital computer and communication systems and networks.
- NRC RG 5.71 Cyber Security Programs for Nuclear Facilities
- NRC RG 1.180, rev. 1; Guidelines for evaluating electromagnetic and radio-frequency interference in safety-related instrumentation and control systems

7.4 Other Supplemental Criteria and Information

- NFPA 803-1989 "Standard for Fire Protection for Nuclear Facility Applications"

7.5 Other NEK Supplemental Criteria and Information

- Zakon o varstvu pred požarom, Ur.l. RS 3/07, 9/11
- Pravilnik o požarni varnosti v stavbah, Ur.l. RS 31/04, 10/05, 83/05, 14/07
- Pravilnik o študiji požarne varnosti, Ur.l. RS 28/05, 66/06, 132/06
- Pravilnik o protieksplozijski zaščiti, Ur.l. RS 102/00, 91/02, 16/08, 1/11, 17/11,103/11
- Tehnična smernica TSG-1-001:2010; Požarna varnost v stavbah
- SIST DIN 14090 - Površine za gasilce na zemljišču

7.6 NEK Programs, Procedures and Licensing documents

7.6.1 NEK Programs

- ED-1 Design Modification Control Program
- ED-2 Document Control Program
- ED-3 NEK Records Control Program
- ED-11 NEK Process Computers Configuration Control Program
- ED-15 Program nadzora konfiguracije
- ED-19 NEK Electromagnetic Compatibility program

7.6.2 ADP - Administrative Procedures

- ADP 1.0.131 Organizacija izvedbe modifikacije (Development of modifications)
- ADP 1.0.500 Program protipožarne zaščite – Požarni red (Fire Protection Program)
- ADP 1.1.016 NEK Document Control Program
- ADP 1.1.033 Varnost in zdravje pri delu v NEK (Health and Safety at Work at NEK)
- ADP 1.1.051 Vstop, izstop in gibanje v tehnološkem delu NEK
- ADP 1.1.101 Preprečitev vnosa tujkov (FME Program)
- ADP 1.1.105 Priročna skladišča in kontrolirano odložena oprema
- ADP-1.1.122 Work Order Preparation
- ADP 1.1.125 Izvedba delovnega naloga (Work Order Process)
- ADP-1.1.141 Ravnanje s težkimi bremeni v NEK
- ADP-1.1.142 NEK Equipment Lifting Requirements
- ADP 1.2.003 Plant Design Modification and Control Process
- ADP-1.2.029 Equipment Labeling control
- ADP-1.2.100 MECL Maintenance and Control
- ADP-1.2.127 Quality Records Management
- ADP 1.3.004 Osamitev in označevanje sistemov / naprav (Tagging)
- ADP 1.3.013 Kontrola ključev (Key Control)
- ADP 1.4.022 Prevzem, skladiščenje, rokovanje in notranji transport
- ADP-1.6.701 Kontrolirani vstop nevarnih kemikalij v NEK
- ADP-1.8.005 External Workers Entry Into NEK
- ADP 1.14.202 Normativi osebnih zaščitnih sredstev

7.6.3 ESP – Engineering Procedures

- ESP-2.111 EAM MECL data element structure/definition
- ESP-2.113 EAM-MECL equipment numbering system
- ESP-2.301 Technical Specification Changes and Lic. Amend.
- ESP-2.302 Administration of Changes to the USAR
- ESP-2.303 Evaluation of Changes in NEK

- ESP-2.306 Administration of Changes to the Radiological Technical Specification
- ESP-2.602 Plant Design Modifications
- ESP-2.604 Design Considerations, Bases and Inputs
- ESP-2.605 Design Analyses and Calculations
- ESP-2.606 Peer Reviews
- ESP-2.609 Field Design Change Request
- ESP-2.611 Design Modification Turnover and Closeout
- ESP-2.613 Izdelava, preslikovanje, popravljanje in predaja načrtov
- ESP-2.617 Engineering Services, Material and Equipment Technical Specifications
- ESP-2.618 System Design Description
- ESP-2.619 Preparation of Installation Packages
- ESP-2.624 Design Impact Evaluation
- ESP-2.631 EMC Program in Design Modification Process
- ESP-2.660 Uporaba programa PC-CKS v procesu modifikacij
- ESP-2.912 Documentation of New Applications for Process Computer Systems
- ESP-2.913 Rules for Process Computer Systems Human Machine Interface
- ESP-2.921 Cyber Security Assessment of Critical Digital Assets (CDA) in NEK
- ESP-2.951 Process Computer Signal Configuration Database Control

7.6.4 FPP - Fire Protection Procedures:

- FPP 3.7.002 Postopanje v primeru pozara
- FPP-3.7.004 Kontrola vnosa gorljivih snovi
- FPP-3.7.006 Požarna dovolilnica
- FPP-3.7.007 Ravnanje z vnetljivimi plini in tekocinami
- EIP 17.044 Nudenje prve pomoči in prve medicinske pomoči v primeru nezgode v NEK

7.6.5 Other Procedures and criteria

- EDC-3 Cable Tray Design Criteria
- EDC-4 Cable Tray, Cable & Conduit Separation Criteria
- EDC-5 Grounding System Criteria
- EDC-9 Lighting & Small Power Systems
- EDC-10 Cable Rating Criteria
- GDC 1; Quality Standards and Records
- GDC 3; Fire Protection
- GDC 10; Reactor Design
- GDC 13; Instrumentation and Control
- GDC 19; Control Room
- SP-S702, Seismic Analysis, Testing and Documentation
- GMC-4.004 Gradbeni odri
- QD-1 Quality Assurance Plan
- QS610, rev. 2 Generic Quality Assurance Program Requirements
- QS600, rev.1 Generic Software Quality Assurance Program Requirements
- ISO 9001; International Standards Organization–- Quality management and QA system
- SP A322 Painting Exterior and Interior Surfaces of Secondary Plant and Equipment
- SP-3; NEK Cyber Security Program
- SP-S702; NEK Seismic analysis, testing, and documentation
- NEK USAR rev. 29; NEK Updated Safety Analysis Report

In accordance with the above-mentioned procedures and criteria listed herein, the following services shall be provided by the Contractor and its subcontractors which are approved by NEK for engineering services and development of the technical documentation according to the NEK design modification process and ESP procedures (if applicable):

- Perform all necessary walk-downs to verify design inputs for the DMP development.
- Develop (finalize) and verify the DI in accordance with the NEK procedures ESP-2.604, ESP-2.605, ESP-2.606 and ESP-2.624.
- Perform a detailed "line-by-line" check of DI, calculations, analyses and evaluations, and submit signed checklists of the peer reviews in accordance with the NEK procedure ESP-2.606 to NEK for review and approval.
- Prepare the final SES and SE in accordance with the NEK procedure ESP-2.303.
- Prepare the UCP in accordance with the NEK procedure ESP-2.302 (based on the new system architecture).
- Develop the DMP's 1282-AS-L in accordance with the NEK procedure ESP-2.602 and referenced procedures within.
- Within the particular the associated and needed Software Documentation shall be developed in accordance with the SLCP. Within the PQP (or as a stand-alone document) the Software Assurance Quality Plan shall be provided which will define the whole process of revision or preparation of the all-software documentation including the testing, verification and validation of the new software.
- Include accomplished engineering studies, analyses, and calculations in the DMP.
- Develop the IP's in accordance with the NEK procedure ESP-2.619.
- Prepare the MECL database update based on the Contractor provided data to facilitate the identification of all removed and newly installed components in accordance with the NEK procedure ADP-1.2.100.
- Prepare the TOP after equipment installation, including documents for archiving and MECL database updates (DCM forms: DIW and DUR) in accordance with the NEK procedure ESP-2.611.

7.6.6 Preliminary list of affected design documents

- TM-AS01 - OPERATING AND MAINTENANCE MANUAL
- TM-AS02 - SER 4100 EVENT RECORDER TRAINING MANUAL
- TM-AS03 - CENTRAL ALARM SYSTEM EXPANSION R-2012 MANUAL
- TM-AS04 - CENTRAL ALARM SYSTEM EXPANSION R-2013 MANUAL
- SP-ES1022 - PREPARATION OF DMP AND ASSOCIATED DOCUMENTATION AND ENG. SERVICES FOR MODIFICATION 629-AS-L
- SP-ES1039 - IZVEDBA ELEKTRO & INSTRUMENTACIJSKIH DEL DMP: 629-AS-L - IZBOLJSAVA AS SISTEMA
- SP-ES1392 - PREPARATION OF FEASIBILITY STUDY FOR REPLACEMENT NEK AS
- SP-ES158 - IZVEDBA EL. IN INSTRUMENTACIJSKIH DEL V R2006 (432-AS-L)
- SP-ES251 - ZAMENJAVA CENTRALNEGA ALARMNEGA SISTEMA - INZENIRING STORITVE ZA IZDELAVO DMP: 432-AS-L
- SP-F3002 - PROGRAMABLE TEST UNIT
- SP-F3005 - NEK CENTRAL ALARM SYSTEM EXPANSION (R-2012)
- SP-F3008 - NEK CENTRAL ALARM SYSTEM EXPANSION (R-2013)
- SP-F358 - NEK CENTRAL ALARM SYSTEM REPLACEMENT
- SP-F363 - ZAMENJAVA ALARMNEGA SISTEMA NEK - IZVEDBA (R2004 & ONLINE) ELEKTROINSTALACIJSKIH IN INSTRUMENTACIJSKIH DEL
- SP-F380 - TECHNICAL SPECIFICATION - NEK CENTRAL ALARM SYSTEM

UPGRADE: SPECIFICATION FOR EQUIPMENT, SERVICES AND SPARE PARTS

Detailed list of affected documents shall be prepared in DMP.

8. IDENTIFICATION OF THE AFFECTED SYSTEMS

- AS (Annunciator system)
- CH (Plant Process Computer System - PIS)
- ES
- EE

Existing connections to the PIS (Plant Process Computer System) shall be upgraded as described in this specification. Consequently and indirectly, other systems will be affected (signals from different system status contacts) that are connected to the AS system. However, the approach in this project is not to modify the existing field (signal) cables—the boundary for the AS system modernization project is the field terminal blocks in the AS system cabinets.

9. IDENTIFICATION OF THE AFFECTED EQUIPMENT

Cabinets with existing system components will be mostly emptied since all components from existing AS system shall be removed. Cabinets will remain in their current locations and will be utilized for the new arrangement of components defined by the designer of new NEK AS system. A list of AS system cabinets:

<u>Cabinets that contain equipment anticipated to be removed entirely:</u>

Main control room / CB el.115

- CB103RCKK802
- ASELAL01A04
- CB102BRDK201 (remains location for PC100CME001, PC100CME002)
- CB102BRDK401 (remains location for PC100CME003, PC100CME004)
- CB102BRDK801 (remains location for PC100CME005, PC100CME006)
- CB102BRDK701 (remains location for ALB-E01, ALB-E02, ALB-E03)
- CB102BRDK503 (remains location for ECBA, ECBB, ECBX, ECBY)
- FP101CAB (remains location for PC100CME007)
- ASELMB all sections (remains location for ALB01 – ALB19)

Cable spreading room / CB el.111

- ASELAL01A06 (based on final design, this cabinet could be removed entirely)
- ASELAL01A05 (based on final design, this cabinet could be removed entirely)

<u>Cabinets containing input terminal blocks with field wiring, which would remain as is:</u>

Main control room / CB el.115

- ASELAL01A01 (remains location for terminal blocks - input field cables)
- ASELAL01A02 (remains location for terminal blocks - input field cables)
- ASELAL01A03 (remains location for terminal blocks - input field cables)
- CB103RCKK804 (remains location for terminal blocks - input field cables)

Cable spreading room / CB el.111

- ASELAL01A07 (remains location for terminal blocks - input field cables)
- EIT358 (remains location for terminal blocks - input field cables)
- EIT359 (remains location for terminal blocks - input field cables)

Therefore, existing field cables and terminal blocks shall not be replaced. The reason for this is to reduce complexity and duration of the project so that installation can fit into standard outage time frame. This way we avoid testing of the complete alarm loops including all triggering devices and components in the field.

The complete list of all affected components shall be detailed in the design package.

10. SUPPLEMENTAL DATA

The work within the scope of the Contract shall include the furnishing of all materials, labor, equipment, tools, protection, and incidental items necessary to complete each portion of the work in an acceptable manner.

The Contract documents are complementary, and any work called for by any part thereof shall be executed as part of the Contract in the same manner as if called for in all parts. Therefore, all work that may be called for in the specification and not shown on the drawings, or shown on the drawings but not called for in the specification, shall be executed and furnished by the Contractor as if described in both documents.

Should any work or materials be required, which are not denoted in the specification, drawings, or other Contract documents, either directly or indirectly but necessary for the proper carrying out of the intent thereof (according to the turn-key definition in the Contract), the Contractor is to understand the same to be implied and required, and shall perform all work and furnish all materials as fully as if they were particularly described.

All Appendices attached to this specification, and listed in Section 45 of this specification, are hereby made a part of this specification.

The supplemental documentation listed below is not an integral part of this specification; however, it is available upon request and shall be used or referred to as needed for the Design documentation preparation:

- NEK USAR rev. 29; NEK Updated Safety Analysis Report
- NEK Technical Specifications
- SP-S702; REV. 10, Seismic Analysis, Testing and Documentation
- ED-1, Design Modification Control Program
- ED-19, Electromagnetic Compatibility Program
- ESP-2.631; EMC program in design modification process
- SP-3, Cyber Security Program
- ESP-2.921; Cyber Security Assessment of Critical Digital Assets in NEK
- Construction Drawings:
    - SS-211 …Electrical Block Diagram
    - B-208 …Electrical Block Diagram
    - D 302 ... Flow Diagrams
    - E 304 ... Piping Systems
    - E 405 ... Structural and Civil
    - 816-… Process Information Systems Diagrams

Additional data may be obtained from NEK through written inquiry.

11. DOCUMENTS SUBMITTAL

11.1 General

Documentation required to be submitted by the Contractor shall be as requested in this Specification and the Contract. In addition, the Contractor shall provide any additional, mutually agreed, documentation not specifically identified herein.
Documentation (as defined in section 3.4) shall be provided according to the delivery schedule defined in the Contract, this Specification or associated Appendix 3.
All documentation shall be prepared and finalized for the complete Scope offered and shall be in the English language. Metric system shall be used for unit measurement expression in submitted document.

11.2 Biding documentation

The Contractor shall submit (1) electronically searchable copy (Adobe pdf) of the Bid documentation. Minimum required content of the Bid documentation shall include:

a. Basic Design of whole system (including System topology)
b. Technical description of the offered project scope
    1. Contractor's technical approach to the project - Scope of supply and work:
        a. Detailed description of the services offered (incl. design, manufacturing, transportation from the factory to the NEK site and commissioning)
        b. Existing equipment removal and detailed description of the installation
        c. General description of FAT and SAT procedures in the sense of the draft of the Commissioning plan.
    2. Required and recommended spare part list for delivery
    3. Draft technical description of the new AS system
    4. Bill of Materials (in excel worksheets)
    5. List of used standards
    6. List of Inspection and Test procedures
    7. Document submittal scope and schedule
    8. Proposed Preliminary overall project schedule
    9. List (or plan) of trainings needed to overtake the whole system (see section 32).
    10. List of all subcontractors
    11. Division of work and responsibilities
    12. Preliminary Quality management (design, programing, purchasing and installation)
    13. Reference list of the similar projects performed in the last 10 years (see details in the section 0 of this specification)
c. Commercial, QA and training
    a. Pricing (incl. offer validity and unit pricing)
    b. Terms of payment
    c. Delivery dates
    d. QA program manual
    e. PQP draft
    f. Training program content and schedule

11.3 Project Execution Phase

All document deliverables shall be submitted in two versions as a minimum: for NEK review and FINAL version to be approved by NEK. All documents for review shall be delivered to NEK in two hard copy (paper) and one soft copy (pdf files structured with bookmarks and active cross reference links). All final documents shall be delivered in three hard copies and six soft copies (CD with files in format as applicable: structured pdf, MS Word, Excel, Access, AutoCAD).
A detailed project schedule, that factors in the key project milestone schedule of Section 3.0, shall be submitted for NPP Krško review as a part of PMM and PQP no late than sixty (60) days after award of Contract. The detailed schedule shall include a listing of all engineering design deliverables (both calculations and drawings), manufacturing, testing, inspection and shipping milestones.

The documents shall be formatted in files and printed as hardcopies in A4, A3, or A2 sizes only. The exceptions could be related only to the revisions or mark-ups of the existing NEK drawings that could be formatted in different (larger) formats.

In addition to the DMP Project documentation to be delivered as a structured set of pdf files, Contractor shall deliver the following documents (potentially to be revised in future), in their original file format that can be revised by NEK when and if needed (two copies of files on transportable media – CD are sufficient):

- SAT and SUP procedures - MS Word (.docx).
- Textual parts of Procurement Specification, DMP in MS Word.
- Drawings in AUTOCAD (ACAD dwg format file).
- Spread sheets in Excel.
- Data bases in Access, SQL or Oracle.
- Training materials (lessons and exercises) in MS Word.
- Training presentations in MS PowerPoint (pptx files).

All the submitted documents shall bear at least the following identification:

- Contractor's Name.
- Date of issue.
- Document number.
- Revision number
- Supplier.
- Mandatory construction code
- NEK's Purchase Order/Contract Number.
- NEK's Specification Number

Final drawings shall be prepared in a form required by NEK procedure ESP-2.613 and shall be ready to be entered to NEK Document Control Module.

The Contractor shall be responsible for furnishing the following manufacturing/testing items in accordance with the Project schedule and contractual document submittal requirements. Final documentation from manufacturing shall comprise the following as a minimum (if applicable):

a. Index
b. The last revision of the fabrication and inspection plan showing the identification

number of all records
c. Records of all the manufacturing and inspection operations chronologically scheduled in the fabrication and inspection plan
d. Bill of materials
e. All material test records as required in Section 15.0
f. All certificates required by materials specifications
g. Welding reports
h. Welding procedure qualification records
i. Heat treatment certificates
j. Deviation reports
k. Repair reports
l. As-built parts lists
m. All NDE records, radiographs (originals) etc.
n. Final cleaning specification
o. A rotor balance and overspeed test report for rotor
p. Packing specifications
q. Transportation specifications
r. Other categories of records

The Contractor shall be responsible for furnishing the following shipping/transportation documents in accordance with the Project schedule and contractual document submittal requirements:

a. The estimated mass weight of each individual major piece of equipment (i.e., Cabinets, etc…) shall be provided at least sixty days (60) prior to shipment. Final weights shall be provided at shipping that includes the shipping and handling packaging.
b. Shipping and preservation requirements per Section 30.
c. Packing & protection specifications
d. Transportation specifications and all details related to transport of equipment and parts from Contractor/supplier to NPP Krško.

The Contractor shall be responsible for furnishing the following assembling installation/testing documents in accordance with the Project schedule and contractual document submittal requirements:

a. A set of field installation procedures (as requested by NPP Krško ESP-2.619) for erection, fabrication, transportation, quality control, painting, insulation, material handling, welding and organisation shall be provided in the form of a Installation Package. Installation and work packages shall be available and approved by Purchaser not later than six (6) months prior to the work beginning.
b. A list of consumables with Material Data Sheets (MDS) for each item as applicable.
c. As-installed dimensions for supplied equipment (i.e., ALB dimensions, etc…)

The Contractor shall be responsible for furnishing the following Final Documentation in accordance with the Project schedule and contractual document submittal requirements:

a. The Contractor shall provide all the data, as required in Chapter 43, to fully incorporate the impact of the »New AS system« on the original plant design basis. The Final Documentation is a complete set of documents, compiled and arranged by Contractor in compliance with the requirements set forth in Ch.43 .
b. Set of the Final Manufacturing Documentation shall be submitted to Purchaser in a collected delivery at last two weeks before Physical Delivery of »New AS system« and

irrespective of the fact that individual documents of the Final Documentation were submitted to Purchaser in an earlier stage.

c. The Documentation of the Technical Supervision and Testing. These documents are required to be the original ones, bearing the original signatures.
d. The "As-Built" drawings
e. The Final Design Data Report
f. The Contractor shall prepare document revision for updating Chapter 10 of Krško USAR. The Contractor shall identify any changes, and provide a markup of the changes required to USAR Sections 10 if applicable.
g. To the extent any document required to be included in the Final Documentation has not been subject to review and approval by Purchaser, the Contractor shall arrange for such review and approval prior to its insertion in the Final Documentation set.
h. The initial issue (rev. 0) of Instruction Manuals (10 hard copies + 1 electronic copy) shall be furnished at last one month before shipment of the first parts for the specific equipment under the Contract. Where general or standard instructions are used, inapplicable data shall be deleted. Sufficient data and instructions shall be provided or modified to install, operate and maintain the Krško »New AS system«.
i. The instruction manual shall include at least below described items:
    a. A complete and detailed description of all systems. Data sheets giving design, construction and performance data for various pieces of equipment.
    b. Maintenance requirements and instructions.
    c. Operational troubleshooting guides.
    d. Manufacturer's operating and maintenance literature (not sales brochures) with parts lists and with applicable data including materials clearly indicated. This shall include assembly/disassembly drawings and sequences.
    e. A list of erection and installation instructions shall be furnished.
    f. Startup and operating instructions.
    g. Manuals must be submitted in hard copies. Electronic copies are also desirable. Microfilm copies are not acceptable.
    h. NPP Krško requires that the Instruction manuals cover every item purchased, including those materials that the Contractor obtained from a sub-supplier. An electronic parts list in the Contractor's standard format shall be provided in the instruction manual.
    i. Both the schedule of predictive maintenance requirements as well as a detailed write-up of the maintenance instructions for each component supplied.
    j. A recommended maintenance frequency.
    k. All applicable field service bulletins including those already included in the design.
    l. A recommended spare parts list and any recommended options shall be included in this.

11.3.1 Documentation according to NEK ESD Procedures:

a. Detailed Procurement Specifications as described in 3.6 above
    - Procurement Specifications
    - BOMs for the remaining material per each modification and discipline
b. Design Modification Package shall be prepared in accordance with the requirements of ESP 2.602, including all other applicable ESD procedures (acc. to Sect. 7.6). Contractor shall prepare DMP according to NEK procedure ESP–2.602, Plant Design Modifications for NEK review and approval. DMP shall be reviewed and approved by NEK prior to the installation. Before the submittal to NEK for

review, the preliminary DMP shall be subject to an independent review cycle organized and implemented by Contractor. This independent review may be performed by the Contractor, or by involving the subcontractors. After the resolution of all the comments as well as corrections related to the results of independent review, the preliminary DMP shall be submitted to NEK for review. The need for expeditious changes to the ''Approved for implementation'' DMP shall be covered by the FDCR (Field Design Change Request) document prepared in accordance with NEK procedure ESP-2.609. FDCRs will cover the problems identified during the installation that require correction of the DMP. They will not cover new design requirements defined after the acceptance of the original DMP. DMP shall be developed as described in item 3 of this Specification.

c. Calculations / Analysis Reports Design calculations shall consider operation during normal conditions, OBE, SSE and plant operational transients. Contractor shall define applicable acceptance criteria for each analysis. Plant specific calculations shall be prepared in accordance to NEK procedure ESP-2.605.
d. Contractor shall prepare necessary licensing documentation as described in section 3.5 of this Specification according to NEK procedures ESP–2.301, Technical Specification Changes and Licensing Amendments, ESP–2.302, Administration of Changes to the Updated Safety Analysis Report (USAR) and ESP–2.303 Evaluation of Changes in NEK, ESP-2.306 Administration of Changes to the Radiological Technical Specification (RETS).
e. Installation Package (IP) – At least six (9) months prior to the Site installation in accordance to ESP-2.619 the Contractor shall develop and submit the IP for review and approval as specified in item 5 of the Attachment 3. Filed implementation and SAT procedures shall be included in IP.
f. Electronic copies of MSDS (in Slovene language) for all hazardous materials to be used during the implementation phase, shall be provided separately.
g. Factory Acceptance Test (FAT) - procedure Contractor shall review Factory Acceptance Test procedure to exercise the full scope of equipment functioning and performance of major equipment vendor documentation and in cooperation with the vendor.
h. Contractor shall prepare Site Acceptance procedures to exercise the full scope of functional and performance testing, including power testing, which may not have been possible during FAT.
i. Final Documentation - Essential drawings shall be furnished by Contractor to NEK as soon as possible but not later than when the systems are ready for operability declaration.
j. Start Up Procedures (SUP) - Contractor shall prepare Start Up Procedures (SUP) which shall be reviewed, commented and approved by NEK. The scope of Start Up shall envelope all the equipment manipulation needed to start the equipment in all designed configurations.
k. As Built drawings - They include all affected and new drawings reflecting as built configuration. Essential drawings shall be delivered before the declaration of operability.
l. Turn Over Package (TOP) - Maximum 3 months after the installation completion, the Contractor shall prepare TOP according to NEK procedure ESP–2.611 Document Turnover and Closeout for NEK review and approval.
m. Number of required documents per NEK procedures:

- Design Modification Package (DMP) for Review
  2 hard and 1 soft copy
- Final Design Modification Package (DMP)
  1 hard and 1 soft copy
- Installation Package (IP); (to be submitted for NEK review 9 months prior to installation start)
  1 hard and 1 soft copy
- Turnover Package acc. to the ESP 2.61; (hard + soft together with the revised originals in NEK archives - three month after successful acceptance testing)
  1 hard and 1 soft copy

11.3.2 Engineering Documents for NEK Review and Approval:

a. Project Management Manual
b. Project Quality Plan
c. Monthly Progress Report (for information)
d. Walk-down report (for information)
e. Purchasing specification for equipment
f. Shipping procedures
g. Prior to the respective fabrication step
h. Manufacturing and testing Plans and Schedule
i. Fabricated Equipment Documentation Package
j. Installation & Inspection Plans
k. As-Built Drawings
l. Revised NEK documentation
m. Installed Equipment Documentation Packages
n. Operations and Maintenance Manuals
o. NCR and deviation Reports
p. FME Plan

All documents, available in soft media, shall be delivered to NEK in hard and soft copy. The documents available in hard copy only should be scanned and delivered in PDF format, if requested by NEK.

11.4 Additional Requirements

11.4.1 General Requirements

All documents (including drawings, graphs ...) submitted shall be in the form of hard copies and electronic media. Hard copies shall be in the form of three good quality full size reproducible and three good, sharp, black and white, direct-contact prints of the Contractor's original drawing. Electronic media shall be in a format fully compatible with the following software:

- Word Processing: Word 2010 version©
- Spreadsheet: EXCEL©
- Computer-aided Drafting ©
- Planning & Scheduling: PRIMAVERA© or MS Project

Additional details shall be defined between Contractor and Purchaser (like paper format A4, "dictionary" for Primavera software, etc.) after Contract award. The Contractor shall furnish a complete set of the drawings.

a. A black line reproducible and hard copy of each drawing shall be submitted with the transmittal stating the application and drawing status. A unique drawing number shall be defined by NPP Krško.
b. The outline drawings shall provide sufficient outline dimensions to permit arranging the space in the Plant to accommodate the installation and maintenance of the newly installed equipment. As a minimum, the outline drawings shall provide overall dimensions, foundation mounting details, including size and orientation of integral support structure, and all other interfaces that will require connecting in the field. These physical outlines must clearly indicate any differences in the size and space requirements as compared to the as-installed equipment. For maintenance purposes, the access for repair shall be indicated.
c. Detailed drawings shall contain information as to materials and process specifications, materials ordering and procurement specifications.

The Contractor shall also furnish all testing procedures related to modified systems. Two sets of the Final Documentation shall be submitted to Purchaser in a collected delivery two months after Operational Delivery and irrespective of the fact that individual documents of the Final Documentation were submitted to the Purchaser in an earlier stage. The Final Documentation is required to contain at least, the following:

a. Documentation on Technical Supervision and Testing, which will be approved by the Purchaser before the insertion into the Turnover Package (TOP). One of the sets of these documents shall be original bearing the original signatures.
b. The "As-Built" drawings.
c. The Technical Manuals.

To the extent any document required to be included in the Final Documentation has not been subject to review and approval by Purchaser, the Contractor shall arrange for such review and approval prior to its insertion in the Final Documentation set.

12. PERFORMANCE REQUIREMENTS

New AS system capabilities and performance must fully comply with the requirements defined in sections 5, 6 and 7 and being proven according to the section 15 of this specification (i.e., scanning times, I/O capacity, consistency with ISA18.1, etc...). Any deviation from these requirements shall be documented and brought to the immediate NEK attention, regardless of whether deviation for worse or for better.
The Contractor shall prepare site test program in order covering all phases of the project to prove that all equipment is fully capable to operate in all operating modes with performance as designed and required by that Technical Specification. Test program shall be accepted and approved by NEK.

13. MATERIAL REQUIREMENTS

All materials shall be new and of the best quality, suitable for the purposes, free from defects and unacceptable imperfections. All materials shall conform to the Contractor's procurement standards, which have been proven satisfactorily in the past and meet the applicable codes and requirements for the offered Work.
The Contractor shall be fully responsible for all materials' selection and procurement.
Materials used shall be suitable for environmental qualification as specified in section 16.
Fire resistant, flame retardant, low-smoke and halogen-free materials shall be used. Materials used for wire penetrations, conduits, wire or cable ties and terminal boards shall be fire resistant, of self-extinguishing material defined by ASTM D 635 or equivalent standard. Polyvinyl Chloride (PVC) and polyethylene shall not be used, nor shall any material be allowed which melts and its droplets carry the flame. All cables must be electrically insulated and must be composed of LSZH (Low Smoke Zero Halogen) polymers which are inflammable and self-extinguishing in the event of fire and halogen free (non-toxic). Cables shall meet at least minimum requirements from this chapter and must pass flame test according to IEEE 383 or equivalent.
Materials of limited shelf life shall not be used after their expiration date.
Certificate of Compliance shall be provided for all materials and parts delivered.
The Contractor shall submit Materials Safety Data Sheets, in Slovenian language, for all hazardous materials (if any) delivered or used on the NEK site during the installation as a part of the IP.

14. FABRICATION AND ASSEMBLY REQUIREMENTS

14.1 General

- Fabrication of all components of the New AS system shall be performed by the Contractor. All items fabricated by the Contractor shall meet the requirements described herein.
- Manufacturer shall have experience/references on same work performed in US and/or in EU Fabrication materials, methods, and quality assurance shall be in accordance with the Contractor's Safety Analysis Report, Certificate of Compliance, Contractor's approved quality assurance program, and the applicable codes and standards in Section 7.0.
- All material used in fabrication shall be new and shall conform to the appropriate material specifications.
- All wiring shall follow accepted industry practice and shall be neatly bounded and marked on both ends.

14.2 Installation at NEK

The Contractor shall develop and submit a draft project schedule within the proposal and a detailed revised time schedule for installation works and commissioning at least four (4) months after the signing of the Contract. The time schedule shall comply with the NEK outage schedule limitations and other milestones listed in Section 34 of this specification.

Safety at work and the prevention of personnel injury are the priorities in performing the work. All persons involved shall be trained and qualified per the NEK safety at work program.

The Contractor shall delegate its experts to coordinate all Work Order implementations and the overall project implementation on-site.

All work executed during the installation phase shall be performed according to the NEK field installation and inspection procedures, applicable drawings, and specific written instructions. This documentation shall generally be part of the DMP and IP. The Contractor shall always comply with NEK standards, regulations, and procedures, as well as good industry practices for similar projects.

The Contractor shall perform all installation works, including tests and inspections on-site, according to the NEK work management and implementation procedures specified in Section 6 of this specification. All demolition and installation works shall be performed by the Contractor or its engaged subcontractor approved by NEK for electrical and I&C modifications implementation and familiar with the NEK work management process. As a minimum, the subcontractor shall have at least two individuals trained and qualified by NEK as work leaders who were involved in the plant electrical or I&C modification implementations (there is a two-day training required for that – it is expected that the workers with the knowledge and sufficient experience will be nominated for that position). Removal of the existing AS system components and new AS system installation must be performed carefully to preclude damage to the other MCB equipment. Instructions for the removal of the existing equipment shall be logically attached as a subsection to the applicable DMP.

The contractor is required to commence preparation works prior to Outage 2025, which is scheduled to start on October 1, 2025, while the plant is still in online mode. These preparation activities encompass site mobilization, a comprehensive overview of work areas, rechecking cable paths, and more.

The designer is tasked with analyzing the installation documentation to assess the feasibility of conducting a portion of the installation works in online mode, if applicable (e.g., conduit installation, cable pulling), with the aim of optimizing the most compressed scope for the outage.

The primary phase of deinstallation and installation works is slated to commence after the shutdown of the existing AS system, scheduled for the 8th day of Outage 25 (estimated date), coinciding with the initiation of the H9 window. This H9 window, estimated for approx. 9 days in outage 2025, will be dedicated to the contractor for the demolition of the existing and complete installation of the new AS system. The SAT will be performed within the same timeframe.

While the AS system is inoperable, a temporary AS system involving the expected 50 top priority alarms shall be active and fully functional.

All activities will be coordinated by NEK personnel.

15. INSPECTIONS AND TESTS

15.1 General

The equipment and software purchased for this project are expected to be standard off-the-shelf items. OEM certificates and warranties will be sufficient and shall be delivered to NEK as the end user. Specific software code developed for NEK will be tested within the project, in accordance with the project schedule, before (if possible) as a FAT and after the installation (as a SAT). Delivered equipment will be assembled and software configured by the Contractor, as agreed, on the Contractor or NEK site.

Tests, inspections, and acceptance criteria shall conform to the applicable codes and standards listed in Section 7 of this specification. Tests and inspections not covered by these requirements shall be performed in accordance with the Contractor's standards and mutually agreed QC plan.

The Contractor shall prepare detailed procedures for the FAT and SAT. Procedures shall be included in the IP. They shall include all relevant information, such as reference documents, test instructions, test equipment, precautions, preliminary conditions, initial and special condition requirements, description of the test, normal parameter values/acceptance criteria, measuring data sheets, etc.

All costs for testing at the site and associated with Contractor and Subcontractors' workers shall be borne by the Contractor. The Contractor shall delegate its experts to perform the tests and required inspections on-site. Plant instrumentation may be used to any extent possible to obtain data (input signals).

NEK reserves the right to check at its own expense the Contractor's instruments to be used or have been used for any test or inspection by an independent, officially acknowledged/certified institution.

The Contractor shall submit a mutually agreed QC plan, which includes relevant data of each planned activity, such as test or inspection name, applicable standards, procedures, acceptance criteria, etc., according to Section 7 of this specification. The QC plan shall conform to the detailed installation work sequence plan.

Each test or inspection shall be properly recorded, and an approved report shall be issued containing all relevant data, such as the type of the test or inspection, measuring equipment data, standard, verification against the acceptance criteria, results, date and time, relevant ambient conditions under which the test or inspection has been performed, name of the person performing the test or inspection, and the person responsible for the results verification, and delivered to NEK to be attached to the associated Work Order.

Before QC plan approval, mutually agreed witness and hold points shall be defined for tests and inspections. Whenever an NEK representative is observing the test or inspection, the raw data report shall be available and submitted immediately after the test or inspection completion. Within two (2) weeks after the test or inspection completion, the final and approved report shall be submitted to NEK. All test and inspection reports shall be submitted to NEK after the completion of the manufacturing and installation phase as a compiled QRP document.

NEK shall be regularly (at least monthly) informed about the work progress. The Contractor shall preliminarily inform NEK of the dates of tests and inspections within the detailed schedule plan. At least ten (10) working days prior to the planned test or inspection, the Contractor shall inform NEK in writing.

The specificity of this project is that all components will be replaced while the functionality of the system (main function) driven by the software codes shall be the same, although using a different platform. The new software shall be validated and verified to test the complete set of inputs and control and check the outputs.

15.2 Acceptance criteria

NEK will accept only materials and equipment that meet the specification requirements, codes, and standards as specified in Section 7 of this specification. The equipment shall operate to the full intent of this specification. Any material or equipment that fails to meet the requirement or acceptance criteria defined in the test or inspection shall be reported to NEK as a nonconformance in accordance with the PMM developed and approved by NEK.

Acceptance of the test results and satisfactory completion of the inspection by NEK shall not relieve the Contractor of any responsibility for furnishing the equipment completely and correctly in all respects, including all necessary devices and functions for satisfactory operation. In the case of disagreement on the test results between NEK and the Contractor, an independent, mutually agreed expert may be appointed.

15.3 Factory acceptance testing (FAT)

FAT of the new AS system shall be in accordance with prepared and approved FAT procedures. FAT shall be performed on the fully assembled actual hardware and software to the extent practicable at the Contractor's and its subcontractors' facilities prior to the delivery to NEK.
The purpose of those tests is to verify that new AS system hardware performs in a reliable manner in accordance with the equipment specification and that the software performs in accordance with the functional requirements.
FAT shall be mutually agreed during the final manufacturing QC plan reconciliation. Testing shall include, but not be limited to the tests and verifications provided herein.

In general:

1. Inspection to verify conformance with the manufacturer’s drawings
2. Visual inspection to verify proper assembly, wiring and construction (in relations to the project, DMP drawings)
3. Verification of the communication with all interfaces
4. Cyber security

Functional verification:

1. FAT shall encompass full scope of the system functional and performance testing,
2. Burn in test shall be performed for all power supplies before installation,
3. Functional test of all logic, accuracy, timing, alarm circuits, inputs, outputs, datalinks, switches, etc..,
4. Functional test of the operator controls and interfaces,
5. Signal validations of the input signals,
6. Proper system operation in case of processor, display, power supply or other failures.

In addition:
New ALB and any other equipment that shall be mounted in or on MCB shall be tested or otherwise proved to be anti-falldown (seismic category 2). If in any case the existing AS system cabinets in MCR shall be replaced by new ones, the thorough analysis or testing must be performed to prove that in case of an seismic event, no adjacent vital equipment in the MCR shall be affected.

A comprehensive assessment of overall system redundancy, failure modes, common cause failures, and reliability is imperative for the entire system. The final redundancy and reliability of

the system will be detailed in an appropriate Failure Mode and Effects Analysis (FMEA), a requirement stipulated in ESP-2.303 Evaluation of changes in NEK.

According to NEK SP-3 CYBER SECURITY PROGRAM the new NEK AS system shall be categorized as critical digital asset and therefore this modification shall be planned and prepared to be implemented in consistence with SP-3 requirements with end goal of protection against cyber-attacks.

Complete system shall be fully manufactured, assembled and software configured (including power supplies, I/Os, network equipment, control racks, ALBs, horns, pushbuttons, IRG-B converter, RCW, operators interface workstation, all internal cabling, etc.) for the full scope FAT testing.

Temporary alarm system shall be designed to enable critical alarm annunciation to operators during NEK AS system replacement in outage. Detailed list of these alarms should be determined in DMP phase of this project. This temporary alarm system shall also be assembled and FAT tested before delivery to NEK.

The factory tests must validate that the entire system is functioning as per the design specifications. Factory tests will be divided into two parts. The first part will consist of basic hardware tests, which validate the foundational system hardware functionality and confirm that the system is configured in accordance with the hardware design. This activity shall be followed by software engineering tests to confirm individual controller software functions in an isolated manner, primarily focusing on testing all functional blocks and functions. The last part of this set of tests will be integrated system validation tests to check complex system functions in their integrated state, encompassing the full range of system functions, I/O functionality, including the system network and system applications with HMI interfaces. These tests validate the system's function in its entirety and generally involve the system in its complete and accurate project-specific configuration, enabling comprehensive testing of the specified functions.

This first part of factory testing will be performed by contractor according to approved FAT procedure and will be named PRE-FAT. The purpose of this PRE-FAT is to verify full operability of the system according to the design without the presence of NEK. Contractor shall deliver filled and signed successfully completed PRE-FAT procedure. It is requested that the complete system is powered and kept online for at least 14 consecutive days after PRE-FAT is successfully completed. It shall remain powered until and through the next phase of tests.

This next phase of the tests is the FAT, primarily involving a functional demonstration to confirm that the system complies with its contractual requirements. During these tests, NEK personnel shall witness the testing at the designated factory facility. The FAT shall be initiated only when PRE-FAT is finished and approved by NEK.

The full range of FAT tests and validation steps will be detailed in the FAT procedure. Successful completion of the FAT procedure and resolution of any test failures indicate that the system is acceptable to the NEK and may proceed to be shipped to the customer site for installation.

As part of the FAT for external communication and data transfer, testing with the PIS system simulator (supplied by NEK) shall be conducted. This test will involve activating all AS system alarms and confirming each alarm on the PIS system's graphical user interface (GUI).

15.4 Site acceptance testing (SAT)

Site Acceptance Testing (SAT) is performed to verify that no damage or other malfunctions have occurred as a result of shipment or installation activities. These tests repeat the verification of proper power supply and grounding, the correct operation of the network, basic equipment functionality (utilizing online diagnostics and equipment self-diagnostic features), and the confirmation that the 'as installed' software configuration complies with the tested FAT configuration.

Additionally, further tests will be conducted to demonstrate the proper integration with the plant's infrastructure, covering the hardwired signal interfaces (Input/Output tests) and external communication interfaces.

SAT is the final check of all system functionality and operability. After successful completion of this test, the AS system shall be handover to NEK operations and shall release the system for plant start-up (from transferring nuclear fuel into reactor to full power operation). However AS system operation shall be closely monitored during plant start-up by both NEK and contractor personnel. Any deviation in the system operation shall be promptly resolved on site. NEK will actively participate in all site test phases.

Furthermore, comprehensive training for maintenance personnel shall be conducted as part of the modification's completion. Whole testing Contractor approach shall be described in the Contractor approach (in accordance with Section 40) as a preliminary but will be then later (in accordance with the project schedule) developed and maintained upon the implementation of all tests as a life project document.

Detailed procedures for both FAT and SAT will be outlined in the Detailed Modification Package (DMP) as separate standalone documents.
SAT shall be prepared and conducted by the Contractor according to the mutually agreed test plan; reviewed, commented and approved by NEK. NEK will offer full support during SAT activities. Testing shall at least include:

1. Visual checks and various controls,
2. Wiring checks,
3. Accuracy checks,
4. Full system redundancy verification,
5. Failure modes recovery and errors processing,
6. Presentation and verification of all signals and alarms,
7. Signals verifications,
8. Communication to external systems – PIS,
9. Cyber Security tests,
10. Proper overall design operation of the whole system and all interfaces.

16. ITEM QUALIFICATIONS

16.1 General

The modernization of the AS system, involving the replacement of the majority of components while retaining the main functions through a new software platform, is classified as Non-Safety Related, as the AS system is not required per NEK Technical Specification. The alarm system is not

credited in the USAR chapter 15, which analyzes the mitigation of design basis accidents. Consequently, Emergency Operating Procedures (EOP) also do not utilize any features of the alarm system for operators' guidance.

However, the inoperability of the NEK AS system will lead to the declaration of ALERT (začetna nevarnost) as per EIP-17.001 "Določitev stopnje nevarnosti." In the event of a plant transient and NEK AS system inoperability, a SITE EMERGENCY, including site evacuation, will have to be declared. Therefore, it is evident that the reliable operation of the NEK AS SYSTEM is necessary and can influence nuclear safety. This will be achieved through redundancy requirements, as specified above. Additionally, industry experience (EPRI documents, OSTI documents) indicates an excellent history with high reliability of digital systems.

Considering the system's importance and other requirements such as cyber security, seismic classification, electromagnetic and radio-frequency interference immunity, as requested per standard IEC standards, it shall be designed and delivered per **Augmented Quality (AQ)** requirements (see Section 43 for more details).

16.2 Seismic requirements

The equipment for the New AS system shall seismically designed/qualified for anti fall-down criteria and shall be installed on the Main Control Board (MCB) in a manner that prevents it from becoming a projectile and causing damage to adjacent safety-related equipment. Adequate seismic analyses/tests, demonstrating the structural integrity of the AS system and proper fixation of equipment within the existing AS system cabinets and on the MCB, shall be conducted in accordance with IEEE 344, 2004. The seismic floor response spectra to be considered are specified in the NEK specification SP-S702 "Seismic analysis, testing, and documentation" and Appendix 7 of this specification. Multiply horizontal FRS in Appendix 7 by factor of 1.82 in the frequency range at and above 10 Hz (Assessment of in-cabinet response spectra) and linearly interpolate between peak spectral response and spectral response Sa (10 Hz). No additional amplification for vertical spectra. So generated spectra (vertical and horizontal) additionally increase for 10% (multiply by 1,1 according to code requirement – IEEE344, 2004). Use 4% damping FRS curves for qualification of ALBs.

Any modification of cabinets in the MCR must not result in possible interaction of those cabinets (during seismic event) with any safety related equipment nearby. The current AS system cabinets are securely anchored to the foundation to withstand seismic movements. If all new equipment is to be installed within these existing cabinets, which are designed to meet anti-fall down criteria, the installation within the cabinets can be deemed standard, apart from the MCB installation as described in the first paragraph of this chapter.

16.3 Electromagnetic compatibility (EMC)

The New AS system equipment must be capable of performing its intended function without degradation or mis-operation, and it should not adversely affect other equipment in the electromagnetic environment where it is installed. The project anticipates the use of commercially available goods, with the installation approach (e.g., fixation) designed not to compromise the integrity of surrounding safety equipment. A standard Electromagnetic Compatibility (EMC) compatibility certificate shall be provided to demonstrate that electronic components, workstations and support equipment are not susceptible to EMC radiation and do not emit quantities of electromagnetic noise beyond allowable limits.

Existing enclosures (cabinets) will be retained and utilized for new equipment installation to the extent possible. However, if there are valid reasons to deliver the equipment pre-mounted in a new cabinet, acceptance will be determined by NEK.

The Contractor, within the design documentation, shall provide details about wiring, earthing, grounding, or other concept documents to outline the plan for EMC compliance.

For the existing AS system, qualification was achieved by adhering to IEC801 and IEC1000. For the new NEK AS system, adherence to Regulatory Guide 1.180 (Rev.1) will be required, superseding the mentioned IEC standards for use in the nuclear industry. NEK ED-19 shall also be considered.

16.4 Cyber security

In general:
The criteria for classifying a system as a CS (critical system) in the NEK are based on 10CFR54.73 Protection of digital computer and communication systems and networks (SSEP) and NRC RG 5.71 Cyber Security Programs For Nuclear Facilities. Based on the definition of the ITS (Important to Safety functions) function, NEK assesses that the AS (Annunciator system) system is an ITS system. The supplier should provide its cybersecurity assessment and explain the reasons. For this reason, all security measurements must be included in the design of the entire system, and the cyber assessment must be performed in accordance with the NEK ESP-2.921 procedure and the EPRI TAM reference methodology.

The provider must identify:

- which and how many computer subsystems are added or changed within the modification
- for each computer subsystem, it is necessary to determine whether it is critical to cyber security. An isolated computer subsystem is also evaluated in the same way.
- For each computer subsystem (regardless of whether it is critical to cyber security or not), the provider must prepare a cyber security analysis using the NEK ESP-2.921 procedure. For each analysis, it is necessary to prepare a list of associated DA (Digital asset). With the analysis according to the NEK ESP-2.921 procedure, the following must be done:
    - describe and understand all the characteristics of DA
    - determine which DA is also a CDA (Critical Digital Asset)
    - identify vulnerabilities for each CDA
    - determine the threats for each CDA
    - choose which security controls need to be implemented for every CDA
- A successful analysis (signed by NEK) is a prerequisite for completing the DMP package.

Other functionalities:

- The provider must configure and establish the connection from digital devices to the existing NEK CheckMK server. NEK has all necessary licenses for CheckMK. NEK will provide all the necessary details and IP settings on the NEK network.
- The provider must configure and establish the connection from digital devices to the existing NEK SIEM server. NEK has all necessary licenses for SIEM server. NEK will provide all the necessary details and IP settings on the NEK network.
- The provider must configure and establish the connection to the existing NEK ADS (anomaly detection system) server. NEK has all necessary licenses for ADS. NEK will provide all the necessary details and settings on the NEK network.
- The provider must describe the communication between AS and NEK PIS LVL2 (Plant Information System). The provider must describe the necessary protocols for sending

process data from the AS and the NEK PIS LVL2 system. The provider must also describe the protocol for sending values from the NEK NEK PIS LVL2 system to the AS. For the proposed protocols, it is necessary to write the necessary data (port, application control…) to describe the policy on the firewall.

- IP settings (subnets, Ips, Gateway, Mask) for the entire AS system must be confirmed by NEK.
- The AS system must have its own independent NTP server. Since the NEK firewall (to which the AS will be connected) is also an NTP server, it would be desirable for the AS system to take this NTP server on the firewall as an NTP backup.

16.5 Environmental requirements

The following environment conditions shall apply for installation of the new AS system electronics in the Main Control Room and in Cable Spreading Area:

- Temperature: 18°C to 27°C (22°C normal)
- Relative humidity: up to 50% (+/- 10%)
- Pressure: Atmospheric
- Radiation: N/A

Adequate (passive) ventilation shall be provided to prevent equipment overheating.

16.6 Software requirements

Software (and software documentation) shall be developed in accordance requirements of NEK ESP-2.912, ESP-2.913 and ESP-2.951 procedures and other standards listed in the section 7 of this specification.
Contractor shall assure the measures to control complete software development lifecycle. The contractor's software development lifecycle shall include the following (but not limited to) activities: Planning, Requirements, Design, Implementation, Integration, Verification & Validation and Installation (adopted to that Project Specific that the most of codes will be migrated).

The contractor’s software development lifecycle shall be described in its Software Quality Assurance Program, which shall be harmonized with NEK QA Specification QS 610 requirements, QS 600 Generic Software Quality Assurance Program Requirements and shall be attached to the Bid. Contractor’s procedures for software development lifecycle activities shall be submitted to NEK for review and acceptance before implementation. Detailed Failure Mode and Effects Analysis shall be performed and delivered.

Software Hazards Analysis shall be performed to evaluate the digital I&C system for possible malfunctions attributed to software applied to the project, like potential watchdog timer problems, potential system reboot problems, infinite loop potential, synchronization problems related to tasks-processes-processors, indeterminate behaviour potential, unacceptable responses to abnormal conditions, potential HSI problems.

17. SPECIAL REQUIREMENTS

Within this Bid the Contractor shall provide a reference list of the comparable AS system installations in nuclear and other factories in last 10 years.
The Contractor shall provide proof of required manpower capabilities with appropriate qualifications and references for performing activities under the scope of this work.
The Contractor shall have a QA program in place (refer to section 43 of this specification).

17.1 Health and Safety

The Contractor shall manage and be responsible for the performance of the safety measures and services for all the work performed within the Project.

The Purchaser shall be provided with unrestricted access to the Contractor's facilities and safety records for the purpose of auditing the Contractor's safety program.

All persons employed by the Contractor, agents, subcontractors, or other persons for which the Contractor has responsibility, shall perform work under the direction of the Contractor's health and safety program. All persons shall be instructed in and be familiar with safety rules and regulations applicable to the work being performed.

The Contractor shall have sole responsibility for ensuring that such persons are so informed and that safe work practices are followed. Contractor shall also bear all responsibilities also for its subcontractors to be included into health and safety program. Other services and hardware supply include provision of all miscellaneous services not defined elsewhere in this Specification that are necessary to successfully complete the new AS system modernization project.

17.2 FME

Contractor shall take appropriate FME actions to prevent the introduction of foreign material into plant systems and its components. Contractor shall prepare FME program for installation and implementation of complete project FME according to SELLER's requirements and NEK FME procedures ADP-1.1.101 Preprečitev vnosa tujkov and ADP-1.1.128 Kontrola izvajanja vzdrževalnih aktivnosti z namenom preprečitve vnosa tujkov.

All workers should be aware of the possible consequences of a failure to properly implement effective FME controls and practices during their work activities. Any workers should stop work if FME becomes or is in danger of becoming compromised. Workers' understanding and implementation of the FME program is critical to the overall success of the FME program.

During machining and factory assembling particular attention shall be paid to FME according to SELLER's requirements.

18. CLEANLINESS

The Contractor shall establish and maintain standard industrial cleanliness throughout fabrication, assembly, removing, installing, testing, and inspection of equipment. The Contractor shall be responsible for ensuring that these same requirements for cleanliness are met by its sub-suppliers.

19. CORROSION PROTECTION/COATING AND PAINTING

Industry standards for the Computer Rooms shall be used for the System Computers and industrial standards for the acquisition electronic equipment shall be used for the equipment for DAS's. If protective coating is damaged in phase of installation or manipulation with equipment, NEK procedures ADP-1.4.810 - ADP-1.4.814 shall be used for repair (respectively).

20. MARKING AND IDENTIFICATION

All components shall be clearly identified in accordance with the NEK MECL designations upon installation, and temporary labels can be used in the previous phases (FAT, etc.). The function of each component (including PCB components), internal adjustment, connector, terminal, and test point shall be identified. The markings shall be located adjacent to the component, adjustment, connector, terminal, or test point. All markings shall be permanent and legible.

A complete list of preliminary labels, markings, and identifications shall be provided to NEK for approval to harmonize them with the NEK standard labelling system. The Contractor shall provide temporary markings for all equipment on front and back panels, and NEK will provide final permanent labels.
Components and modules where a separate MECL designation does not exist shall be marked in a way that eliminates any question or confusion during subsequent assembly or repair.

All wiring shall follow accepted industry practice and shall be neatly bound and marked on both ends. This shall be accomplished by individual sleeve-type wire markers slipped over and fastened to the end of each wire at each termination. Sleeves shall be flame-resistant, non-conductive, a minimum of one (1) inch in length and lettered lengthwise. The marking shall be of such a nature that it will not rub off. Wire identification shall correspond to that shown on the wiring diagrams or wire list furnished by the Supplier.

The Contractor shall establish and maintain a system for the identification of materials, parts, and components according to the NEK instructions. If the Contractor offers its own identification system, it shall be approved by NEK. These measures shall ensure that the item and serial number or other appropriate means, either on the item or on the design documentation, maintain identification of the items traceable to the item throughout design, materials and components purchasing, fabrication, shipment, and use of them.
These identification and control measures shall be designed to prevent the use of incorrect or defective materials, parts, and components, as well as to provide a permanent record to assist in the future evaluation of in-service degradation of parts.

The Contractor shall provide supplemental data for all AS system items and spare parts for the NEK MECL database in an Excel spreadsheet provided by NEK.

21. PACKAGING, HANDLING AND STORAGE

The Contractor shall prepare, pack, and load all materials and components in a manner that protects them from damage during transportation. The Contractor shall be responsible for any damage resulting from improper packing, handling, or transportation. All parts exceeding 90 kg

gross weight shall be prepared for transportation so that slings for handling by a crane may be readily attached while the parts are on a car, truck, special trailer, or ship's deck.

All delicate parts subject to damage from moisture shall be packed in hermetically sealed containers, plastic envelopes, or other approved containers within their respective packing cases. Each package and/or container shall be clearly marked, and the contents identified for proper warehousing. The outside of all containers, boxes, etc. shall be clearly marked with the total weight, point of maximum weight, and the correct position for the attachment of lifting hooks and cables.

The Contractor shall inform NEK of any special storage requirements to allow for necessary preparation. The Contractor shall verify the site conditions and provide a written procedure for packing, receiving, handling, and storing the delivered equipment. All delivered equipment shall be on a delivery list, with marked specific instructions for handling and storage. If requested, the Contractor shall submit a Handling and Storage procedure to NEK at least two (2) months in advance of shipping.

The Contractor shall specify any additional requirements necessary to maintain equipment warranties.

22. NON-CONFORMING MATERIALS

Nonconformance with specification requirements, approved drawings, and applicable federal, state, and local codes and standards invoked by this Specification will not be accepted until approved by the Purchaser.
Non-conformances to be reported for approval by the Purchaser are those nonconformances which cannot be brought within specification requirements by rework or replacement. When such a condition exists, the Contractor shall initiate a Nonconformance Report (NCR) using the Contractor's standard proposed disposition.

Additionally, the Contractor shall:

- segregate the nonconforming item to prevent any further processing which may result in a change of the nonconformance as identified,
- make the NCR available to the Purchaser's Inspector for review to assure the nonconformance is completely identified and accurately stated, and
- Properly disposition and transmit the NCR to the Responsible Engineer by the most expeditious means. The NCR may be telecopied, followed by direct transmittal of the original. The Contractor shall provide technical justification if recommended disposition is "Accept-As-Is" or "Repair".

The requirements of the Specification are binding; no departures are acceptable without the prior consent of the Purchaser. The resolution/approval of Deficiency Notices, Nonconformance reports, Field Change Notices, etc. must be approved in advance by the Purchaser. Further engineering and/or manufacturing after the detection of nonconformances, prior to Purchaser's approval, shall be at Contractor's risk.
The NCR shall provide the method by which the Contractor shall obtain a documented response and approval from the Purchaser when non-conformances are identified. The use of the NCR will pertain to work at the Contractor's and/or subsupplier's shops.

23. SPECIAL HANDLING

As applicable, the Contractor shall specify any special handling instruction that may be required. These shall be forwarded to the designated "ship to" address prior to the arrival of the item to allow for adequate preparations. The instructions shall include the NEK Purchase order number and the expected delivery date.

24. SHELF AND SERVICE LIFE

The new equipment shall be designed and manufactured for a service life of at least twenty (20) years. This does not constitute a warranty for the design life. A list of all components that cannot meet the above requirement shall be provided. A complete service plan for any such component shall be provided, including replacement parts, replacement frequency, shelf life of the spare parts, etc.
Spare parts shall also be available for at least twenty (10) years. The Contractor shall not ship any item that has less than ten (10) years of the remaining shelf life at the time of shipment. The Contractor will also provide shelf-life data for the recommended and supplied spare parts by Contractor's material number or style number and price per unit.

25. 10CFR21 REPORTING

N/A

26. COMMERCIAL GRADE DEDICATION

N/A

27. CONTRACTOR DOCUMENTATION REQUIREMENTS

Documents shall be submitted as requested in section 11 of this specification. All document deliverables shall be submitted to NEK in the form of hard copies and searchable electronic media (Adobe Acrobat [.pdf], MS Word [.docx], MS Excel [.xlsx], and Primavera P6 [.xml] file format for schedules). All documents shall be provided in English, or in Slovenian or Croatian language if the OEM documentation or NEK original document is in one of those languages.
All document deliverables specified herein shall be delivered to the NEK PM.

NEK representatives will review the documentation for completeness and reproduction quality. If not satisfactory, the Contractor will be promptly advised that additional documentation is required. The Contractor's documentation review by NEK shall not relieve the Contractor of any part of its responsibility to meet all of the requirements of this specification, applicable codes, and requirements or standards for the correctness of the documents and drawings.

28. REPAIR RECORDS

Potential failures of the components, other services, or any other discrepancy (installations, software codes, etc.) will be treated per Problem Discrepancy Report (PDR) process as described in PMM.

29. SOURCE INSPECTION/SURVEILLANCE NOTIFICATION

The Contractor shall grant access to the Contractor's and its subcontractors' facilities and records related to the contract for the purpose of planning and conducting source inspection/surveillance activities. Inspections or examinations conducted by NEK representatives or designated agents do not absolve the Contractor of its responsibility to meet the requirements of this specification and purchase order.
The Contractor shall formally notify the Purchaser of manufacturing "hold" and "witness" points in accordance with the Manufacturing and Inspection Plan. Notification shall be provided ten (10) working days before the anticipated occurrence.

30. SHIPPING REQUIREMENTS

The Contractor shall provide packaging and shipping methods for protection from the effects of temperature extremes, humidity and in transit shocks. The NEK's authorized source inspector has the right to hold shipment if contractual requirements are not met.
The Contractor is responsible to get all permissions for transportation of the equipment.
The packaging procedure shall consider the method of transportation to be used, as well as possible storage duration and storage environment.

Protection of internal cleanliness shall be achieved by sealing all openings with plugs, caps or covers. Covers shall be designed and installed in such manner that their removal can be done without damaging the pipe nozzle weld joint preparation area. Internals shall be protected against moisture during shipment and storage by suitable means. Coated equipment shall be handled in such way to prevent damage to the coating.

Material and all certifications or accompanying documentation supplied under this Contract shall be directly shipped from the Supplier/Manufacturer to DAT NPP Krško Site.
The Distributor shall not take possession of material or documentation. Prior to the shipment, the Contractor shall contact Purchaser’s Representative to confirm shipping arrangements. All pieces of equipment, boxes, cartons, etc., shall have a waterproof identification label attached with the following information:

Purchaser:
Nuclear Power Plant Krško
Vrbina 12, 8270 Krško, SLOVENIA
Modernization of AS system
Attn: Mrs. Lisec Nataša

CONTENTS: Contents Description (Provide reference to the Contract and Heater No.)
The Contractor shall ensure that the shipment includes a packing list identifying each item or assembly being shipped. The Contractor shall notify the Purchaser at least one month prior to the shipment.

31. VENDOR TECHNICAL MANUAL AND REGISTERED UPDATES

The Contractor shall supply required instruction manuals according to the section 11.7 of this specification. All OEM manuals shall be provided to the NEK (or the web link shall be ensured).

32. TRAINING

32.1 Training scope and schedule

The training shall be designed and organized for NEK maintenance engineers and technicians, addressing the following key objectives:

a. To instruct NEK personnel on the principles of the operation and maintenance of the newly installed equipment, including required periodic testing and inspections, ensuring a comprehensive understanding of all functions.
b. Detailed coverage of revised preventive maintenance/test procedures.
c. Instruction on equipment assembling and disassembling procedures, including on-the-job training during assembling, installation, and commissioning activities performed on-site or at the Contractor's facilities during the FAT period.
d. Guidance on the maintenance schedule for the new equipment.
e. Instruction on identifying and addressing possible malfunctions during operation, troubleshooting procedures, and implementing corrective actions to maintain safe and reliable operation.

The training program shall include both theoretical classroom sessions and hands-on training, each of appropriate durations, catering to NEK technical (maintenance) staff, involving at least six (6) persons. The Contractor must submit a training program schedule with the bid. NEK acknowledges that some system parts will be delivered as off-the-shelf products and may not require specific training. However, the training plan will be discussed during the negotiation phase, with a focus on non-standard aspects of the system.

Hands-on training for maintenance personnel shall be conducted just before or during FAT activities on the live system configuration, or alternatively, during system commissioning at NEK. At least one (1) month before the training, the Contractor shall submit a detailed training program schedule to NEK for review and approval.

Training for NEK MCR licensed operators will be conducted by NEK personnel based on training materials provided by the Contractor. These materials, covering system operation principles and interfaces, shall be delivered at least four (4) months before system commissioning.

32.2 NEK training requirements

The Contractor has to fulfil the standard NEK training requirements and provide training services as follows:

a. Instructors conducting training have to possess an adequate technical knowledge and experience of the course content and have to possess adequate instructional skills.
b. Develop the training materials and documentation.
c. Provide the training materials (searchable soft copy in the Adobe Acrobat .pdf or MS Word format is acceptable) to the NEK training department at least two (2) weeks before the start of the training course.
d. Prepare hard copies of the training materials for each participant of the training course.
e. Conduct the training course.
f. Issue the training certificates for participants that successfully completed the training course and submit them to the NEK training department.

Within four (4) weeks after the completion of the training course prepare and submit to the NEK training department a short training course report with the following content:

a. scope of the training course
b. specific dates and duration
c. list of instructors
d. list of participants
e. training certificates
f. post-course student feedback analysis and results
g. other relevant information

Provide a copy of student handouts and other written training materials to the NEK training department for archiving.

33. REVIEW AND/OR VERIFICATION OF THE WORK

The Contractor is required to perform a detailed "line-by-line" review of the all documents in the Plant Design Modification package (DMP) as requested per ESP-2.606 Peer Reviews.
The Contractor shall provide distinct evidence that such a review was conducted by presenting with the DMP package for NEK review, a set (copy) of checked drawings and documents that have been marked up and would indicate that: all design inputs and design outputs match, calculation equation references and quantitative formulas have been checked, and various drawings have been checked against each other for continuity and overall agreement.
The Contractor shall provide a copy of all directly available and releasable reference documents (pages) used in calculations as an appendix to the calculation or design input documents so that the NEK review of the Contractor's review process can be expediently performed.
Contractor's proprietary documents that are classified as non-releasable may be made available for consultation (not for release) by Purchaser and regulatory authorities on a case-by-case basis.

Main Contractor cannot delegate this task to the subcontractor involved in the preparation of the DMP.

34. SCHEDULE REQUIREMENTS

To fulfill the objective of complete modification implementation, the following schedule completion activities/milestones are considered. The Contractor has the flexibility to propose an improved or modified schedule while adhering to the general requirements. Shut-down of the existing AS system shall be done in H9 window (denoting the timeframe when the reactor is unloaded with fuel, estimated for 9 days in outage 2025), wherein the complete installation works and SAT must be completed.

Key dates outlined in the preliminary schedule include:

- Installation, validation and operation of temporary AS system for expected 50 top priority alarms (OL33-RE25)
- Replacement of the complete AS system (RE25 (H9 / 9 days).

A rough AS system Project schedule is outlined in Appendix 3. This schedule is crafted based on NEK's expectations and understanding of the tasks required to achieve the project goals. The Contractor is tasked with implementing the project based on the attached schedule, but the final

schedule will be proposed within the bid and approved during negotiations, before the signing of the contract.

For overall project schedule (milestone dates) see Appendix 3, however major milestones shall be followed:

No	Description	Duration (months)
1	**Contract signed** Contractor awarded	T0
2	**PMM and PQP** PMM and PQP Approved by Purchaser	T0+1
3	**Design Input Documents** Design documentation according to ESP-2.604 section B approved by Purchaser	T0+2
4	**Basic Design** Basic Design approved by Purchaser	T0+3
5	**DMP submitted to Purchaser for review** Design Modification Package approved by Seller	T0+5
6	**DMP** Design Modification Package approved by Purchaser	T0+6
7	**Installation Package and Work Safety Plan** Submitted to Purchaser for review	T0+8
8	**Installation Package and Work Safety Plan** Installation Package and WSP approved by Purchaser	T0+9 (not later than six (6) months before the installation)
9	**FAT** Successfully completed Factory Acceptance Test	T0+12
10	**Hardware** Delivery to DAT NPP Krško Site	T0+14
11	**Installation od temp. AS system and Test** Installation of temporary AS system	September 2025
12	**Installation** Installation works according to IP	October 2025 (H9 / 9 days)
13	**Essential Drawings** In accordance to ESP-2.604 approved by Purchaser	One (1) day before plant startup
14	**SAT** Successfully Completed Site Acceptance Test	October 2025 (H9 / 9 days)
15	**TOP for review** Turn Over Package submittal to Purchaser	two months after installation
16	**TOP** Turn Over Package approved by Purchaser	three months after installation
17	**Project closeout**	three months after installation

For delivery of documentation see section 11, where the due dates are listed and explained.

The Contractor shall submit the overall Preliminary project schedule, within the Bid including equipment delivery and documentation submittal schedule. The proposed schedule shall be in accordance with the above project schedule milestones, and as specified in the section 11 (documents submittal milestones) of this specification.

Rough AS system replacement schedule is prepared and attached as attachment 3. The contractor will be challenged to implement the project per attached schedule, however the final schedule will be proposed within the proposal and approved during the negotiations and before the sign of Contract.

35. STATUS REPORTING REQUIREMENTS

The Contractor (cannot delegate this responsibility to the subcontractor) is required to provide periodic (at least monthly) written status reports for the ongoing work, project progress, and schedule updates to NEK. The reports should be concise while conveying necessary information to the NEK Responsible Engineer, and they are expected to include the following:

a. Overall status of the work, covering technical and management problem areas, recovery plans to ensure milestone schedule dates are achieved, and any corrective actions taken to implement the recovery plans.
b. Status of scheduled activities, categorized as started, not started, completed, or not completed since the last reporting period, with an explanation of deviations from the schedule.
c. Status of scheduled activities expected to start, not expected to start, expected to be completed, or not expected to be completed during the next four (4) week period, with reasons for schedule deviations.
d. Preparation and maintenance of a list of project drawings and documents, indicating their update status during the most recent period.
e. Risk management overview, including the identification of initial project risks and measures to deal with them. Ongoing monitoring of the risk portfolio to track the status of initially identified risks and identify new ones, with a description of how project risks will be managed as outlined in the PMM.
f. Progress updates for all activities, presented in terms of percent (%) progress to date or remaining days needed to complete the effort.

The Contractor is also responsible for preparing and maintaining a list of all deviations, non-conformances, or field design changes, submitting NEK Responsible Engineer original documents at the end of the activity.

36. WORK OR INFORMATION TO BE PROVIDED BY NEK

The potential Contractor shall specify the required documents/information to be provided by NEK. The utilization of this information by the Contractor will be subject to specific instructions provided by NEK.

The Purchaser will provide:

a. All interface information related to any plant activities connected with this project.
b. Access for onsite inspection to all areas where new systems, major equipment, and accessories will be located.

c. All available as-built documentation.
d. Site Safety and Access Training (General Employee Training).
e. Electrical power connections (220/400 V, 3 phase, 50 Hz).
f. Provide 1 container (office with 3 working desks) for the Contractors team on the container area (outside the technological area),
g. Integration of AS system modernization project schedule into the plant outage 25 schedule.

Whenever Purchaser approval is required by this Specification for submittals, procedures, methodologies, approaches, or options, such approval shall be provided in writing. If provided orally, it shall be confirmed in writing.

The Purchaser will:

a. Designate a Project Manager who will serve as the principal interface with the Contractor on the individual modification.
b. Perform preliminary and final design documentation review and approval within four (4) weeks after submittal.
c. Revise all procedures based on the inputs provided by the Contractor. These inputs will include the markup of affected procedures.

37. CHANGES OF THE WORK SCOPE

The scope of work and services is fixed and firm.

38. RECORDS

The Contractor shall deliver to the ING all reproducible drawings and other documents, such as changes to the Plant procedures, equipment technical specifications, USAR updates, and reviewer-checked drawings and documents.

All documents must bear a unique identification number with revision and should be sorted into groups and subgroups. Details regarding this process must be explained in the PMM.

A records system must be established and maintained by the Contractor to provide documentary evidence of the quality of items and activities affecting quality. The Quality Assurance (QA) records shall include the results of reviews, inspections, tests, audits, and monitoring of work performance. Records shall, at a minimum, identify the inspector or data recorder, the date of inspection, type of observation, procedures used, results, acceptability, and action taken with any deficiencies noted.

Additional records or supporting data shall also be maintained. All quality verification records, procedures, and qualifications shall identify the item or activity involved. These records shall be retrievable and available for examination. One copy of all documents (including computer software - validation reports and any referenced documents) required by this Specification, applicable regulations, codes, and standards, or generated as a result of the Contractor's QA program shall be transferred to the purchaser.

Persons responsible for generating, completing, or reviewing records shall ensure that the following requirements are met:

a. Ensure that records are technically correct in accordance with applicable procedures.
b. Ensure that records are complete, including all attachments. The records shall be reviewed to ensure all required data, i.e., signatures, dates, etc., have been completed or marked "Not Applicable" (N/A) as required.
c. Ensure that corrections to data have been made properly. Corrections to the data shall include the date and the identification of the person authorized to make the correction. Examples of corrections are line through, write-overs, white-out, correction tape, and any other correction method. This is required anytime when record data (numbers or the meaning, intent, or integrity of a record) are affected by a correction. This is not required for other information not considered as data.
d. Ensure that records are legible - can be clearly read and suitable for microfilming.
   The original of all records should be transmitted to the Purchaser as the record. If a record is not legible, one of the following methods shall be applied:

The illegible area of the record shall be enhanced by tracing or writing the information clearly on the record or by submitting additional information for clarification of the illegible area. The Contractor person authorized to perform this function shall initial and date the area enhanced or clarified.

If the record cannot be enhanced, the records shall be marked "Best Copy Available," and the marked record shall be initialed and dated by the responsible organization's supervisor or designee.

After the installation and testing of the "New AS system," all documents developed in the installation phase become records and shall be provided by the Contractor to NEK. The Contractor shall provide all procedures, drawings, checklists, test results, measurements, etc.

39. ORGANIZATIONAL CONTACT

The Contractor shall assign its PM for coordinating all project matters with the assigned NEK PM/RE. All commercial items are to be addressed with the NEK Purchasing Department and NEK project PM/RE. NEK contact persons according to the area of responsibilities are as follows:

Project Manager:	name: **Franjo Boh** phone: +386 7 48 02 753 e-mail: franjo.boh@guest.nek.si
Deputy Project Manager:	name: **Gordan Janković** phone: +386 7 48 02 523 e-mail: gordan.jankovic@nek.si
Purchasing Administrator:	name: **Nataša Lisec** phone: +386 7 48 02 619 e-mail: natasa.lisec@nek.si
QA Responsible Engineer:	name: **Miroslav Vuletić** phone: +386 7 48 02 121 e-mail: miroslav.vuletic@nek.si
ING.MOD Superintendent:	name: **Peter Jan** phone: +386 7 48 02 207 e-mail: peter.jan@nek.si

40. CONTRACTOR'S TECHNICAL APPROACH TO THE WORK

As part of the proposal documentation, the Contractor shall prepare a brief "Technical Approach Plan" outlining how the work will be performed, the location of the work, and indicating the Contractor's understanding of the scope of work to fulfill all the requirements of this specification. This "Technical Approach Plan" should be synchronized with the Contractor's "Project Management Manual." Specific topics should not be repeated in both documents, but the documents should refer to each other.

Within the proposal, the project schedule shall be prepared based on the NEK Project Schedule as presented in Chapter 34 and Appendix 3. In any case, deviations from the NEK requirements (in duration and due dates) shall be explained. The alternative implementation schedule can be accepted by the NEK but will be discussed and mutually agreed upon. In any case, the NEK reserves the right to approve deviations from the requested plan upon explanation of the reasons.

The Contractor’s responsibilities (Scope of Services and Delivery) are specified in this specification. Additionally, this Specification provides the requirements that the Contractor must comply with.

The Contractor shall be responsible for the following resources:

- All labor required to physically perform the work. This labor force shall possess the skills necessary to perform the work on the Project.
- Field Engineering. Contractor's field personnel shall be capable, qualified, and able to perform the tasks required for the satisfactory resolution of field problems and preparation of FDCRs.

41. ACCESS TO THE CONTRACTOR'S FACILITIES AND DOCUMENTS

The Contractor shall provide full access to the Contractor's and authorized subcontractor's facilities to the NEK's Representatives who are engaged in the work for the purpose of reviewing the quality and the amount of the work being performed. Purchaser and Contractor will define access in a PQP document.

42. SUBCONTRACTED WORK

All subcontractors must be listed in the Quotation. If the selected Contractor wishes to change or select a new sub-supplier after Contract signature, this change is subject to NEK approval.
Contracted personnel working under the Contractor's direct responsibility are not considered subcontractors in this context.

The Contractor shall impose the requirements of this Specification on its subcontractors.
The Contractor must ensure that all subcontractors meet the requirements outlined in this Specification. The Specification's requirements for procedure submittals shall apply to subcontractors for services not performed by the Contractor.
The Contractor should review subcontractors' procedures to ensure compliance with the Specification requirements, submit these procedures, and obtain the Purchaser's written acceptance before the subcontractor commences work. The Contractor's procedures may be used at the subcontractor's facilities if necessary.

As the Contractor retains full responsibility for all aspects of subcontractors' performance, including quality and schedule, the Contractor must ensure adequate and periodic audits and surveillance of the sub-supplier/subcontractor are maintained. NEK's right of access to the Contractor's subcontractor facilities for inspection or audit purposes shall be outlined in the Contractor's documents.

The Contractor must engage qualified companies with a proven track record of developing Design Modification Packages in accordance with NEK procedures. Such qualified companies (subcontractors) shall provide support in the engineering and installation phases with a response time of less than eight (8) hours to ensure timely preparation and processing of potential FDCRs (Field Design Change Requests) per NEK ESP-2.609 procedure.

All subcontractors need to be qualified by the Contractor and approved by NEK. They should also have experience/references in the same or similar work performed on nuclear power plants.
The Contractor or its subcontractor shall not subcontract any portion of the Work without the written approval of the Purchaser.

43. QUALITY ASSURANCE PROGRAM REQUIREMENTS

43.1 General

General Requirements:

a. The Contractor must be qualified for the Scope of the Contract.
b. NEK QA requirements are specified in Quality Specification QS-610 rev.2 - Generic Quality Assurance Program Requirements, which is attached to the Request for Bid/Quotation.
c. NEK QA software requirements are specified in Quality Specification QS-600 rev.1 - Generic Software Quality Assurance Program Requirements, which is attached to the Request for Bid/Quotation.
d. The Contractor's QA Program review and acceptance by the Purchaser shall be a prerequisite for selection of a Contractor as the Contractor. The Contractor shall implement and maintain this program while carrying out the requirements of this Specification. All proposed changes to the program shall be submitted and approved by the Purchaser prior to the implementation.
e. One (1) controlled copy of the Contractor's Level I QA Program Manual shall be submitted to NEK with the Quotation unless already submitted to NEK. Contractor shall notify Purchaser of any Level I QA Program changes issued during the Contract execution.
f. The Contractor has the responsibility for QA activities for all work pursuant to this Specification. All technical and quality requirements shall be met QA requirements specified in this Specification apply to the Contractor's subcontractors. All work performed by subcontractor(s) shall be subject to the technical and quality requirements of this Specification as well. The Contractor shall be responsible for all subcontracted activities.

43.2 Project management manual (PMM)

The Contractor shall fill in and submit PMM provided in this specification as Appendix 9 or shall prepare PMM in accordance with their AQ Manual for NEK review and final approval. The purpose of PMM is to confirm that the Contractor's project organization (including subcontractors), work practices, procedures etc. will be effectively organized and controlled to fulfill the following, but not be limited to:

a. NEK configuration, design, documentation and QA program requirements.
b. NEK field installation and testing requirements.
c. NEK project management contractual requirements specified in this specification regarding organization, schedule compliance and progress reporting.

43.3 Project quality plan (PQP)

The Contractor is required to prepare and submit the PQP to NEK for review and approval, as specified in section 11.4 of this specification. The PQP should provide a comprehensive overview of the Contractor's QA/QC approach, covering aspects such as the processing of non-conformances, reporting of deficiencies, corrective actions implementation, and quality records management.

The AS system engineering, hardware, purchasing, software development, validation, and testing efforts for the project must be planned and executed with the goal of integrating quality into the products. This plan serves as documentation for QA and QC activities, ensuring that work is well-

defined, monitored, and controlled throughout the project execution. The objective is to enhance the quality of the products and services within the scope of supply through documented methodologies, controls, timely feedback, and corrective actions.

Part of the PQP, or as a standalone document, should be dedicated to potential risk management. The project should commence with the identification of major risks (related to time adherence, equipment deliverance dates, etc.) and the description of mitigation actions. The Project Risk Management shall be updated based on the project progress and can be organized as a project Planning, Monitoring, and Controlling system used for the bi-monthly 2MPPR (2-monthly Project Progress Report).

The PQP must include a test and inspection plan, i.e., QC plan, for the design, assembling, programming, and installation phases for both the Contractor and each subcontractor of major parts of the project. The QC plan should outline a logical sequence of activities, including R (record), W (witness), and H (hold) points, separately for the Contractor and NEK.

The PQP should also encompass a plan for verification and validation activities (test and inspection plan) for the software development lifecycle, incorporating all applicable standards, procedures, and instructions. The Software QA Plan can be accepted as part of the general PQP but should recognize the core functionalities and know-how built into the existing AS system. The PMM and PQP should provide details about different technologies, subcontractors, and platforms involved in the modification. All project phases must be covered.

The detailed schedule plans of the Contractor or its subcontractors' phases should incorporate a schedule plan with test and inspection dates.

QC plan shall include the following activities:

a) Tests and inspections at Contractor's or its subcontractors' facilities:
   - tests of equipment
   - tests and inspections during design and assembling
   - FAT
   - inspections prior to the shipment
b) Tests and inspections on the NEK site:
   - tests and inspections prior to assembly and installation of the equipment
   - tests and inspections during assembling activities
   - SAT
   - test and inspections during commissioning

NEK will identify record (R), witness (W), and hold (H) points for each item in the QC plan before PQP approval. The PQP must be approved before proceeding with any affected activity. NEK should be notified in writing at least fifteen (15) working days before any witness (W) or hold (H) point execution. If there is a witness (W) or hold (H) point in the QC plan, and the acceptance criteria or test procedure is established according to the Contractor’s codes or standards, then codes, standards, and test procedures must be shown to the NEK inspector at least three (3) days before the test or inspection execution. All provided documents must be in English, Slovenian, or Croatian. All applicable Contractor’s codes and standards must be included in the Bid as specified in section 7 of this specification.

43.4 Certificates of compliance

The Contractor shall submit a CoC to certify that provided equipment and services meet the requirements of this specification and the contract. Any deviation from the specification or repair of the equipment, which has been accepted by NEK in writing, shall not relieve the Contractor from its responsibility for satisfactorily performance according to this specification and all applicable standards for the scope of work to be provided under this contract.

43.5 Quality records

A quality records system shall be established and maintained by the Contractor to provide documentary evidence of the quality of items and activities affecting quality according to the PQP. Quality assurance records shall include results of reviews, inspections, test reports (FAT and SAT), installations Final reports etc.

Quality records shall be identifiable to the item or activity involved. Quality records shall be submitted to NEK as they originate or on request but shall be definitely included into the TOP.
Final QRP document will be submitted to NEK as per section 11 of this specification.

43.6 Non-conformance reports

Any deviation or design change during procurement, manufacturing, testing and commissioning of equipment per this specification which is not fully in accordance with the technical or QA requirements of the contract, and which the Contractor desires to accept shall be documented as a non-conformance. Any such deviation if sensitive to NEK shall be made in writing for NEK approval prior to the disposition by means of issuing customer sensitive NCR.
Non-conformance with specification requirements or applicable codes and standards invoked by this specification will not be accepted until approved by NEK.
Non-conformances, which cannot be brought within specification requirements by rework or replacement, or non-conformance that impact product fit, function or existing NEK equipment interface, shall be considered as significant to NEK (i.e. customer sensitive) and therefore must be reported to NEK for approval.
When such a condition appears, Contractor shall issue an NCR using the Contractor's standard non-conformance process for documenting the non-conformance and proposing its disposition. Any mutually agreed document form can be used for NEK notification as far as the basic elements of the non-conformance process are applied (e.g. PDR form as per PMM).
The NCR shall provide the method by which the Contractor shall obtain a documented response and approval from NEK when customer sensitive non-conformance is identified. The use of NCR will pertain to the work at the Contractor’s and its subcontractors' shops.
Once the non-conformed item is identified as the customer sensitive NCR, that NCR shall remain assigned to that item permanently and NEK shall be advised of the originating NCR.

When the customer sensitive NCR is issued, the Contractor shall do the following:

- Segregate the non-conformance item to prevent any further processing which may result in a change of the non-conformance as identified.
- Make the NCR available to the responsible NEK inspector (if present) for review to ensure the non-conformance is completely identified and accurately stated.
- Submit the NCR with recommended disposition to the NEK in an expeditious manner. The Contractor shall provide technical justification for the recommended dispositions.

The requirements of the specification are binding; no deviations are acceptable without the prior written consent by NEK. NEK shall either approve or reject the recommended disposition within the required time defined in PMM (e.g. according to the PDR classification). If there is no response from NEK within a specified time, the recommended disposition shall be considered as accepted by NEK and the non-conformance item processing shall continue.
NEK RE shall have the right to request from the Contractor a repair or replacement of any defective equipment which does not comply with this specification. Repair or replacement of such equipment shall be at the sole discretion of the Contractor.

43.7 Notification Points

NEK shall have the right to establish notification points for which the Contractor shall give prior notification to the NEK. In addition, NEK may establish temporary notification points if necessary to ensure the resolution of temporary quality problems. Notification for
Witness or Hold Points require the receipt of notification at least ten (10) working days in advance of the scheduled time of performance. Alternatively, if there is a resident NEK Representative, the schedules may be submitted in advance to the NEK Representative identifying the activities which have been designated as notification points in the Inspection Plan. The Purchaser may require that the activities performed without proper notification be repeated for NEK Representative observation at the Contractor's expense.
When the Contractor or NEK Responsible Inspector has any concerned about some nonconforming condition found by the test and inspection specified herein, the Inspector shall have the right to call for inappropriate supplementary non-destructive test. Acceptance criteria for any supplementary testing will be defined and agreed prior to performing the tests and inspections. Non-acceptable results will be dispositioned and corrected, and the subject test repeated in accordance with the Contractor quality program requirements.

Mandatory hold points are considered to be those tests, inspections, or operations which require witnessing by the NEK Representative and beyond which operations shall not proceeded without written consent provided by NEK.

The Contractor's failure to stop at a Hold Point will be a cause for rejection of those activities for which notification was not provided or which were not held.

44. NEK PROPRIETARY DATA

Information, including but not limited to, all originals of engineering and related data, plans, maps, drawings, computer programs, and specifications provided in any form by NEK and related to the scope of work and supply under the contract, shall remain the property of NEK.

The Contractor agrees not to use or release such information to any third party, except for the purposes of fulfilling the Contractor's obligations under this contract, with prior written consent from NEK. In cases where such information is disclosed to the Contractor's subcontractors, the Contractor shall ensure that its subcontractors execute necessary undertakings to comply with this provision. The Contractor shall provide NEK with a receipt for property furnished by NEK and shall be responsible for the safekeeping and return of such property to NEK upon request, contract termination, or termination of the relevant services.

NEK has a proprietary interest in all drawings, specifications, documents, information, or know-how furnished during the execution of this contract, as well as in any improvements, discoveries, or inventions made, developed, or conceived during the work under this contract. All such information is considered proprietary to NEK. The right to use such information is granted to the Contractor solely for its personnel use, entirely restricted to the performance of the contract, and subject to confidentiality provisions.

45. APPENDIXES

Appendix 1 **Existing AS system essential drawings**

Appendix 2 **List of existing AS system documentation (upon request)**

Appendix 3 **Project Schedule**

Appendix 4 **PMM (sample)**

Appendix 5 **QS-610 Generic Quality Assurance Program Requirements**

Appendix 6 **QS-600 Generic Software Quality Assurance Program Requirements**

Appendix 7 **Applicable Seismic Response Spectra**

Appendix 1

Existing AS system essential drawings

CB103RCKK802

GPS RECEIVER YX/9001GR

SER EVENT/STATUS DATA

NOTE 6 RPA

CH1A: PDT, IPS1A, ACM/A, MCM/A, SPARE, FDM/A, S6A S5A S4A S3A S2A S1A

NOTE 6 RPB

CH1B: PDT, IPS1B, ACM/B, MCM/B, SPARE, FDM/B, S6B S5B S4B S3B S2B S1B

MCR-SF

CH3210WS

CH905RCK-FOPP1 (see 816-212 Sh.16)

AS432EDU001-FOC

1EIW1184X 1-2-FO

ESE DESK

FOC11 ATS SER EVENT/STATUS DATA

(UMUX-A) ALF-A

(UMUX-B) ALF-B

K802-FOPP2 (see 816-236 Sh.3)

K802-FOPP3 (see 816-236 Sh.4)

K802-FOPP1 (see 816-212 Sh.15)

TO PIS Lvl.2 (FEP/MUX No.1) P2500 Room see: 816-212 sh.2 — 1CHW8983X

TO PIS Lvl.2 (FEP/MUX No.2) DEH Room see: 816-212 sh.4 — 1CHW8984X

FOC9A, FOC9B, FOC10A (NOTE 2), FOC10B (NOTE 3)

1EIW1185X 1-2-FO

1EIW1182X 1-8-FO

CONFIGURATION WORKSTATION

AS432RCW001

FONC

CH984CAB-FOPP4 (see 816-212 Sh.42) Note 7, Note 8

CB984CAB

COMPUTER ROOM

MC

ETHERNET TERMINAL SERVER LANTRONIX

PRH

SM SyncMaster

BPCB BROADCAST PCB

FOC1 FOC2 FOC3 FOC4 FOC5 FOC6 FOC7 FOC8

1EIW1166X(2FO)

1EIW1167X(4FO)

A05-FOPP1 (see 816-236 Sh.6)

(MCB)

RL1 RL2 RL3 RL4

ASELAL01A05

1EIW1168X(2FO)

1EIW1169X(4FO)

A06-FOPP1 (see 816-236 Sh.7)

(MCB)

RL5 RL6 RL7 RL8

ASELAL01A06

1EIW1170X(6FO)

1EIW1171X(6FO)

(ECB+EYCB)

A07-FOPP1 (see 816-236 Sh.8)

CH51A: S24A S25A S26A S27A S28A S29A S30A SPARE SPARE SPARE IPS1A/IPS2A

CH51B: S24B S25B S26B S27B S28B S29B S30B SPARE SPARE SPARE IPS1B/IPS2B

RL9

ASELAL01A07

1EIW1172X(2FO)

1EIW1173X(4FO)

1EIW1176X(2FO)

1EIW1177X(4FO)

K201-FOPP1 (see 816-236 Sh.9)

(VCB)

PC100CME001 PC100CME002

CB102BRDK201

1EIW1174X(2FO)

1EIW1175X(4FO)

K401-FOPP1 (see 816-236 Sh.10)

(VCB)

PC100CME003 PC100CME04

CB102BRDK401

1EIW1178X(2FO)

1EIW1179X(4FO)

1EIW1180X(6FO)

1EIW1181X(6FO)

1EIW1195X(2FO)

1EIW1196X(4FO)

A04-FOPP1 (see 816-236 Sh.5)

(MCB)

CH51A: S8A S9A S10A S11A S12A S13A S14A S15A SPARE SPARE SPARE IPS2A IPS1A

CH52A: S16A S17A S18A S19A S20A SPARE SPARE SPARE SPARE SPARE IPS2A IPS1A

CH51B: S8B S9B S10B S11B S12B S13B S14B S15B SPARE SPARE SPARE IPS2B IPS1B

CH52B: S16B S17B S18B S19B S20B SPARE SPARE SPARE SPARE SPARE IPS2B IPS1B

ALB22

ASELAL01A04

FP101CAB-FOPP1 (see 816-216 Sh.03)

RL10

FP101CAB

1EIW1091X(4FO)

1EIW1092X(4FO)

FOPP1

ALB-E02

(SYCB)

ALB-E03

CB102BRDK701

K801-FOPP1 (see 816-236 Sh.11)

(VCB)

PC100CME005 PC100CME006

CB102BRDK801

NOTES:

1. DEVICES
   - MCM/A – MAIN CONTROLLER A
   - MCM/B – MAIN CONTROLLER B
   - ACM/A – AUXILIARY CONTROLLER A
   - ACM/B – AUXILIARY CONTROLLER B
   - ALF/B – ALARM FILTER B
   - ATS – EDU AUTO TRANSFER SWITCH
   - PRH – ETHERNET TERMINAL SERVER
   - AS432EDU001– ELECTRONIC DISPLAY UNIT
   - AS432RCW001– REMOTE CONFIGURATION WORKSTATION
   - YX/9001 – GPS RECEIVER
   - S1A, S2A... – SCANNERS A
   - S1B, S2B... – SCANNERS B
   - RL1, RL2... – REMOTE LOGIC UNITS
   - RPA, RPB – RELAY OUTPUT PANEL (8 PROGRAMMED RELAYS)
   - FOC1, FOC2... – FO/RS232 CONVERTERS
   - MC1 – MEDIA CONVERTER 100Mb
2. FIBER OPTIC CONVERTER (FOC10A) MOUNTED DIRECTLY ON MCM/A
3. FIBER OPTIC CONVERTER (FOC10B) MOUNTED DIRECTLY ON MCM/B
4. LEGEND

DEVICE	ASSOCIATE ALB'S
RL1	ALB01, ALB02, ALB03
RL2	ALB04, ALB05
RL3	ALB06, ALB07
RL4	ALB08, ALB09, ALB11
RL5	ALB10
RL6	ALB12, ALB13
RL7	ALB14, ALB15, ALB16
RL8	ALB17, ALB18, ALB19
RL9	ECB-A, ECB-B, ECB-X, ALBE01
RL10	FIRE PROTECTION

5. REFERENCES
   - LOGIC CARDS OUTPUTS (DATA A TO ALB'S) ARE SHOWN ON DWG SERIES 816-336 (SH.201-244)
   - LOGIC CARDS OUTPUTS (DATA B TO ALB'S) ARE SHOWN ON DWG SERIES 816-336 (SH.301-344)
6. SER STATUS ALARM CONTACTS (TO ALB22) SEE 816-336, Sh.100 FOR RPA/RPB OUTPUT & ALARMS
7. SPARE RCW NETWORK CARD CONNECTION
8. INTERNAL FIBER OPTIC INTERCONNECTIONS ARE SHOWN ON DWG. 816-236 sh.2

LEGEND
- ○ – ST CONNECTOR
- □ – SMA CONNECTOR
- ▣ – RJ-45 CONNECTOR
- ⬭ – DB25 CONNECTOR
- ⬡ – FONC (Fiber Optic Net Cord)
- ·-·-· DATA LINK
- – – – SYNC, CONFIG LINK

Nuklearna Elektrarna Krško MASTER DOCUMENT
Date Received: 16-01-2023
Log Number: 229822

Original Design Firm: SIPRO–Inzeniring d.o.o.
Replaced Manual Drawing: N/A
Last Revision And Date: N/A

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	CKD. BY	LE APPR.
4	22.5.2012	SIPRO	REV'D PER MOD 689-FP-L	D.I.	D.V.
3	15.06.09	SIPRO	REV'D PER MOD 629-AS-L,FDCR03	M.S.	
7	16.12.22	V.P.	REV'D PER MOD 1230-SE-L	M.S.	D.V.
6	11.2018	V.S.	REV'D PER MOD 1007-R-L	M.M.	D.V.
5	11.2015	IBE	REV PER MOD 796-SY-L	D.S.	D.V.

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO

PROCESS COMPUTER SYSTEM – PCS

PCS DATA LINKS DIAGRAM: ANNUN SYSTEM

SCANNERS, RLU DATA & CONFIG I/O COMM LINES

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO — KRSKO, SLOVENIA

MADE	CHECKED	LE APPROVAL
SIPRO	2. M. MOSKON	3. D. VEHOVAR

REFERENCE DRAWINGS:

SCALE

816-236 | AS | 1 | 7
DRAWING NUMBER | SYSTEM | SH.NO. | REV

SPREJEL:

FILE: 81623601.DWG

DWG. NO.	SH. NO.	TITLE
816-336	00	INDEX
816-336	0A	BLOCK DIAGRAM OF AS SYS OVERALL I/O STRUCTURE & REFERENCES
816-336	0B	TABLES OF AS SYS INPUT STRUCTURE & REFERENCES
816-336	0C	TABLES OF AS SYS OUTPUT STRUCTURE & REFERENCES
816-336	01	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S1A(J2)
816-336	02	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S1A(J3)
816-336	03	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S2A(J2)
816-336	04	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S2A(J3)
816-336	05	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S3A(J2)
816-336	06	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S3A(J3)
816-336	07	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S4A(J2)
816-336	08	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S4A(J3)
816-336	09	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S5A(J2)
816-336	10	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S5A(J3)
816-336	11	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S6A(J2)
816-336	12	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S6A(J3)
816-336	13	RESERVED FOR SCANNER CB103RCKK802-S7A(J2)
816-336	14	RESERVED FOR SCANNER CB103RCKK802-S7A(J3)
816-336	15	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S8A(J2)
816-336	16	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S8A(J3)
816-336	17	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S9A(J2)
816-336	18	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S9A(J3)
816-336	19	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S10A(J2)
816-336	20	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S10A(J3)
816-336	21	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S11A(J2)
816-336	22	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S11A(J3)
816-336	23	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S12A(J2)
816-336	24	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S12A(J3)
816-336	25	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S13A(J2)
816-336	26	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S13A(J3)
816-336	27	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S14A(J2)
816-336	28	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S14A(J3)
816-336	29	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S15A(J2)
816-336	30	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S15A(J3)
816-336	31	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S16A(J2)
816-336	32	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S16A(J3)
816-336	33	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S17A(J2)
816-336	34	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S17A(J3)
816-336	35	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S18A(J2)
816-336	36	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S18A(J3)
816-336	37	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S19A(J2)
816-336	38	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S19A(J3)
816-336	39	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S20A(J2)
816-336	40	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S20A(J3)
816-336	41	RESERVED FOR SCANNER ASELA01A04-S21A(J2)
816-336	42	RESERVED FOR SCANNER ASELA01A04-S21A(J3)
816-336	43	RESERVED FOR SCANNER ASELA01A04-S22A(J2)
816-336	44	RESERVED FOR SCANNER ASELA01A04-S22A(J3)
816-336	45	RESERVED FOR SCANNER ASELA01A04-S23A(J2)
816-336	46	RESERVED FOR SCANNER ASELA01A04-S23A(J3)
816-336	47	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S24A(J2)
816-336	48	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S24A(J3)
816-336	49	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S25A(J2)
816-336	50	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S25A(J3)
816-336	51	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S26A(J2)
816-336	52	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S26A(J3)
816-336	53	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S27A(J2)
816-336	54	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S27A(J3)
816-336	55	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S28A(J2)
816-336	56	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S28A(J3)
816-336	57	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S29A(J2)
816-336	58	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S29A(J3)
816-336	59	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S30A(J2)
816-336	60	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S30A(J3)
816-336	SH. 61	TO SH. 97 ARE UNUSED
816-336	98	RESERVED FOR AS INPUT RELAY PANELS: RP1
816-336	99	AS INPUT RELAY PANELS: RP2 (24Vdc)
816-336	100	CB103RCKK802 RELAY TERMINAL WIRING DIAGRAM

DRAWING NO.	SH. NO.	TITLE
816-336	101	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S1B(J2)
816-336	102	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S1B(J3)
816-336	103	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S2B(J2)
816-336	104	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S2B(J3)
816-336	105	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S3B(J2)
816-336	106	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S3B(J3)
816-336	107	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S4B(J2)
816-336	108	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S4B(J3)
816-336	109	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S5B(J2)
816-336	110	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S5B(J3)
816-336	111	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S6B(J2)
816-336	112	AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S6B(J3)
816-336	113	RESERVED FOR SCANNER CB103RCKK802-S7B(J2)
816-336	114	RESERVED FOR SCANNER CB103RCKK802-S7B(J3)
816-336	115	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S8B(J2)
816-336	116	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S8B(J3)
816-336	117	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S9B(J2)
816-336	118	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S9B(J3)
816-336	119	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S10B(J2)
816-336	120	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S10B(J3)
816-336	121	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S11B(J2)
816-336	122	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S11B(J3)
816-336	123	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S12B(J2)
816-336	124	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S12B(J3)
816-336	125	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S13B(J2)
816-336	126	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S13B(J3)
816-336	127	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S14B(J2)
816-336	128	AS SYSTEM, DIGITAL SCANNER INPUTs ASELAL01A04-S14B(J3)
816-336	129	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S15B(J2)
816-336	130	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S15B(J3)
816-336	131	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S16B(J2)
816-336	132	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S16B(J3)
816-336	133	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S17B(J2)
816-336	134	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S17B(J3)
816-336	135	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S18B(J2)
816-336	136	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S18B(J3)
816-336	137	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S19B(J2)
816-336	138	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S19B(J3)
816-336	139	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S20B(J2)
816-336	140	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S20B(J3)
816-336	141	RESERVED FOR SCANNER ASELA01A04-S21B(J2)
816-336	142	RESERVED FOR SCANNER ASELA01A04-S21B(J3)
816-336	143	RESERVED FOR SCANNER ASELA01A04-S22B(J2)
816-336	144	RESERVED FOR SCANNER ASELA01A04-S22B(J3)
816-336	145	RESERVED FOR SCANNER ASELA01A04-S23B(J2)
816-336	146	RESERVED FOR SCANNER ASELA01A04-S23B(J3)
816-336	147	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S24B(J2)
816-336	148	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S24B(J3)
816-336	149	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S25B(J2)
816-336	150	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S25B(J3)
816-336	151	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S26B(J2)
816-336	152	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S26B(J3)
816-336	153	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S27B(J2)
816-336	154	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S27B(J3)
816-336	155	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S28B(J2)
816-336	156	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S28B(J3)
816-336	157	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S29B(J2)
816-336	158	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S29B(J3)
816-336	159	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S30B(J2)
816-336	160	AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S30B(J3)
816-336	SH. 161	TO SH. 194 ARE UNUSED
816-336	195	AS SYSTEM, OVERVIEW OF COMBINED ALARMS
816-336	196	AS SYSTEM, OVERVIEW OF COMBINED ALARMS
816-336	197	AS SYSTEM, OVERVIEW OF COMBINED ALARMS
816-336	198	AS SYSTEM, OVERVIEW OF COMBINED ALARMS
816-336	199	AS SYSTEM, OVERVIEW OF COMBINED ALARMS
816-336	SH. 200	IS UNUSED

DWG. NO.	SH. NO.	TITLE
816-336	201	AS ASELAL01A05, RLU 1 LOGIC CARD 0A OUTPUTS
816-336	202	AS ASELAL01A05, RLU 1 LOGIC CARD 0A OUTPUTS
816-336	203	AS ASELAL01A05, RLU 1 LOGIC CARD 2A OUTPUTS
816-336	204	AS ASELAL01A05, RLU 1 LOGIC CARD 2A OUTPUTS
816-336	205	AS ASELAL01A05, RLU 2 LOGIC CARD 4A OUTPUTS
816-336	206	AS ASELAL01A05, RLU 2 LOGIC CARD 4A OUTPUTS
816-336	207	AS ASELAL01A05, RLU 2 LOGIC CARD 6A OUTPUTS
816-336	208	AS ASELAL01A05, RLU 2 LOGIC CARD 6A OUTPUTS
816-336	209	AS ASELAL01A05, RLU 3 LOGIC CARD 8A OUTPUTS
816-336	210	AS ASELAL01A05, RLU 3 LOGIC CARD 8A OUTPUTS
816-336	211	AS ASELAL01A05, RLU 3 LOGIC CARD 10A OUTPUTS
816-336	212	AS ASELAL01A05, RLU 3 LOGIC CARD 10A OUTPUTS
816-336	213	AS ASELAL01A05, RLU 4 LOGIC CARD 12A OUTPUTS
816-336	214	AS ASELAL01A05, RLU 4 LOGIC CARD 12A OUTPUTS
816-336	215	AS ASELAL01A05, RLU 4 LOGIC CARD 14A OUTPUTS
816-336	216	AS ASELAL01A05, RLU 4 LOGIC CARD 14A OUTPUTS
816-336	217	AS ASELAL01A06, RLU 5 LOGIC CARD 16A OUTPUTS
816-336	218	AS ASELAL01A06, RLU 5 LOGIC CARD 16A OUTPUTS
816-336	219	AS ASELAL01A06, RLU 5 LOGIC CARD 18A OUTPUTS
816-336	220	AS ASELAL01A06, RLU 5 LOGIC CARD 18A OUTPUTS
816-336	221	AS ASELAL01A06, RLU 6 LOGIC CARD 20A OUTPUTS
816-336	222	AS ASELAL01A06, RLU 6 LOGIC CARD 20A OUTPUTS
816-336	223	AS ASELAL01A06, RLU 6 LOGIC CARD 22A OUTPUTS
816-336	224	AS ASELAL01A06, RLU 6 LOGIC CARD 22A OUTPUTS
816-336	225	AS ASELAL01A05, RLU 7 LOGIC CARD 24A OUTPUTS
816-336	226	AS ASELAL01A06, RLU 7 LOGIC CARD 24A OUTPUTS
816-336	227	AS ASELAL01A06, RLU 7 LOGIC CARD 26A OUTPUTS
816-336	228	AS ASELAL01A06, RLU 7 LOGIC CARD 26A OUTPUTS
816-336	229	AS ASELAL01A06, RLU 8 LOGIC CARD 28A OUTPUTS
816-336	230	AS ASELAL01A06, RLU 8 LOGIC CARD 28A OUTPUTS
816-336	231	AS ASELAL01A06, RLU 8 LOGIC CARD 30A OUTPUTS
816-336	232	AS ASELAL01A06, RLU 8 LOGIC CARD 30A OUTPUTS
816-336	233	AS ASELAL01A07, RLU 9 LOGIC CARD 32A OUTPUTS
816-336	234	AS ASELAL01A07, RLU 9 LOGIC CARD 32A OUTPUTS
816-336	235	AS ASELAL01A07, RLU 9 LOGIC CARD 34A OUTPUTS
816-336	236	AS ASELAL01A07, RLU 9 LOGIC CARD 34A OUTPUTS
816-336	237	AS SYSTEM, PC100CME001 LOGIC CARD 36A OUTPUTS
816-336	238	AS SYSTEM, PC100CME002 LOGIC CARD 38A OUTPUTS
816-336	239	AS SYSTEM, PC100CME003 LOGIC CARD 40A OUTPUTS
816-336	240	AS SYSTEM, PC100CME004 LOGIC CARD 42A OUTPUTS
816-336	241	AS SYSTEM, PC100CME005 LOGIC CARD 44A OUTPUTS
816-336	242	AS SYSTEM, PC100CME006 LOGIC CARD 46A OUTPUTS
816-336	243	AS SYSTEM, ALB22 LOGIC CARD 52A OUTPUTS
816-336	244	AS SYSTEM, ALB22 LOGIC CARD 52A OUTPUTS
816-336	245	FP101CAB-RLU10 LOGIC CARD 48A OUTPUTS
816-336	246	FP101CAB-RLU10 LOGIC CARD 48A OUTPUTS
816-336	247	FP101CAB-RLU10 LOGIC CARD 50A OUTPUTS
816-336	248	FP101CAB-RLU10 LOGIC CARD 50A OUTPUTS
816-336	249	CB102BRDK701, ALB-E02 LOGIC CARD 54A OUTPUTS
816-336	250	CB102BRDK701, ALB-E02 LOGIC CARD 54A OUTPUTS
816-336	251	CB102BRDK701, ALB-E03 LOGIC CARD 56A OUTPUTS
816-336	252	CB102BRDK701, ALB-E03 LOGIC CARD 56A OUTPUTS
816-336	299	ALB WIRING DIAG.(JUMPERS) AND INT.CONNECTIONS
816-336	SH. 253	TO SH. 298 AND SH. 300 ARE UNUSED

DWG. NO.	SH. NO.	TITLE
816-336	301	AS ASELAL01A05, RLU 1 LOGIC CARD 1B OUTPUTS
816-336	302	AS ASELAL01A05, RLU 1 LOGIC CARD 1B OUTPUTS
816-336	303	AS ASELAL01A05, RLU 1 LOGIC CARD 3B OUTPUTS
816-336	304	AS ASELAL01A05, RLU 1 LOGIC CARD 3B OUTPUTS
816-336	305	AS ASELAL01A05, RLU 2 LOGIC CARD 5B OUTPUTS
816-336	306	AS ASELAL01A05, RLU 2 LOGIC CARD 5B OUTPUTS
816-336	307	AS ASELAL01A05, RLU 2 LOGIC CARD 7B OUTPUTS
816-336	308	AS ASELAL01A05, RLU 2 LOGIC CARD 7B OUTPUTS
816-336	309	AS ASELAL01A05, RLU 3 LOGIC CARD 9B OUTPUTS
816-336	310	AS ASELAL01A05, RLU 3 LOGIC CARD 9B OUTPUTS
816-336	311	AS ASELAL01A05, RLU 3 LOGIC CARD 11B OUTPUTS
816-336	312	AS ASELAL01A05, RLU 3 LOGIC CARD 11B OUTPUTS
816-336	313	AS ASELAL01A05, RLU 4 LOGIC CARD 13B OUTPUTS
816-336	314	AS ASELAL01A05 ,RLU 4 LOGIC CARD 13B OUTPUTS
816-336	315	AS ASELAL01A05, RLU 4 LOGIC CARD 15B OUTPUTS
816-336	316	AS ASELAL01A05, RLU 4 LOGIC CARD 15B OUTPUTS
816-336	317	AS ASELAL01A06, RLU 6 LOGIC CARD 17B OUTPUTS
816-336	318	AS ASELAL01A06, RLU 5 LOGIC CARD 17B OUTPUTS
816-336	319	AS ASELAL01A06, RLU 5 LOGIC CARD 19B OUTPUTS
816-336	320	AS ASELAL01A06, RLU 5 LOGIC CARD 19B OUTPUTS
816-336	321	AS ASELAL01A06, RLU 6 LOGIC CARD 21B OUTPUTS
816-336	322	AS ASELAL01A06, RLU 6 LOGIC CARD 21B OUTPUTS
816-336	323	AS ASELAL01A06, RLU 6 LOGIC CARD 23B OUTPUTS
816-336	324	AS ASELAL01A06, RLU 6 LOGIC CARD 23B OUTPUTS
816-336	325	AS ASELAL01A06, RLU 7 LOGIC CARD 25B OUTPUTS
816-336	326	AS ASELAL01A06, RLU 7 LOGIC CARD 25B OUTPUTS
816-336	327	AS ASELAL01A06, RLU 7 LOGIC CARD 27B OUTPUTS
816-336	328	AS ASELAL01A06, RLU 7 LOGIC CARD 27B OUTPUTS
816-336	329	AS ASELAL01A06, RLU 8 LOGIC CARD 29B OUTPUTS
816-336	330	AS ASELAL01A06, RLU 8 LOGIC CARD 29B OUTPUTS
816-336	331	AS ASELAL01A06, RLU 8 LOGIC CARD 31B OUTPUTS
816-336	332	AS ASELAL01A06, RLU 8 LOGIC CARD 31B OUTPUTS
816-336	333	AS ASELAL01A07, RLU 9 LOGIC CARD 33B OUTPUTS
816-336	334	AS ASELAL01A07, RLU 9 LOGIC CARD 33B OUTPUTS
816-336	335	AS ASELAL01A07, RLU 9 LOGIC CARD 35B OUTPUTS
816-336	336	AS ASELAL01A07, RLU 9 LOGIC CARD 35B OUTPUTS
816-336	337	AS SYSTEM, PC100CME001 LOGIC CARD 37B OUTPUTS
816-336	338	AS SYSTEM, PC100CME002 LOGIC CARD 39B OUTPUTS
816-336	339	AS SYSTEM, PC100CME003 LOGIC CARD 41B OUTPUTS
816-336	340	AS SYSTEM, PC100CME004 LOGIC CARD 43B OUTPUTS
816-336	341	AS SYSTEM, PC100CME005 LOGIC CARD 45B OUTPUTS
816-336	342	AS SYSTEM, PC100CME006 LOGIC CARD 47B OUTPUTS
816-336	343	AS SYSTEM, ALB22 LOGIC CARD 53B OUTPUTS
816-336	344	AS SYSTEM, ALB22 LOGIC CARD 53B OUTPUTS
816-336	345	FP101CAB-RLU10 LOGIC CARD 49B OUTPUTS
816-336	346	FP101CAB-RLU10 LOGIC CARD 49B OUTPUTS
816-336	347	FP101CAB-RLU10 LOGIC CARD 51B OUTPUTS
816-336	348	FP101CAB-RLU10 LOGIC CARD 51B OUTPUTS
816-336	349	CB102BRDK701, ALB-E02 LOGIC CARD 55B OUTPUTS
816-336	350	CB102BRDK701, ALB-E02 LOGIC CARD 55B OUTPUTS
816-336	351	CB102BRDK701, ALB-E03 LOGIC CARD 57B OUTPUTS
816-336	352	CB102BRDK701, ALB-E03 LOGIC CARD 57B OUTPUTS
816-336	SH. 353	TO SH. 398 ARE UNUSED
816-336	399	ALB WIRING DIAG.(JUMPERS) AND INT.CONNECTIONS

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 17-09-2018
Log Number: 240838

Original Design Firm: SIPRO INŽENIRING d.o.o.
Replaced Manual Drawing: N/A
Last Revision And Date: N/A

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	CKD. BY	LE APPR.
3	25.04.18	V.Š.	REV'D PER MOD. 1007-XI-L	M.M.	D.V.
2	12.2013	IBE	REV'D PER MOD 796-SY-L	D.S.	D.V.
1	22.5.2012	SIPRO	ISSUED PER MOD. 689-FP-L	D.I.	D.V.
0	10.4.09	SIPRO	ISSUED PER MOD. 629-AS-L	M.Š.	B.Š.

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO

PROCESS COMPUTER SYSTEM – PCS

PCS I/O LOOP WIRING DIAGRAMS, AS SYSTEM

INDEX

DESIGN ENGINEERING

NUCLEAR POWER PLANT KRSKO KRSKO, SLOVENIA

MADE	CHECKED	LE APPROVAL
1. SIPRO	2. M. ŠUŠNIĆ	3. B. ŠPAN

REFERENCE DRAWINGS:

SCALE

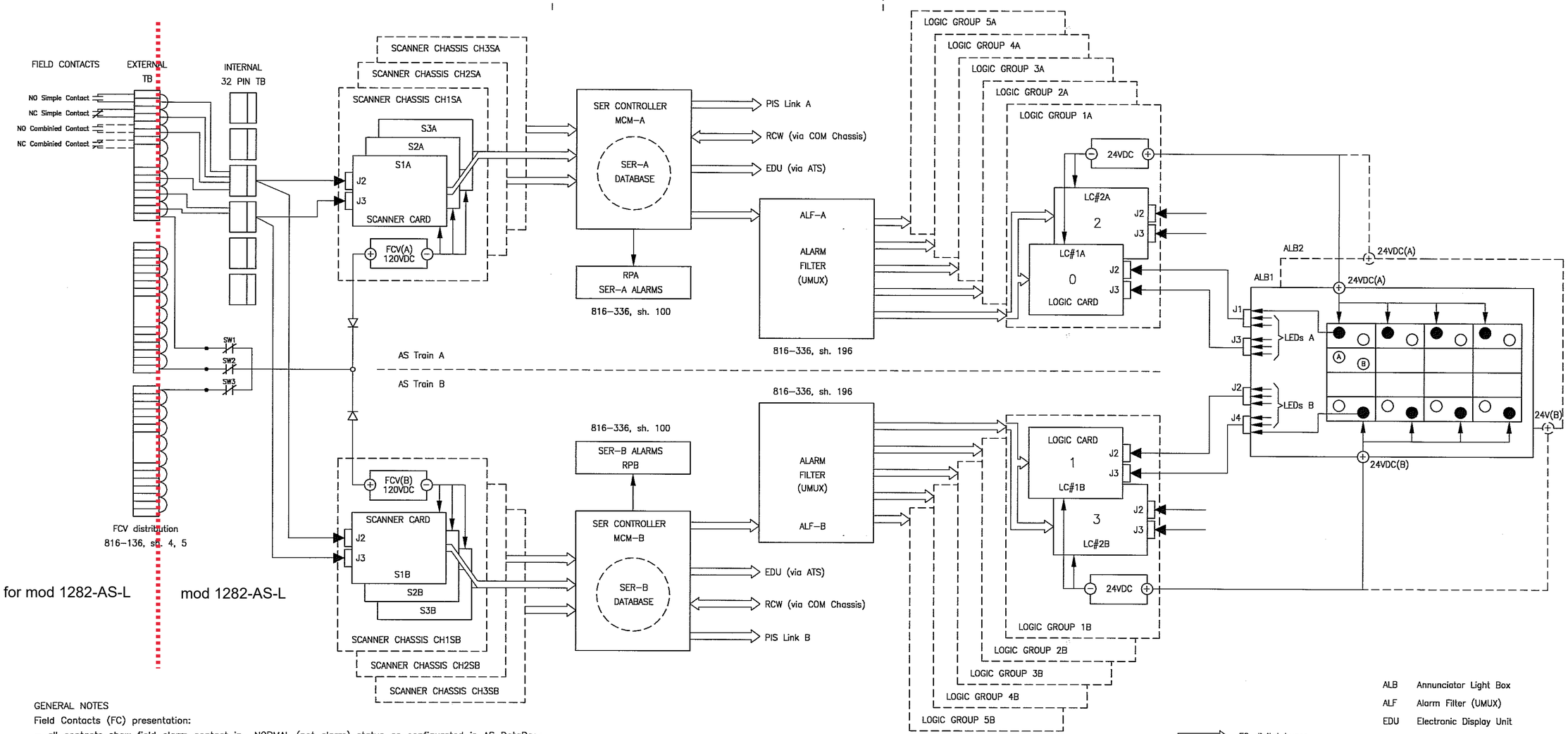
816-336 DRAWING NUMBER | 00 SYSTEM | 3 SH.NO. | REV

FILE: 81633600 DWG, SPREJEL:

Alarm contacts status scanning and processing
SER4100 scanners and FCV distribution
816–336, sh. 1–50(A)/ 816–336, sh. 101–150(B)

Advanced digital data processing
SER4100 processor & Alarm logic filtering

Alarms decoding and displaying
BL1500 logic, ALB's (ANN) and 24VDC distribution
816–336, sh. 201–245(A)/ 816–336, sh. 301–345(B)



OUT OF SCOPE for mod 1282-AS-L

mod 1282-AS-L

GENERAL NOTES

Field Contacts (FC) presentation:
- all contacts show field alarm contact in NORMAL (not alarm) status as configurated in AS DataBase
- simple contacts are shown as wired by continuous line
- combined contacts are show by dashed line (see referenced drawing for detail wiring)

Alarm Control Contacts (Test, Silence, Ack) Pseudo–Pushbutton presentation:
- specific Pseudo–Pushbuttons are identified by their ANN–Box Tag (common for a group) and description of pushbutton function bellow

Synthetic Alarms:
- wiring and SER status synthetic alarm functions are shown on sheet 100
- tabular overview of all synthetic alarms is shown on sheet 196
- logic/functional diagrams of these alarms are presented in 816–636 series

External alarm input cabling references:
- E–210–053 sh. EI39 (ASELAL01A01)
- E–210–053 sh. EI39/40 (ASELAL01A02)
- E–210–053 sh. EI40 (ASELAL01A03)
- E–210–053 sh. EI83 (ASELAL01A07)
- D–210–146 sh. VA08 (CB103RCKK804)

SHEET	CONTENTS DESCRIPTION
001–50	Alarm inputs to SER4100 A–scanners (wiring&connectors; scanner inputs and SER/PIS addresses)
101–150	Alarm inputs to SER4100 B–scanners (wiring&connectors; scanner inputs and SER/PIS addresses)
201–245	Alarm outputs (BL1500 subsystem) to A–ALB/ANN windows (wiring&connectors; Logic Cards, alarm windows & associated SER inputs)
301–345	Alarm outputs (BL1500 subsystem) to B–ALB/ANN windows (wiring&connectors; Logic Cards, alarm windows & associated SER inputs)
98	RP1 – AS system Multiple Input Relay Panel 120V (later)
99	RP2 – AS system Input Relay Panel 24V
100	SER4100 RPA & RPB Relay panel (SER Status Programable Relays and their reference to ALB22 abd ALB15)
195	NEK Reflash and Combined Alarm overview Tables
196	NEK Synthetised Alarms (via UMUX) overview Table
299/399	A/B–side tabular presentation of internal wiring interconnection of ALB patch modules (for combined ALBs)

FO digital buses
multicore cables
single conductors
SER4100/ BL1500 32 pin connectors

ALB	Annunciator Light Box
ALF	Alarm Filter (UMUX)
EDU	Electronic Display Unit
FCV	Field Contact Voltage
MCM	Main Controller Module
RCW	Remote Configuration Workstation
RPA/RPB	Scanner Relay Panels A/B
SER	Sequential Events Recorder
TB	Terminal Board

Log Number 240839
Date Received: 17 -12- 2009
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Nuklearna Elektrarna Krško

Original Design Firm: NEK
Replaced Manual Drawing: N/A
Last Revision And Date: N/A

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NO.	DATE	BY	REVISION	CKD. BY	LE APPR.
0	16.12.09	M.M.	ISSUED PER MOD 629–AS–L	M.S.	B.S.

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO

PROCESS COMPUTER SYSTEMS – PCS

AS SYSTEM

Block Diagram of AS Sys Overall I/O Structure & References

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO KRSKO, SLOVENIA

MADE	CHECKED	LE APPROVAL
1. M. MOŠKON	2. M. SUSNIC	3. B. STAN

REFERENCE – 816–236 (System Diagram)
DRAWINGS: – 816–136 (AC and FCV Distribution)

SCALE	816–336		0A	0
	DRAWING NUMBER	SYSTEM	SH. NO	REV

FILE: 8161360A DWG, SPREJEL: _____

OVERVIEW OF COMBINED ALARMS

alarm (SER) inputs				associated alarm window
status NORMAL	address	alarm input description (per AS database)	logic relation	alarm type ANN/window window label (per AS database)
1) REFLASH ALARMS (RF)				
CLOSE	1179	ALB09/A2: LOOP 1 TAVG/AUCT TAVG DEVIATION (1)	OR	RF1 ALB09/A2 LOOP 1 TAVG/AUCT TAVG DEVIATION
CLOSE	1180	ALB09/A2: LOOP 1 TAVG/AUCT TAVG DEVIATION (2)		
CLOSE	1181	ALB09/A2: LOOP 1 TAVG/AUCT TAVG DEVIATION (3)		
CLOSE	1182	ALB09/A2: LOOP 1 TAVG/AUCT TAVG DEVIATION (4)		
CLOSE	1183	ALB09/B2: LOOP 2 TAVG/AUCT TAVG DEVIATION (1)	OR	RF2 ALB09/B2 LOOP 2 TAVG/AUCT TAVG DEVIATION
CLOSE	1184	ALB09/B2: LOOP 2 TAVG/AUCT TAVG DEVIATION (2)		
CLOSE	1185	ALB09/B2: LOOP 2 TAVG/AUCT TAVG DEVIATION (3)		
CLOSE	1186	ALB09/B2: LOOP 2 TAVG/AUCT TAVG DEVIATION (4)		
CLOSE	1187	ALB09/C2: LOOP 1 DT/AUCT DT DEVIATION (1)	OR	RF3 ALB09/C2 LOOP 1 DT/AUCT DT DEVIATION
CLOSE	1188	ALB09/C2: LOOP 1 DT/AUCT DT DEVIATION (2)		
CLOSE	1189	ALB09/C2: LOOP 1 DT/AUCT DT DEVIATION (3)		
CLOSE	1190	ALB09/C2: LOOP 1 DT/AUCT DT DEVIATION (4)		
CLOSE	1191	ALB09/D2: LOOP 2 DT/AUCT DT DEVIATION (1)	OR	RF4 ALB09/D2 LOOP 2 DT/AUCT DT DEVIATION
CLOSE	1192	ALB09/D2: LOOP 2 DT/AUCT DT DEVIATION (2)		
CLOSE	1193	ALB09/D2: LOOP 2 DT/AUCT DT DEVIATION (3)		
CLOSE	1194	ALB09/D2: LOOP 2 DT/AUCT DT DEVIATION (4)		
CLOSE	1195	ALB11/A5: ROD BANK LO LIMIT (1)	OR	RF5 ALB11/A5 ROD BANK LO LIMIT
CLOSE	1196	ALB11/A5: ROD BANK LO LIMIT (2)		
CLOSE	1197	ALB11/A5: ROD BANK LO LIMIT (3)		
CLOSE	1198	ALB11/A5: ROD BANK LO LIMIT (4)		
CLOSE	1199	ALB11/B5: ROD BANK LO-LO LIMIT (1)	OR	RF6 ALB11/B5 ROD BANK LO-LO LIMIT
CLOSE	1200	ALB11/B5: ROD BANK LO-LO LIMIT (2)		
CLOSE	1201	ALB11/B5: ROD BANK LO-LO LIMIT (3)		
CLOSE	1202	ALB11/B5: ROD BANK LO-LO LIMIT (4)		
OPEN	1203	ALB14/A5: ACCUM TANK 1 ISOL VALVE 8808A NOT FULLY OPEN (1)	OR	RF7 ALB14/A5 ACCUM TANK 1 ISOL VALVE 8808A NOT FULLY OPEN
OPEN	1204	ALB14/A5: ACCUM TANK 1 ISOL VALVE 8808A NOT FULLY OPEN (2)		
OPEN	1205	ALB14/A7: RWST TANK ISOL NOT FULLY OPEN (1)	OR	RF8 ALB14/A7 RWST TANK ISOL NOT FULLY OPEN
OPEN	1206	ALB14/A7: RWST TANK ISOL NOT FULLY OPEN (2)		
OPEN	1207	ALB14/B5: ACCUM TANK 2 ISOL VALVE 8808B NOT FULLY OPEN (1)	OR	RF9 ALB14/B5 ACCUM TANK 2 ISOL VALVE 8808B NOT FULLY OPEN
OPEN	1208	ALB14/B5: ACCUM TANK 2 ISOL VALVE 8808B NOT FULLY OPEN (2)		
CLOSE	121	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/A1S:SER-A PWR)	OR	RF10 ALB15/A5 ALM SYS-VITAL FAIL
CLOSE	122	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/A2S:SER-B PWR)		
OPEN	123	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/B1Z:SER-A FAIL)		
OPEN	124	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/B2Z:SER-B FAIL)		
OPEN	297	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/D5S:VCB-A ALB P/S FAIL)		
OPEN	299	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/C5S:VCB-B ALB P/S FAIL)		
OPEN	301	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/B5S:VCB-X ALB P/S FAIL)		
CLOSE	1210	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/A1Z:MCB SYS PWR-A)		
CLOSE	1211	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/A2Z:MCB SYS PWR-B)		
OPEN	1213	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/A4S: RLU1 P/S FAIL)		
OPEN	1215	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/B4S: RLU2 P/S FAIL)		
OPEN	1217	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/C4S: RLU3 P/S FAIL)		
OPEN	1219	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/D4S: RLU4 P/S FAIL)		
OPEN	1221	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/A3S: RLU5 P/S FAIL)		
OPEN	1223	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/B3S: RLU6 P/S FAIL)		
OPEN	1225	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/C3S: RLU7 P/S FAIL)		
OPEN	1227	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/D3S: RLU8 P/S FAIL)		
OPEN	1504	ALB15/A5: ALM SYS-VITAL FAIL (ALB22/A5S: RLU9 P/S FAIL)		
OPEN	61	ALB15/B5: ALM SYS-NON_VITAL FAIL (ALB22/E1Z: VCB DC GROUND)	OR	RF11 ALB15/B5 ALM SYS-NON_VITAL FAIL
CLOSE	62	ALB15/B5: AS NON-VITAL FAIL / VCB-FCV P/S-A (ALB22/E1S)		
OPEN	125	ALB15/B5: ALM SYS-NON_VITAL FAIL (ALB22/B1S: SER-A TROUBLE)		
OPEN	126	ALB15/B5: ALM SYS-NON_VITAL FAIL (ALB22/B2S: SER-B TROUBLE)		
OPEN	127	ALB15/B5: ALM SYS-NON_VITAL FAIL (ALB22/C1Z: SER-A T SYNC)		
OPEN	128	ALB15/B5: ALM SYS-NON_VITAL FAIL (ALB22/C2Z: SER-B T SYNC)		
CLOSE	303	ALB15/B5: AS NON-VITAL FAIL / VCB-FCV P/S-B (ALB22/E1S)		
CLOSE	789	ALB15/B5: AS NON-VITAL FAIL / MCB1-FCV P/S-A (ALB22/D1S)		
CLOSE	796	ALB15/B5: AS NON-VITAL FAIL / MCB1-FCV P/S-B (ALB22/D1S)		
OPEN	1209	ALB15/B5: ALM SYS-NON_VITAL FAIL (ALB22/D1Z: MCB1 DC GROUND)		
OPEN	1245	ALB15/B5: ALARM SYSTEM NON_VITAL FAILURE BY ALB22 P/S		
CLOSE	1248	ALB15/B5: AS NON-VITAL FAIL / MCB2-FCV P/S-A (ALB22/D2S)		
CLOSE	1249	ALB15/B5: AS NON-VITAL FAIL / MCB2-FCV P/S-B (ALB22/D2S)		
OPEN	1250	ALB15/B5: ALM SYS-NON_VITAL FAIL (ALB22/D2Z: MCB2 DC GROUND)		
OPEN	1502	ALB15/B5: ALM SYS-NON_VITAL FAIL (ALB22/E2Z: ECB DC GROUND)		
CLOSE	1521	ALB15/B5: AS NON-VITAL FAIL / ECB-FCV P/S-A (ALB22/E2S)		
CLOSE	1522	ALB15/B5: AS NON-VITAL FAIL / ECB-FCV P/S-B (ALB22/E2S)		

alarm (SER) inputs				associated alarm window
status NORMAL	address	alarm input description (per AS database)	logic relation	alarm type ANN/window window label (per AS database)
1) REFLASH ALARMS (RF)				
OPEN	296	ALB15/C5: ALM SYS-LOGIC FAIL (ALB22/D5Z: VCB-A ALB LOGIC)	OR	RF12 ALB15/C5 ALM SYS-LOGIC FAIL
OPEN	298	ALB15/C5: ALM SYS-LOGIC FAIL (ALB22/C5Z: VCB-B ALB LOGIC)		
OPEN	300	ALB15/C5: ALM SYS-LOGIC FAIL (ALB22/B5Z: VCB-X ALB LOGIC)		
OPEN	1212	ALB15/C5: ALM SYS-LOGIC FAIL (ALB22/A4Z: RLU1 LOGIC)		
OPEN	1214	ALB15/C5: ALM SYS-LOGIC FAIL (ALB22/B4Z: RLU2 LOGIC)		
OPEN	1216	ALB15/C5: ALM SYS-LOGIC FAIL (ALB22/C4Z: RLU3 LOGIC)		
OPEN	1218	ALB15/C5: ALM SYS-LOGIC FAIL (ALB22/D4Z: RLU4 LOGIC)		
OPEN	1220	ALB15/C5: ALM SYS-LOGIC FAIL (ALB22/A3Z: RLU5 LOGIC)		
OPEN	1222	ALB15/C5: ALM SYS-LOGIC FAIL (ALB22/B3Z: RLU6 LOGIC)		
OPEN	1224	ALB15/C5: ALM SYS-LOGIC FAIL (ALB22/C3Z: RLU7 LOGIC)		
OPEN	1226	ALB15/C5: ALM SYS-LOGIC FAIL (ALB22/D3Z: RLU8 LOGIC)		
OPEN	1244	ALB15/C5: ALARM SYSTEM LOGIC FAILURE BY ALB22 LOGIC)		
OPEN	1503	ALB15/C5: ALM SYS-LOGIC FAIL (ALB22/A5Z: RLU9 LOGIC)		
OPEN	1541	E01/A5: T1 MOTNJE (VISOKA TEMPERATURA NAVITJA)	OR	RF13 E01/A5 T1 MOTNJE
OPEN	1542	E01/A5: T1 MOTNJE (NIVO OLJA MINIMUM)		
OPEN	1543	E01/A5: T1 MOTNJE (PLINSKI RELE OPOZORILO)		
OPEN	1544	E01/A5: T1 MOTNJE (KONTAKTNI TERMOMETER OPOZORILO)		
OPEN	1546	E01/A7: T1 HLADILNA SKUPINA V OKVARI (H1 V OKVARI)	OR	RF14 E01/A7 T1 HLADILNA SKUPINA V OKVARI
OPEN	1547	E01/A7: T1 HLADILNA SKUPINA V OKVARI (H2 V OKVARI)		
OPEN	1548	E01/A7: T1 HLADILNA SKUPINA V OKVARI (H3 V OKVARI)		
CLOSE	930	ALB13/A7: MID-LOOP NARROW RANGE RCS LEVEL LOW (1)	OR	RF15 ALB13/A7 MID-LOOP NARROW RANGE RCS LEVEL LOW
CLOSE	963	ALB13/A7: MID-LOOP NARROW RANGE RCS LEVEL LOW (2)		
OPEN	1557	E01/B5: T2 MOTNJE (VISOKA TEMPERATURA NAVITJA)	OR	RF16 E01/B5 T2 MOTNJE
OPEN	1558	E01/B5: T2 MOTNJE (NIVO OLJA MINIMUM)		
OPEN	1559	E01/B5: T2 MOTNJE (PLINSKI RELE OPOZORILO)		
OPEN	1560	E01/B5: T2 MOTNJE (KONTAKTNI TERMOMETER OPOZORILO)		
OPEN	1562	E01/B7: T2 HLADILNA SKUPINA V OKVARI (H1 V OKVARI)	OR	RF17 E01/B7 T2 HLADILNA SKUPINA V OKVARI
OPEN	1563	E01/B7: T2 HLADILNA SKUPINA V OKVARI (H2 V OKVARI)		
OPEN	1564	E01/B7: T2 HLADILNA SKUPINA V OKVARI (H3 V OKVARI)		
CLOSE	1729	ALB02/E3: BREAKER MD1-T1 TRANSFER SWITCH IN LOCAL	OR	RF18 BUS MD1 PWR DIST TRANSFER SWITCHES IN LOCAL
CLOSE	1730	ALB02/E3: BREAKER MD1-DG1 TRANSFER SWITCH IN LOCAL		
CLOSE	1731	ALB02/E3: BREAKER MD1-MD3 TRANSFER SWITCH IN LOCAL		
CLOSE	1732	ALB02/E3: BREAKER MD1-11 TRANSFER SWITCH IN LOCAL		
CLOSE	1733	ALB02/E3: BREAKER MD1-12 TRANSFER SWITCH IN LOCAL		
CLOSE	1734	ALB02/E3: BREAKER MD1-13 TRANSFER SWITCH IN LOCAL		
CLOSE	1745	ALB02/E4: BREAKER MD2-T2 TRANSFER SWITCH IN LOCAL	OR	RF19 BUS MD2 PWR DIST TRANSFER SWITCHES IN LOCAL
CLOSE	1746	ALB02/E4: BREAKER MD2-DG2 TRANSFER SWITCH IN LOCAL		
CLOSE	1747	ALB02/E4: BREAKER MD2-MD3 TRANSFER SWITCH IN LOCAL		
CLOSE	1748	ALB02/E4: BREAKER MD2-21 TRANSFER SWITCH IN LOCAL		
CLOSE	1749	ALB02/E4: BREAKER MD2-22 TRANSFER SWITCH IN LOCAL		
CLOSE	1750	ALB02/E4: BREAKER MD2-23 TRANSFER SWITCH IN LOCAL		

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NO.	DATE	BY	REVISION	CKD. BY	LE APPR.
3	15.01.19	M.Š.	REV'D PER MOD. 1007-XI-L	M.Š.	D.V.
2	29.04.15	K.K.	REV'D PER MOD 1023-RC-L	G.J.	D.V.
1	11.2013	IBE	REV'D PER MOD 796-SY-L	D.S.	D.V.
0	10.4.09	SIPRO	ISSUED PER MOD. 629-AS-L	M.Š.	B.Š.

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO

PROCESS COMPUTER SYSTEMS – PCS

PCS 1/0 LOOP WIRING DIAGRAMS

AS SYSTEM, OVERVIEW OF COMBINED ALARMS

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO KRSKO, SLOVENIA

MADE	CHECKED	LE APPROVAL
1. SIPRO	2. M. ŠUŠNIĆ	3. B. ŠPAN

REFERENCE DRAWINGS:

SCALE

816-336	AS	195	3
DRAWING NUMBER	SYSTEM	SH.NO.	REV

FILE: 816336195.DWG, SPREJEL: _____

OVERVIEW OF COMBINED ALARMS

alarm (SER) inputs				associated alarm window
status NORMAL	address	alarm input description (per AS database)	logic relation	alarm type ANN/window window label (per AS database)
2) DUAL ALARMS (DP) (one input – two different windows)				
OPEN	780	ALB09/A7 & ALB11/D5: OVERTEMP DT ALERT	N/A	DP1 ALB09/A7 OVERTEMP DT ALERT
		ALB09/A7 & ALB11/D5: OVERTEMP DT ALERT	N/A	DP1 ALB11/D5 OVERTEMP DT ALERT
OPEN	787	ALB09/B7 & ALB11/E6: OVERPOWER DT ALERT	N/A	DP2 ALB09/B7 OVERPOWER DT ALERT
		ALB09/B7 & ALB11/E6: OVERPOWER DT ALERT	N/A	DP2 ALB11/E6 OVERPOWER DT ALERT
		3) SYNTHETIZED ALARMS UMUX or AS_LOGIC (PIS) logic operators used: AND (*), OR (+) , NOT (/)		
OPEN	51	CME02/A3: CZ CHILL/PMP 1A (TROUBLE)	51+(316+1251)*/(316*1251) +(382*/(316*1251) PIS: AS_LOGIC1	SP1 (51+3001), PIS: UX07564 CME02/A3 CZ CHILL/PMP 1A PULL TO LOCK, BRK DISCON OR TROUBLE
OPEN	316	CME02/A3+B5: CHILLER 1A (SWITCH IN PULLOUT)		
OPEN	1251	CME02/A3+B5: CHILLER 1A (BRK DISCONNECTED)		
OPEN	382	CME02/A3+B5: CHILLER 1A STANDBY POWER ON		
OPEN	65	CME02/B3: CZ CHILL/PMP 1C–A (MOTOR TRIP)	(318+1253+65)*/(318*1253) PIS: AS_LOGIC2	SP2 (3003), PIS: UX7566 CME02/B3 CZ CHILL/PMP 1C–A PULL TO LOCK, BRK DISCON OR MOT TRIP
OPEN	318	CME02/B3+F5: CHILLER 1C–A (SWITCH IN PULLOUT)		
OPEN	1253	CME02/B3+F5: CHILLER 1C–A (BRK DISCONNECTED)		
CLOSE	67	CME02/B5: CZ CHILLER 1A DISCH TEMP HI (TIS7102)	67*/(316*1251)	SP3 (3005) CME02/B5 CHILLED WATER CHILLER 1A DISCH TEMP HI
OPEN	316	CME02/A3+B5: CHILLER 1A (SWITCH IN PULLOUT)		
OPEN	1251	CME02/A3+B5: CHILLER 1A (BRK DISCONNECTED)		
OPEN	71	CME02/C3: CZ CHILL/PMP 1C–B (MOTOR TRIP)	(319+1254+71)*/(319*1254) PIS: AS_LOGIC2	SP4 (3004), PIS: UX07467 CME02/C3 CZ CHILL/PMP 1C–B PULL TO LOCK, BRK DISCON OR MOT TRIP
OPEN	319	CME02/C3: CHILLER 1C–B (SWITCH IN PULLOUT)		
OPEN	1254	CME02/C3: CHILLER 1C–B (BRK DISCONNECTED)		
CLOSE	79	CME02/D5: CZ CHILLER 1B DISCH TEMP HI (TIS7103)	79*/(317*1252)	SP5 (3006) CME02/D5 CHILLED WATER CHILLER 1B DISCH TEMP HI
OPEN	317	CME02/D5+G3: CHILLER 1B (SWITCH IN PULLOUT)		
OPEN	1252	CME02/D5+G3: CHILLER 1B (BRK DISCONNECTED)		
CLOSE	91	CME02/F5: CZ CHILLER 1C DISCH TEMP HI (TIS7104)	91*/(318*319*1253*1254)	SP6 (3007) CME02/F5 CHILLED WATER CHILLER 1C DISCH TEMP HI
OPEN	318	CME02/B3+F5: CHILLER 1C–A (SWITCH IN PULLOUT)		
OPEN	319	CME02/C3: CHILLER 1C–B (SWITCH IN PULLOUT)		
OPEN	1253	CME02/B3+F5: CHILLER 1C–A (BRK DISCONNECTED)		
OPEN	1254	CME02/C3: CHILLER 1C–B (BRK DISCONNECTED)		
OPEN	95	CME02/G3: CZ CHILL/PMP 1B (TROUBLE)	95+(317+1252)*/(317*1252) +(383*/(317*1252) PIS: AS_LOGIC1	SP7 (95+3002), PIS: UX07565 CME02/G3 CZ CHILL/PMP 1B PULL TO LOCK, BRK DISCON OR TROUBLE
OPEN	317	CME02/D5+G3: CHILLER 1B (SWITCH IN PULLOUT)		
OPEN	1252	CME02/D5+G3: CHILLER 1B (BRK DISCONNECTED)		
OPEN	383	CME02/G3: CHILLER 1B STANDBY POWER ON		
CLOSE	67	CME02/B5: CZ CHILLER 1A DISCH TEMP HI (TIS7102)	67*/(323*1255) PIS: AS_LOGIC3	PIS: UX07568 CME02/B5 (PIS) CHILLED WATER CHILLER 1A DISCH TEMP HI
OPEN	323	CME02/B5: CHILLER1A (SWITCH IN PULL OUT) PIS		
OPEN	1255	CME02/B5: CHILLER1A (BRK DISCONNECTED) PIS		
CLOSE	79	CME02/D5: CZ CHILLER 1B DISCH TEMP HI (TIS7103)	79*/(324*1256) PIS: AS_LOGIC3	PIS: UX07569 CME02/D5 (PIS) CHILLED WATER CHILLER 1B DISCH TEMP HI
OPEN	324	CME02/D5: CHILLER1B (SWITCH IN PULL OUT) PIS		
OPEN	1256	CME02/D5: CHILLER1B (BRK DISCONNECTED) PIS		
CLOSE	91	CME02/F5: CZ CHILLER 1C DISCH TEMP HI (TIS7104)	91*/(325*326*1257*1258) PIS: AS_LOGIC4	PIS: UX07570 CME02/F5 (PIS) CHILLED WATER CHILLER 1C DISCH TEMP HI
OPEN	325	CME02/F5: CHILLER1C–A (SWITCH IN PULL OUT) PIS		
OPEN	326	CME02/F5: CHILLER1C–B (SWITCH IN PULL OUT) PIS		
OPEN	1257	CME02/F5: CHILLER1C–A (BRK DISCONNECTED) PIS		
OPEN	1258	CME02/F5: CHILLER1C–B (BRK DISCONNECTED) PIS		
OPEN	1259	ALB01/D1: AE2998A DETECTED H2 INGRESS IN IPBC UNIT A	(1259*1260)+ (1259*1261)+ (1260*1261)+ (1262*1263)+ (1262*1264)+ (1263*1264) PIS: AS_LOGIC55	SP8 (3008), PIS: UX06060 ALB01/D1 IPB H2 INGRESS
OPEN	1260	ALB01/D1: AE2998B DETECTED H2 INGRESS IN IPBC UNIT A		
OPEN	1261	ALB01/D1: AE2998C DETECTED H2 INGRESS IN IPBC UNIT A		
OPEN	1262	ALB01/D1: AE2998D DETECTED H2 INGRESS IN IPBC UNIT B		
OPEN	1263	ALB01/D1: AE2998E DETECTED H2 INGRESS IN IPBC UNIT B		
OPEN	1264	ALB01/D1: AE2998F DETECTED H2 INGRESS IN IPBC UNIT B		
OPEN	76	CME02/D2: CHILLER 1C TROUBLE	76+(384*/1265*1266) PIS: AS_LOGIC7	SP9 (76+3009) PIS: UX06912 CME02/D2 (PIS) CHILLED 1C TROUBLE ALARM
OPEN	384	CME02/D2: CHILLER 1C STANDBY POWER ON		
OPEN	1265	CME02/D2: CHILLER1C–A (BRK DISCONNECTED) PIS		
OPEN	1266	CME02/D2: CHILLER1C–B (BRK DISCONNECTED) PIS		

alarm (SER) inputs				associated alarm window
status NORMAL	address	alarm input description (per AS database)	logic relation	alarm type ANN/window window label (per AS database)
1) REFLASH ALARMS (RF)				
OPEN	775	ALB09/D3: RCP 1 BRKR SSPS TRAIN A&B INPUT RLYS	OR	RF20 ALB09/D3 RCP 1 BREAKER OPEN/LO FLOW ALERT
OPEN	797	ALB09/D3: RCP 1 BRKR OR LO FLOW SSPS TRAIN A DEMUX		
OPEN	782	ALB09/E3: RCP 2 BRKR SSPS TRAIN A&B INPUT RLYS	OR	RF21 ALB09/E3 RCP 2 BREAKER OPEN/LO FLOW ALERT
OPEN	804	ALB09/E3: RCP 2 BRKR OR LO FLOW SSPS TRAIN A DEMUX		
OPEN	1665	EO3/A1: GT1 PLINSKI RELE KOTLA ALI REG. STIKALA AKTIVIRAN	OR	RF22 EO3/A1 GT1 MOTNJE
OPEN	1666	EO3/A1: GT1 VISOKA TEMPERATURA OLJA V KOTLU		
OPEN	1667	EO3/A1: GT1 PLINSKI RELE KOTLA OPOZORILO		
OPEN	1668	EO3/A1: GT1 NIVO OLJA V KOTLU ALI REG. STIKALU MINIMUM		
OPEN	1669	EO3/A1: GT1 RAZBREMENILNI ALI NEPOVRATNI VENTIL AKTIVIRAN		
OPEN	1672	EO3/D1: GT1 HLADILNA SKUPINA H1 V OKVARI	OR	RF23 EO3/D1 GT1 HLADILNA SKUPINA V OKVARI
OPEN	1673	EO3/D1: GT1 HLADILNA SKUPINA H2 V OKVARI		
OPEN	1674	EO3/D1: GT1 HLADILNA SKUPINA H3 ALI H5 V OKVARI		
OPEN	1675	EO3/D1: GT1 HLADILNA SKUPINA H4 V OKVARI		
OPEN	1676	EO3/E1: GT1 PRETOK OLJA H1 NE DELUJE	OR	RF24 EO3/E1 GT1 PRETOK OLJA NE DELUJE
OPEN	1677	EO3/E1: GT1 PRETOK OLJA H2 NE DELUJE		
OPEN	1678	EO3/E1: GT1 PRETOK OLJA H3 ALI H5 NE DELUJE		
OPEN	1679	EO3/E1: GT1 PRETOK OLJA H4 NE DELUJE		
OPEN	1681	EO3/A2: GT2 PLINSKI RELE KOTLA ALI REG. STIKALA AKTIVIRAN	OR	RF25 EO3/A2 GT2 MOTNJE
OPEN	1682	EO3/A2: GT2 VISOKA TEMPERATURA OLJA V KOTLU		
OPEN	1683	EO3/A2: GT2 PLINSKI RELE KOTLA OPOZORILO		
OPEN	1684	EO3/A2: GT2 NIVO OLJA V KOTLU ALI REG. STIKALO MINIMUM		
OPEN	1685	EO3/A2: GT2 RAZBREMENILNI ALI NEPOVRATNI VENTIL AKTIVIRAN		
OPEN	1688	EO3/D2: GT2 HLADILNA SKUPINA H1 V OKVARI	OR	RF26 EO3/D2 GT2 HLADILNA SKUPINA V OKVARI
OPEN	1689	EO3/D2: GT2 HLADILNA SKUPINA H2 ALI H3 V OKVARI		
OPEN	1690	EO3/D2: GT2 HLADILNA SKUPINA H4 V OKVARI		
OPEN	1691	EO3/D2: GT2 HLADILNA SKUPINA H5 V OKVARI		
OPEN	1692	EO3/E2: GT2 PRETOK OLJA NA H1 NE DELUJE	OR	RF27 EO3/E2 GT2 PRETOK OLJA NE DELUJE
OPEN	1693	EO3/E2: GT2 PRETOK OLJA NA H2 ALI H3 NE DELUJE		
OPEN	1694	EO3/E2: GT2 PRETOK OLJA NA H4 NE DELUJE		
OPEN	1695	EO3/E2: GT2 PRETOK OLJA NA H5 NE DELUJE		
OPEN	1697	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/A3: GLBS INT CHAMBER SF6 LOW DENSITY)	OR	RF28 ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE
OPEN	1701	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/C3: GLBS TRIP 1 CIRCUIT VOLTAGE SUPERVISION ALARM)		
OPEN	1702	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/D3: GLBS TRIP 2 CIRCUIT VOLTAGE SUPERVISION ALARM)		
OPEN	1703	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/E3: GLBS TRIP 1 CIRCUIT FAULT)		
OPEN	1704	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/F3: GLBS TRIP 2 CIRCUIT FAULT)		
OPEN	1705	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/A4: GLBS DRIVE MECHANISM TROUBLE)		
OPEN	1706	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/B4: GLBS DRIVE MECH PUMP CIRCUIT DC VOLTAGE FAULT)		
OPEN	1707	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/C4: GLBS AUX HEATING CIRCUIT AC VOLTAGE FAULT)		
OPEN	1708	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/D4: Q9, Q81 & Q82 WRONG PHASE SEQUENCE)		
OPEN	1709	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/E4: DISCONNECTOR & EARTHING SWITCHES CIRCUIT DC VOLTAGE FAULT)		
OPEN	1710	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/F4: Q9 MOTOR TRIP)		
OPEN	1711	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/A5: Q81 MOTOR TRIP)		
OPEN	1712	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/B5: Q82 MOTOR TRIP)		
OPEN	1717	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/E5: GLBS CONTROL IN LOCAL)		
OPEN	1718	ALB01/B4 GEN LOAD BREAK SWITCH TROUBLE (EO3/F5: TEMPERATURE)		
OPEN	1700	ALB01/C4 GEN LOAD BREAK SWITCH TROUBLE (EO3/B3: GLBSINT CHAMBER SF6 BLOCKING CLOSE/TRIP	OR	RF29 ALB01/C4 GEN LOAD BREAK SWITCH BLOCKED
OPEN	1713	ALB01/C4 GEN LOAD BREAK SWITCH TROUBLE (EO3/C5: GLBS TRIP BLOCKED)		
OPEN	1716	ALB01/C4 GEN LOAD BREAK SWITCH TROUBLE (EO3/D5: GLBS CLOSE BLOCKED)		

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5	24.10.16	K.K.	REV'D PER MOD 749-RP-L	G.J.	D.V.
4	15.09.16	B.Z.	REV'D PER MOD. 1103-GN-L	R.P.	D.V.
8	06.09.21	M.Ž.	REV'D PER MOD. 1246-CZ-L	R.P.	D.V.
7	02.2019	M.Ž.	REV'D PER AS-BUILT 1190-GN-L	R.P.	D.V.
6	05.2018	P.V.	REV'D PER CAP 2018-1755	R.P.	D.V.

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO

PROCESS COMPUTER SYSTEMS – PCS

PCS I/O LOOP WIRING DIAGRAMS

AS SYSTEM, OVERVIEW OF COMBINED ALARMS

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO KRSKO, SLOVENIA

MADE	CHECKED	LE APPROVAL
1. SIPRO	2. M. ŠUŠNIC	3. B. ŠPAN

REFERENCE DRAWINGS:

SCALE	DRAWING NUMBER	SYSTEM	SH.NO.	REV.
	816-336	AS	196	8

FILE: 816336196.DWG, SPREJEL:

OVERVIEW OF COMBINED ALARMS

alarm (SER) inputs					associated alarm window
status NORMAL	address	alarm input description (per AS database)	notes	logic relation	alarm type ANN/window window label (per AS database)
1) REFLASH ALARMS (RF)					
CLOSE	1793	CME03/B3: MCR AHU 1A CONTROL IN LOCAL		OR	RF30 CME03/B3 CONT BLDGS FAN/AHU LOCAL
CLOSE	1794	CME03/B3: ELECTR ROOMS AHU 1A CONTROL IN LOCAL			
CLOSE	1857	CME03/B3: MCR AHU 1B CONTROL IN LOCAL			
CLOSE	1858	CME03/B3: ELECTR ROOMS AHU 1BCONTROL IN LOCAL			
CLOSE	1795	CME04/A1Z & ALB13/C2: AF PMP 1A CONTROL IN ECR		OR	RF31 CME04/A1Z AF PMP 1A FCV3003A, FCV3003B CONTROL IN ECR
CLOSE	1798	CME04/A1Z & ALB13/C2: FCV3003A CONTROL IN ECR			
CLOSE	1799	CME04/A1Z & ALB13/C2: FCV3003B CONTROL IN ECR			
CLOSE	1801	CME04/A1S & ALB13/C2: PCV3702 CONTROL IN ECR		OR	RF32 CME04/A1Z PCV3702, 20124 CONTROL IN ECR
CLOSE	1802	CME04/A1S & ALB13/C2: 20124 CONTROL IN ECR			
CLOSE	1796	CME04/A2Z & ALB13/C2: 2000A CONTROL IN ECR		OR	RF33 CME04/A2Z 20000A, 11096, FCV3019 CONTROL IN ECR
CLOSE	1797	CME04/A2Z & ALB13/C2: 11096 CONTROL IN ECR			
CLOSE	1800	CME04/A2Z & ALB13/C2: FCV3019 CONTROL IN ECR			
CLOSE	1803	CME04/A2S & ALB13/C2: PCV655A CONTROL IN ECR		OR	RF34 CME04/A2S PCV655A, 8000A, PRZR HTR GROUP A CONTROL IN ECR
CLOSE	1804	CME04/A2S & ALB13/C2: 8000A CONTROL IN ECR			
CLOSE	1805	CME04/A2S & ALB13/C2: PRZR HTR BACK-UP GROUP A CONTROL IN ECR			
CLOSE	1859	CME04/A3Z & ALB13/C2: AF PMP 2B CONTROL IN ECR		OR	RF35 CME04/A3Z AF PMP 2B FCV3004A, FCV3004B CONTROL IN ECR
CLOSE	1863	CME04/A3Z & ALB13/C2: FCV3004A CONTROL IN ECR			
CLOSE	1864	CME04/A3Z & ALB13/C2: FCV3004B CONTROL IN ECR			
CLOSE	1861	CME04/A3S & ALB13/C2: 20000B CONTROL IN ECR		OR	RF36 CME04/A3S 20000B, 11105, FCV3020 CONTROL IN ECR
CLOSE	1862	CME04/A3S & ALB13/C2: 11105 CONTROL IN ECR			
CLOSE	1865	CME04/A3S & ALB13/C2: FCV3020 CONTROL IN ECR			
CLOSE	1866	CME04/A4S & ALB13/C2: PCV3703 CONTROL IN ECR		OR	RF37 CME04/A4S PCV3703, 20125 CONTROL IN ECR
CLOSE	1867	CME04/A4S & ALB13/C2: 20125 CONTROL IN ECR			
CLOSE	1806	CME04/B1Z & ALB13/C2: LCV665 CONTROL IN ECR		OR	RF38 CME04/B1Z LCV665, 8121, 8133 CONTROL IN ECR
CLOSE	1807	CME04/B1Z & ALB13/C2: 8121 CONTROL IN ECR			
CLOSE	1808	CME04/B1Z & ALB13/C2: 8133 CONTROL IN ECR			
CLOSE	1811	CME04/B1S & ALB13/C2: CENT CHG PMP 1 CONTROL IN ECR		OR	RF39 CME04/B1S CENT CHG PMP 1, CHG PMP ROOM A FAN CONTROL IN ECR
CLOSE	1832	CME04/B1S & ALB13/C2: CHG PMP ROOM A FAN CONTROL IN ECR			
CLOSE	1809	CME04/B2Z & ALB13/C2: LCV112B CONTROL IN ECR		OR	RF40 CME04/B2Z LCV112B, LCV112C CONTROL IN ECR
CLOSE	1810	CME04/B2Z & ALB13/C2: LCV112C CONTROL IN ECR			
CLOSE	1868	CME04/B3Z & ALB13/C2: 8000B CONTROL IN ECR		OR	RF41 CME04/B3Z (PCV656A) 8000B, PRZR HTR GROUP B CONTROL IN ECR
CLOSE	1869	CME04/B3Z & ALB13/C2: PRZR HTR BACK-UP GROUP B CONTROL IN ECR			
CLOSE	1909	CME04/B3Z & ALB13/C2: PCV656A CONTROL IN ECR			
CLOSE	1873	CME04/B3S & ALB13/C2: CENT CHG PMP 2 CONTROL IN ECR		OR	RF42 CME04/B3S CENT CHG PMP 2, CHG PMP ROOM B FAN CONTROL IN ECR
CLOSE	1894	CME04/B3S & ALB13/C2: CHG PMP ROOM B FAN CONTROL IN ECR			
CLOSE	1870	CME04/B4Z & ALB13/C2: LCV666 CONTROL IN ECR		OR	RF43 CME04/B4Z LCV666, 8122, 8123 CONTROL IN ECR
CLOSE	1871	CME04/B4Z & ALB13/C2: 8122 CONTROL IN ECR			
CLOSE	1872	CME04/B4Z & ALB13/C2: 8123 CONTROL IN ECR			
CLOSE	1874	CME04/B4S & ALB13/C2: 8112 CONTROL IN ECR		OR	RF44 CME04/B4S 8112, 8135 CONTROL IN ECR
CLOSE	1875	CME04/B4S & ALB13/C2: 8135 CONTROL IN ECR			
CLOSE	1816	CME04/C1S & ALB13/C2: RH PMP 1 CONTROL IN ECR		OR	RF45 CME04/C1S RH PMP 1, RH PMP ROOM A FAN CONTROL IN ECR
CLOSE	1833	CME04/C1S & ALB13/C2: RH PMP ROOM A FAN CONTROL IN ECR			
CLOSE	1813	CME04/C2Z & ALB13/C2: 8119 CONTROL IN ECR		OR	RF46 CME04/C2Z FCV205, 8119 CONTROL IN ECR
CLOSE	1814	CME04/C2Z & ALB13/C2: FCV205 CONTROL IN ECR			
CLOSE	1817	CME04/C2S & ALB13/C2: 8701A CONTROL IN ECR		OR	RF47 CME04/C2S 8701A, FCV851 CONTROL IN ECR
CLOSE	1819	CME04/C2S & ALB13/C2: FCV851 CONTROL IN ECR			
CLOSE	1878	CME04/C3S & ALB13/C2: RH PMP 2 CONTROL IN ECR		OR	RF48 CME04/C3S RH PMP 2, RH PMP ROOM B FAN CONTROL IN ECR
CLOSE	1895	CME04/C3S & ALB13/C2: RH PMP B FAN CONTROL IN ECR			
CLOSE	1877	CME04/C4Z & ALB13/C2: 8358 CONTROL IN ECR		OR	RF49 CME04/C4Z 8358, HCV218 CONTROL IN ECR
CLOSE	1908	CME04/C4Z & ALB13/C2: HCV218 CONTROL IN ECR			
CLOSE	1879	CME04/C4S & ALB13/C2: 8702A CONTROL IN ECR		OR	RF50 CME04/C4S 8702A, FCV852 CONTROL IN ECR
CLOSE	1881	CME04/C4S & ALB13/C2: FCV852 CONTROL IN ECR			
CLOSE	1818	CME04/D1Z & ALB13/C2: 8701B CONTROL IN ECR		OR	RF51 CME04/D1Z 8701B, HCV864 CONTROL IN ECR
CLOSE	1820	CME04/D1Z & ALB13/C2: HCV864 CONTROL IN ECR			
CLOSE	1822	CME04/D1S & ALB13/C2: 8815A CONTROL IN ECR		OR	RF52 CME04/D1S 8815A, 8808A, 8811A CONTROL IN ECR
CLOSE	1823	CME04/D1S & ALB13/C2: 8808A CONTROL IN ECR			
CLOSE	1824	CME04/D1S & ALB13/C2: 8811A CONTROL IN ECR			
CLOSE	1825	CME04/D2S & ALB13/C2: CI PMP 1 CONTROL IN ECR		OR	RF53 CME04/D2S CI PMP 1, 9103A CONTROL IN ECR
CLOSE	1826	CME04/D2S & ALB13/C2: 9103A CONTROL IN ECR			
CLOSE	1880	CME04/D3Z & ALB13/C2: 8702B CONTROL IN ECR		OR	RF54 CME04/D3Z 8702B, HCV865 CONTROL IN ECR
CLOSE	1882	CME04/D3Z & ALB13/C2: HCV865 CONTROL IN ECR			
CLOSE	1884	CME04/D3S & ALB13/C2: 8815B CONTROL IN ECR		OR	RF55 CME04/D3S 8815B, 8808B, 8811B CONTROL IN ECR
CLOSE	1885	CME04/D3S & ALB13/C2: 8808B CONTROL IN ECR			
CLOSE	1886	CME04/D3S & ALB13/C2: 8811B CONTROL IN ECR			
CLOSE	1887	CME04/D4S & ALB13/C2: CI PMP 2 CONTROL IN ECR		OR	RF56 CME04/D4S CI PMP 2, 9103B CONTROL IN ECR
CLOSE	1888	CME04/D4S & ALB13/C2: 9103B CONTROL IN ECR			
CLOSE	1827	CME04/E1Z & ALB13/C2: SW PMP 1A CONTROL IN ECR		OR	RF57 CME04/E1Z SW PMP 1A, SW PMP 3C-A CONTROL IN ECR
CLOSE	1828	CME04/E1Z & ALB13/C2: SW PMP 3C-A CONTROL IN ECR			
CLOSE	1829	CME04/E2Z & ALB13/C2: RB RECIRC FAN 1A CONTROL IN ECR		OR	RF58 CME04/E2Z RB RECIRC FAN 1A, RB RECIRC FAN 2A CONTROL IN ECR
CLOSE	1830	CME04/E2Z & ALB13/C2: RB RECIRC FAN 2A COTROL IN ECR			
CLOSE	1834	CME04/E2S & ALB13/C2: CC PMP 1A CONTROL IN ECR		OR	RF59 CME04/E2S CC PMP 1A, CC PMP 3C-A CONTROL IN ECR
CLOSE	1835	CME04/E2S & ALB13/C2: CC PMP 3C-A CONTROL IN ECR			
CLOSE	1889	CME04/E3Z & ALB13/C2: SW PMP2B CONTROL IN ECR		OR	RF60 CME04/E3Z SW PMP B, SW PMP 3C-B CONTROL IN ECR
CLOSE	1890	CME04/E3Z & ALB13/C2: SW PMP 3C-B CONTROL IN ECR			
CLOSE	1891	CME04/E4Z & ALB13/C2: RB RECIRC FAN 1B CONTROL IN ECR		OR	RF61 CME04/E4Z RB RECIRC FAN 1B, RB RECIRC FAN 2B CONTROL IN ECR
CLOSE	1892	CME04/E4Z & ALB13/C2: RB RECIRC FAN 2B CONTROL IN ECR			

alarm (SER) inputs					associated alarm window
status NORMAL	address	alarm input description (per AS database)	notes	logic relation	alarm type ANN/window window label (per AS database)
1) REFLASH ALARMS (RF)					
CLOSE	1896	CME04/E4S & ALB13/C2: CC PMP 2B CONTROL IN ECR		OR	RF62 CME04/E4S CC PMP 2B, CC PMP 3C-B CONTROL IN ECR
CLOSE	1897	CME04/E4S & ALB13/C2: CC PMP 3C-B CONTROL IN ECR			
CLOSE	1837	CME04/F1S & ALB13/C2: 10045 & 10064 CONTROL IN ECR		OR	RF63 CME04/F1S 10045 & 10064, 10050 & 10068 CONTROL IN ECR
CLOSE	1838	CME04/F1S & ALB13/C2: 10050 & 10068 CONTROL IN ECR			
CLOSE	1839	CME04/F2Z & ALB13/C2: 10367 & 10369 CONTROL IN ECR		OR	RF64 CME04/F2Z 10367 & 10369, 10366 & 10368, 10370 CONTROL IN ECR
CLOSE	1840	CME04/F2Z & ALB13/C2: 10366 & 10368 CONTROL IN ECR			
CLOSE	1841	CME04/F2Z & ALB13/C2: 10370 CONTROL IN ECR			
CLOSE	1842	CME04/F2S & ALB13/C2: 10257 CONTROL IN ECR		OR	RF65 CME04/F2S 10257, 10305, 10087 CONTROL IN ECR
CLOSE	1843	CME04/F2S & ALB13/C2: 10305 CONTROL IN ECR			
CLOSE	1844	CME04/F2S & ALB13/C2: 10087 CONTROL IN ECR			
CLOSE	1899	CME04/F3S & ALB13/C2: 10046 & 10065 CONTROL IN ECR		OR	RF66 CME04/F3S 10046 & 10065, 10051 & 10069 CONTROL IN ECR
CLOSE	1900	CME04/F3S & ALB13/C2: 10051 & 10069 CONTROL IN ECR			
CLOSE	1901	CME04/F4Z & ALB13/C2: 10373 & 10376 CONTROL IM ECR		OR	RF67 CME04/F4Z 10373 & 10376, 10374 & 10375, 10371 CONTROL IN ECR
CLOSE	1902	CME04/F4Z & ALB13/C2: 10374 & 10375 CONTROL IN ECR			
CLOSE	1903	CME04/F4Z & ALB13/C2: 10371 CONTROL IN ECR			
CLOSE	1904	CME04/F4S & ALB13/C2: 10258 CONTROL IN ECR		OR	RF68 CME04/F4S 10258, 10306, 10184 CONTROL IN ECR
CLOSE	1905	CME04/F4S & ALB13/C2: 10306 CONTROL IN ECR			
CLOSE	1906	CME04/F4S & ALB13/C2: 10184 CONTROL IN ECR			

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 16-09-2020
Log Number: 263792

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Replaced Manual Drawing: N/A
Last Revision And Date: N/A

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	CKD. BY	LE APPR.
1	04.08.20	M.M.	REV'D PER MOD. 1007-XI-L PART 4	M.M.	D.V.
0	25.04.18	V.Š.	ISSUED PER MOD. 1007-XI-L	M.M.	D.V.

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO

PROCESS COMPUTER SYSTEMS – PCS

PCS 1/0 LOOP WIRING DIAGRAMS

AS SYSTEM, OVERVIEW OF COMBINED ALARMS

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO KRSKO, SLOVENIA

MADE	CHECKED	LE APPROVAL
1. V.ŠIMIĆ	2. M.MOŠKON	3. D.VEHOVAR

REFERENCE DRAWINGS:

SCALE	DRAWING NUMBER	SYSTEM	SHEET NO.	REV
	816-336	AS	197	1

FILE: 816336197.DWG, SPREJEL:

OVERVIEW OF COMBINED ALARMS

alarm (SER) inputs					associated alarm window
status NORMAL	address	alarm input description (per AS database)	notes	logic relation	alarm type ANN/window window label (per AS database)
1) REFLASH ALARMS (RF)					
CLOSE	1793	CME03/B3: MCR AHU 1A CONTROL IN LOCAL			
CLOSE	1794	CME03/B3: ELECTR ROOMS AHU 1A CONTROL IN LOCAL			
CLOSE	1857	CME03/B3: MCR AHU 1B CONTROL IN LOCAL			
CLOSE	1858	CME03/B3: ELECTR ROOMS AHU 1B CONTROL IN LOCAL			
CLOSE	1795	CME04/A1Z & ALB13/C2: AF PMP 1A CONTROL IN ECR			
CLOSE	1798	CME04/A1Z & ALB13/C2: FCV3003A CONTROL IN ECR			
CLOSE	1799	CME04/A1Z & ALB13/C2: FCV3003B CONTROL IN ECR			
CLOSE	1801	CME04/A1S & ALB13/C2: PCV3702 CONTROL IN ECR			
CLOSE	1802	CME04/A1S & ALB13/C2: 20124 CONTROL IN ECR			
CLOSE	1796	CME04/A2Z & ALB13/C2: 2000A CONTROL IN ECR			
CLOSE	1797	CME04/A2Z & ALB13/C2: 11096 CONTROL IN ECR			
CLOSE	1800	CME04/A2Z & ALB13/C2: FCV3019 CONTROL IN ECR			
CLOSE	1803	CME04/A2S & ALB13/C2: PCV655A CONTROL IN ECR			
CLOSE	1804	CME04/A2S & ALB13/C2: 8000A CONTROL IN ECR			
CLOSE	1805	CME04/A2S & ALB13/C2: PRZR HTR BACK-UP GROUP A CONTROL IN ECR			
CLOSE	1859	CME04/A3Z & ALB13/C2: AF PMP 2B CONTROL IN ECR			
CLOSE	1863	CME04/A3Z & ALB13/C2: FCV3004A CONTROL IN ECR			
CLOSE	1864	CME04/A3Z & ALB13/C2: FCV3004B CONTROL IN ECR			
CLOSE	1861	CME04/A3S & ALB13/C2: 20000B CONTROL IN ECR			
CLOSE	1862	CME04/A3S & ALB13/C2: 11105 CONTROL IN ECR			
CLOSE	1865	CME04/A3S & ALB13/C2: FCV3020 CONTROL IN ECR			
CLOSE	1860	CME04/A4Z & ALB13/C2: AF TURB PMP TRIP CONTROL IN ECR			
CLOSE	1866	CME04/A4S & ALB13/C2: PCV3703 CONTROL IN ECR			
CLOSE	1867	CME04/A4S & ALB13/C2: 20125 CONTROL IN ECR			
CLOSE	1806	CME04/B1Z & ALB13/C2: LCV665 CONTROL IN ECR			
CLOSE	1807	CME04/B1Z & ALB13/C2: 8121CONTROL IN ECR			
CLOSE	1808	CME04/B1Z & ALB13/C2: 8133 CONTROL IN ECR			
CLOSE	1811	CME04/B1S & ALB13/C2: CENT CHG PMP 1 CONTROL IN ECR			
CLOSE	1832	CME04/B1S & ALB13/C2: CHG PMP ROOM A FAN CONTROL IN ECR			
CLOSE	1809	CME04/B2Z & ALB13/C2: LCV112B CONTROL IN ECR			
CLOSE	1810	CME04/B2Z & ALB13/C2: LCV112C CONTROL IN ECR			
CLOSE	1815	CME04/B2S & ALB13/C2: PCV135 CONTROL IN ECR			
CLOSE	1868	CME04/B3Z & ALB13/C2: 8000B CONTROL IN ECR			
CLOSE	1869	CME04/B3Z & ALB13/C2: PRZR HTR BACK-UP GROUP B CONTROL IN ECR			
CLOSE	1909	CME04/B3Z & ALB13/C2: PCV656A CONTROL IN ECR			
CLOSE	1873	CME04/B3S & ALB13/C2: CENT CHG PMP 2 CONTROL IN ECR			
CLOSE	1894	CME04/B3S & ALB13/C2: CHG PMP ROOM B FAN CONTROL IN ECR			
CLOSE	1870	CME04/B4Z & ALB13/C2: LCV666 CONTROL IN ECR			
CLOSE	1871	CME04/B4Z & ALB13/C2: 8122 CONTROL IN ECR			
CLOSE	1872	CME04/B4Z & ALB13/C2: 8123 CONTROL IN ECR			
CLOSE	1874	CME04/B4S & ALB13/C2: 8112 CONTROL IN ECR			
CLOSE	1875	CME04/B4S & ALB13/C2: 8135 CONTROL IN ECR			
CLOSE	1812	CME04/C1Z & ALB13/C2: BAT PMP 1 CONTROL IN ECR			
CLOSE	1816	CME04/C1S & ALB13/C2: RH PMP 1 CONTROL IN ECR			
CLOSE	1833	CME04/C1S & ALB13/C2: RH PMP ROOM A FAN CONTROL IN ECR			
CLOSE	1813	CME04/C2Z & ALB13/C2: 8119 CONTROL IN ECR			
CLOSE	1814	CME04/C2Z & ALB13/C2: FCV205 CONTROL IN ECR			
CLOSE	1817	CME04/C2S & ALB13/C2: 8701A CONTROL IN ECR			
CLOSE	1819	CME04/C2S & ALB13/C2: FCV851 CONTROL IN ECR			
CLOSE	1876	CME04/C3Z & ALB13/C2: BAT PMP 2 CONTROL IN ECR			
CLOSE	1878	CME04/C3S & ALB13/C2: RH PMP 2 CONTROL IN ECR			
CLOSE	1895	CME04/C3S & ALB13/C2: RH PMP B FAN CONTROL IN ECR			
CLOSE	1877	CME04/C4Z & ALB13/C2: 8358 CONTROL IN ECR			
CLOSE	1908	CME04/C4Z & ALB13/C2: HCV218 CONTROL IN ECR			
CLOSE	1879	CME04/C4S & ALB13/C2: 8702A CONTROL IN ECR			
CLOSE	1881	CME04/C4S & ALB13/C2: FCV852 CONTROL IN ECR			
CLOSE	1818	CME04/D1Z & ALB13/C2: 8701B CONTROL IN ECR			
CLOSE	1820	CME04/D1Z & ALB13/C2: HCV864 CONTROL IN ECR			
CLOSE	1822	CME04/D1S & ALB13/C2: 8815A CONTROL IN ECR			
CLOSE	1823	CME04/D1S & ALB13/C2: 8808A CONTROL IN ECR			
CLOSE	1824	CME04/D1S & ALB13/C2: 8811A CONTROL IN ECR			
CLOSE	1821	CME04/D2Z & ALB13/C2: SI PMP 1 CONTROL IN ECR			
CLOSE	1825	CME04/D2S & ALB13/C2: CI PMP 1 CONTROL IN ECR			
CLOSE	1826	CME04/D2S & ALB13/C2: 9103A CONTROL IN ECR			
CLOSE	1880	CME04/D3Z & ALB13/C2: 8702B CONTROL IN ECR			
CLOSE	1882	CME04/D3Z & ALB13/C2: HCV865 CONTROL IN ECR			
CLOSE	1884	CME04/D3S & ALB13/C2: 8815B CONTROL IN ECR			
CLOSE	1885	CME04/D3S & ALB13/C2: 8808B CONTROL IN ECR			
CLOSE	1886	CME04/D3S & ALB13/C2: 8811B CONTROL IN ECR			
CLOSE	1883	CME04/D4Z & ALB13/C2: SI PMP CONTROL IN ECR			
CLOSE	1887	CME04/D4S & ALB13/C2: CI PMP 2 CONTROL IN ECR			
CLOSE	1888	CME04/D4S & ALB13/C2: 9103B CONTROL IN ECR			
CLOSE	1827	CME04/E1Z & ALB13/C2: SW PMP 1A CONTROL IN ECR			
CLOSE	1828	CME04/E1Z & ALB13/C2: SW PMP 3C-A CONTROL IN ECR			
CLOSE	1831	CME04/E1S & ALB13/C2: CRDM COOL FAN 1 CONTROL IN ECR			
CLOSE	1829	CME04/E2Z & ALB13/C2: RB RECIRC FAN 1A CONTROL IN ECR			
CLOSE	1830	CME04/E2Z & ALB13/C2: RB RECIRC FAN 2A COTROL IN ECR			
CLOSE	1834	CME04/E2S & ALB13/C2: CC MP 1A CONTROL IN ECR			
CLOSE	1835	CME04/E2S & ALB13/C2: CC PMP 3C-A CONTROL IN ECR			
CLOSE	1889	CME04/E3Z & ALB13/C2: SW PMP2B CONTROL IN ECR			
CLOSE	1890	CME04/E3Z & ALB13/C2: SW PMP 3C-B CONTROL IN ECR			
CLOSE	1893	CME04/E3S & ALB13/C2: CRDM COOL FAN 2 CONTROL IN ECR			
CLOSE	1891	CME04/E4Z & ALB13/C2: RB RECIRC FAN 1B CONTROL IN ECR			
CLOSE	1892	CME04/E4Z & ALB13/C2: RB RECIRC FAN 2B CONTROL IN ECR			
CLOSE	1896	CME04/E4S & ALB13/C2: CC PMP 2B CONTROL IN ECR			
CLOSE	1897	CME04/E4S & ALB13/C2: CC PMP 3C-B CONTROL IN ECR			
CLOSE	1836	CME04/F1Z & ALB13/C2: 10048 & 10066 CONTROL IN ECR			
CLOSE	1837	CME04/F1S & ALB13/C2: 10045 & 10064 CONTROL IN ECR			
CLOSE	1838	CME04/F1S & ALB13/C2: 10050 & 10068 CONTROL IN ECR			
CLOSE	1839	CME04/F2Z & ALB13/C2: 10367 & 10369 CONTROL IN ECR			
CLOSE	1840	CME04/F2Z & ALB13/C2: 10366 & 10368 CONTROL IN ECR			
CLOSE	1841	CME04/F2Z & ALB13/C2: 10370 CONTROL IN ECR			
CLOSE	1842	CME04/F2S & ALB13/C2: 10257 CONTROL IN ECR			
CLOSE	1843	CME04/F2S & ALB13/C2: 10305 CONTROL IN ECR			
CLOSE	1844	CME04/F2S & ALB13/C2: 10087 CONTROL IN ECR			
CLOSE	1898	CME04/F3Z & ALB13/C2: 10049 & 10067 CONTROL IN ECR			
CLOSE	1899	CME04/F3S & ALB13/C2: 10046 & 10065 CONTROL IN ECR			
CLOSE	1900	CME04/F3S & ALB13/C2: 10051 & 10069 CONTROL IN ECR			
CLOSE	1901	CME04/F4Z & ALB13/C2: 10373 & 10376 CONTROL IM ECR			
CLOSE	1902	CME04/F4Z & ALB13/C2: 10374 & 10375 CONTROL IN ECR			
CLOSE	1903	CME04/F4Z & ALB13/C2: 10371 CONTROL IN ECR			
CLOSE	1904	CME04/F4S & ALB13/C2: 10258 CONTROL IN ECR			
CLOSE	1905	CME04/F4S & ALB13/C2: 10306 CONTROL IN ECR			
CLOSE	1906	CME04/F4S & ALB13/C2: 10184 CONTROL IN ECR			

OR

RF69
ALB13/C2
TRANSFER MCR/ECR WARNING

OR

RF69
ALB13/C2
TRANSFER MCR/ECR WARNING

Nuklearna Elektrarna Krško
MASTER DOCUMENT
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THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	CKD. BY	LE APPR.
1	04.08.20	M.M.	REV'D PER MOD. 1007-XI-L PART 4	M.M.	D.V.
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NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO

PROCESS COMPUTER SYSTEMS – PCS

PCS 1/0 LOOP WIRING DIAGRAMS

AS SYSTEM, OVERVIEW OF COMBINED ALARMS

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO KRSKO, SLOVENIA

MADE	CHECKED	LE APPROVAL
1. V.ŠIMIĆ	2. M.MOŠKON	3. D.VEHOVAR

REFERENCE DRAWINGS:

SCALE	DRAWING NUMBER	SYSTEM	SHEET NO.	REV
	816-336	AS	198	1

FILE: 816336198.DWG, SPREJEL:

OVERVIEW OF COMBINED ALARMS

alarm (SER) inputs					associated alarm window
status NORMAL	address	alarm input description (per AS database)	notes	logic relation	alarm type ANN/window window label (per AS database)
1) REFLASH ALARMS (RF)					
CLOSE	854	ALB11/A1: SOURCE RANGE HI FLUX LEVEL AT SHUTDOWN		OR	RF70 ALB11/A1 SOURCE RANGE HI FLUX LEVEL AT SHUTDOWN
CLOSE	858	ALB11/A1: SOURCE RANGE HI FLUX LEVEL AT SHUTDOWN			
CLOSE	996	ALB15/A3: RMS CHANNEL IN TEST		OR	RF71 ALB15/A3 RMS CHANNEL IN TEST
CLOSE	1735	ALB15/A3: SFP RAD MONITORING IN TEST			
CLOSE	1738	ALB15/A3: CONTMT RAD MONITORING IN TEST			
CLOSE	1003	ALB15/B3: RMS CHANNEL HI LEVEL		OR	RF72 ALB15/B3 RMS CHANNEL HI LEVEL
CLOSE	1736	ALB15/B3: SFP RAD MONITORING HI LEVEL			
CLOSE	1010	ALB15/C3: RMS CHANNEL FAILURE		OR	RF73 ALB15/C3 RMS CHANNEL FAILURE
CLOSE	1737	ALB15/C3: SFP RAD MONITORING FAILURE			
CLOSE	1017	ALB15/D3: CONTMT HI RANGE RAD MONITORING TROUBLE/ALERT		OR	RF74 ALB15/D3 CONTMT HI RANGE RAD MONITORING TROUBLE/ALERT
CLOSE	1739	ALB15/D3: CONTMT RAD MONITORING HI LEVEL			
CLOSE	1740	ALB15/D3: CONTMT RAD MONITORING FAILURE			
CLOSE	998	ALB17/B2: SPENT FUEL PIT HI LEVEL		OR	RF75 ALB17/B2 SPENT FUEL PIT HI LEVEL
CLOSE	1077	ALB17/B2: SPENT FUEL PIT HI LEVEL			
CLOSE	1005	ALB17/C2: SPENT FUEL PIT LO LEVEL		OR	RF76 ALB17/C2 SPENT FUEL PIT LO LEVEL
CLOSE	1084	ALB17/C2: SPENT FUEL PIT LO LEVEL			
OPEN	1648	E03/A6: GT1/GT2 REGULATOR NAPETOSTI MOTNJA		OR	RF77 ALB01/C1 MAIN TRANSFORMER GT1/GT2 TAP CHANGER TROUBLE
OPEN	1650	E03/C6: GT1/GT2 REGULACIJSKI STIKALI V RAZLIČNIH STOPNJAH			
OPEN	781	ALB09/B3: AMSAC A URGENT FAILURE		OR	RF78 ALB09/B3 AMSAC A OR B URGENT FAILURE
OPEN	783	ALB09/B3: AMSAC B URGENT FAILURE			

Nuklearna Elektrarna
MASTER DOCUMENT
Date Received: 06-03-2023
Log Number: 266086

Original Design Firm: SIPRO INŽENIRING d.o.o.
Replaced Manual Drawing: N/A
Last Revision And Date: N/A

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	CKD. BY	LE APPR.
1	20.01.23	ERA	REV'D PER MOD. 1194-AM-L	D.V.	D.V.
0	15.02.19	V.S.	ISSUED PER MOD. 1007-XI-L	M.M.	D.V.

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO

PROCESS COMPUTER SYSTEMS – PCS

PCS I/O LOOP WIRING DIAGRAMS

AS SYSTEM, OVERVIEW OF COMBINED ALARMS

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO KRSKO, SLOVENIA

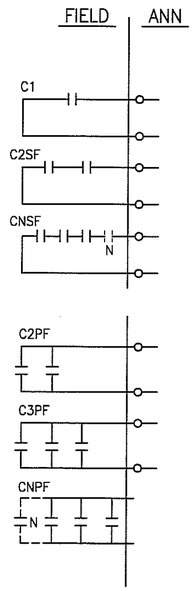
MADE	CHECKED	LE APPROVAL
1. V.ŠIMIĆ	2. M.MOŠKON	3. D.VEHOVAR

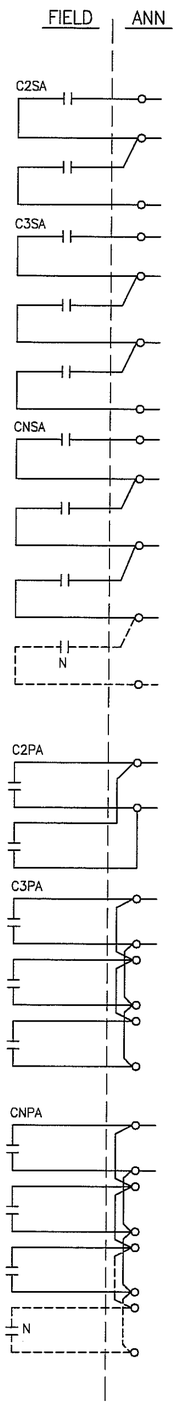
REFERENCE DRAWINGS:

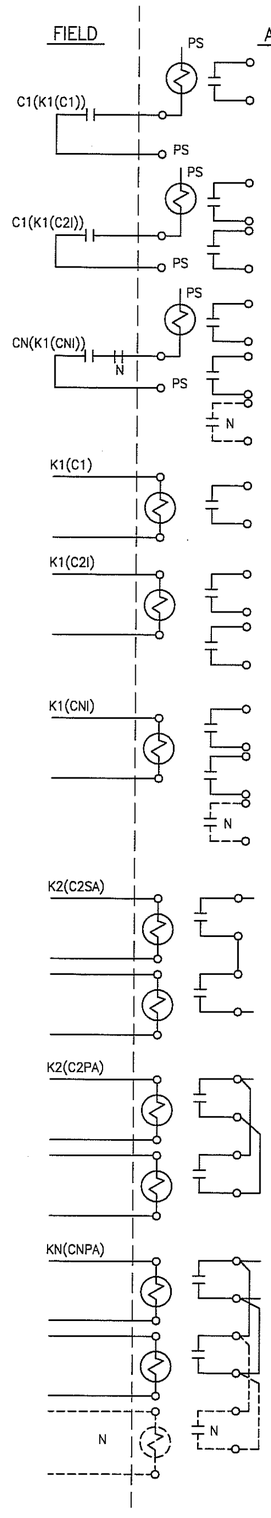
SCALE

816-336	AS	199	1
DRAWING NUMBER	SYSTEM	SHEET	REV

FILE:816336199.DWG, SPREJEL:







CIRCUIT CODE

1 ST CHARACTER
- K–RELAY
- C–CONTACT
- R–CONTACT DRIVING RELAY

2 ND CHARACTER
- NO. OF CIRCUITS

3 RD CHARACTER
- S–CIRCUITS CONNECTED IN SERIES
- P–CIRCUITS CONNECTED IN PARALLEL
- I–CIRCUITS ARE INDEPENDENT

4 TH CHARACTER
- A–CIRCUIT CONNECTED AT ANNUNCIATOR
- F–CIRCUIT CONNECTED IN FIELD

SEQUENCE SYMBOLS
- A – AUTO RESET
- M – MANUAL RESET
- RF– REFLASH
- FO– FIRST OUT
- RB– RING BACK

ALARM CONDITION
- O – CONTACT OPENS TO ANNUNCIATE
- C – CONTACT CLOSES TO ANNUNCIATE
- DE– RELAY DENERGIZES TO ANNUNCIATE
- E – RELAY ENERGIZES TO ANNUNCIATE
- ( )–RELAY COIL VOLTAGE OR CURRENT GIVEN IN PARENTHESIS

LOCATION SYMBOL
- SSPS – SOLID STATE PROTECTION SYSTEM
- CBDM – CONTROL BOARD DEMULTIPLEXER
- ARR – AUXILIARY RELAY RACK
- NIS – NUCLEAR INSRTUMENTATION SYSTEM
- PCS – PROCESS CONTROL SYSTEM
- RCS – ROD CONTROL SYSTEM
- RPI – ROD POSITION INDICATION SYSTEM
- RMS – RADIATION MONITORING SYSTEM
- AP – AUXILIARY PANEL
- CB – CONTROL BOARD
- F – FIELD
- C – COMPUTER
- ANN – ANNUNCIATOR LOGIC CABINET
- STR – SAFEGUARDS TEST RACK
- HSP – HYDRAULIC SERVICE PANEL
- SWG – SWITCHGEAR CABINETS
- LP – LOCAL PANEL
- AP – AUXILIARY PANEL
- BOP – BALANCE OF PLANT
- PRB – PROTECTIVE RELAY BOARD
- ETC – EMERGENCY TRIP CABINET
- INV – INVERTER CABINET
- AMS – AMSAC CABINET
- SEC – SEISMIC CABINET

NOTES:

1. WINDOW NUMBER – CORRELATE WINDOW ENGRAVING WITH ALARM INPUT INFORMATION TABLE
2. WINDOW ENGRAVING SHALL BE AS FOLLOWS:

WINDOW SIZE	CHARACTER SPACES PER LINE	LINES PER WINDOW	CHARACTER HEIGHT
2x3	17	4	3/16"
1x1 1/2	17	4	1/8"
1 1/2x2 1/4	15	4	3/16"

   ALL ENGRAVING SHALL BE CENTERED IN WINDOW
3. INITIATING DEVICE – IDENTIFIES THE TAG NUMBERS OF THE INITIATING DEVICES FOR THE WINDOW. ALL INITIATING DEVICES IN PARENTHESIS ( ) ARE WIRED TOGETHER IN THE FIELD AND ARE ROUTED TO THE ANNUNCIATOR INPUT TERMINALS AS ONE INPUT SIGNAL.
4. LOCATION – IDENTIFIES LOCATION OF INITIATING DEVICE. REFER TO LOCATION SYMBOL TABLE.
5. REFERENCE DRAWING – IDENTIFIES REFERENCE DWG. FOR INITIATING DEVICE.
6. NUMBER OF INPUT TERMINALS – IDENTIFIES NUMBER OF INPUT TERMINALS REQUIRED FOR EACH WINDOW.
7. ALARM CONDITION – IDENTIFIES STATE OF CONTACTS OR INPUT VOLTAGE TO ANNUNCIATOR WINDOW. REFER TO ALARM CONDITION TABLE.
8. CONTACT CONFIGURATION – IDENTIFIES THE TYPE OF INPUT SCHEME FOR THE WINDOW. REFER TO CIRCUIT CODE AND TYPICAL INPUT SCHEMES. THE INPUT SCHEMES CAN BE EXPANDED BY INCREASING THE NUMBER OF CONTACTS AND THEIR CONNECTIONS.
9. SEQUENCE TYPE – IDENTIFIES THE SEQUENCE TO BE USED FOR THE WINDOW. REFER TO SEQUENCE SYMBOL TABLE.

* 10. FIELD INPUT TERMINALS – IDENTIFIES THE INPUT TERMINALS ASSIGNED TO THE WINDOW.

* 11. ANNUNCIATOR OUTPUT TERMINALS – IDENTIFIES THE OUTPUT TERMINALS ASSIGNED TO THE WINDOW.

* – TO BE COMPLETED BY ANNUNCIATOR SYSTEM SUPPLIER.

12. ALL WINDOWS TO BE ENGRAVED IN ENGLISH.
13. ALL ENGRAVED LENSES FOR LAMP CABINET ALB10 ARE TO BE RED WHEN ILLUMINATED.
14. → DENOTES LAST REV. CHANGES

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 07-11-2012
Log Number: 150
S.O. 395

Original Design Firm: WESTINGHOUSE
Replaced Manual Drawing: 1462F87 Sh.1
Last Revision And Date: 5 12.05.1982

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	CKD. BY	L.E. APPR.
7	05.11.12		REVD PER MOD 745-EE-L		
6	30.01.98		CAD CONV. & AS BUILT UPDATE		
5	12.05.82		KRK-385, ECN-32187 REVISED SUB BLOCK		
			BILL SMOODY		
4	25.02.80		ECN31562 REVISED SUB BLOCK AND NOTE12		

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO
ANNUNCIATOR ENGRAVING & SYSTEM INFO.
DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO KRSKO, SLOVENIA

MADE	CHECKED	LE APPROVAL
1.	2.	3.

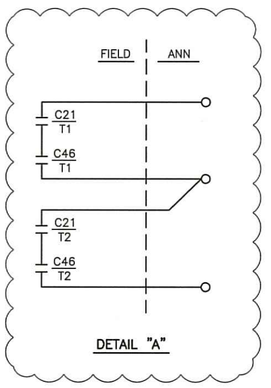
REFERENCE DRAWINGS:

SCALE	DRAWING NUMBER	SYSTEM	SH.NO.	REV
	1462F87		1	7

FILE: 1462F871 DWG, SPREJEL:

1	2	3	4	5	6	
1 GEN PRI LO 86/G ACTUATED/LOSS OF CONTROL POWER	2 GEN SEC LO 86/U ACTUATED/LOSS OF CONTROL POWER	3 GEN LO 86/GC ACTUATED/LOSS OF CONTROL POWER/ EXCESSIVE VOLTS & HZ	4 LO 86/T3 ACTUATED/ LOSS OF CONTROL POWER/PROT RELAY FAILURE	5 LO 86/SB ACTUATED/ LOSS OF CONTROL POWER/PROT RELAY FAILURE	6 6.3 KV BUS M1 BRK M1–T1 TRIP	A
7 MAIN TRANSFORMER GT1/GT2 TROUBLE	8 UNIT TRANSFORMER T1/T2 TROUBLE	9 STATION AUX TRANSFORMER T3 TROUBLE	10 GEN LOAD BREAK SWITCH TROUBLE	11 LOSS OF GEN PT A/B	12 6.3 KV BUS M1 BRK MT–T1 OUT OF SERVICE	B
13 MAIN TRANFORMER GT1/GT2 TAP CHANGER TROUBLE	14 LOSS OF IPB COOLING	15 STATION AUX TRANSFORMER T3 TAP CHANGER TROUBLE	16 GEN LOAD BREAK SWITCH BLOCKED	17 GEN LO FREQUENCY	18 6.3 KV BUS M1 86/M1–T1 ACTUATED	C
19 IPB H2 INGRESS	20 GEN EXC SYS TROUBLE	21 GEN EXC SYS AUTO TRIP	22 GEN EXCITATION LIMITER IS ACTIVE	23 IPB COOLING UNIT TROUBLE	24 6.3 KV BUS M1 UNDERVOLTAGE PT FAILURE UNDERFREQ	D
25 GEN BEARING VAPOR EXTRACTOR PRESS HI	26 RGD BRUSHES NOT SEATED PROPERLY	27 GEN FIELD GND OR EXC SYS GND OR HIGH SHAFT VOLT	28 GEN EXC SYS REGULATOR IN FCR MODE	29 GEN PRI & SEC PROT RELAYS FAILURE	30 400 KV BRKR #1 #2 TRIP	E

GENERATOR
TAG NO. ALB01



DETAIL "A"

Appendix 1 - Existing AS system essential drawings

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. 10
– WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
– ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
– ENGRAVING HAS BEEN CHANGED ON WINDOW NO. 26
– REFERENCE DRAWING HAS BEEN ADDED FOR WINDOW NO. 17
– ALARM COND HAS BEEN CHANGED FOR FOLLOWING WINDOWS NO.: 1, 2, 3, 6, 11, 13, 25

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	86G,27C–86G	PRB	B–208–080 (GN–07)	2	O	C2SF	A	TB1–1 TB1–C1		
2	A2	86U,27C–86U	PRB	B–208–080 (GN–08)	2	O	C2SF	A	–2		
3	A3	86GC, 27C–86GC	PRB	B–208–080 (GN–09)	2	O	C2SF	A	–3		
4	A4	86T3, 27C–86T3, 11T3–A	PRB T3	B–208–080 (GN–10)	2	O	C3SF	A	–4		
5	A5	86SB, 27C–86SB, 11T3–B	PRB T3	B–208–080 (GN–11)	2	O	C3SF	A	–5		
6	A6	3/M1–T1	ARR	B–208–052 (EE–03)	2	C	C3SF	A	–6		
7	B1	K43/GT1, K79/GT2	F	JST 1013496 sh. 26 B–208–159 (XR–21)	2	O	C2SF	A	–7		
8	B2	(C46, C21) T1; (C46, C21) T2	F	B–208–159 (XR–10)	3	O	C4SA, DETAIL 'A'	A	–8		
9	B3	K22	F	B–208–159 (XR–34)	2	O	C1	A	–9		
10	B4	43/GN905PNL–S2, GN905PNL–K50, K51, K52, K4, K8, K101.1, K102.1	LP	B–208–080 (GN–61) 62, 63, 64)	8	C	C1I	RF			
11	B5	11GN–A1, 11GN–B1	PRB	B–208–080 (GN–44)	2	C	C2PF	A	–11		
12	B6	33, CS	MCB,SWG	B–208–052 (EE–03)	2	C	C2PF	A	–12		
13	C1	COMMON FROM ALB–E03 A6, C6		D–200–521 sh. 8							
14	C2	EE106PNLG994–CR503	MCB,SWG	816–359, SH. GN–02	2	C	C1	A	–14		
15	C3	3–1/AVR, 3–2/AVR, 3–3/AVR	SWG	B–208–159 (XR–28)	2	O	C3SF	A	–15		
16	C4	GN905PNL–K3, GN104CBKQ0A–S1, S1	LP	B–208–080 (GN–61)	3	C	C1I	RF			
17	C5	TU104CABRMC7–R8	PDEH	B–208–144 (TU–34)	2	C	C1	A	–17		
18	C6	86/M1–T1	SWG	B–208–052 (EE–03)	2	O	C1	A	–18		
19	D1	EE106PNLG994–AIT2998/1RLY, 2RLY, 3RLY, 4RLY, 5RLY, 6RLY	SWG	B–810–080, sh. 06 B–816–636, sh. 06	7	C	C1	A	–19		
20	D2	MKC01–A90–K3	SWG	B–208–080 (GN–79)	2	C	C1	A	XDO–3 XDO–4		
21	D3	MKC01–A90–K1	SWG	B–208–080 (GN–79)	2	C	C1	A	XDO–1 XDO–14		
22	D4	MKC01–A90–K2	SWG	B–208–080 (GN–79)	2	C	C1	A	XDO–2 XDO–15		
23	D5	EE106PNLG994–CR506	F	816–359, SH. GN–02	2	C	C11PF	A	TB1–23 TB1–C2		
24	D6	27Z/M1,27Y–2/M1,3/81X–AB–RP–M1,3/81X–BC–RP–M1	SWG,ARR	B–208–052 (EE–66)(EE–74)	2	C	C4PF	A	–24		
25	E1	PS5317	PRB	B–208–080 (GN–19)	2	C	C1	A	–25		
26	E2	11GN–A1	SWG	B–208–080 (GN–42)	2	C	C1	A	–26		
27	E3	11GN–A1–R19, MKC01–A90–K5	SWG	B–208–080 (GN–79)(GN–42)	2	C	C1	A	XDO–5 XDO–18		
28	E4	MKC01–A90–K6	SWG	B–208–080 (GN–79)	2	C	C1	A	XDO–6 XDO–19		
29	E5	11T1–A,11T2–A,11U–A,11GN–A2,11GN–A,160/64BB 11T1–B,11T2–B,11U–B,11GN–B2,11GN–B1,81G–GN	PRB	B–208–080 (GN–07) B–208–080 (GN–08)	2	O	C12SF	A	TB1–29 TB1–C2		
30	E6	11/SYCA01, 11/SYCA02	SW–YD	B–208–138 (SY–66)	2	C	C2PF	A	–30		

S.O. 335

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 21-12-2022
Log Number: 14-1

Original Design Philosophy: Westinghouse
Original Design Date: 07/1989
Last Revision And Date: 3 07/1989

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY.

NO.	DATE	BY	REVISION	Des. BY	LE APPR.
29	30.12.22	BE	REVD PER CAF 2011–1985	B.P.	
25	22.01.20	BE	REVD PER MOD 1095–XR–L	B.P.	
24	28.06.19	K.K.	REVD PER MOD 1007–XR–L & 1051–GN–L	S.J.	
23	03.2018	MEK	REVD PER ZNP 2018–23	JAN	B.P.
22	24.04.17	P.V.	REVD PER ZNP 2017–632	R.D.	B.P.

NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRŠKO
ALB01
ANNUNCIATOR ENGRAVING & SYSTEMS INFO.

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRŠKO
MADE 2 CHECKED 3.
KRŠKO, SLOVENIA
LE APPROVAL

REFERENCE DRAWINGS:

SCALE

1462F87
DRAWING NUMBER

SS-1462-26

Appendix 1 - Existing AS system essential drawings

	1	2	3	4	5	6	7	
	1 6.3 KV BUS M2 BRK M2–T2 TRIP	2 6.3 KV BUS MD1 BRK MD1–T1 TRIP	3 6.3 KV BUS MD1 BRK MD1–T3 TRIP	4 6.3 KV BUS MD2 BRK MD2–T2 TRIP	5 6.3 KV BUS MD2 BRK MD2–T3 TRIP	6 6.3 KV BUS M2 BRK M2–T3 TRIP	7 6.3 KV BUS M1 BRK M1–T3 TRIP	A
	8 6.3 KV BUS M2 BRK M2–T2 OUT OF SERVICE	9 6.3 KV BUS MD1 BRK MD1–T1 OUT OF SERVICE	10 6.3 KV BUS MD1 BRK MD1–T3 OUT OF SERVICE	11 6.3 KV BUS MD2 BRK MD2–T2 OUT OF SERVICE	12 6.3 KV BUS MD2 BRK MD2–T3 OUT OF SERVICE	13 6.3 KV BUS M2 BRK M2–T3 OUT OF SERVICE	14 6.3 KV BUS M1 BRK M1–T3 OUT OF SERVICE	B
	15 6.3 KV BUS M2 86/M2–T2 ACTUATED	16 6.3 KV BUS MD1 86/MD1–T1 ACTUATED	17 6.3 KV BUS MD1 86/ MD1–T3 ACTUATED	18 6.3 KV BUS MD2 86/MD2–T2 ACTUATED	19 6.3 KV BUS MD2 86/MD2–T3 ACTUATED	20 6.3 KV BUS M2 86/M2–T3 ACTUATED	21 6.3 KV BUS M1 86/M1–T3 ACTUATED	C
	22 6.3 KV BUS M2 BRK PARALLEL	23 6.3 KV BUS MD1 UNDERVOLTAGE/ PT FAILURE BUS GROUND	24 6.3 KV BUS MD1 BRK PARALLEL	25 6.3 KV BUS MD2 UNDERVOLTAGE/ PT FAILURE BUS GROUND	26 6.3 KV BUS MD2 BRK PARALLEL	27 6.3 KV BUS M2 UNDERVOLTAGE/ PT FAILURE UNDERFREQ	28 6.3 KV BUS M1 BRK PARALLEL	D
	29 6.3 KV FROM T3 UNDERVOLTAGE/ PT FAILURE	30 6.3 KV BUS MD1 DEGRADED VOLTAGE	31 BUS MD1 PWR DIST TRANSFER SWITCHES IN LOCAL	32 BUS MD2 PWR DIST TRANSFER SWITCHES IN LOCAL	33 6.3 KV BUS MD2 DEGRADED VOLTAGE	34 UNDERVOLTAGE RELAYING IN TEST TRAIN A	35 UNDERVOLTAGE RELAYING IN TEST TRAIN B	E

ELECTRICAL SYSTEM 1
TAG NO. ALB02

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. 9
– WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
– ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
– ALARM COND HAS BEEN CHANGED FOR FOLLOWING WINDOWS NO.: 1, 6, 7, 32, 33

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Data Received: 28-09-2017
Item Number: 140

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	3/M2–T2	BOP–ARR	B–208–052 (EE–04)	2	C	C1	A	TB1–36 TB1–C2		
2	A2	3/MD1–T1B	BOP–ARR	B–208–099 IN–02	2	C	C1	A	–37		
3	A3	3/MD1–T3B	BOP–ARR	B–208–099 IN–02	2	C	C1	A	–38		
4	A4	3/MD2–T2B	BOP–ARR	B–208–099 IN–04	2	C	C1	A	–39		
5	A5	3/MD2–T3B	BOP–ARR	B–208–099 IN–04	2	C	C1	A	–40		
6	A6	3/M2–T3	BOP–ARR	B–208–052 (EE–08)	2	C	C1	A	–41		
7	A7	3/M1–T3	BOP–ARR	B–208–052 (EE–07)	2	C	C1	A	–42		
8	B1	CS, 33	MCB_A SWG	B–208–052 (EE–04)	2	C	C2PF	A	–43		
9	B2	33, 3/MD1–T1A	BOP–ARR	B–208–099 IN–01	2	C	C2PF	A	–44		
10	B3	33, 3/MD1–T3A	BOP–ARR	B–208–099 IN–01	2	C	C2PF	A	–45 TB1–C3		
11	B4	33, 3/MD2–T2A	BOP–ARR	B–208–099 IN–03	2	C	C2PF	A	–46		
12	B5	33, 3/MD2–T3A	BOP–ARR	B–208–099 IN–03	2	C	C2PF	A	–47		
13	B6	CS, 33	MCB_A SWG	B–208–052 (EE–08)	2	C	C2PF	A	–48		
14	B7	CS, 33	MCB_A SWG	B–208–052 (EE–07)	2	C	C2PF	A	–49		
15	C1	86/M2–T2	SWG	B–208–052 (EE–04)	2	O	C1	A	–50		
16	C2	86/MD1–T1	SWG	B–208–052 (EE–01)	2	O	C1	A	–51		
17	C3	86/MD1–T3	SWG	B–208–052 (EE–05)	2	O	C1	A	–52		
18	C4	86/MD2–T2	SWG	B–208–052 (EE–02)	2	O	C1	A	–53		
19	C5	86/MD2–T3	SWG	B–208–052 (EE–06)	2	O	C1	A	–54		
20	C6	86/M2–T3	SWG	B–208–052 (EE–08)	2	O	C1	A	–55		
21	C7	86/M1–T3	SWG	B–208–052 (EE–07)	2	O	C1	A	–56		
22	D1	52S/M2–T2, 52S/M2–T3	SWG	B–208–052 (EE–04)	2	O	C2PF	A	–57		
23	D2	27Y–3/MD1, 27Z/MD1	SWG	B–208–052 (EE–60)	2	C	C2PF	A	–58		
24	D3	52S/MD1–T1, 52S/MD1–T3	SWG	B–208–052 (EE–01)	2	O	C2PF	A	–59		
25	D4	27Y–3/MD2, 27Z/MD2	SWG	B–208–052 (EE–61)	2	C	C2PF	A	–60		
26	D5	52S/MD2–T2, 52S/MD2–T3	SWG	B–208–052 (EE–02)	2	O	C2PF	A	–61		
27	D6	27Y–2/M2, 27Z/M2, 3/81–AB–R–M2, 3/81–BC–R–M2	SWG BOP–ARR	B–208–052 (EE–67) (EE–75)	2	C	C4PF	A	–62		
28	D7	52S/M1–T1, 52S/M1–T3	SWG	B–208–052 (EE–03)	2	O	C2PF	A	–63		
29	E1	27A–B/M1–UNIT 14, 27B–C/M2–UNIT 13	SWG	W1594F31	2	C	C2PF	A	–64		
30	E2	27X–3T/MD1	SWG	B–208–052 (EE–101)	2	C	C1	A	–65		
31	E3	43/EEMD1T1, 43/MD1–11, 43/MD1–12, 43/MD1–DG1, 43/MD1–13, 43/MD1–MD3	SWG	B–208–052 (EE–01, 09, 11, 12, 13, 86)	12	O	RF18	A	TB2–23 THRU TB2–C8 TB2–28		
32	E4	43/EEMD2T2, 43/MD2–21, 43/MD2–22, 43/MD2–DG2, 43/MD2–23, 43/MD2–MD3	SWG	B–208–052 (EE–02, 10, 14, 15, 16, 87)	12	O	RF19	A	TB2–29 THRU TB2–C9 TB2–34		
33	E5	27X–3T/MD2	SWG	B–208–052 (EE–102)	2	C	C1	A	TB1–68 TB1–C3		
34	E6	1/MD1–UVT, 1/LD11–UVT, 1/LD12	SWG	B–208–052 (EE–62)	2	O	C3SF	A	TB2–1 TB2–C4		
35	E7	1/MD2–UVT, 1/LD21–UVT, 1/LD22	SWG	B–208–052 (EE–63)	2	O	C3SF	A	–2		

NO.	DATE	BY	REVISION
13	28.09.17	MK	REVD PER MOD 1007–SI–L
12	17.05.16	MK	REVD PER MOD 796–SI–L
11	05.11.12	K.K.	REVD PER MOD 746–EE–L
10	02.04.08	MK	REVD PER MOD 811–SI–L
9	22.06.06	SPRO	REVD PER MOD 432–AD–L

Original Design Firm: WESTINGHOUS
Replaced Manual Drawing: 1462F87 SH-3
Last Revision And Date: 6, 22.12.1995

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

CHK'D	APP'D
S.K.	A.K.
D.S.	B.P.
Z.J.	B.P.
I.S.	B.P.
M.S.	B.P.
B.S.	

MADE	1. M. KOSMC	REFERENCE DRAWINGS:
CHECKED	2. A. VILMAN	
	3. D. MANDIC	

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO — KRSKO, SLOVENIA — LE APPROVAL

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO
ALB02
ANNUNCIATOR ENGRAVING & SYSTEMS INFO.

DRAWING NUMBER: 1462F87 — SHEET: 3 — REV: 13

1	2	3	4	5	6	7	
1 INVERTER #1 TROUBLE	2 INVERTER #2 TROUBLE	3 INVERTER #3 TROUBLE	4 INVERTER #4 TROUBLE	5 INVERTER #5 TROUBLE	6 INVERTER #6 TROUBLE	7 INVERTERS CH201INV, CH202INV CH203INV TROUBLE	A
8 BUS MD1 UNDERVOLTAGE & SIS LO 86/27A ACTUATED	9 BUS MD2 UNDERVOLTAGE & SIS LO 86/27B ACTUATED	10 125 VDC BUS 1A TROUBLE	11 125 VDC BATTERY CHARGER 1A TROUBLE	12 NAPAJALNI ODKLOPNIK L11/4C LASTNE RABE STIKALIŠČA ODPRT	13 LOAD ON BATTERY 220 VDC	14 TURBINE LO 86/TURB 1 ACTUATED/LOSS OF CONTROL POWER	B
15 LOAD ON BATTERY TRAIN A	16 LOAD ON BATTERY TRAIN B	17 125 VDC BUS 1B TROUBLE	18 125 VDC BATTERY CHARGER 1B TROUBLE	19 AUX BOILER FEEDER BRK TRIP	20 118V REG XFRM BUS A UNDERVOLTAGE OR REG XFRM TROUBLE	21 TURBINE LO 86/TURB 2 ACTUATED/LOSS OF CONTROL POWER	C
22 CW FILTER TROUBLE A	23 CW FILTER TROUBLE B	24 118V REG XFRM BUS B UNDERVOLTAGE OR REG XFRM TROUBLE	25 125 VDC SWING BATT CHARGER 1A–1B TROUBLE	26 LUBE OIL CONDITIONER TROUBLE	27 GN MONITORING REQUESTING LOAD REDUCTION	28 GEN BRK CLOSED & MW LESS THAN 3% 20 MW	D
29 CW FILTER TROUBLE C	30 CW FILTER TROUBLE D	31 220 VDC BUS TROUBLE	32 220 VDC BATTERY CHARGER TROUBLE	33 EP UPS 1/2 TROUBLE OR EP 220 VDC BUS UNDERVOLTAGE	34 GN MONITORING REQUESTING GENERATOR TRIP	35 GEN BRK CLOSED & TURBINE TRIPPED	E

ELECTRICAL SYSTEM 2
TAG NO. ALB03

Appendix 1 - Existing AS system essential drawings

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. 10

- WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
- ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
- ENGRAVING HAS BEEN CHANGED ON WINDOW NO. 20, 24 AND 28
- REFERENCE DRAWING HAS BEEN ADDED FOR WINDOW NO. 20 AND 24
- INITIATING DEVICE HAS BEEN ADDED FOR WINDOW NO. 20 AND 24
- ALARM COND HAS BEEN CHANGED FOR FOLLOWING WINDOWS NO.: 1, 2, 7, 8, 9, 11, 14, 18, 19, 25, 26, 31, 32, 33, 34

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	27, 59, 25	F	B-208-056 (ES-01)	2	O	C1	A	TB2-B TB2-C4		
2	A2	27, 59, 25	F	B-208-056 (ES-02)	2	O	C1	A	-9		
3	A3	27	F	B-208-056 (ES-01)	2	O	C4SF	A	-10		
4	A4	27	F	B-208-056 (ES-02)	2	O	C4SF	A	-11		
5	A5	27	F	B-208-056 (ES-01)	2	O	C4SF	A	-12		
6	A6	27	F	B-208-056 (ES-02)	2	O	C4SF	A	-13		
7	A7	ICF, SST, BSL, BSF, FF, LDCV, BBO, ACOO, IHV, ILV, IF, UT	INV	B-208-027 (CH-01)	2	C	C4SF	A	-14		
8	B1	86/27A	BOP-ECB	B-208-052, EE-76	2	C	C2SF	A	-15		
9	B2	86/27B	BOP-ECB	B-208-052, EE-77	2	C	C2SF	A	-16		
10	B3	27	F	W 9165D59	2	C	C1	A	-17		
11	B4	K31	F	40202693WSP	2	O	C1	A	-18		
12	B5	52A	F	B-208-138 (SY-02)	2	O	C1	A	-19		
13	B6	27	F	B-208-044, DC-01	2	O	C1	A	-20		
14	B7	86/TURB 1, 27C/TURB 1	PRB	B-208-144, TU-32	2	O	C2SF	A	-21		
15	C1	27	F	B-208-044, DC-01	2	O	C1	A	-22		
16	C2	27	F	B-208-044, DC-01	2	O	C1	A	-23 TB2-C5		
17	C3	27	F	W 9165D59	2	C	C1	A	-24		
18	C4	K31	F	40202693WSP	2	C	C1	A	-25		
19	C5	94, 95	SWG	B-208-123,SA-15,16	2	O	C2SF	A	-26		
20	C6	27/LS101BRDJ101, EE115XFRJ101	IB, CB	B-208-054, EP-02	2	O	C6SF	A	-27		
21	C7	86/TURB 2, 27C/86 TURB 2	PRB	B-208-144, TU-33	2	O	C2SF	A	-28		
22	D1	-3/K06	LP	B-208-039, CW-83	2	O	C1	A	-29		
23	D2	-3/K07	LP	B-208-039, CW-83	2	O	C1	A	-30		
24	D3	27/LS301BRDJ301, EE115XFRJ301	IB, CB	B-208-054. EP-03	2	O	C6SF	A	-31		
25	D4	K31	F	40202693WSP	2	C	C1	A	-32		
26	D5	LO100OPE001PNL-CR2	F	B-208-100, LO-07	2	C	C1	A	-33		
27	D6	TU103CABRMD7-R7	PDEH	B-208-080, GN-19	2	C	C1	A	-34		
28	D7	TU104CABRMC7-R4	PDEH	B-208-144, TU-34	2	C	C1	A	-35		
29	E1	-3/K08	LP	B-208-039, CW-83	2	O	C1	A	-36		
30	E2	-3/K09	LP	B-208-039, CW-83	2	O	C1	A	-37		
31	E3	27	LOCAL ANN	W 7028D47	2	C	C1	A	-38		
32	E4	K31	LOCAL ANN	40202693WSP	2	C	C1	A	-39		
33	E5	27/DC101PNLG901, PCB19/EP900UPS001 PCB19/EP900UPS002	CB	B-208-054, EP-05	2	C	C3PF	A	-40		
34	E6	TU103CABRMD7-R8	PDEH	B-208-080, GN-19	2	C	C1	A	-41		
35	E7	TU104CABRMC7-R3	PDEH	B-208-144, TU-34	2	C	C1	A	-42		

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 09-02-2015
Log Number: 132

Original Design Firm: WESTINGHOUSE
Replaced Manual Drawing: 1462F87 SH.4
Last Revision Add Date: 9 29/06/1994

THIS S.A.D. DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY.

NO.	DATE	BY	REVISION	DES. BY	APPR.
17	09/02/15	MAG	REVD PER CAP 2014-539	MAG	JNL
16	22/10/13	MAG	REVD PER MOD. 748-13-L	B.P.	JNL
15	15/10/09	B.P.	REVD PER MOD. 615-04-L & 684-04-L	B.P.	NL
14	15/12/08	B.P.	REVD PER MOD. 395-11-L & 495-11-L	M.K.	NL
13	07/2005	K.C.	REVD PER MOD.	S.N.	DM

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO
ALB03
ANNUNCIATOR ENGRAVING & SYSTEMS INFO

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO
KRSKO, SLOVENIA

1. MADE	2. CHECKED	3. I.E. APPROVAL

REFERENCE DRAWINGS:

SCALE: NONE
DRAWING NUMBER: 1462F87
SHEET 4 OF 17
REV. 10

SPES1455

FILE: 1462F87 DWG, SPREJEL:

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. 11
- WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
- ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
- ENGRAVING HAS BEEN CHANGED ON WINDOW NO. 35
- ALARM COND HAS BEEN CHANGED FOR FOLLOWING WINDOWS NO.: 8, 14, 24, 32
- REFERENCE DRAWING HAS BEEN ADDED TO WINDOW NO. 34
- WINDOW NO. 35 HAS BECOME SPARE

1	2	3	4	5	6	7
1 TURBINE EH FLUID PRESS PRE TRIP	2 EMERGENCY OIL PUMP MOTOR OVERLOAD	3 MAIN PUMP #1 FILTER PRESS HI	4 OTDT/OPDT TURBINE RUNBACK	5 HP RETURN FLUID PRESS HI	6 LOW EH SUPPLY HDR PRESS	7 TURBINE VIBRATION HI
8 TURBINE CONDENSER VACUUM PRE TRIP	9 GLAND STM BRG 3 HI/LO PRESS	10 MAIN PMP #2 FILTER PRESS HI	11 GENERATOR TURBINE RUNBACK	12 HP FLUID IN RESERVOIR LEVEL LO	13 ETS CONTROLLER TROUBLE	14 TURBINE VIBRATION HI-HI
15 TURBINE BRG OIL PRESS PRE TRIP	16 GLAND STM BRG 4 HI/LO PRESS	17 OIL RESERVOIR OIL LEVEL HI	18 EH FLUID TEMP HI	19 HP FLUID IN RESERVOIR LEVEL LO-LO	20 OA/OPC CONTROLLER TROUBLE	21 TURBINE SUPERVISORY TROUBLE
22 TURBINE OVERSPEED PRE TRIP	23 GLAND STM BRG 5 HI/LO PRESS	24 OIL RESERVOIR OIL LEVEL LO	25 TURBINE OIL COOLER TEMP HI	26 HP FLUID IN RESERVOIR LEVEL HI	27 ATC/MSR CONTROLLER TROUBLE	28 BYPASS VALVE FCV3993 NOT IN AUTO MODE
29 TURBINE ROTOR POSITION PRE TRIP	30 GLAND STM BRG 6 HI/LO PRESS	31 HP OR EMERG OIL PUMP PULL TO LOCK	32 BRG OIL, BRG LIFT OR SEAL OIL BACK UP PULL TO LOCK	33 HP FLUID LO-LO LEVEL LOCKOUT	34 ATC/MSR CONTROLLER VITAL FAILURE	35 ATC PROGRAM REQUEST TURBINE TRIP

TURBINE 1
TAG NO. ALB04

A
B
C
D
E

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	TU106OABRMC5-R4	PDEH	B-208-144; TU-34	2	C	C1	A	TB2-48		
2	A2	49/OL	F	B-208-144; TU-01	2	C	C1	A	-49		
3	A3	63J/MPD1	F	B-208-144; TU-04	2	C	C1	A	-50		
4	A4	TU104CAB-AR6	PDEH	B-208-080; GN-39	2	C	C1	A	-51		
5	A5	63/PR	F	B-208-144; TU-29	2	C	C1	A	-52		
6	A6	63/LP	F	B-208-144; TU-29	2	C	C1	A	-53		
7	A7	TU201CABRGK1-R5	F	B-208-144; TU-34	2	O	C1	A	-54		
8	B1	TU106OABRMC5-R5	PDEH	B-208-144; TU-34	2	C	C1	A	-55		
9	B2	63/SS3	F	B-208-144; TU-29	2	C	C2SF	A	-56		
10	B3	63D/MPF2	F	B-208-144; TU-05	2	C	C1	A	-57		
11	B4	(TU104CAB-AR2)	PDEH	B-208-080; GN-39	2	C	C1	A	-58		
12	B5	71/FL2	F	B-208-144; TU-29	2	C	C1	A	-59		
13	B6	TU106OABRMB7-R7	PDEH	B-208-144; TU-34	2	O	C1	A	-60		
14	B7	TU201CABRGK1-R7	F	B-208-144; TU-34	2	O	C1	A	-61		
15	C1	TU106OABRMC5-R6	F	B-208-144; TU-29	2	O	C2SF	A	-62		
16	C2	63/SS4	F	B-208-144; TU-29	2	O	C2SF	A	-63		
17	C3	71/OL	F	B-208-144; TU-02	2	O	C1	A	-64		
18	C4	TS-5468	F	B-208-139; TC-03	2	C	C1	A	-65		
19	C5	71/FU	F	B-208-144; TU-29	2	C	C1	A	-66		
20	C6	TU104OABRMC7-R9	PDEH	B-208-144; TU-34	2	O	C1	A	-67		
21	C7	TU201CAB-K1, TU201CAB-K2	TSI	B-208-144; TU-34	2	O	C2PF	A	-68		
22	D1	71/OL, TU106OABRMC5-R7	PDEH	B-208-144; TU-34	2	O	C1	C1	TB3-1		
23	D2	63/GS5	F	B-208-144; TU-29	2	O	C2SF	A	-2		
24	D3	71/OL	F	B-208-144; TU-02	2	O	C1	A	-3		
25	D4	TS-5466	F	B-208-139; TC-03	2	C	C1	A	-4		
26	D5	71/FU	F	B-208-144; TU-29	2	C	C1	A	-5		
27	D6	TU103OABRMD7-R5	PDEH	B-208-144; TU-34	2	O	C1	A	-6		
28	D7	1/FCV3993	CB	B-208-041; CY-09	2	C	C1	C1	-7		
29	E1	TU106OABRMC5-R3, YU/TU-RCK1-15/CH1, YU/TU-RCK2-15/CH1	PDEH, TSI	B-208-144; TU-34	2	C	C3PF	A	-8		
30	E2	63/GSG	F	B-208-144; TU-29	2	O	C2SF	A	-9		
31	E3	1/EOP, 1/MP1, 1/MP2	CB	B-208-144; TU-01,04,05	2	C	C3PF	A	-10		
32	E4	1/BL, 1/BOP, 1/SOB	CB	B-208-144; TU-06,07,08	2	C	C3PF	A	-11		
33	E5	86/LFT	F	B-208-144; TU-02	2	O	C1	A	-12		
34	E6	TU103OAB-AR41	PDEH	B-208-144; TU-34	2	O	C1	A	-13		
35	E7	TU103OABRMD7-R6	PDEH	B-208-144; TU-34	2	C	C1	A	-14		

NO.	DATE	BY	REVISION	CHD. BY	E.C. APPR.
13	07.2009	M.G.	REV'D PER MOD 500-TU-L & 488-TU-L	S.N.	D.K.
14	10.2009	M.G.	CORRECT PER MOD. 500-TU-L	S.N.	D.K.
15	10.5.15	D.K.	REV'D PER MOD 1123-TU-L	S.N.	R.K.
11	22.08.08	SPRO	REV'D PER MOD 432-AS-L	M.S.	R.K.
12	15.05.09	M.K.	REV'D PER CAF 2009-1276	M.B.	N.L.

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

Original Design Firm: WESTINGHOUSE
Reposed Manual Drawing: 1462F87, Sh.5
Last Revision And Date: 4 06.03.1980

Data Received: 09-07-2015

Westinghouse Electric Nuclear
MASTER DOCUMENT

50.39F

146

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO
ALB04
ANNUNCIATOR ENGRAVING & SYSTEMS INFO.

DESIGN ENGINEERING
MADE: KRSKO, SLOVENIA
CHECKED: LE APPROVAL
1. M. KODRIC 2. A. VLIANN 3. 4. 5. D. MANDIC

REFERENCE DRAWINGS:

DRAWING NUMBER	SYSTEM	SH.NO.	REV
1462F87			

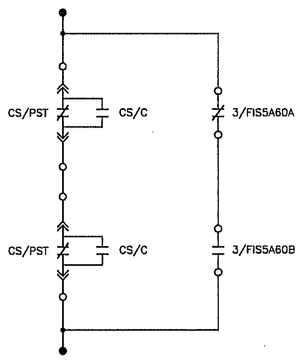
FILE: 1462F876 DWG, SPREJEL: ____

Appendix 1 - Existing AS system essential drawings

	1	2	3	4	5	6	7	8	9	
	1 TURBINE PLANT INSTR AIR HEADER A OR B PRESS LO	2 TURBINE CLOSED CYCLE PMP MTR OVERLOAD IN PROGRESS OR TRIP	3 CW102PMP–001 SEAL WATER FLOW TROUBLE	4 CONDENSATE PMPS SEAL WTR PRESS LO	5 CONDENSER HOTWELL LEVEL HI/LO	6 VACUUM PRIMING PMP 001 OR 002 PULL TO LOCK	7 LOCAL FW PNL TROUBLE	8 FW/WT LOCAL CONTROL PNLS TROUBLE	9 AUX BOILER 1 OR 2 OR FO SYSTEM TROUBLE	A
	10 TURBINE PLANT SERVICE AIR HDR PRESS LO	11 TURBINE CLOSED CYCLE PMP PULL TO LOCK	12 CW102PMP–002 SEAL WATER FLOW TROUBLE	13 CONDENSATE PMP PULL TO LOCK	14 CONDENSER A OR B LOSS OF VACUUM	15 VACUUM CONTROL TANK LEVEL HI	16 FW CHEMICAL ADDITION LOCAL PNL TROUBLE	17 POWER CYCLE SAMPLING LOCAL PNL TROUBLE	18 CONDENSER TUBE CLEANING TROUBLE	B
	19 TURBINE CLOSED CYCLE COOLING LO FLOW	20 TURBINE CLOSED CYCLE HEAD TANK LEVEL HI/LO	21 CW102PMP–003 SEAL WATER FLOW TROUBLE	22 CONDENSATE PMP MTR OVERLOAD IN PROGRESS OR TRIP	23 VACUUM PUMP MOTOR TRIP	24 VACUUM CONTROL TANK PRESS HI	25 PORAST NIVOJA SAVE GORVODNO	26 FW PUMP VIBRATION HI ALERT	27 FW PUMP VIBRATION HI–HI DANGER	C
	28 AUX STM HDR PRESS LO	29 CW TUNNEL PRESS LO	30 CW TUNNEL PRESS HI	31 CONDENSER STG TANK 001 OR 002 LEVEL HI/LO	32 CONDENSER △ P MISMATCH	33 ATMOSPHERIC DRAIN TANK LEVEL HI	34 NAPAKA V MERILNO REG SISTEMU NA JEZU SAVE	35 LOCAL CW OR CT PNL TROUBLE	36 GEN AUX PNL TROUBLE	D
	37 TG CONDENSER HI–HI LEVEL LO VACUUM OR VALVE 28522 OPEN	38 CW PMP MTR OVERLOAD IN PROGRESS OR TRIP	39 CW TRASH RAKE HI △ LEVEL	40 CW TRAVELING SCREEN HI △ LEVEL	41 CONDENSER STG TANK 001 OR 002 LO–LO LEVEL	42 ATMOSPHERIC DRAIN TANK LEVEL LO	43 ATMOSPHERIC DRAIN TANK PUMP PULL TO LOCK	44 AUXILIARY STEAM PRESS LOW OR VALVE 26515 OPENING	45 LOCAL PANEL CK001PNL001 TROUBLE	E

TURBINE 2
TAG NO. ALB05

FIG. 1



THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. 17
– WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
– ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
– ENGRAVING HAS BEEN CHANGED ON FOLLOWING WINDOWS NO.:
9, 31, 37, 41, 44, 45
– ALARM COND HAS BEEN CHANGED FOR FOLLOWING WINDOWS NO.:
3, 7, 8, 10, 12, 17, 19, 21, 23, 28, 34, 45

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	PS–6242 & PS6242A	F	B–208–097; IA–01	2	O	C2SF	A	TB3–20 TB3–C7		
2	A2	CONTACTS FROM 74 & 86 RELAYS	SWG	B–208–139; TC–01	2	C	C4PF	A	–21		
3	A3	1/CW102PMP001 & FU5578, 2/FB5578B, 3/FB5578A	ARR	B–208–039; CW–01	2	C	C1	A	–22		
4	A4	PS3971	F	B–208–041; CY–06	2	O	C1	A	–23		
5	A5	(LS3854/LS3853)	F	B–208–041; CY–13	2	O	C2SF	A	–24 TB3–C8		
6	A6	(1/VC100CPR001/ 1/VC100CPR002)	CB	B–208–147; VC–01	2	C	C2PF	A	–25		
7	A7	PC100CME012	LP	B–208–066; FW–34	2	C	C2SF	A	–26		
8	A8	AUX REL 38KA2	LP	B–208–156; WT–29	2	O	C1	A	–27		
9	A9	G868–K533; G869–K533; (G758–KA101)	LP	B–208–123; SA–08	2	C	(C3PF)	A	–28		
10	B1	PS6190	F	B–208–021; CA–01	2	C	C1	A	–29		
11	B2	1/TC101PMP001 & 002	CB	B–208–139; TC–01	2	C	C2PF	A	–30		
12	B3	1/CW102PMP002 & FU5577, 2/FB5577B, 3/FB5577A	ARR	B–208–039; CW–02	2	C	C1	A	–31		
13	B4	(1/CY100PMP001, 002, 1/CY100PMP003)	CB	B–208–041; CY–06	2	C	C3PF	A	–32		
14	B5	PY3866B, PY3867B	BOP–PCS	B–208–041; CY–13	2	O	C2SF	A	–33		
15	B6	LUI6144	LP	B–810–147, sh.1	2	O	C1	A	–34		
16	B7	C–HLLX, C–ALLX, HLLX, ALLX	LP	B–208–059; FC–06	2	O	C4SF	A	–35		
17	B8	SX101RCK001	LP	B–208–137; SX–03	2	C	C1	A	–36		
18	B9	EE106PNLG838	LP	816–326; 53	2	C	C1	A	–37		
19	C1	FIS5460	F	B–208–139; TC–01	2	C	C6SPF	A	–38		
20	C2	PDEH, R1/TU103CAB–RMD7 (DO13246)	PDEH	B–208–139; TC–03	2	O	C1	A	–39		
21	C3	1/CW102PMP003 & FU5576, 2/FB5576B, 3/FB5576A	ARR	B–208–039; CW–03	2	C	C1	A	–40		
22	C4	CONTACTS FROM 74 & 86 RELAYS	SWG	B–208–041; CY–08	2	C	C6PF	A	–41		
23	C5	OTS CONTACTS	SWG	B–208–038; CV–01	2	C	C6PF	A	–42		
24	C6	PS6141	F	B–208–147; VC–03	2	O	C1	A	–43		
25	C7	X923–K501	LP	B–208–121,SH.24	2	O	C3SF	A	–44		
26	C8	VIBRATION–HI	LP	B–208–066; FW–34	2	O	C1	A	–45 TB3–C9		
27	C9	VIBRATION–HI–HI	LP	B–208–066; FW–34	2	O	C1	A	–46		
28	D1	PS3426	F	B–208–123; SA–08	2	C	C1	A	–47		
29	D2	PY/5556	BOP–PCS	B–208–039; CW–19	2	O	C1	A	–48		SEE FIGURE 1
30	D3	PS–5593	F	B–208–039; CW–19	2	O	C1	A	–49		
31	D4	LY3894B, C; LY3895B, C	F	B–208–041; CY–13	2	O	C4SF	A	–50		
32	D5	PY/3866D; PY/3867D	BOP–PCS	B–208–041; CY–13	2	O	C2SF	A	–51		
33	D6	LS3888	F	B–208–041; CY–11	2	C	C1	A	–52		
34	D7	RD106PNLX921–ANN	RD	B–208–121,SH.24	2	O	C1	A	–53		
35	D8	EE106PNLX824	LP	B–208–039; CW–19	2	O	C2SF	A	–54		
36	D9	GN099SYEG702–ANN	LP	B–208–080; GN–54	2	C	C1	A	–55		
37	E1	LS5453, 33 CONTACTS, (RMB7–R3)	F	B–208–141; TG–02	2	O	(C3SF)	A	–56		TG SYSTEM
38	E2	CONTACTS FROM 74 & 86 RELAYS	SWG	B–208–039; CW–01	2	C	C6PF	A	–57		
39	E3	LUI5552	LP	B–208–039; CW–123	2	O	C1	A	–58		
40	E4	LUI5551	LP	B–208–039; CW–123	2	O	C1	A	–59		
41	E5	LY/3894A, LY/3895A	F	B–208–041; CY–13	2	O	C2SF	A	–60		
42	E6	LS3887	F	B–208–041; CY–11	2	O	C1	A	–61		
43	E7	1/CY112PMP001 & 002	CB	B–208–041; CY–11	2	C	C2PF	A	–62		
44	E8	PIS3455, 33 CONTACT	F	B–208–141; TG–01	2	O	C2SF	A	–63		
45	E9	CONTACT FROM CKALB01	LP	B–208–030; CK–45	2	O	C1	A	–64		

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 08-04-2022
Log Number: 1151
S.O. 335

Original Design Firm: WESTINGHOUSE
Replaced Manual Drawing: 1462F87 Sh 6
Last Revision And Date: 3 14.07.1995

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DOCC	BY	REVISION	DSN. BY	DR. BY	CHK. BY
27	ELSA18	BLZ.	REVD PER MOD. 625–TD–L	J.K.	M.L.	
26	ELSA18	M.S.	REVD PER MOD 1043–RD–L	J.K.	E.P.	
25	ELSA18	BLZ.	REVD PER MOD 1211–CA–L	J.K.	M.L.	
24	ELSA17	F.F.	REVD PER MOD 1224–RD–L	T.K.	M.L.	
23	ELSA22	M.S.	REVD PER MOD 1224–RD–L	T.K.	M.L.	

DESIGN ENGINEERING
NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRSKO
ALB05
ANNUNCIATOR ENGRAVING & SYSTEMS INFO.

	MADE	CHECKED	KRSKO, SLOVENIA LE APPROVAL
1.	M. KODRIČ		
2.	M. SUŠNIC		
3.	V. DRNŠEK		

REFERENCE DRAWINGS:

SCALE	DRAWING NUMBER	SYSTEM	SHEET	REV
	1462F87	1	6	28

SP-FS1455

14/4/11

Appendix 1 - Existing AS system essential drawings

1	2	3	4	5	6	7	8	9	10	11	
1 FW HTR 1A OR 2A HI/LO LEVEL	2 FW HTR 1A OR 2A HI–HI LEVEL	3 FW PUMP MTR OVERLOAD IN PROGRESS OR TRIP	4 FW ISOL VLV LOOP 1 CLOSE SIGNAL	5 HD LEVEL CONTROL SYSTEM URGENT ALARM	6	7 SG1 HI AF FLOW TURB PMP FLOW ISOL VLV 11096 CLOSED	8 SG1 HI AF FLOW MTR PMP 01A TRIP	9 AF MTR PMP 01A OR 02B PULL TO LOCK OR BKR DISCONNECT	10 AF TURB STM INLET VLV SWITCH 1/20000A IN STOP	11	A
12 FW HTR 1B OR 2B HI/LO LEVEL	13 FW HTR 1B OR 2B HI–HI LEVEL	14 FW PMP 1, 2 OR 3 PULL TO LOCK/BRK DISCONNECT	15 FW ISOL VLV LOOP 2 CLOSE SIGNAL	16 HD LEVEL CONTROL SYSTEM NON–URGENT ALARM	17 MISC CHEMICAL ADDITION LOCAL PNL TURBINE PLANT TROUBLE	18 SG2 HI AF FLOW TURB PMP FLOW ISOL VLV 11105 CLOSED	19 SG2 HI AF FLOW MTR PMP 02B TRIP	20	21 AF TURB STM INLET VLV SWITCH 1/20000B IN STOP	22	B
23 FW HTR 3A LO LEVEL	24 FW HTR 3B LO LEVEL	25 FW HTR 4A LO LEVEL	26 FW HTR 4B LO LEVEL	27 FW HTR 5A LO LEVEL	28 FW HTR 5B LO LEVEL	29 FW HTR 6A LO LEVEL	30 FW HTR 6B LO LEVEL	31 SW TRAIN A TO AF SUPPLY PRESS LO & CST LEVEL LO	32 AF PMP MTR OVERLOAD IN PROGRESS OR TRIP	33	C
34 FW HTR 3A HI LEVEL	35 FW HTR 3B HI LEVEL	36 FW HTR 4A HI LEVEL	37 FW HTR 4B HI LEVEL	38 FW HTR 5A HI LEVEL	39 FW HTR 5B HI LEVEL	40 FW HTR 6A HI LEVEL	41 FW HTR 6B HI LEVEL	42 SW TRAIN B TO AF SUPPLY PRESS LO & CST LEVEL LO	43 AF MTR PMP 01A, 02B OR TURB PMP SUCT PRESS LO	44	D
45 FW HTR 3A HI–HI LEVEL	46 FW HTR 3B HI–HI LEVEL	47 FW HTR 4A HI–HI LEVEL	48 FW HTR 4B HI–HI LEVEL	49 FW HTR 5A HI–HI LEVEL	50 FW HTR 5B HI–HI LEVEL	51 FW HTR 6A HI–HI LEVEL	52 FW HTR 6B HI–HI LEVEL	53	54 AF TURB PMP STM INLET PRESS LO	55 AF TURBINE LOCAL PNL TROUBLE	E

FEEDWATER/AUXILIARY FEEDWATER
TAG NO. ALB06

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	K111	F	B–208–091, HD–23	2	O	C1	A	TB4–1 TB4–C10		
2	A2	K211	F	B–208–091, HD–20	2	O	C1	A	–2		
3	A3	CONTACTS FROM 74 & 86 RELAYS	SWG	B–208–066, FW–01	2	C	C8PF	A	–3		
4	A4	3/SV21136A, 3/SV21136B	F	B–208–066, FW–12	2	O	C2SF	A	–4		
5	A5	K175		B–208–091, HD–25	2	O	C1	A	–5		
6	A6	SPARE				C			–6		
7	A7	33bo/11096	F	B–208–014, AF–16	2	C	C1	A	–7		
8	A8	3/AF102PMP01AB	ARR	B–208–014, AF–01	2	O	C1	A	–8		
9	A9	3/AF102PMP01A		B–208–014, AF–01				A			
		3/AF102PMP02B 33 CONTACTS	ARR, SWG	B–208–099, IN–01, 03	2	C	C4PA	A	–9		
10	A10	3/20000A	ARR	B–208–099, IN–01	2	C	C1	A	–10		
11	A11	SPARE				C			–11		
12	B1	K311	F	B–208–091, HD–24	2	O	C1	A	–12		
13	B2	K411	F	B–208–091, HD–21	2	O	C1	A	–13		
14	B3	3/FW105PWP & 33 CONTACTS	SWG, ARR	B–208–066, 099, FW–02, IN–01	2	C	C4PF	A	–14		
15	B4	3/SV21137A, 3/SV21137B	F	B–208–066, FW–48	2	O	C2SF	A	–15		
16	B5	K173		B–208–091, HD–25	2	O	C1	A	–16		
17	B6	AB–HLLX, AB–ALLX, TR–SNLLX	LP	B–208–026, CF–06	2	O	C3SF	A	–17		
18	B7	33bo/11105	F	B–208–014, AF–17	2	C	C1	A	–18		
19	B8	3/AF102PMP02BB	ARR	B–208–014, AF–02	2	O	C1	A	–19		
20	B9	SPARE				C			–20		
21	B10	3/20000B	ARR	B–208–099, IN–03	2	C	C1	A	–21		
22	B11	SPARE				C			–22		
23	C1	K113	F	B–208–091, HD–23	2	O	C1	A	–23 TB4–C11		
24	C2	K313	F	B–208–091, HD–23	2	O	C1	A	–24		
25	C3	K115	F	B–208–091, HD–23	2	O	C1	A	–25		
26	C4	K315	F	B–208–091, HD–23	2	O	C1	A	–26		
27	C5	K117	F	B–208–091, HD–23	2	O	C1	A	–27		
28	C6	K317	F	B–208–091, HD–24	2	O	C1	A	–28		
29	C7	K119	F	B–208–091, HD–24	2	O	C1	A	–29		
30	C8	K319	F	B–208–091, HD–24	2	O	C1	A	–30		
31	C9	PIS3017, LY/3894B1	F	B–208–014, AF–15	2	C	C1	A	–31		
32	C10	CONTACTS FROM 74 & 86 RELAYS	SWG	B–208–014, AF–02	2	C	C4PA	A	–32		
33	C11	SPARE				C			–33		
34	D1	K112	F	B–208–091, HD–23	2	O	C1	A	–34		
35	D2	K312	F	B–208–091, HD–23	2	O	C1	A	–35		
36	D3	K114	F	B–208–091, HD–24	2	O	C1	A	–36		
37	D4	K314	F	B–208–091, HD–24	2	O	C1	A	–37		
38	D5	K116	F	B–208–091, HD–24	2	O	C1	A	–38		
39	D6	K316	F	B–208–091, HD–24	2	O	C1	A	–39		
40	D7	K118	F	B–208–091, HD–24	2	O	C1	A	–40		
41	D8	K318	F	B–208–091, HD–24	2	O	C1	A	–41		
42	D9	PIS3018, LY3895B1	F	B–208–014, AF–15	2	C	C1	A	–42		
43	D10	PY3000A, PY3001A, PY3002A	BOP, PCS	B–208–014, AF–15	2	O	C3SF	A	–43		
44	D11	SPARE				C			–44		
45	E1	K212	F	B–208–091, HD–08	2	O	C1	A	–45 TB4–C12		
46	E2	K412	F	B–208–091, HD–12	2	O	C1	A	–46		
47	E3	K213	F	B–208–091, HD–07	2	O	C1	A	–47		
48	E4	K413	F	B–208–091, HD–11	2	O	C1	A	–48		
49	E5	K214	F	B–208–091, HD–06	2	O	C1	A	–49		
50	E6	K414	F	B–208–091, HD–10	2	O	C1	A	–50		
51	E7	K215	F	B–208–091, HD–05	2	O	C1	A	–51		
52	E8	K415	F	B–208–091, HD–09	2	O	C1	A	–52		
53	E9	SPARE				C			–53		
54	E10	3/PIS3712	ARR	B–208–105, MS–45	2	O	C1	A	–54		
55	E11	R–722	LP	B–208–014, AF–23	2	O	C1	A	–55		

REF. DWG: 1207E07 SH. 3 ITEM 197

Original Design Firm: WESTINGHOUSE
Original Design Drawing No.: 6 – 1462F 877
Last Revision And Date: 05.1991

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	CHD. BY	E. APPR.
20	29.06.18	K.K.	REVD PER MOD. 1007–2R–1	M.M.	B.P.
19	27.10.17	K.K.	REVD PER QAF 2017–2393 & 2017–2416	M.D.	B.P.
18	20.10.17	K.K.	REVD PER QAF 2017–1287	M.D.	B.P.
17	03.02.17	BIC	REVD PER MOD 1911–AF–L	G.J.	B.P.
16	28.08.14	K.K.	REVD PER QAF 2013–3552	M.D.	B.P.

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 12-07-2018
Log Number: 149

NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRSKO
ALB06
ANNUNCIATOR ENGRAVING & SYSTEMS INFO.

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO, KRSKO, SLOVENIA

	MADE	CHECKED	LE. APPROVAL
1.	M. KODRIČ		
2.		A. VILMAN	
3.			D. MANDIĆ

REFERENCE DRAWINGS:

SCALE:

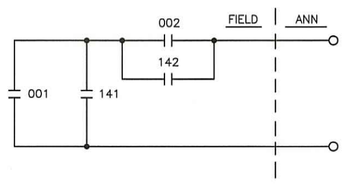
1462F877 SH. 1 REV. 20

DRAWING NUMBER

1	2	3	4	5	6	7	8	9	10	11	
1 HTR DRAIN PMP OVERLOAD IN PROGRESS OR TRIP	2 MSR–A DRAIN TANK A HI LEVEL	3 MSR–B DRAIN TANK B HI LEVEL	4 LS3719B MAIN STM LINE DRAIN LOOP 1 HI–HI LEVEL	5	6 STM GEN 1 FLOW MISMATCH	7 STM GEN 2 FLOW MISMATCH	8 STM GEN 1 LEVEL DEVIATION	9 STM GEN 2 LEVEL DEVIATION	10 TURBINE STM STOP VLVS CLOSE	11 TURBINE AUTO STOP OIL	A
12 SG LEVEL LOW–LOW BLOWDOWN ISOL VLVS OPENED	13 MSR–A 1ST STAGE DRAIN TANK HI LEVEL	14 MSR–B 1ST STAGE DRAIN TANK HI LEVEL	15 LS3717B MAIN STM LINE DRAIN LOOP 1 HI–HI LEVEL	16 MAIN STM LINE ISOLATION VLV CLOSED	17 STM GEN 1 LO LEVEL ALERT	18 STM GEN 2 LO LEVEL ALERT	19 STM GEN 1 HI–HI LEVEL	20 STM GEN 2 HI–HI LEVEL	21 TURBINE INLET PRESS CHANNEL OUT OF SERVICE	22 LO TAVG AND REACTOR TRIP FW VLVS CLOSE	B
23 HTR DRAIN TANK HI/LO LEVEL	24 MSR–A 2ND STAGE DRAIN TANK HI LEVEL	25 MSR–B 2ND STAGE DRAIN TANK HI LEVEL	26 LS3718B MAIN STM LINE DRAIN LOOP 2 HI–HI LEVEL	27 LS3759B MAIN STM XOVER LINE HI–HI LEVEL	28 STM GEN 1 STMLINE HI–HI FLOW ALERT	29 STM GEN 2 STMLINE HI–HI FLOW ALERT	30 STM GEN 1 LO–LO LEVEL	31 STM GEN 2 LO–LO LEVEL	32 LOOP 1 FW ISOL VALVE N_2 PRECHARGE LO	33 LOOP 2 FW ISOL VALVE N_2 PRECHARGE LO	C
34 HTR DRAIN TANK HI–HI LEVEL	35 EXTRACTION LINE A DRAIN LEVEL HI	36 HTR DRAIN TANK LO–LO LEVEL PMP TRIP	37 LS3728 MAIN STM LINE DRAIN LOOP 1 HI–HI LEVEL	38	39 STM GEN 1 STM LINE HI & P12 OR HI–HI STM FLOW ALERT	40 STM GEN 2 STM LINE HI & P12 OR HI–HI STM FLOW ALERT	41	42	43	44 BD ISOL VALVS AREA TEMP HI–HI/OR/ URGENT ALARM	D
45 HTR DRAIN PMP DISCH FLOW LO	46 EXTRACTION LINE B DRAIN LEVEL HI	47 HD PUMPS TROUBLE	48 LS3729 MAIN STM LINE DRAIN LOOP 2 HI–HI LEVEL	49	50 STM GEN 1 STMLINE LO PRESS SI ALERT	51 STM GEN 2 STMLINE LO PRESS SI ALERT	52 STM GEN 1 STMLINE LO PRESS	53 STM GEN 2 STMLINE LO PRESS	54	55	E

MAIN STEAM & STEAM GENERATORS
TAG NO. ALB07

DETAIL "B"



WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	CONTACTS FROM 74 & 66 RELAYS	SWG	B–208–091, HD–01	2	C	C6PF	A	TB4–62 TB4–C12		
2	A2	K122	F	B–208–091, HD–18	2	O	C1	A	–63		
3	A3	K322	F	B–208–091, HD–19	2	O	C1	A	–64		
4	A4	LS3719B	F	B–208–105, MS–08	2	O	C1	A	–65		
5	A5	SPARE				C			–66		
6	A6	FY/510BA1, FY/510BA2	PCS	8756D36–19							
				B–208–066, FW–34	5	O	C2SA	A	–67,67A		
7	A7	FY/520BA1, FY/520BA2	PCS	8756D36–21							
				B–208–066, FW–34	5	O	C2SA	A	–68,68A		
8	A8	LY/551A1, LY/551A2	PCS	8756D36–19				A			
				B–208–066, FW–34	3	O	C2SA		TB5–1,1A TB5–C13		
9	A9	LY/552A1, LY/552A2	PCS	8756D36–21							
				B–208–066, FW–34	3	O	C2SA	A	–2		
10	A10	K1001, K1002	CBDM	8759D79–38	2	C	C2PF	A	–3		
11	A11	K1005, K1006, K1007	CBDM	8759D79–38	2	C	C3PF	A	–4		
12	B1	K713, K714	PSC	B–208–018, BD–9,10,12,14	4	C	C4PF	A	–5		
13	B2	K121	F	B–208–091, HD–17	2	O	C1	A	–6		
14	B3	K321	F	B–208–091, HD–19	2	O	C1	A	–7		
15	B4	LS3717B	F	B–208–105, MS–09	2	O	C1	A	–8		
16	B5	33ac/20001, 33ac/20002, 33ao/20141, 33ao/20142	F	B–208–105, MS–40	2	O	DETAIL "B"	A	–9		
17	B6	K0709, K0710	CBDM	8759D79–35	2	C	C2PF	A	–10		
18	B7	K0711, K0712	CBDM	8759D79–35	2	C	C2PF	A	–11		
19	B8	K0901, K0902, K0903	CBDM	8759D79–37	2	C	C3PF	A	–12		
20	B9	K0904, K0905, K0906	CBDM	8759D79–37	2	C	C3PF	A	–13		
21	B10	PY/550X, PY/550Y	PCS	8756D36–19	3	O	C2SA	A	–14,14A		
22	B11	K1010	CBDM	8759D79–38	2	C	C1	A	–15		
23	C1	K323	F,ARR	B–208–091, HD–02	2	O	C1	A	–16		
24	C2	K120	F	B–208–091, HD–17	2	O	C1	A	–17		
25	C3	K320	F	B–208–091, HD–18	2	O	C1	A	–18		
26	C4	LS3718B	F	B–208–105, MS–07	2	O	C1	A	–19		
27	C5	LS3759B	F	B–208–105, MS–42	2	O	C1	A	–20		
28	C6	K0602, K0604	CBDM	8759D79–34	2	C	C2PF	A	–21		
29	C7	K0606, K0608	CBDM	8759D79–34	2	C	C2PF	A	–22		
30	C8	K0803, K0804, K0805	CBDM	8759D79–36	2	C	C3PF	A	–23 TB5–C14		
31	C9	K0806, K0807, K0808	CBDM	8759D79–36	2	C	C3PF	A	–24		
32	C10	PS91A, PS91B	F	B–208–066, FW–11	2	O	C2SF	A	–25		
33	C11	PS91A, PS91B	F	B–208–066, FW–48	2	O	C2SF	A	–26		
34	D1	K416	F	B–208–091, HD–15	2	O	C1	A	–27		
35	D2	LS3902	F	B–208–057, EX–07	2	O	C1	A	–28		
36	D3	K422	F	B–208–091, HD–25	2	O	C1	A	–29		
37	D4	LS3728	F	B–208–105, MS–01	2	O	C1	A	–30		
38	D5	SPARE				C			–31		
39	D6	K0613	CBDM	8759D79–34	2	C	C1	A	–32		
40	D7	K0614	CBDM	8759D79–34	2	C	C1	A	–33		
41	D8	SPARE				C					
42	D9	SPARE				C					
43	D10	SPARE				C			–36		
44	D11	–K100A, –K200A, –K101	F	B–208–018, BD–09	2	O	C3SF	A	–37		EE106PNLG981
45	E1	K1704	F	B–208–091, HD–29	2	O	C1	A	–38		HD900RCKG001
46	E2	LS3903	F	B–208–057, EX–08	2	O	C1	A	–39		
47	E3	K1703BO	F	B–208–091, HD–19		O	C1	A	–40		HD900RCKG001
48	E4	LS3729	F	B–208–105, MS–02	2	O	C1	A	–41		
49	E5	SPARE				C			–42		
50	E6	K0907, K0908, K0909	CBDM	8759D79–37	2	C	C3PF	A	–43		
51	E7	K0910, K0911, K0912	CBDM	8759D79–37	2	C	C3PF	A	–44		
52	E8	PY/514A2, PY/515A2, PY/516A2	PCS	8756D36 SH.12&14							
				B–208–105, MS–40	4	O	C3SA	A	–45,45A,45B		
53	E9	PY/524A2, PY/525A2, PY/526A2	PCS	8756D36 SH.12&14							
				B–208–105, MS–40	4	O	C3SA	A	–46,46A,46B TB5–C15		
54	E10	SPARE				C			–47 TB3–SP18		
55	E11	SPARE				C		A	–48 TB5–C15		

Appendix 1 - Existing AS system essential drawings

SP-ES1455

MASTER DOCUMENT
Date Received: 15-03-2013
Log Number: 143

S.O. 395

Original Design Firm: WESTINGHOUSE
Original Drawing Date: 13.01.1993
Last Revision And Date: E 13.01.1993

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	DRG. BY	LE APPR.
23	13.01.93	M.K.	REVISED PER ECP 2015–2174	N.L.	B.P.
22	93.11.22	V.S.	REVISED PER MOD. 1700–05–L	M.M.	D.V.
21	93.06.18	V.S.	REVISED PER MOD. 1707–91–L	M.D.	B.P.
20	93.10.07	K.K.	REVISED PER ECP 2017–1287		
19	93.07.19	K.G.	REVISED PER ECP 2015–2174		

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO
ALB07
ANNUNCIATOR ENGRAVING & SYSTEMS INFO.

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO
KRSKO, SLOVENIA

	MADE	CHECKED	LE APPROVAL
1.	M. KODRIČ		
2.		A. VILMAN	
3.			D. MANDIĆ

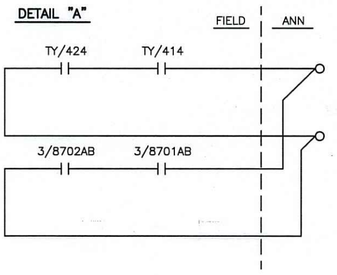
REFERENCE DRAWINGS:

DRAWING NUMBER	SYSTEM	SHEET	REV.
1462F87	1	8	23

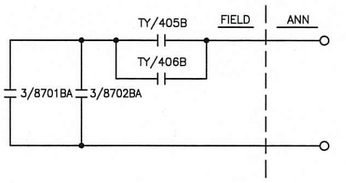
1	2	3	4	5	6	7	
1 PRZR LO PRESS PWR RELIEF VLV PCV655A BLOCKED	2 PRZR HI PRESS SETPOINT DEVIATION	3 PRZR HI LEVEL CHANNEL ALERT	4 PRZR LIQUID HI TEMP	5 PRZR LO PRESS SETPOINT DEVIATION BACKUP HEATERS ON	6 PRZR LO LEVEL LETDOWN SECURED TRAIN A	7 PRZR RELIEF TANK HI TEMP	A
8 PRZR LO PRESS PWR RELIEF VLV PCV656A BLOCKED	9 PRZR HI PRESS CHANNEL ALERT	10 PRZR HI WATER LEVEL ALERT	11 PRZR VAPOR HI TEMP	12 PRZR LO LEVEL HEATERS OFF	13 PRZR LO LEVEL LETDOWN SECURED TRAIN B	14 PRZR RELIEF TANK HI PRESS	B
15 PRZR POWER RELIEF DISCHARGE HI TEMP	16 PRZR HI PRESS ALERT	17 PRZR HI LEVEL SETPOINT DEVIATION BACK-UP HTRS ON	18 PRZR SURGE LINE LO TEMP	19	20 PRZR MOV RELIEF VALVE DISCHARGE HI TEMP	21 PRZR RELIEF TANK HI/LO LEVEL	C
22 PRZR SAFETY RELIEF DISCHARGE HI TEMP	23 PRZR LO COMPENSATED PRESS ALERT	24 PRZR LO LEVEL SETPOINT DEVIATION	25 PRZR PWR RELIEF VLV PCV655A OR PCV656A OPEN	26 PRZR CONTROLLER TROUBLE	27 PRZR HEATERS BREAKER TRIPPED	28 PRZR SAFETY VLV 8010A OR 8010B OPEN	D
29 PRZR SPRAY LINE LO TEMP	30 PRZR LO PRESS SI ALERT	31	32	33 PRZR HEATERS GROUND BUS LD13 OR LD23	34 LTOP ALERT	35 LTOP HI PRESSURE	E

RCS
TAG NO. ALB08

DETAIL "A"



DETAIL "B"



WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	1-PY/658XA	ARR	271C331-125, B-208-118, RC-23	2	C	C1	A	TB5-53 TB5-C15		
2	A2	PY/655B1	PCS	8756D36-19, B-208-118, RC-25	2	O	C1	A	-54		
3	A3	LY/666A1	PCS	8756D36-19, B-208-188, RC-25	2	O	C1	A	-55		
4	A4	TY/608	PCS	8756D36-21, B-208-118, RC-25	2	O	C1	A	-56		
5	A5	1-PY/655B2XA, 1-PY/655B2XB	ARR	271C331-125, B-208-118, RC-23	2	C	C2PF	A	-57		
6	A6	K706 (CAB. 2 TB731-3, 4)	SSPS	8759D79-27	2	C	C1	A	-58		
7	A7	TY/668	PCS	8756D36-21, B-208-118, RC-25	2	O	C1	A	-59		
8	B1	PY/657XB	ARR	271C331-129, B-208-118, RC-24	2	C	C1	A	-60		
9	B2	PY/656A2	PCS	8756D36-21, B-208-118, RC-25	2	O	C1	A	-61		
10	B3	K1405, K1406, K1407	CBDM	8759D79-42	2	C	C4PF	A	-62		
11	B4	TY/607	PCS	8756D36-21, B-208-118, RC-25	2	O	C1	A	-63		
12	B5	1-LY/665AXA, XB, 1-LY/666A2XA, XB	ARR	271C331-125, B-208-118, RC-23	2	C	C1	A	TB6-1 TB6-C16		
13	B6	K706 (CAB. 2 TB731-3, 4)	SSPS	8759D79-27	2	C	C1	A	-2		SPECIAL SERIES, PARELLEL NETWORK @ ARR
14	B7	PY/669	PCS	8756D36-19, B-208-118, RC-25	2	O	C1	A	-3		
15	C1	TY/676	PCS	8756D36-19, B-208-118, RC-25	2	O	C1	A	-4		
16	C2	K1401, K1402, K1403, K1404	CBDM	8757D79-42	2	C	C4PF	A	-5		
17	C3	1-LY/665B1XA, 1-LY/665B1XB	ARR	271C331-125, B-208-118, RC-23	2	C	C2PF	A	-6		
18	C4	TY/609	PCS	8756D36-21, B-208-118, RC-25	2	O	C1	A	-7		
19	C5	SPARE				C		C	-8		
20	C6	TY/679	PCS	B-208-118, RC-24	2	O	C1	O	-9		
21	C7	LY/670A1, LY/670A2	PCS	8756D36-19, B-208-118, RC-25	3	O	C2SA	A	-10, 10A		
22	D1	TY/677, TY/678	PCS	8756D36-21, 23, B-208-118, RC-25	3	O	C2SA	A	-11, 11A		
23	D2	K1309, K1310, K1311, K1312	CBDM	8759D79-42	2	C	C4PF	A	-12		
24	D3	LY/665B2	PCS	8756D36-21, B-208-118, RC-25	2	O	C1	A	-13		
25	D4	33ac/PCV655A, 33ac/PCV656A	F	B-208-118, RC-11,14	2	C	C2PF	A	-14		
26	D5	RY1-TB19, 20 RY2-TB15, 16	F	B-208-118, RC-03	3	O	C2SA	A	-15, 15A		
27	D6		SWG	B-208-118, RC-03	2	C	C4PF	A	-16		CONTACTS LOCATED IN PRZR. PWR. CONTR. CAB.
28	D7	ZB638, ZB639	PCS	B-208-118, RC-25	2	O	C2SA	A	-17		
29	E1	TY/606, TY/605	PCS	8756D36-21, 23, B-208-118, RC-25	3	O	C2SA	A	-18, 18A		
30	E2	K1408, K1409, K1410, K1411	CBDM	8759D79-42	2	C	C4PF	A	-19		
31	E3	SPARE							-20		
32	E4	SPARE							-21		
33	E5	64-LD-13, 64-LD-23	SWG	B-208-118, RC-03	2	C	C2SA	A	-22		
34	E6	TY/414, TY/424, 3/8701AB, 3/8702AB	PCS/F	B-208-119, RH-05	2	O	DETAIL "A"	A	-23 TB6-C17		
35	E7	PY/405B, PY/406B, 3/8701BA, 3/8702BA	PCS/F	B-208-119, RH-06	2	C	DETAIL "B"	A	-24		

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Data Received: 17-07-2018
Log Number: 145

Original Design Firm: WESTINGHOUSE
Original Drawing: 4.160E+13
Last Revision And Date: 4.160E+13

THIS S.A.D.D. DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	ORG. APPR.	
11	22.08.06	SPRO	REVD PER M00 432-AS-L	MG AS	B.S.
12	25.06.18	V.S.	REVD PER M00 1087-JA-L & 1025-RC-L	MG	J.C.
9	11.07.96		REVD PER M00 334-FP-L	S.J.	J.C.
B	30.05.96		REVD PER M00 325-RC-L		

REFERENCE DRAWINGS:
8756

MADE: M. KODRIČ
CHECKED: A. VILMAN
APPROVAL: D. MANDIĆ

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRŠKO
KRŠKO, SLOVENIA
LE APPROVAL

NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRŠKO
ALB08
ANNUNCIATOR ENGRAVING & SYSTEM INFO.

DRAWING NUMBER: 1462F87
SHEET: 9
OF SHEETS: 12
REV: 12

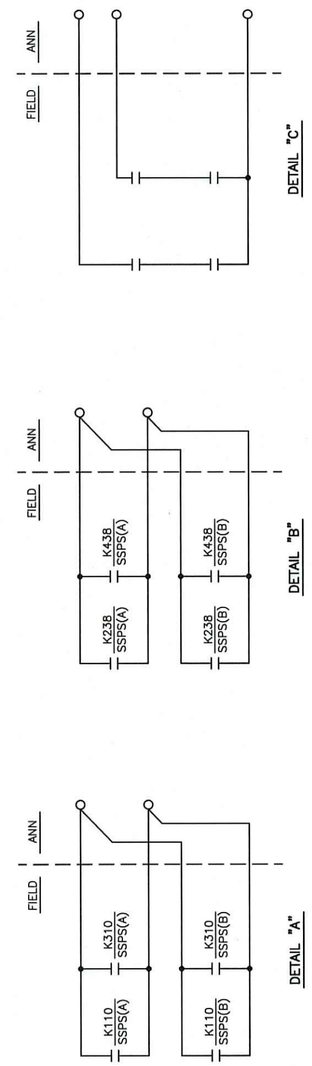
Appendix 1 - Existing AS system essential drawings

SPES1155

1744

1	2	3	4	5	6	7
(RCP VIBRATION MONITORING TROUBLE)	2 LOOP 1 TAVG/AUCT TAVG DEVIATION	3 TREF/AUCT TAVG DEVIATION ALERT	4 AMSAC ACTUATION	5 RCP 1 LOWER OIL RES HI/LO LEVEL	6 UNDERVOLTAGE RCP BUS ALERT	7 OVERTEMP ΔT ALERT
8	9 LOOP 2 TAVG/AUCT TAVG DEVIATION	10 AMSAC A OR B URGENT FAILURE	11 RCP1 OR RCP2 VIBRATION LEVEL HI	12 RCP 2 LOWER OIL RES HI/LO LEVEL	13 UNDERFREQUENCY RCP BUS ALERT	14 OVERPOWER ΔT ALERT
15 RVHVS SOL ISOL VALVES HIGH TEMPERATURE	16 LOOP 1 ΔT/AUCT ΔT DEVIATION	17 AMSAC BYPASS	18 RCP1 OR RCP2 VIBRATION LEVEL HI-HI	19 RCP 1 UPPER OIL RES HI/LO LEVEL	20 RCP 1 OIL LIFT PMP LO PRESS	21 RV FLG LEAKOFF HI TEMP
22 SG 1 OR 2 LO-LO LEVEL AMSAC	23 LOOP 2 ΔT/AUCT ΔT DEVIATION	24 RCP 1 BREAKER OPEN/ LO FLOW ALERT	25 RCP 1 BREAKER OVERLOAD IN PROGRESS OR TRIP	26 RCP 2 UPPER OIL RES HI/LO LEVEL	27 RCP 2 OIL LIFT PMP LO PRESS	28 SE SYSTEM TRIGGERED
29 TAVG HI	30 TAVG LO-LO ALERT	31 RCP 2 BREAKER OPEN/ LO FLOW ALERT	32 RCP 2 BREAKER OVERLOAD IN PROGRESS OR TRIP	33 LOOSE PARTS MONITORING WARNING	34 SE SYSTEM TROUBLE	35 SE SYSTEM OBE EXCEEDED

REACTOR COOLANT SYSTEM
TAG NO. ALB09



WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	CB5900RCKG702	(LP)	(B-208-118, RC-34)	(2)	(C)	(C1)		TB6-30 TB8-C17		
2	A2	TY/612A1, TY/612A2, TY/632A1, TY/632A2	PCS	8756036-23, B-208-118, RC-25	8	C	C11	RF	TB8-24,25,26,27 TB8-C23(4)		
3	A3	TY/612B1, TY/612B2	PCS	8756036-23, B-208-118, RC-25	3	O	C25A	A	TB6-32,32A TB6-C17		
4	A4	CB103RCKK808 & 809 (-A111, -A121, -A211, -A221),12.2	AMS	B-208-016, AM-03	2	C	C4PF	A	-33		
5	A5	LS-688A	F	1188E09-3	2	C	C2PF	A	-34		
6	A6	K1101, K1102, K1103, K1104	CB-DM	8759079-39, B-208-052, EE-66	2	C	C4PF	A	-35		
7	A7	K1207, K1208, K1209, K1210	CB-DM	8759079-40	2	C	C4PF	A	-36		
8	B1	SPARE				O					
9	B2	TY/622A1, TY/622A2, TY/642A1, TY/642A2	PCS	8756036-23, B-208-118, RC-25	8	C	C11	RF	TB8-28,29,30,31 TB8-C23(4)		
10	B3	CB103RCKK808 & 809 (-A111, -A121, -A211, -A221),13.2	AMS	B-208-016, AM-03	3	C	C25F, DETAIL "C"	A	TB6-37,39 TB6-C17		
11	B4	CB103BRDK802 (YU691)	LP	LATER BY EPZ	2	C	C1	A	-40		
12	B5	LS-688B	F	1188E09-3, B-208-118, RC-25	2	C	C2PF	A	-41		
13	B6	K1105, K1106, K1107, K1108	CB-DM	8759079-38, B-208-052, EE-74	2	C	C4PF	A	-42		
14	B7	K1211, K1212, K1213, K1214	CB-DM	8759079-40	2	C	C4PF	A	-43		
15	C1	TUI 601, 602, 603, 604	AP_C	1188E09 SH.2	2	C	C4PF	A	-44	TB8-C23(4)	
16	C2	TY/611A1, TY/611A2, TY/631A1, TY/631A2	PCS	8756035-23, B-208-118, RC-25	8	C	C11	RF	TB8-32,33,34,35 TB6-C18		
17	C3	CB103RCKK808 & 809 (-A111, -A121, -A211, -A221),12.3	AMS	B-208-016, AM-03	2	C	C4PF	A	-46		
18	C4	CB103BRDK802 (YU691)	LP	LATER BY EPZ	2	C	C1	A	-47		
19	C5	LS-687A	F	1188E09-3, B-208-118, RC-25	2	C	C2PF	A	-48		
20	C6	PS-699A-2	F	1188E09-3, B-208-118, RC-08	2	O	C1	A	-49		
21	C7	TY/600	PCS	8756036-19, B-208-118, RC-25	2	O	C11	A	-50		
22	D1	CB103RCKK808 & 809 (-A111, -A121, -A211, -A221),13.3	AMS	B-208-016, AM-03	2	C	C4PF	A	-51		
23	D2	TY/621A1, TY/621A2, TY/641A1, TY/641A2	PCS	8756035-23, B-208-118, RC-25	8	C	C11	A	TB8-36,37,38,39 TB8-C23(4)		
24	D3	(K1011), (K1109, K1110, K1111), (K110, K310)	SSPS Act	8759079-38+39, B-208-118, RC-25	4	C	C2PA, DETAIL "A"	RF	TB6-53,31 TB6-C18,C17		ISOLATION REQUIRED BY AE
25	D4	86, 74	SWGR	B-208-118, RC-01	2	C	C1	A	-54		
26	D5	LS-687B	F	1188E09-3, B-208-118, RC-25	2	C	C2PF	A	-55		
27	D6	PS-699B-2	F	1188E09-3, B-208-118, RC-09	2	O	C1	A	-56		
28	D7	YXB9001-A1	SEC	B-208-127, SE-01	2	O	C11	A	-57		
29	E1	TY/612C	PCS	8756036-23, B-208-118, RC-25	2	O	C11	A	-58		
30	E2	K1305, K1306, K1307, K1308	CB-DM	8759079-41	2	C	C4PF	A	-59		
31	E3	(K1012), (K1112, K1113, K1114), (K238, K438)	SSPS Act	8759079-38+39, B-208-118, RC-25	4	C	C2PA, DETAIL "B"	RF	-60,38		ISOLATION REQUIRED BY AE
32	E4	86, 74	SWGR	B-208-118, RC-02	2	C	C1	A	-61		
33	E5	3/R2 RC900RCKK701	DMMS	B-208-118, RC-34	2	O	C1	A	-62		
34	E6	YXB9001-A5, YXB9001-A6	SEC	B-208-127, SE-01	2	O	C25F	A	-63		
35	E7	YXB9001-A3	SEC	B-208-127, SE-01	2	C	C1	A	-64		

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. 10
- WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
- ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
- ENGRAVING HAS BEEN CHANGED ON WINDOW NO. 11, 15 AND 18
- REFERENCE DRAWING HAS BEEN ADDED FOR FOLLOWING WINDOWS NO.: 1, 2, 3, 5, 8, 9, 12, 13, 16, 19, 20, 21, 23, 26, 27, 29
- ALARM COND HAS BEEN CHANGED FOR FOLLOWING WINDOWS NO.: 2, 9, 16, 23

50.395

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 16-11-2022
Log Number: 133

Original Design Firm: WESTINGHOUSE
Replaced Manual Drawing: 1462F87 Sh.10
Last Revision And Date: 4 06.03.1980

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	CHD. BY	LE APPR.
13	09.11.16	K.K.	REV'D PER MOD 749-RP-L	G.J.	B.P.
12	08.01.14	B.Z.	REV'D PER MOD 716-RC-L	G.J.	N.I.
16	03.11.22	V.S.	REV'D PER MOD 700-CS-L	S.J.	B.P.
15	26.10.22	FRA	REV'D PER MOD 1194-AM-L	S.J.	B.P.
14	21.10.22	V.S.	REV'D PER MOD. 1230-SE-L	M.M.	B.P.

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO
RCS ALB09
ANNUNCIATOR ENGRAVING & SYSTEM INFO.
DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO KRSKO, SLOVENIA

MADE	CHECKED	LE APPROVAL
1. M. KODRIČ	2. A. VILMAN	3. D. MANDIĆ

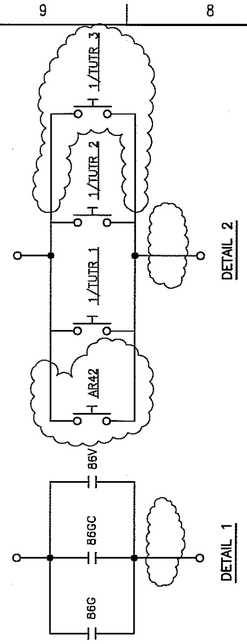
REFERENCE DRAWINGS:
SCALE
1462F87 10 16
DRAWING NUMBER

FILE: 1462F8710 DWG, SPREJEL:

1		2	NIS HI FLUX LO SETPOINT POWER RANGE REACTOR TRIP	3	STM GEN 1 LO-LO LEVEL REACTOR TRIP	4	STM GEN 1 HI-HI LEVEL TURBINE TRIP	5	PRZR SAFETY INJECTION REACTOR TRIP	6	LO FLOW/RCP P7 PERMISSIVE REACTOR TRIP
10	MANUAL REACTOR TRIP	11	NIS HI FLUX HI SETPOINT POWER RANGE REACTOR TRIP	12	STM GEN 2 LO-LO LEVEL REACTOR TRIP	13	STM GEN 2 HI-HI LEVEL TURBINE TRIP	14	PRZR HI PRESS REACTOR TRIP	15	TURBINE TRIP & P7 PERMISSIVE REACTOR TRIP
19	MANUAL SAFETY INJECTION REACTOR TRIP	20	NIS HI FLUX RATE POWER RANGE REACTOR TRIP	21	STMLINE P LOOP 1 LO SAFETY INJECTION REACTOR TRIP	22		23	PRZR LO PRESS & P7 PERMISSIVE REACTOR TRIP	24	REACTOR TRIP & P4 PERMISSIVE TURBINE TRIP
28	OVERPOWER ΔT REACTOR TRIP	29	NIS HI FLUX INTERMEDIATE RANGE REACTOR TRIP	30	STMLINE P LOOP 2 LO SAFETY INJECTION REACTOR TRIP	31		32	PRZR HI LEVEL & P7 PERMISSIVE REACTOR TRIP	33	
37	OVERTEMP ΔT REACTOR TRIP	38	NIS HI FLUX SOURCE RANGE REACTOR TRIP	39	HI CONTMT PRESS SAFETY INJECTION REACTOR TRIP	40	UNDERVOLTAGE RCP BUS & P7 REACTOR TRIP	41	UNDERFREQUENCY RCP BUS & P7 REACTOR TRIP	42	

7	GEN TRIP TURBINE TRIP	8	ROTOR POSITION TURBINE TRIP	9	TURBINE OVERSPEED TURBINE TRIP
16	PUSH BUTTON TURBINE TRIP	17	TURBINE CONTROL VITAL FAILURE TURBINE TRIP	18	
25	LO EH FLUID PRESS TURBINE TRIP	26		27	
34	CONDENSER VACUUM TURBINE TRIP	35		36	
43	TURBINE BRG OIL TURBINE TRIP	44		45	

FIRST OUT
TAG NO. ALB10



WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TERMINALS	REMARKS
									TB7-C19		
1	A1	SPARE						FO	-2		
2	A2	K0113	CBDM	8759D79-31	2	C	C1	FO	-3		
3	A3	K0210	CBDM	8759D79-32	2	C	C1	FO	-4		
4	A4	K0301	CBDM	8759D79-31	2	C	C1	FO	-5		
5	A5	K0201	CBDM	8759D79-32	2	C	C1	FO	-6		DETAIL 1
6	A6	K0305	CBDM	8759D79-32	2	C	C1	FO	-7		
7	A7	TU104CAB-OAR4, OAR5, B6G, B6U 3/RM	SWG	A-208-144, TU-42	2	C	DETAIL 1	FO	-8		
8	A8	TU106CAB-AR37, AR38	PDEH	B-208-144, TU-34	2	C	C2PF	FO	-9		
9	A9	TU106CAB-AR35, AR36	PDEH	B-208-144, TU-34	2	C	C2PF	FO	-10		
10	B1	3/1-RTFOR	CB	B-208-099, IN-05	2	C	C1	FO	-11		
11	B2	K0114	CBDM	8759D79-31	2	C	C1	FO	-12		
12	B3	K0211	CBDM	8759D79-31	2	C	C1	FO	-13		
13	B4	K0302	CBDM	8759D79-32	2	C	C1	FO	-14		
14	B5	K0203	CBDM	8759D79-31	2	C	C1	FO	-15		
15	B6	K0105	CBDM	8759D79-31	2	C	C1	FO	-16		DETAIL 2
16	B7	1/TUTR1, 1/TUTR2/TU106CAB-AR42,1/TUTR3	CB, FAP	B-208-144, TU-42	2	O	(C2SF)	FO	-17		(C2SF)
17	B8	TU106CAB-AR39, AR40	PDEH	B-208-144, TU-34	2	C		FO	-18		
18	B9	SPARE						FO	-19		
19	C1	3/1-SIFOR	CB	B-208-099, IN-05	2	C	C1	FO	-20		
20	C2	K0110	CBDM	8759D79-31	2	C	C1	FO	-21		
21	C3	K0206	CBDM	8759D79-31	2	C	C1	FO	-22		
22	C4	SPARE						FO	-23	TB7-C20	
23	C5	K0202	CBDM	8759D79-31	2	C	C1	FO	-24		
24	C6	K0303 & K0304	CBDM	8759D79-32	2	C	C2PA	FO	-25		
25	C7	TU105CAB-AR31	PDEH	B-208-144, TU-34	2	C1	C1	FO	-26		
26	C8	SPARE				C			-27		
27	C9	SPARE				C		FO	-28		
28	D1	K0102	CBDM	8759D79-31	2	C	C1	FO	-29		
29	D2	K0112	CBDM	8759D79-31	2	O	C1	FO	-30		
30	D3	K0208	CBDM	8759D79-31	2	C	C1		-31		
31	D4	SPARE				C		FO	-32		
32	D5	K0204	CBDM	8759D79-31	2	C	C1	FO	-33		
33	D6	SPARE				C		FO	-34		
34	D7	TU106CAB-AR33, AR34	PDEH	B-208-144, TU-34	2	C1	C2PF	FO	-35		
35	D8	SPARE				C			-36		
36	D9	SPARE				C		FO	-37		
37	E1	K0101	CBDM	8759D79-31	2	C	C1	FO	-38		
38	E2	K0111	CBDM	8759D79-31	2	C	C1	FO	-39		
39	E3	K0205	CBDM	8759D79-31	2	C	C1	FO	-40		
40	E4	K0103	CBDM	8759D79-31	2	C	C1	FO	-41		
41	E5	K0104	CBDM	8759D79-31	2	C	C1	FO	-42		
42	E6	SPARE				C			-43		
43	E7	TU105CAB-AR32	PDEH	B-208-144, TU-34	2	C1	C1.7	FO	-44		
44	E8	SPARE				C			-45	TB7-C21	
45	E9	SPARE									

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. 6

- WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
- ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
- ALARM COND HAS BEEN CHANGED FOR FOLLOWING WINDOWS NO.: 1, 18, 22, 26, 27, 29, 31, 33, 34, 35, 36, 39, 42, 44, 45

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 10-09-2009
Log Number: 144
50.395

Original Design Firm: WESTINGHOUSE
Replaced Manual Drawing: 1462F87 Sh.11
Last Revision And Date: 4 06.03.1980

NO.	DATE	BY	REVISION	CKD. BY	LE APPR.
6	22.08.06	SPRO	REVD PER MOD 432-AS-L	M.S.	B.S.
5	30.01.96		CAD CONV. & AS BUILT UPDATE		
4	06.03.80		DELETED ENGRAVING FROM WINDOW 1....		
3	06.05.77		ADDED FIELD INPUT TERMINAL INFORMAT.		
7	07.2009		REVD PER MOD 500-TU-L		

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO
ALB10
ANNUNCIATOR ENGRAVING & SYSTEMS INFO.
DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO KRSKO, SLOVENIA

MADE	CHECKED	LE APPROVAL
1.	2.	3.

REFERENCE DRAWINGS:

SCALE: 1462F87 | 11 | 7
DRAWING NUMBER | SHEET | REV

FILE:#1462F711.DWG

QTL-01455

Appendix 1 - Existing AS system essential drawings

1	2	3	4	5	6	7	
1 SOURCE RANGE HI FLUX LEVEL AT SHUTDOWN	2 INTERMED RANGE HI FLUX LEVEL ROD STOP	3 POWER RANGE LOWER DETECTOR HI FLUX DEVIATION OR AUTO DEFEAT	4 POWER RANGE HI NEUTRON FLUX HI SETPOINT ALERT	5 ROD BANK LO LIMIT	6 RPI NON URGENT ALARM	7 RPI ROD DEVIATION ALARM	A
8 SOURCE RANGE N31/N32 HI FLUX LVL AT SHUTDOWN ALARM BLOCKED	9	10 POWER RANGE UPPER DETECTOR HI FLUX DEVIATION OR AUTO DEFEAT	11 POWER RANGE HI NEUTRON FLUX LO SETPOINT ALERT	12 ROD BANK LO–LO LIMIT	13 RPI URGENT ALARM	14 ROD CONTROL NON URGENT ALARM	B
15 SOURCE RANGE LOSS OF DET VOLTAGE	16 INTRMED RANGE LOSS OF DET VOLTAGE	17 POWER RANGE LOSS OF DET VOLTAGE	18 OVERTEMP ΔT BLOCK ROD WITHDRAWAL	19 ROD BANK D FULL ROD WITHDRAWAL	20 ROD AT BOTTOM	21 ROD CONTROL URGENT FAILURE	C
22 INTRMED RANGE NO 1 LOSS OF COMP. VOLTAGE	23 INTERMED RANGE NO 2 LOSS OF COMP. VOLTAGE	24 POWER RANGE CHANNEL DEVIATION	25 OVERPOWER ΔT BLOCK ROD WITHDRAWAL	26 OVERTEMP ΔT ALERT	27 TWO OR MORE RODS AT BOTTOM	28 NIS CHANNEL ON TEST	D
29 NIS SOURCE AND INTERMED RANGE TRIP BYPASS	30 POWER RANGE HI NEUTRON FLUX RATE ALERT	31 COMPTR ALARM ROD DEV/SEQ/NIS POWER RANGE TILTS	32 NIS WIDE RANGE CHANNEL TROUBLE	33 OVERPOWER ROD STOP	34 OVERPOWER ΔT ALERT	35 ROD DRIVE M–G SET TROUBLE	E

NIS & ROD CONTROL
TAG NO. ALB11

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TERMINALS	REMARKS
1	A1	1–NC/31CX, 1–NC/32CX, 1–N31AX, 1–N32CX, 1–SRBA, NIELCA01A03–N51, (NIELCA01A02–N52)	ARR	271C331–118, B–208–110, NI06	2	O	RF70	RF	TB7–51 TB7–C21		SPECIAL SERIES PARELLEL NETWORK @ ARR
2	A2	1–RSXA, 1–RSXB	ARR	271C331–119	2	O	C2SF	A	–52		
3	A3	K603, K604	NIS	583F941–9, B–208–111–3	2	O	C1	A	–53		
4	A4	K1605, K1606, K1607, K1608	CB–DM	8759D79–44	2	C	C4PF	A	–54		
5	A5	ZY/650AI, ZY/650BI, ZY/650CI, ZY/650DI	PCS	8756D36–23	8	O	C1I	RF	TB8–40,41,42,43 TB8–C23(4)		
6	A6	J–104–L & J–104–M	RPI	108D760	2	O	C1	A	TB7–56 TB7–C21		
7	A7	J104–T, J104–U	RPI	(108D760)	2	O	C1	A	TB7–57		20M SEC AUTO RESET, CKT. TO BE PROVIDED
8	B1	1–N31AX, 1–N32AX	ARR	271C331–118, B–208–110–(1)	2	C	C2PF	A	TB7–58		
9	B2	SPARE				C			–59		
10	B3	K601, K602	NIS	583F941–9	2	O	C1	A	–60		
11	B4	K1613	CB–DM	8759D79–44, B–208–110–3	2	C	C1	A	–61		
12	B5	ZY/650A2, ZY/650B2, ZY/650C2, ZY/650D2	PCS	8756D36–23	8	O	C1I	RF	TB8–44,45,46,47 TB8–C24(4)		
13	B6	J104–N, J104–P	RPI	108D760	2	O	C1	A	TB7–63 TB7–C21		
14	B7	TB17–7, TB17–8	RCS	7246D14	2	C	C1	A	–64		
15	C1	NC31H, NC32H	NIS	583F941–3, 5, B–208–110–3	4	O	K2(C2SA)	A	TB14–B1A,B1B,B2A,B2B		
16	C2	NC35K, NC36K	NIS	583F941–3, 5	4	O	K2(C2SA)	A	TB14–B3A,B3B,B4A,B4B		
17	C3	NC41T, NC42T, NC43T, NC44T	NIS	583F941–3, 5, 7, 9	8	O	K4(C4SA)	A	TB14–B5A,B5B,B6A,B6B,B7A,B7B,B8A,B8B		
18	C4	1–TY/411AIX, 1–TY/421AX, 1–TY/431AX, 1–TY/441AX	ARR	271C331–122	2	C	C4PF	A	TB7–68 TB7–C21		
19	C5	1–ZY/650EX	ARR	271C331–124	2	C	C1	A	TB8–1 TB8–C22		
20	C6	J104–C, J104–D	RPI	108D760	2	O	C1	A	–2		
21	C7	TB17–10, TB17–11	RCS	7246D14	2	C	C1	A	–3		
22	D1	NC35M	NIS	583F941–3	2	C	K1(C1)	A	TB14–B9A,B9B		
23	D2	NC36M	NIS	583F941–5	2	C	K1(C1)	A	TB14–B10A,B10B		
24	D3	NC46B	NIS	583F941–9	2	C	K1(C1)	A	TB14–B11A,B11B		
25	D4	1–TY/411B1X, 1–TY/421B1X, 1–TY/431B1X, 1–TY/441B1X	ARR	271C331–122	2	C	C4PF	A	TB8–7 TB8–C22		
26	D5	K1207, K1208, K1209, K1210	CB–DM	8759D79–40	2	C	C4PF	A	–8		
27	D6	J104–E, J104–F	RPI	108D760	2	O	C1	A	–9		
28	D7	NM41E, NM42E, NM43E, NM44E	NIS	583F941–7, 9, B–208–110–3	8	C	C4PA	A	–10(4) (4)		
29	E1	K1701, K1702, K1703, K1704	CB–DM	8759D79–45	2	C	C4PF	A	–11		
30	E2	K1609, K1610, K1611, K1612	CB–DM	8759D79–44	2	C	C4PF	A	–12		
31	E3	TB1401A, TB1401B, CH942CAD/WD	C	816–301, Sh. 150	2	C	C3PF	A	–13		20M SEC AUTO RESET, CKT. TO BE PROVIDED
32	E4	NIELCA01A03–N51, (NIELCA01A02–N52)	NIS	B–208–110, NI06	2	O	(C4SF)	A	–14		(
33	E5	1–NC41LX, 1–NC43LX, 1–N49A1X, 1–N49B1X	ARR	271C331–120	2	O	C1	A	–15		SPECIAL SERIES, PARELLEL NETWORK @ ARR
		1–NC42LX, 1–NC44LX, 1–N49C1X, 1–N49D1X									
34	E6	K1211, K1212, K1213, K1214	CB–DM	8759D79–40	2	C	C4PF	A	–16		
35	E7	FROM ROD DRIVE MGSETS TERM. 540, 546 & SWGLD12/3C–CBK & SWGLD22/3C–CBK	RDMG	3688C41 Sh. 5, B–208–033–1	2	O	C13SF	A	–17		

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 06-07-2000
Log Number: 139

S.D. 395

Original Design Firm: WESTINGHOUSE
Replaced Manual Drawing: 1462F87 Sh. 12
Last Revision And Date: J 06.03.1980

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY!

NO.	DATE	BY	REVISION
10	2006.08	V.S.	REVD PER MOD 1007–2H–L
9	1998.11	K.K.	REVD PER MOD 883–2–L
8	1998.08	K.K.	REVD PER MOD 883–2–L
7	1998.08	K.K.	REVD PER MOD 883–2–L
6	1996.08	V.S.	REVD PER MOD 1007–2H–L PART 4

	NAME	DIV.
DRAWN:	M.M.	D.V.
CHECKED:	M.L.	D.V.
APPROVED:	V.S.	N.S.
CONT. BY I.E. APPRN:	ANV	LAV

REFERENCE DRAWINGS:

SCALE: NONE

NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRŠKO
ALB11
ANNUNCIATOR ENGRAVING &SYSTEMS INFO.

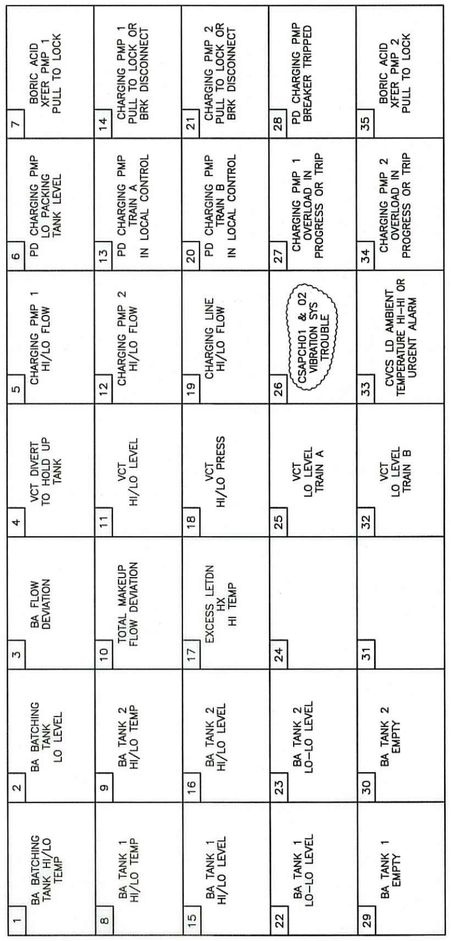
MADE: NUCLEAR POWER PLANT KRŠKO, KRŠKO, SLOVENIA
CHECKED: I.E. APPRVNG:

DESIGN ENGINEERING

DRAWING NUMBER: 1462F87

SHEET 11 OF 12

Scale 1:1



WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	TIS-100	F	118E10-5, B-208-035, CS-68	2	C	C25F	A	TB9-1		
2	A2	LIS-101	F	118E10-5, B-208-035, CS-70	2	O	C1	A	-2		
3	A3	1-MUX6A	ARR	271C331-116	2	C	C1	A	-3		
4	A4	1-LY/113B1XB	ARR	271C331-126	2	O	C1	A	-4		
5	A5	FS-201A,B, 2/1-APCH1	SWG, F	B-208-035, CS-29	2	C	C25F	A	-5		ISOLATION REQUIRED BY AE
6	A6	LS-219	F	118BE10-3	2	C	C1	A	-6		
7	A7	3/1-APBA1	ARR	B-208-199, IN-05	2	C	C1	A	-7		
8	B1	TY/104A1, TY/104A2	PCS	8756D36-23	3	O	C25A	A	-8, 8A		
9	B2	TY/107A1, TY/107A2	PCS	8756D36-19	3	O	C25A	A	-9, 9A		
10	B3	1-MUX7A	ARR	271C331-116	2	C	C1	A	-10		
11	B4	LS/113A1, LS/113A2	PCS	8756D36-17	3	O	C25A	A	-11, 11A		ISOLATION REQUIRED BY AE
12	B5	FS-202A,B, 2/1-APCH2	SWG, F	B-208-035 CS-30	2	O	C25F	A	-12		ISOLATION REQUIRED BY AE
13	B6	43/1-APPDA	F	271C331-57	2	O	C1	A	-13		
14	B7	3/1-APCH1, 33	ARR	B-208-035, CS-29	2	C	C1	A	-14		
15	C1	LY/102A1, LY/102A2, LY/103A1, LY/103A2	PCS	8756D36-11, 18	5	O	C4SA	A	-15, 15A, 15B, 15C		
16	C2	LY/105A1, LY/105A2, LY/106A1, LY/106A2	PCS	8756D36-15, 17	5	O	C4SA	A	-16, 16A, 16B, 16C		
17	C3	TY/229	PCS	8756D36-23	2	O	C1	A	-17		
18	C4	PY/115A1, PY/115B	PCS	8756D36-21	3	O	C2SA	A	-18, 18A		
19	C5	FY/205A1, FY/205A2	PCS	8756D36-23	3	O	C2SA	A	-19, 19A		ISOLATION REQUIRED BY AE
20	C6	43/1-APPDB	F	271C331-58	2	O	C1	A	-20		
21	C7	3/1-APCH2, 33	ARR	B-208-035, CS-30	2	C	C1	A	-21		
22	D1	LY/102B1, LY/103B1	PCS	8756D36-11, 18	3	O	C25A	A	-22, 22A	TB9-C26	
23	D2	LY/105B1, LY/106B1	PCS	8756D36-15, 17	3	O	C25A	A	-23, 23A		ISOLATION REQUIRED BY AE
24	D3	SPARE							-24		
25	D4	K701, TB731, 1-2	SSPS	8759D79-27	2	C	C1	A	-25		
26	D5	CS900RCKM002-K2	LP	B-208-035, CS-69	(2)	(O)	(C1)		-26		( )
27	D6	86, 74	SWG	B-208-035, CS-29	2	C	C1	A	-27		ISOLATION REQUIRED BY AE
28	D7	OTS	SWG	B-208-035, CS-31&32	2	O	C2PF	A	-28		ISOLATION REQUIRED BY AE
29	E1	LY/102B2, LY/103B2	PCS	8756D36-11, 18	3	O	C25A	A	-29, 29A		
30	E2	LY/105B2, LY/106B2	PCS	8756D36-15, 17	3	O	C25A	A	-30, 30A		ISOLATION REQUIRED BY AE
31	E3	SPARE							-31		
32	E4	K701, TB731, 1-2	SSPS	8759D79-27	2	C	C1	A	-32		
33	E5	KU	LP	B-208-035, CS-95	2	O	C1	A	-33		ISOLATION REQUIRED BY AE
34	E6	86, 74	SWG	B-208-035, CS-30	2	C	C1	A	-34		
35	E7	3/1-APBA2	ARR	B-208-099, IN-06	2	C	C1	A	-35		

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. 7

- WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
- ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
- ENGRAVING HAS BEEN CHANGED ON WINDOW NO. 25 AND 32
- REFERENCE DRAWING HAS BEEN ADDED FOR WINDOW NO. 1 AND 2
- ALARM COND HAS BEEN CHANGED FOR FOLLOWING WINDOWS NO.: 1, 6, 26, 33

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 04-11-2022
Log Number: 142
S.0.395

Original Design Firm: WESTINGHOUSE
Replaced Manual Drawing: 1462F87 Sh.13
Last Revision And Date: 4 04.03.1980

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	CKD. BY	LE APPR.
6	04.09.98		REVD'D PER EEAR 98-110		
5	30.01.96		CAD CONV. & AS BUILT UPDATE		
9	26.10.22	V.S.	REVD PER MOD. 700-CS-L	M.K.	D.V.
8	20.06.18	V.S.	REVD PER MOD. 1007-XI-L	M.M.	D.V.
7	22.08.06	SIPRO	REVD PER MOD 432-AS-L	M.S.	B.S.

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO
ALB12
ANNUNCIATOR ENGRAVING & SYSTEMS INFO.

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO — KRSKO, SLOVENIA

MADE	CHECKED	LE APPROVAL
1.	2.	3.

REFERENCE DRAWINGS:

SCALE

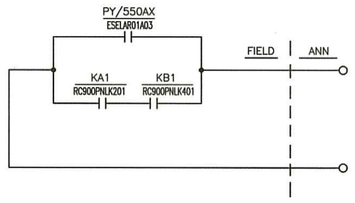
1462F87 — 13 — 9
DRAWING NUMBER — SYSTEM — SHEET NO.

FILE: 1462F8713.DWG

1	2	3	4	5	6	7	
1 LP LETDN RELIEF HI TEMP	2 LETDN RH HX OUT HI TEMP	3 REGEN HX LETDN HI TEMP	4 CHILLER SURGE TANK HI/LO LEVEL	5 MID–LOOP WIDE RANGE RCS LEVEL LOW	6 RCP 1 & 2 NO 1 SEAL LO ΔP	7 MID–LOOP NARROW RANGE RCS LEVEL LOW	A
8 LETDN HX OUT HI TEMP	9 LETDN RH HX HI TEMP DEMIN DIVERT	10 BTRS RETURN HDR HI TEMP	11 CHILLER PACKAGE LOCAL CONTROL	12 RCP 1 & 2 NO 1 SEAL LEAKOFF LO FLOW	13 FCV205 IN LOCAL CONTROL ON EE106PNLM804	14 RCP 1 STANDPIPE LO LEVEL	B
15 LETDN HX OUT HI PRESS	16 TRANSFER MCR/ECR WARNING	17 ICCM CAB TRAIN A OR ICCM CAB TRAIN B MALFUNCTION	18 CHILLER PACKAGE TROUBLE	19 RCP 1 & 2 NO 1 SEAL LEAKOFF HI FLOW	20 RCP 1 & 2 NO 2 SEAL LEAKOFF HI FLOW	21 RCP 1 STANDPIPE HI LEVEL	C
22 LETDN HX OUT HI/LO FLOW	23 TRANSFER PANEL TRAIN A DOOR OPEN	24 SUBCOOLING ALARM	25 POS DISP CHRG PUMP A CONTROL PULL TO LOCK OR BRK DISCONNECT	26 SEAL WATER INJ FILTER HI TEMP	27 RCP 1 SEAL INJECTION LO FLOW	28 RCP 2 STANDPIPE LO LEVEL	D
29 BCMS SYSTEM FAILURE OR DILUTION IN PROGRESS	30 TRANSFER PANEL TRAIN B DOOR OPEN	31 PDP BRK CONTROL MISMATCH	32 POS DISP CHRG PUMP B CONTROL PULL TO LOCK OR BRK DISCONNECT	33 RCP SEAL WATER INJ FILTER HI ΔP	34 RCP 2 SEAL INJECTION LO FLOW	35 RCP 2 STANDPIPE HI LEVEL	E

CVCS
TAG NO. ALB13

DETAIL "A"



WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	TY/125	PCS	8756D36–21	2	O	C1	A	TB9–41 TB9–C26		
2	A2	TY/381	PCS	8756D36–21	2	O	C1	A	–42		
3	A3	TY/127	PCS	8756D36–21	2	O	C1	A	–43		
4	A4	LY/380A1, LY/380A2	PCS	8756D36–21, B–208–035, CS–70	3	O	C2SA	A	–44, 44A		
5	A5	LUI635	MCB	B–208–118, RC–34	2	O	C2PF	A	–45 TB9–C27		
6	A6	PY/153, PY/152	PCS	8756D36–19, 21	3	O	C2SA	A	–46, 46A		
7	A7	LY/637, LY/651	PCS	8811D50–5	2	O	C1	A	–47		
8	B1	TY/130	PCS	8756D36–21	2	O	C1	A	–48		
9	B2	TIS–382, TIS–143	F	1188E10–4, 5	3	O	C2SA	A	–49, 49A		
10	B3	TY/386	PCS	8756D36–21	2	O	C1	A	–50		
11	B4	CONTROL SEL. SW, (TERM. A2, B2)	F	271C331–79	2	C	C1	A	–51		SWITCH IN CHILLER PACKAGE
12	B5	FY/156B, FY/157B	PCS	8756D36–19	3	O	C2SA	A	–52, 52A		
13	B6	FK205A	LP	B–208–035, CS–96	2	C	C1	A	–53		
14	B7	LS–178B	F	1188E10–1	2	O	C1	A	–54		
15	C1	PY/135A	PCS	8756D36–19	2	O	C1	A	–55		
16	C2	43/*	LP	816–336 sh.198	2	O	RF 69	RF			* TRANSFER SWITCH, LIST PER REF. DWG.
17	C3	RC900PNLK201 & 401	LP	B–208–118, RC–35	2	O	C2PF	A	TB9–57 TB9–C27		
18	C4	RELAY X CONTACTS A & B	F	271C331–79	2	C	C1	A	–58		
19	C5	FY/156A, FY/157A	PCS	8756D36–19	3	O	C2SA	A	TB10–1, 1A TB10–C28		
20	C6	FY/166, FY/167	PCS	8756D36–19, 21, B–208–035, CS–70	3	O	C2SA	A	–2, 2A		
21	C7	LS–178A	F	1188E10–1	2	O	C1	A	–3		
22	D1	FY/132A1, FY/132A2	PCS	8756D36–19	3	O	C2SA	A	–4, 4A		
23	D2	LSW1, LSW2, LSW3	LP	B–208–053, EI–03	2	C	C3PF	A	–5		ISOLATION REQUIRED BY AE
24	D3	RC900PNLK201 & 401, PY/550AX	LP	B–208–118, RC–35	2	O	DETAIL "A"	A	–6		
25	D4	3/1–APPDA, 33 CONTACTS	SWG–ARR	B–208–035, CS–31	2	C	C1	A	–7		
26	D5	TY/216	PCS	8756D36–21	2	O	C1	A	–8		
27	D6	FY/144	PCS	8756D36–19	2	O	C1	A	–9		
28	D7	LS–179B	F	1188E10–1	2	O	C1	A	–10		
29	E1	CB103RCKK807, FY230	LP–F	B–208–035, CS–70	2	C	C4PF	A	–11		RELAYS WITHIN XIMEBS01A, 3001517 Sh.15
30	E2	LSW1, LSW2, LSW3	LP	B–208–053, EI–03	2	C	C3PF	A	–12		ISOLATION REQUIRED BY AE
31	E3	33, 33aA, 33aB	SWG	B–208–035, CS–32	2	O	C1	A	–13		
32	E4	3/1–APPDB, 33 CONTACTS	SWG–ARR	B–208–035, CS–32	2	C	C1	A	–14		
33	E5	PIS–217A, PIS–217B	F	1188E10–3	3	O	C2SA	A	–15, 15A		
34	E6	FY/145	PCS	8756D36–21	2	O	C1	A	–16		
35	E7	LS–179A	F	1188E10–1	2	O	C1	A	–17		

Nuklearna Elektrarna Krško
MASTER DOCUMENT

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Original Design Firm: WESTINGHOUSE
Replaced Manual Drawing: 1462F87 SH.14
Last Revision And Date: 7. 28.11.1997

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	CHK. BY/E.APPR.
18	23.08.23	MM	REVD PER CAP 2023–1416	DV.
17	15.01.18	V.S.	REVD PER MOD. 1007–Rb–L	M.M.
16	11.10.18	K.K.	REVD PER MOD 1024–RC–L	Z.J.
15	14.08.18	K.K.	REVD PER MOD 1024–RC–L	M.B.
14	14.03.11	K.K.	REVD PER MOD 872–RC–L	M.B.

NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRSKO

ALB13

ANNUNCIATOR ENGRAVING & SYSTEMS INFO.

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO
MADE
CHECKED
KRSKO, SLOVENIA
E.E. APPROVAL

REFERENCE DRAWINGS:
NONE

1462F87
DRAWING NUMBER

14 18

SP-ES-1455

Appendix 1 - Existing AS system essential drawings

22/41

1	2	3	4	5	6	7	
1 RHR PMP 1 DISCHARGE HI PRESS	2 BIT HI TEMP	3 BI SURGE TANK HI LEVEL	4 ACCUM TANK 1 NARROW RANGE HI/LO LEVEL	5 ACCUM TANK 1 ISOL VALVE 880BA NOT FULLY OPEN	6 HI-1 CONTMT PRESS ALERT	7 RWST TANK ISOL VALVE NOT FULLY OPEN	A
8 RHR PMP 2 DISCHARGE HI PRESS	9 BIT LO TEMP	10 BI SURGE TANK LO LEVEL	11 ACCUM TANK 2 NARROW RANGE HI/LO LEVEL	12 ACCUM TANK 2 ISOL VALVE 880BB NOT FULLY OPEN	13 HI-2 CONTMT PRESS ALERT	14 ACCUM TANK 1 WIDE RANGE HI/LO LEVEL	B
15 RHR LOOP 1 OR 2 LO-LO FLOW	16 BIT HI PRESS	17 BI SURGE TANK HI/LO TEMP	18 ACCUM TANK 1 HI/LO PRESS	19 SI PUMP 1 PULL TO LOCK BRK DISCONNECT OVERLOAD OR TRIP	20 HI-3 CONTMT PRESS ALERT	21 ACCUM TANK 2 WIDE RANGE HI/LO LEVEL	C
22 RHR LOOP 1 LO FLOW	23 RHR PMP 1 PULL TO LOCK BRK DISCONNECT OR TRIP	24 BI RECIRC LO FLOW	25 ACCUM TANK 2 HI/LO PRESS	26 SI PUMP 2 PULL TO LOCK BRK DISCONNECT OVERLOAD OR TRIP	27 CONTMT SPRAY ACTUATION	28 CONTMT SPRAY PMP 1 PULL TO LOCK BRK DISCONNECT OR TRIP	D
29 RHR LOOP 2 LO FLOW	30 RHR PMP 2 PULL TO LOCK BRK DISCONNECT OR TRIP	31 BIT RECIRC PMP 1 PULL TO LOCK	32 BIT RECIRC PMP 2 PULL TO LOCK	33 CONTAINMENT ISOL PHASE A ACTIVATED	34 CONTMT ISOL PHASE B	35 CONTMT SPRAY PMP 2 PULL TO LOCK BRK DISCONNECT OR TRIP	E

SIS & RHR
TAG NO. ALB14

Appendix 1 - Existing AS system essential drawings

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. 11
- WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
- ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
- ENGRAVING HAS BEEN CHANGED ON WINDOW NO. 7

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS		ANN OUTPUT TEMINALS	REMARKS
1	A1	PY/861	PCS	8756D36-19	2	O	C1	A	TB10-23	TB10-C29		
2	A2	TIS-944-1, TIS-945-1	F	1188E11-1	3	O	C2SA	A	-24,24A			
3	A3	LIS-946-1, LIS-948-1	F	1188E11-4	3	O	C2SA	A	-25,25A			
4	A4	LY/950A1,LY/950A2,LY/951A1,LY/951A2	PCS	8756D36-19,21	5	O	C4SA	A	-26,26A,26B,26C			
5	A5	(33B0,1P11AX1)(1-2A/8808AX)	ARR,F	B-208-131, SI-56	4	C	(C2SF)(C1I)	RF	TB8-48,49	TB8-C24(2)		
6	A6	KO401,KO402,KO403	CBDM	8759D79-33	2	C	C3PF	A	TB10-28	TB10-C29		
7	A7	(33B0,1P11BX1)(1-2B/8806X)	ARR,F	B-208-131, SI-56	4	C	(C2SF)(C1I)	RF	TB8-50,51	TB8-C24(2)		
8	B1	PY/862	PCS	8756D36-21	2	O	C1	A	TB10-30	TB10-C29		
9	B2	TIS-944-2, TIS-945-2	F	1188E11-1	3	O	C2SA	A	-31,31A			
10	B3	LIS-946-2, LIS-948-2	F	1188E11-4	3	O	C2SA	A	-32,32A			
11	B4	LY/952A1,LY/952A2,LY/953A1,LY/953A2	PCS	8756D36-19,21	5	O	C4SA	A	-33,33A,33B,33C			
12	B5	(33B0,1P11BX1)(1-2B/8808BX)	ARR,F	B-208-131, SI-56	4	C	(C2SF)(C1I)	RF	TB8-52,53	TB8-C24(2)		
13	B6	KO404,KO405,KO406	CBDM	8759D79-33	2	C	C3PF	A	TB10-35	TB10-C29		
14	B7	LY/0954A1, LY/0954A2	PCS	B-208-131, SI-57	2	O	C1	A	-36			
15	C1	FY/851B, FY/852B	PCS	B-208-119, RH.1	2	O	C2SA	A	-37			
16	C2	PY/947	PCS	8756D36-23	2	O	C1	A	-38			
17	C3	TY-942A1, TY-942A2	PCS	8756D36-23	3	O	C2SA	A	-39,39A			
18	C4	PY/960A1,PY/960A2,PY/961A1,PY/961A2	PCS	8756D36-19,21	5	O	C4SA	A	-40,40A,40B,40C			
19	C5	86,3/1-APS1-1,74,33	ARR,SWG	B-208-131, SI-01	2	C	C4PA	A	-41			ISOLATION REQUIRED
20	C6	KO407,KO408,KO409,KO410	CBDM	8759D79-33	2	C	C3PF	A	-42			
21	C7	LY/0955A1, LY/0955A2	PCS	B-208-131, SI-57	2	O	C1	A	-43			ISOLATION REQUIRED
22	D1	FY/851A,(2/APRH1)	PCS,SWG	8756D36-19(B-208-119, RH01)	2	O	C2PA	A	-44			ISOLATION REQUIRED BY AE
23	D2	OTS, 3/1-APRH1, 33	ARR,SWG	B-208-119, RH01	2	C	C3PA	A	-45			ISOLATION REQUIRED
24	D3	FS-949	F	1188E11-4	2	O	C1	A	-46	TB10-C30		
25	D4	PY/962A1,PY/962A2,PY/963A1,PY/963A2	PCS	8756D36-19,21	5	O	C4SA	A	-47,47A,47B,47C			
26	D5	86,3/1-APS1-2,74,33	ARR,SWG	B-208-131,SI-02	2	C	C4PA	A	-48			ISOLATION REQUIRED
27	D6	KO411	CBDM	8759D79-33	2	C	C1	A	-49			
28	D7	OTS, 3/APCS2, 33	ARR,SWG	B-208-028,C1-02	2	C	C3PA	A	-50			ISOLATION REQUIRED
29	E1	FY/852A,(2/APRH2)	PCS,SWG	8756D36-21(B-208-119, RH02)	2	O	C2PA	A	-51			ISOLATION REQUIRED BY AE
30	E2	OTS, 3/1-APRH2, 33	ARR,SWG	B-208-119, RH-02	2	C	C3PA	A	-52			ISOLATION REQUIRED
31	E3	3/1-APRP1	ARR	B-208-099, IN-05	2	C	C1	A	-53			
32	E4	3/1-APRP2	ARR	B-208-099, IN-06	2	C	C1	A	-54			
33	E5	K624 TRAIN A & TRAIN B ACTIVATED	SSPS		2	C	C1	A	-55			
34	E6	KO412	CBDM	8759D79-33	2	C	C1	A	-56			
35	E7	OTS,3/APCS2,33	ARR,SWG	B-208-119 (RH-02)	2	C	C3PA	A	-57			

Original Design Firm: WESTINGHOUSE
Replaced Manual Drawing: 1462F87 SH15
Last Revision Add Date: 1 2011/11/30

THIS IS A CAD DRAWING AND SHOULD NOT BE REDSED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	CHK. BY	LE. APPR.
12	2017/12/27	M.K.	REVIZIJA PER ZAH. 2017-2330 & 2017-2331	M.B.	N.L.
11	2016/08/04	K.K.	REVIZIJA PER MOD. 385-NH-L	M.B.	N.L.
10	2016/08/04	K.K.	REVIZIJA PER MOD. 385-NH-L	M.B.	N.L.
9	2011/11/03	K.K.	REVIZIJA PER ESAR 09-1259	S.J.	D.V.
8	01/10/03	K.K.	REVIZIJA PER MOD 385-NH-L	M.B.	N.L.

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Nuklearna Elektrarna Krško
MASTER DOCUMENT

NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRSKO
ALB14
ANNUNCIATOR ENGRAVING & SYSTEM INFO.

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO
KRSKO, SLOVENIA

	NAME	SIGNATURE	DATE
MADE	1. M. KOBRIČ		
CHECKED	2. A. VILMAN		
LE. APPROVAL	3. D. MANDIĆ		

REFERENCE DRAWINGS:

SCALE: DRAWING NUMBER: 1462F87 SHEET: 15 REV: 12

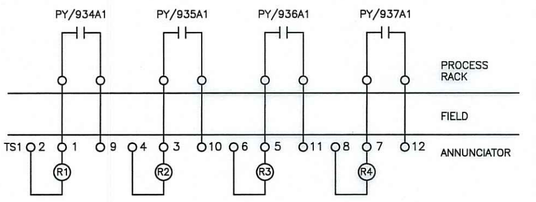
SB-S1455

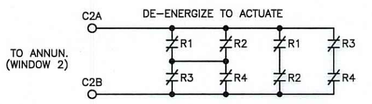
	1	2	3	4	5	6	7
A	1 PROCESS PROT SET VIOLATED > 1 DOOR OPEN	2 PROCESS CHANNEL SPRAY ACTUATION TEST SEQUENCE VIOLATED	3 RMS CHANNEL IN TEST	4 WASTE LIQUID PROCESS PNL TROUBLE	5 ALARM SYSTEM VITAL FAILURE	6 MLB–1 COMPONENT OFF NORMAL	7 MLB–2 COMPONENT OFF NORMAL
B	8 PROCESS PROT CABINET I DOOR OPEN	9 PROCESS CABINETS POWER SUPPLY FAILURE	10 RMS CHANNEL HI LEVEL	11 WASTE GAS PROCESS PNL TROUBLE	12 ALARM SYSTEM NON–VITAL FAILURE	13 MLB–3 COMPONENT OFF NORMAL	14 MLB–4 COMPONENT OFF NORMAL
C	15 PROCESS PROT CABINET II DOOR OPEN	16 MAIN STEAM RAD MONITORING TROUBLE/ALERT	17 RMS CHANNEL FAILURE	18 BORON RECYCLE PNL TROUBLE	19 ALARM SYSTEM ALB LOGIC FAILURE	20 BLACKOUT SEQ TROUBLE TRAIN A	21 BLACKOUT SEQ TROUBLE TRAIN B
D	22 PROCESS PROT CABINET III DOOR OPEN	23 CCB LOCAL CTRL PNL R202 OR R402 DOOR OPEN	24 CONTMT HI RANGE RAD MONITORING TROUBLE/ALERT	25 PROTECT SYSTEM TRAIN A TROUBLE	26 SAFEGUARDS TEST RACK TRAIN A TEST	27 RX TRIP BY–PASS BRK CLOSED TRAIN A	28 RX TRIP BY–PASS BRK A IN OPERATE POSITION
E	29 PROCESS PROT CABINET IV DOOR OPEN	30	31 STEAM GENERATOR BLOWDOWN PANEL TROUBLE	32 PROTECT SYSTEM TRAIN B TROUBLE	33 SAFEGUARDS TEST RACK TRAIN B TEST	34 RX TRIP BY–PASS BRK CLOSED TRAIN B	35 RX TRIP BY–PASS BRK B IN OPERATE POSITION

AUXILIARIES 1
TAG NO. ALB15

DETAIL "E"

CONTACTS OPEN TO ALARM





DETAIL "D"

CONTACTS CLOSED TO ALARM

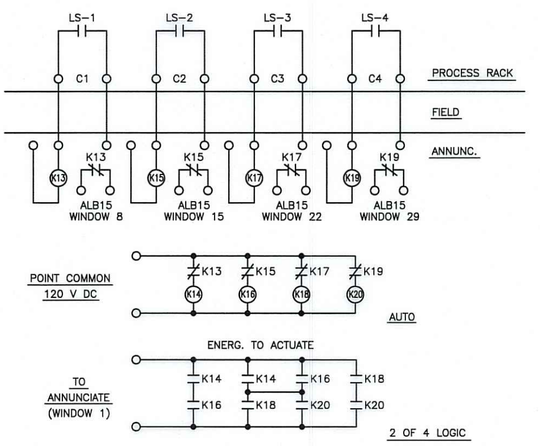


TABLE 1

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	REFERENCE DRAWING
6	A6	3/HCV864, 3/HCV865, 3/8802A, 3/8802B, 8808A–LS2, 8808B–LS2, 3/8809A, 3/8809B, 3/8818A, 3/8818B, 3/8840	B–208–119 SH. RH–03, RH–04 B–208–131 SH. SI–10, SI–11, SI–19, SI–20, SI–21, SI–22, SI–34, SI–35, SI–38
7	A7	8804A–LS1, 8804B–LS1, 3/8810A, 3/8810B, 3/8811A, 3/8811B, 3/8812A, 3/8812B, 3/8813, 3/8814A, 3/8814B, 3/8821A, 3/8821B, 3/8823A, 3/8823B, 3/8806, 3/9101A, 3/9101B, 3/9103A, 3/9103B, 3/9104A, 3/9104B, 8806–LS2	B–208–131 SH. SI–14, SI–15, SI–23, SI–24, SI–25, SI–26, SI–27, SI–28, SI–29, SI–30, SI–31, SI–36, SI–37, SI–53, SI–54, SI–16 B–208–028 SH. CI–07, CI–08, CI–09, CI–10, CI–11, CI–12 B–208–131 SH. SI–16
13	B6	3/8801A, 3/8801B, 3/8803A, 3/8803B, 3/8815A, 3/8815B	B–208–131 SH. SI–08, SI–09, SI–12, SI–13, SI–32, SI–33
14	B7	SWGMD1/5–52S2 (SIAPSI01) SWGMD2/5–52S2 (SIAPSI02) SWGLD11/2C–CBK (RHAPRH01) SWGLD21/2C–CBK (RHAPRH02) SWGLD11/5A–CBK (CIAPCS01) SWGLD21/5A–CBK (CIAPCS02) 3/9100A, 3/9100B	B–208–131 SH. SI–01, SI–02 B–208–119 SH. RH–01, RH–02 B–208–028 SH. CI–01, CI–02, CI–05, CI–06

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	DOOR LIMIT SW. C1 THRU C4	PCS	B–208–053, EI–01	8	C	DETAIL "D"	A	TB14–D1,D2,D3,D4, TB14–C40(4), TB14–A01,A01,A02,A02,A03,A03,A04,A04		
2	A2	PS/937A1, PS/936A1, PS/934A1, PS/935A1	PCS	8756D36–12, 14	3	C	DETAIL "E"	A	TB11–6, 6A TB11–C31		FIELD INPUT TERMINALS ON RELAY PNL.
3	A3	RMELRM01A01–A300.1,(3/RDU55, 3/RDU56)	RMS	B–208–120, RM–44,(RM–77)	2	O	(RF71)	(RF)	–7		
4	A4	LIQUID PANEL ANN. HORN RELAY	LP	B–208–154, WP–37	2	O	C1	A	–8		
5	A5	AS SYSTEM STATUS CONTACTS	ANN	816–336, AS–195	2	C	RF10	(RF)	–9		
6	A6	SEE TABLE 1	F	SEE TABLE 1	6	C	C4PA	A	TB11–10, TB12–SP19, TB12–SP21 – TB11–C31, TB12–SP20, TB12–SP22		C4PF (PNLK101) C5PF (PNLK301) C1 (8808B) C1 (8808B)
7	A7	SEE TABLE 1	F	SEE TABLE 1	6	C	C6PA	A	TB11–11, TB12–SP17, TB14–SP70 – TB11–C31, TB12–SP18, TB14–SP71		C7PF(PNLK101) C3PF(PNLK102) C8PF(PNLK301) C3PF(PNLK302) C2PF(SII19) C1(8806)
8	B1	K13–DETAIL "D" THIS DWG.	ANN	B–208–053, EI–01	2	C	C1	A	TB11–12 TB11–C31		
9	B2	PWR. SUPPLY CONTACTS, UY/761–767	PCS	B–208–053, EI–01	8	O	C8SA	A	TB11–13,20A THRU 20G		
10	B3	RMELRM01A01–A100.1,(3/RDU55, 3/RDU56)	RMS	B–208–120, RM–42,(RM–77)	2	O	(RF72)	(RF)	TB11–14		
11	B4	WASTE PROCESSING PANEL ANN. HORN RELAY	LP	B–208–074, GH–13	2	O	C1	A	–15		
12	B5	AS SYSTEM STATUS CONTACTS	ANN	816–336, AS–195	2	C	RF11	(RF)	–16		
13	B6	SEE TABLE 1	F	SEE TABLE 1	2	C	C2PA	A	TB11–17 – TB11–C31		C3PF (PNLK101) C3PF (PNLK301)
14	B7	SEE TABLE 1	F	SEE TABLE 1	8	C	C8PA	A	TB11–18, TB11–SP5, TB11–SP3, TB14–SP68 – TB11–C31, TB11–SP6, TB11–SP4, TB14–SP69		
15	C1	K15	ANN	B–208–053, EI–01	2	C	C1	A	TB11–19 TB11–C31		
16	C2	3/RUI31A	RMS	B–208–120, RM–11	2	C	C1	A	–20		
17	C3	RMELRM01A01–A200.1,(3/RDU55, 3/RDU56)	RMS	B–208–120, RM–43,(RM–77)	2	O	(RF73)	(RF)	–21		
18	C4	BORON PANEL ANN. HORN RELAY	LP	B–208–020, BR–03	2	O	C1	A	–22		
19	C5	AS SYSTEM STATUS CONTACTS	ANN	816–336, AS–195	2	C	RF12	(RF)	–23 TB11–C32		
20	C6	2/TD01A	AP	B–208–129, SG–02	2	O	C1	A	–24		
21	C7	2/TD01B	AP	B–208–129, SG–06	2	O	C1	A	–25		
22	D1	K17	ANN	B–208–053, EI–01	2	C	C1	A	–26		
23	D2	R202–LSW1, LSW2; R402–LSW1, LSW2	F	B–208–053, EI–03	2	O	C4SF	A	TB12–7 TB12–C34		
24	D3	RUI09, RUI10	RMS	B–208–120, RM–14	2	O	(RF74)	(RF)	TB11–28 TB11–C32		
25	D4	TB731, 1+2, K704	SSPS	1084H27 Sh.27	2	C	C1	A	–29		
26	D5	K822 (TRAIN A)	STR	9554D01 Sh.4	2	O	C1	A	–30		
27	D6	X2A, TB–11–2, 11–1	SWG	1189E15	2	C	C1	A	–31		
28	D7	X6A, TB–11–7, 11–8	SWG	1189E15	2	C	C1	A	–32		
29	E1	K19	ANN	B–208–053, EI–01	2	C	C1	A	–33		
30	E2	SPARE				(C)		A	TB12–15 TB12–C34		
31	E3	AUX RELAY TB1–23, 24	SGBP	2650C50	2	C	C1	A	TB11–35 TB11–C32		
32	E4	TB731, (1+2), K704	SSPS	1084H27 Sh.27	2	C	C1	A	–36		
33	E5	K822, (TRAIN B)	STR	9554D01 Sh.4	2	O	C1	A	–37		
34	E6	X2B, TB11–3, 11–4	SWG	1189E15	2	C	C1	A	–38		
35	E7	X6B, TB11–9, 11–10	SWG	1189E15	2	C	C1	A	–39		

Nuklearna elektrarna Krško
MASTER DOCUMENT
Date Received: 17-07-2018
Log Number: 147

Appendix 1 – Existing AS system essential drawings

SP-ES1455

Original Design Firm: WESTINGHOUSE
Original Design Drawing: 1462F8716
Last Revision And Date: 5 – 10.07.1996

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	DSGN. BY	E.E. APPR.
14	06.05.11	K.K.	REV'D PER CAP 2011–1271	S.J.	B.P.
15	04.07.12	BE	REV'D PER MOD. 797–RM–L	D.L.	B.P.
16	03.06.15	M.L.	REV'D PER MOD 1085–SF–L	S.J.	B.P.
17	20.04.18	V.M.	REV'D PER MOD 1087–SF–L	M.K.	J.K.

REFERENCE DRAWINGS:
1. M. KODRIČ
2. A. VILMAN
3. D. MANDIĆ

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRŠKO
KRŠKO, SLOVENIA
LE APPROVAL

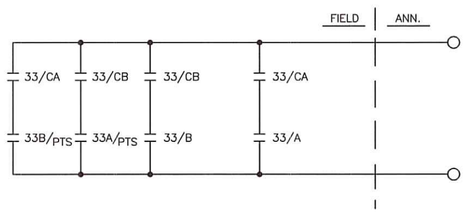
NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRŠKO
ALB15
ANNUNCIATOR ENGRAVING & SYSTEMS INFO.

DRAWING NUMBER: 1462F87
SHEET: 16
OF SHEETS: 17

1	2	3	4	5	6	7	8	
1 CC PMP 1A PULL TO LOCK OR BRK DISCONNECT	2 CC PMP 2B PULL TO LOCK OR BRK DISCONNECT	3 CHARGING PMP 1 COOLING FLOW LO	4 CHARGING PMP 2 COOLING FLOW LO	5 SURGE TANK 1 LEVEL HI/LO	6 RCP 1 OR 2 THERMAL BARRIER FLOW HI/LO	7 RCP 1 OR 2 THERMAL BARRIER TEMP HI	8 CC LOOP A FLOW LO	A
9	10 CC PMP MTR OVERLOAD IN PROGRESS OR TRIP	11 SIS PMP 1 COOLING FLOW LO	12 SIS PMP 2 COOLING FLOW LO	13 SURGE TANK 2 LEVEL HI/LO	14 RCP 1 UPPER BEARING FLOW LO	15 RCP 1 LOWER BEARING FLOW LO	16 CC LOOP B FLOW LO	B
17 CC PMP 3C (A) SW PULL TO LOCK OR BRK DISCONNECT	18 CC PMP 3C BRKR PMP BRK CONTROL MISMATCH	19 CONTAINMENT SPRAY PMP 1 COOLING FLOW LO	20 CONTAINMENT SPRAY PMP 2 COOLING FLOW LO	21 SURGE TANK 1 OR 2 LEVEL LO-LO	22 RCP 2 UPPER BEARING FLOW LO	23 RCP 2 LOWER BEARING FLOW LO	24 NON-SAFETY CLASS EQUIP COOL FLOW HI	C
25 CC PMP 3C (B) SW PULL TO LOCK OR BRK DISCONNECT	26 RHR HEAT EXCHANGER 1 FLOW HI/LO	27 AF PMP 1A MOTOR COOLING FLOW LO	28 AF PMP 2B MOTOR COOLING FLOW LO	29 SURGE TANK 1 OR 2 N_2 PRESS HI/LO	30 RCP 1 OR 2 MOTOR BEARINGS CC OUTLET TEMP HI	31 CC LOOP A HDR DISCH PRESS LO	32	D
33 ESW STRAINER A/B/C HI-HI DIFFER PRESS TROUBLE	34 RHR HEAT EXCHANGER 2 FLOW HI/LO	35 RHR PMP 1 COOLING FLOW LO	36 RHR PMP 2 COOLING FLOW LO	37 COOL FLOW TO NON-SAFETY CLASS WP EQUIP HI ALARM	38 ESW BALL STRAINER A/B HI DIFFER PRESS TROUBLE	39 CC LOOP B HDR DISCH PRESS LO	40 LOOP A OR B SUCTION TEMP HI/LO	E

COMPONENT COOLING
TAG NO. ALB16

DETAIL 'E'



WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	3/CC102PMP01A, 33 CONTACT	ARR, SWG	B-208-023 CC01, B-208-099 IN01	2	C	C2PA	A	TB11-45 TB11-C33		
2	A2	3/CC102PMP02B, 33 CONTACT	ARR, SWG	B-208-023 CC02, B-208-099 IN03	2	C	C2PA	A	-46		
3	A3	FIS2630	F	B-208-023, CC-47	2	O	C1	A	-47		
4	A4	FIS2631	F	B-208-023, CC-47	2	O	C1	A	-48		
5	A5	LY/2604D, LY2604F	BOP-PCS	B-208-023, CC-37	2	O	C2SF	A	-49		
6	A6	FY2714B, FY2714C, FY2715B, FY2715C	BOP-PCS	B-208-023, CC-34	2	O	C4SF	A	-50		
7	A7	TY/2716, TY/2717	BOP-PCS	B-208-023, CC-48	2	O	C2SF	A	-51		
8	A8	FY/2618, 52S/PMP01A, 52SPMP03CA	BOP-PCS SWG	B-208-023, CC-47	2	O	C3SPF	A	-52		
9	B1	SPARE				C			-53		
10	B2	CONTACTS FROM 74 & 86 RELAYS	SWG	B-208-023, CC-04	2	C	C8PF	A	-54		
11	B3	FIS2628	F	B-208-023, CC-47	2	O	C1	A	-55		
12	B4	FIS2629	F	B-208-023, CC-47	2	O	C1	A	-56		
13	B5	LY/2605F, LY/2605D	BOP-PCS	B-208-023, CC-38	2	O	C2SF	A	-57		
14	B6	FIS2708	F	B-208-023, CC-48	2	O	C1	A	-58		
15	B7	FIS2710	F	B-208-023, CC-48	2	O	C1	A	-59		
16	B8	FY/2619, 52S/PMP01A, 52S/PMP03CA	BOP-PCS SWG	B-208-023, CC-47	2	O	C3SPF	A	-60		
17	C1	3/CC102PMP03CA, 33 CONTACTS	ARR, SWG	B-208-023,099,CC-03,IN-01	2	C	C2PA	A	-61		
18	C2	CONTACTS FROM 33 & 43 SWITCH	SWG	B-208-023, CC-03	2	C	DETAIL "E"	A	-62		
19	C3	FIS2634	F	B-208-023, CC-47	2	O	C1	A	-63		
20	C4	FIS2635	F	B-208-023, CC-47	2	O	C1	A	TB12-1 TB12-C34		
21	C5	LY/2604B, LY/2605B	BOP-PCS	B-208-023, CC-07	2	O	C2SF	A	-2		
22	C6	FIS2709	F	B-208-023, CC-48	2	O	C1	A	-3		
23	C7	FIS2711	F	B-208-023, CC-48	2	O	C1	A	-4		
24	C8	3/FIS2732A, 3/FIS2732B	F	B-208-023, CC-32	2	O	C2SF	A	-5		
25	D1	3/CC102PMP03CB, 33 CONTACTS	ARR, SWG	B-208-032,099,CC-04,IN-03	2	C	C2PA	A	-6		
26	D2	FY/2640A, VALVE 10087, FY/2640B	BOP-PCS	B-208-023, CC-35	3	O	DETAIL "G"	A	-56 TB12-C36		
27	D3	FIS2636	F	B-208-023, CC-47	2	O	C1	A	-8 TB12-C34		
28	D4	FIS2637	F	B-208-023, CC-47	2	O	C1	A	-9		
29	D5	PY/2600A, PY/2600B, PY/2601A, PY/2601B	BOP-PCS	B-208-023, CC-47	2	O	C4SF	A	-10		
30	D6	TY/2712, TY/2713	PCS	B-208-023, CC-48	2	O	C2SF	A	-11		
31	D7	3PY/2614A	BOP-PCS	B-208-023, CC-02	2	O	C1	A	-12		
32	D8	SPARE							-13		
33	E1	DPS2830, DPS2831, DPS2832	F	B-208-136, SW-18	2	O	C3SF	A	-14		
34	E2	FY/2641A, VALVE 10184, FY/2641B	BOP-PCS	B-208-023, CC-36	3	O	DETAIL "G"	A	-57 TB12-C36		
35	E3	FIS2632	F	B-208-023, CC-47	2	O	C1	A	-16 TB12-C34		
36	E4	FIS2633	F	B-208-023, CC-47	2	O	C1	A	-17		
37	E5	3/FIS2722A, 3/FIS2722B	F	B-208-023, CC-53	2	O	C2SF	A	-18		
38	E6	DPS2833, DPS2834	F	B-208-136, SW-30	2	O	C2SF	A	-19		
39	E7	PY/2615A	BOP-PCS	B-208-023, CC-01	2	O	C1	A	-20		
40	E8	TY/260BA, TY/260BB, TY/2609A, TY/2609B	PCS	B-208-023, CC-47	2	O	C4SF	A	-21		

24-01-2024
136

Original Design Firm: WESTINGHOUSE
Replaced Manual Drawing: 1462F87 SH.7
Last Revision And Date: 7 11.1994

THIS S.A.D. DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	CHD. BY	LE APPR.
18	11.08.23	P.K.	REVD PER MOD. 822-CA-L	P.P.	P.P.
17	12.12.18	M.S.	REVD PER MOD. 1126-SW-L	M.M.	B.K.
16	03.06.15	M.S.	REVD PER MOD. 1087-SW-L	M.M.	B.K.
15	03.06.15	M.S.	REVD PER MOD. 1087-CA-L	M.M.	B.K.
14	94.02.10	R.N.	REVD PER QAP 2209-506	S.A.	B.K.

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO
ALB16
ANNUNCIATOR ENGRAVING & SYSTEMS INFO.

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO
KRSKO, SLOVENIA

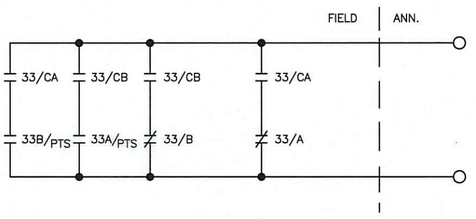
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SCALE: NONE
DRAWING NUMBER: 1462F87
SYSTEM: 17 18

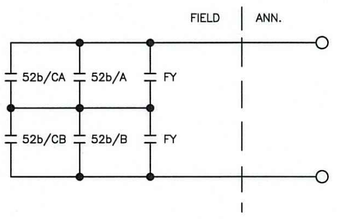
1	2	3	4	5	6	7	
1 SPENT FUEL PIT LO FLOW OR TROUBLE	2 SPENT FUEL PIT HI TEMP	3 LOOP A AIR HANDLER FLOW (IN–OUT) HI	4 CC BLDG SUMP LEVEL HI	5 SW PMP MTR OVERLOAD IN PROGRESS OR TRIP	6 SW LOOP A PRESS LO	7 TRAVEL SCREEN 1A WTR LEVEL DIFFERENTIAL HI	A
8 SW PMP 1A PULL TO LOCK OR BRK DISCONECT	9 SPENT FUEL PIT HI LEVEL	10 LOOP B AIR HANDLER FLOW (IN–OUT) HI	11 CC BLDG SUMP LEVEL HI–HI	12 SW PMP 2B PULL TO LOCK OR BRK DISCONNECT	13 SW LOOP B PRESS LO	14 TRAVEL SCREEN 2B WTR LEVEL DIFFERENTIAL HI	B
15	16 SPENT FUEL PIT LO LEVEL	17	18 CC BLDG SUMP PMPS 1 OR 2 PULL TO LOCK	19 SW PMP 3C (A) SW PULL TO LOCK OR BRK DISCONNECT	20	21 TRAVEL SCREEN 1A OR 2B WATER DIFF HI–HI LEVEL	C
22 EXCESS LETDOWN HEAT EXCHANGER COOLING FLOW LO	23 EXCESS LETDOWN HEAT EXCHANGER COOL FLOW HI	24 CC LOOP A SUPPLY TEMP HI/LO	25 CC HEAT EXCH 1 OR 2 SW COOLING FLOW LO	26 SW PMP 3C (B) SW PULL TO LOCK OR BRK DISCONNECT	27 SW PMP 03C BRK PARALLEL BRK CONT MISMATCH	28 SCREEN WASH SYSTEM A LOCAL TROUBLE	D
29 SPENT FUEL PIT COOLING PMP 1 PULL TO LOCK OR BREAKER TRIPPED	30 SPENT FUEL PIT COOLING PMP 2 PULL TO LOCK OR BREAKER TRIPPED	31 CC LOOP B SUPPLY TEMP HI/LO	32 SW PMP SUPPLY LEVEL LO	33 SW PMP SUPPLY LEVEL LO–LO	34 SW SUPPLY TEMP HI/LO	35 SCREEN WASH SYS B LOCAL TROUBLE	E

COMPONENT COOLING. HVAC. SERVICE WATER & SUMPS
TAG NO. ALB17

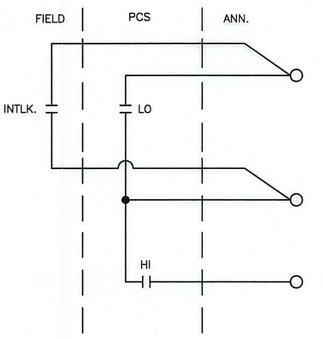
DETAIL "E"



DETAIL "F"



DETAIL "G"



WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	3/FUI1419	F	B–208–128, SF–03	2	O	C2	A	TB12–28 TB12–C35		
2	A2	TIS–1400	F	1188E13	2	O	C1	A	–29		
3	A3	FY/2720	BOP–PCS	B–208–023, CC–48	2	O	C1	A	–30		
4	A4	LY/6110B	BOP–PCS	B–208–060, FD–08	2	O	C1	A	–31		
5	A5	CONTACTS FROM 74 & 86 RELAYS	SWG	B–208–136, SW–04	2	C	C8PF	A	–32		
6	A6	PY/2818A	BOP–PCS	B–208–136, SW–02	2	O	C1	A	–33		
7	A7	3/DPS2802A	ARR	B–208–136, SW–05	2	C	C1	A	–34		
8	B1	3/SW101PMP01A, 33 CONTACT	ARR, SWG	B–208–136 SW01, B–208–099 IN01	2	C	C4PA	A	–35		
9	B2	LS–1401–1	F	1188E13	2	O	C1	A	–36		
10	B3	FY/2721	BOP–PCS	B–208–023, CC–48	2	O	C1	A	–37		
11	B4	LY/6110E	BOP–PCS	B–208–060, FD–08	2	O	C1	A	–38		
12	B5	3/SW101PMP02B, 33 CONTACT	ARR, SWG	B–208–136 SW02, B–208–099 IN03	2	C	C4PA	A	–39		
13	B6	PY/2819A	BOP–PCS	B–208–136, SW–01	2	O	C1	A	–40		
14	B7	3/DPS2803A	ARR	B–208–136, SW–06	2	C	C1	A	–41		
15	C1	SPARE				(C)			–42		
16	C2	LS–1401–2	F	1188E13	2	O	C1	A	–43		
17	C3	SPARE				(C)			–44		
18	C4	1/FD901PMP001, 1/FD901PMP002	CB	B–208–060, FD–08, 09	2	C	C2PA	A	–45 TB12–C36		
19	C5	3/SW101PMP03CA, 33 CONTACTS	ARR, SWG	B–208–099, IN–51 136, SW–04	2	C	C2PA	A	–46		
20	C6	SPARE				(C)			–47		
21	C7	3/DPS2802B, 3/03B	ARR	B–208–136, SW–06	2	O	C2SF	A	–48		
22	D1	(FIS2719/VALVE 10377, 10378)	F	B–208–023, CC–42	2	O	C3PF	A	–49		
23	D2	FIS2719	F	B–208–023, CC–42	2	O	C1	A	–50		
24	D3	TY/2616A, TY/2616B	BOP–PCS	B–208–023, CC–47	2	O	C2SF	A	–51		
25	D4	FY/2828, FY/2829, 52SWPMP01A, 2B, 3CA, 3CB	BOP–PCS	B–208–136, SW–18	2	O	DETAIL "F"	A	–52		
26	D5	3/SW101PMP03CB, 33 CONTACTS	CB–SWG	B–208–099, IN–52 136, SW–04	2	C	C2PA	A	–53		
27	D6	CONTACTS FROM 33 & 43 SWITCH	SWG	B–208–136, SW–03	2	C	DETAIL "E"	A	–54		
28	D7	33b/SW102TSC01A, 3/SW100PMP01AA, 3/PIS2850	F, ARR	B–208–136, SW–9	2	O	C6SF	A	–55		
29	E1	OTS, 1/SFAPSF01	SWG	B–208–128, SF–01	2	C	C1	A	–27 TB11–C32		
30	E2	OTS, 1/SFAPSF02	SWG	B–208–128, SF–02	2	C	C1	A	–34		
31	E3	TY/2617A, TY/2616B	BOP–PCS	B–208–023, CC–47	2	O	C2SA	A	–58 TB12–C36		
32	E4	LY/2804	BOP–PCS	B–208–136, SW–18	2	O	C1	A	–59		
33	E5	LY/2804A	BOP–PCS	B–208–136, SW–18	2	O	C1	A	–60		
34	E6	TY/2800A, TY/2800B	BOP–PCS	B–208–136, SW–18	2	O	C2SF	A	–61		
35	E7	33b/SW102TSC02B, 3/SW101PMP02BA, 3/PIS2851	F, ARR	B–208–136, SW–10	2	O	C6SF	A	–62		

Appendix 1 - Existing AS system essential drawings

SP-ES1455

Nuklearna elektrarna Krško
MASTER DOCUMENT
Date Received: 17-07-2018
Log Number: 134

Original Design Firm: WESTINGHOUSE
Original Design Drawing: 5 1462F8718
Last Revision And Date: 04.1991

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	DSGN. BY	DRN. BY	CHK. BY	E.E. APPR.
13	26.06.18	V.S.	REVD PER MOD. 1007–20–L	M.S.	M.S.	M.K.	
12	15.06.09	F.F.	REVD PER MOD. 639–45–L	M.S.	M.S.	M.K.	
11	19.02.14	M.L.	REVD PER CAP 2013–2867	S.A.	S.A.	M.L.	
10	09.03.10	M.K.	REVD PER CAP 2010–5141	D.B.	D.B.	M.L.	
9	01.08.07	M.K.	REVD PER MOD. 1007–20–L	M.S.	M.S.	M.K.	

MADE: 1. M. KODRIČ
CHECKED: 2. A. VILMAN
APPROVAL: 3. D. MANDIĆ

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO
KRSKO, SLOVENIA
LE APPROVAL

REFERENCE DRAWINGS:

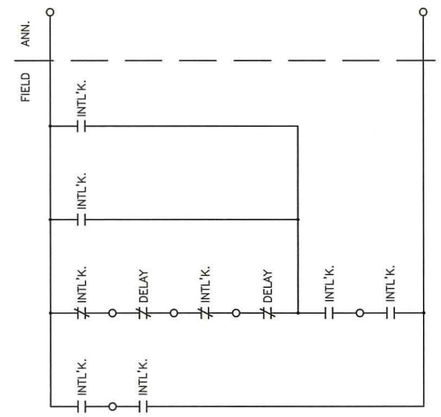
NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO
ALB17
ANNUNCIATOR ENGRAVING & SYSTEMS INFO.

DRAWING NUMBER: 1462F87
SHEET: 18
SHEETS: 13

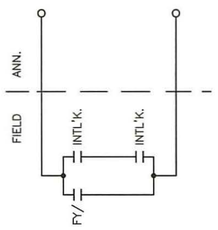
1	2	3	4	5	6	7
A	AUX BLDG SUMP LEVEL HI	CONTAINMENT BLDG SUMP LEVEL HI	INSTR AIR COMP SWITCHES IN PULL TO LOCK OR BRK DISCONNECT	RWST LEVEL A HI/LO	RWST LEVEL B HI/LO	REAC MAKE-UP WTR TANK LEVEL HI-HI OR LO-LO
B	AUX BLDG SUMP LEVEL HI-HI	CONTAINMENT BLDG SUMP LEVEL HI-HI	INSTR AIR COMP SWITCHES IN LOCAL	RWST LEVEL LO-LO	RWST EMPTY	REAC MAKE-UP WTR TANK LEVEL LO
C	AUX BLDG SUMP PMPS 001 OR 002 PULL TO LOCK	CONTAINMENT BLDG SUMP PMPS 001 OR 002 PULL TO LOCK	INSTR AIR COMP MOTOR TRIP	RWST TEMP A HI/LO	RWST TEMP B HI/LO	REAC MAKE-UP WTR PUMP SWITCH IN LOCAL
D	PROCESS CONT CABINET A CARD IN TEST	CONTAINMENT SUMP PMP RUNNING DISC VALVES CLOSED	SERVICE AIR COMPRESSOR TROUBLE	INSTR AIR HEADER A AIR TEMP HI	RWST HTR PMPS 001 OR 002 FLOW LO	REAC MAKE-UP WTR PUMP SWITCH PULL TO LOCK
E	PROCESS CONT CABINET B CARD IN TEST	INSTR AIR DRYER TROUBLE	INSTR AIR HEADERS A OR B PRESS LO	INSTR AIR HEADER B AIR TEMP HI	REAC MAKE-UP WTR PUMP HEADER A PRESS LO	BOP RACK TRAIN A POWER FAILURE
F						BOP RACK TRAIN B POWER FAILURE
G						BOP RACK TRAIN X POWER FAILURE
H						REAC MAKE-UP WTR STG TANK TEMP HI/LO
J						(LOCAL) NW PNL EE106PNLR926 TROUBLE

AUXILIARIES 2
TAG NO. ALB18

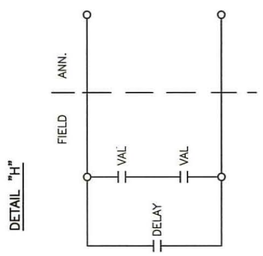
DETAIL "K"



DETAIL "J"



DETAIL "H"



WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TERMINALS	REMARKS
1	A1	LY/6100B	BOP-PKS	B-208-060, FD-01	2	O	C1	A	TB13-1		
2	A2	LY/6101B	BOP-PKS	B-208-060, FD-03	2	O	C1	A	-2		
3	A3	1/A9004CPR001 & 002, 33 CONTACTS	CB,SWG	B-208-097, IA-01 & 02-021	2	C	C4PF	A	-3		
4	A4	LY/2877A, LY/2877B	BOP-PKS	B-208-155, WS-06	2	O	C2SF	A	-4		
5	A5	LY/2878A, LY/2878B	BOP-PKS	B-208-155, WS-06	2	O	C2SF	A	-5		
6	A6	LY/3201A, LY/3201D	BOP-PKS	B-208-107, MW-05	2	O	C2SF	A	-6		
7	A7	UY/761G	BOP	8814D91, Sh.2	2	O	C1	A	-7		
8	B1	LY/6100E	BOP-PKS	B-208-060, FD-01	2	O	C1	A	-8		
9	B2	LY/6101E	BOP-PKS	B-208-060, FD-03	2	O	C1	A	-9		
10	B3	43/1A9044CPR001 & 002	LP	B-208-097, IA-01 & 02	2	O	C2SF	A	-10		
11	B4	LY/2877C, LY/2878C	BOP-PKS	B-208-155, WS-06	2	O	C1	A	-11		
12	B5	LY/2877D, LY/2878D	BOP-PKS	B-208-155, WS-06	2	O	C1	A	-12		
13	B6	LY/3200C	BOP-PKS	B-208-107, MW-07	2	O	C2SF	A	-13		
14	B7	UY/762B	BOP	8814D92, Sh.2	2	O	C1	A	-14		
15	C1	1/FD103PMP001, 1/FD103PMP002	CB	B-208-060, FD-01, 02	2	C	C2PA	A	-15		
16	C2	1/FD105PMP001, 1/FD105PMP002	CB	B-208-060, FD-03, 04	2	C	C2PA	A	-16		
17	C3	SWGLD11/7B5 & SWGLD21/5B & 2A, OTS	SWG	B-208-097, IA-02	2	C	C3PF	A	-17		
18	C4	TY/2875A, TY/2875B	BOP-PKS	B-208-155, WS-06	2	O	C2SF	A	-18		
19	C5	TY/2876A, TY/2876B	BOP-PKS	B-208-155, WS-06	2	O	C2SF	A	-19		
20	C6	3/MW100PMP001, 3/MW100PMP002	LP	B-208-099, Sh.1,3	2	C	C2PF	A	-20		
21	C7	UY/763A	BOP	8814D93, Sh.2	2	O	C1	A	-21		
22	D1	CB103RCKK201, CARDS	BOP-PKS	8814D91, Sh.7	2	O	C18SF	A	-22		
23	D2	VALVES 13500, 13501 2/13501	F	B-208-060, FD-06	2	O	DETAIL "H"	A	-23	TB13-C38	
24	D3	TIS-6182, TIS-6183, PS6187 OTS	F	B-208-021, CA-01	2	O	C4PF	A	-24		
25	D4	TIS6203	F	B-208-097, IA-01	2	O	C1	A	-25		
26	D5	FY/2888A/42b/WS901PMP001/WS106PMP002	BOP-PKS	B-208-155, WS-01	2	O	DETAIL "J"	A	-26		
27	D6	43/MW100PMP001, 43/MW100PMP002	LP	B-208-107, MW-01, 02	2	O	C2SF	A	-27		
28	D7	TS3202	F	B-208-107, MW-01	2	O	C1	A	-28		
29	E1	CB103RCKK401, CARDS	BOP-PKS	8814D92, Sh.12	2	O	C19SF	A	-29		
30	E2	DRYER TROUBLE CONTACT	F	B-208-097, IA-03	2	O	DETAIL "K"	A	-30		
31	E3	PY/6207, PY/6227	PCS	B-208-097, IA-01	2	O	C2SF	A	-31		
32	E4	TIS-6223	F	B-208-097, IA-02	2	O	C1	A	-32		
33	E5	PIS3204	F	B-208-107, MW-01	2	O	C1	A	-33		
34	E6	PIS-3205	F	B-208-107, MW-02	2	O	C1	A	-34		
35	E7	EE106PNLR926-ANNUNCIATOR	LP	B-208-107, MW-22	2	O	C1	A	-35		REF.: D-804-623

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. 11

- WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
- ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
- ENGRAVING HAS BEEN CHANGED ON WINDOW NO. 25 AND 32

MASTER DOCUMENT
Date Received: 02-12-2022
Loc Number: 135

Original Design Firm: WESTINGHOUSE
Replaced Manual Drawing: 1462F87 Sh.19
Last Revision And Date: 4 08.03.1980

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	CKD. BY	LE APPR.
14	30.11.22		REV'D PER CAP 2022-1743		
13	15.09.09	F.F.	REV'D PER MOD 629-AS-L	M.S.	N.I.
12	10.12.07	F.F.	REV'D PER MOD. 157-MW-L	N.I.	B.S.
11	22.08.06	SPRO	REV'D PER MOD. 432-AS-L	M.S.	B.S.
10	08.10.02	NUKEL	REV'D PER MOD. 348-A-L	B.B.	D.V.

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO

ALB18

ANNUNCIATOR ENGRAVING & SYSTEMS INFO.

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO — KRSKO, SLOVENIA

MADE	CHECKED	LE APPROVAL
1. M. KODRIČ	2. A. VILMAN	3. D. MANDIĆ

REFERENCE DRAWINGS:

SCALE

1462F87 — DRAWING NUMBER — 19 | 14

FILE: 1462F8719 DWG, SPREJEL

1	2	3	4	5	6	7	8	
1 VA101AHU SUPERVISORY ALERT	2 RECIRC FAN 1A SMOKE	3 RECIRC FAN 1A LO AIR FLOW	4 SPARE	5 CONTMT–ANNULUS DIFF PRESS HI/LO	6 ANNULUS PLENUM HEATING COIL 1A OR 1B IN PULL TO LOCK	7 ANNULUS OUTLET SYS A SMOKE	8 ANNULUS OUTLET SYS A HI HUMIDITY	A
9 SW DESILTING TROUBLE	10 RECIRC FAN 1B SMOKE	11 RECIRC FAN 1B LO AIR FLOW	12 RECIRC FANS PULL TO LOCK OR BRK DISCONNECT	13 CONTAINMENT TEMP ELEMENT FAILURE	14 ANNULUS FAN 1A OR 1B PULL TO LOCK BRK DISCONNECT	15 ANNULUS OUTLET SYS B SMOKE	16 ANNULUS OUTLET SYSTEM B HI HUMIDITY	B
17 MISC CHEMICAL ADDITION CC LOCAL PNL TROUBLE	18 RECIRC FAN 2A SMOKE	19 RECIRC FAN 2A LO AIR FLOW	20 RECIRC FAN MOTOR TRIP	21 CONTAINMENT TEMP HI	22 ANNULUS PLENUM 1A OR 1B HI ΔP	23 ANNULUS FAN 1A DISCHARGE LO AIR FLOW	24 ANNULUS FAN 1A DISCHARGE SMOKE	C
25 IDDS GENERAL TROUBLE	26 RECIRC FAN 2B SMOKE	27 RECIRC FAN 2B LO AIR FLOW	28 INST AIR COMPRESSOR 001 TROUBLE	29 INSTR AIR COMPRESSOR 002 TROUBLE	30 ANNULUS PRESS HI/LO	31 ANNULUS FAN 1B DISCHARGE LO AIR FLOW	32 ANNULUS FAN 1B DISCHARGE SMOKE	D
33 CV EMERG OR PERSONNEL AIR LOCK INTLK DEFEATED	34 CV EMERG AIR LOCK DOOR UNLATCHED	35 CV PERSONNEL AIR LOCK DOOR UNLATCHED	36 RECIRC SMOKE DET TROUBLE	37	38 PIS LEVEL 1 VITAL FAILURE	39 PIS LEVEL 1 FAILURE/ BEACON FAILURE	40 ANNULUS SMOKE DET TROUBLE	E

CONTAINMENT VENTILATION
TAG NO. ALB19

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	VA100PLC–K1	LP	816–344, Sh. 3	2	O	C1	A	TB13–41 TB13–C38		
2	A2	AE–6403	F	B–208–146, VA–10	2	O	C1	A	42		
3	A3	2/FS–6412	ARR	B–208–146, VA–01	2	C	C1	A			TIME DELAY
4	A4	SPARE				C			44		
5	A5	PY/6423A & B, 6424A & B	BOP–PCS	B–208–146, VA–09	2	O	C4SF	A	45 TB13–C39		
6	A6	3/VA181AHU01A, 02B	ARR	B–208–099, IN–02, 04	2	C	C2PF	A	46		
7	A7	3/AE–6601	LP	B–208–146, VA–18	2	C	C1	A	47		
8	A8	MY/6607	BOP–PCS	B–208–146, VA–18	2	O	C1	A	48		
9	B1	E805–ANN	LP	B–208–136, SW–41	2	O	C2SF	A	49		
10	B2	AE–6405	LP	B–208–146, VA–10	2	O	C1	A	50		
11	B3	2/FS–6414	ARR	B–208–146, VA–03	2	C	C1	A			TIME DELAY
12	B4	33 SWITCH–3VA101AHU, 01A, 02A, 01B, 02B	SWG, ARR	B–208–099, IN–02, 04	2	C	12PFA	A	52		
13	B5	TY/6400A, B, C, D, & TY/6401A, B, C, D	BOP–PCS	B–208–146, VA–09	2	O	C8SF	A	53		
14	B6	3/VA181FAN01B, 01A	ARR	B–208–099, IN–02, 04	2	C	C2PF	A	54		
15	B7	AE–6602	F	B–208–146, VA–18	2	C	C1	A	55		
16	B8	MY–6608	BOP–PCS	B–208–146, VA–18	2	O	C1	A	56		
17	C1	AUX ANN RELAY	LP	B–208–026, CF–09	2	O	C1	A	57		
18	C2	AE–6402	F	B–208–146, VA–10	2	O	C1	A	58		
19	C3	2/FS–6411	ARR	B–208–146, VA–02	2	C	C1	A	55		TIME DELAY
20	C4	CONTACTS FROM OTS SW AMPTEC UNIT	SWG	B–208–146, VA–09	2	C	C8PF	A	60		
21	C5	TY/6400E & TY/6401E	BOP–PCS	B–208–146, VA–09	2	O	C2SF	A	61		
22	C6	DPY/6599, DPY/6600	BOP–PCS	B–208–146, VA–18	2	O	C2SF	A	62		
23	C7	2/FS–6603	ARR	B–208–146, VA–12	2	O	C2PF	A			TIME DELAY
24	C8	AE–6619	F	B–208–146, VA–18	2	C	C1	A	64		
25	D1	EE106PNLM936 , PLC	IDDS	B–208–154, WP–65	2	O	C1	A	65		
26	D2	AE–6404	F	B–208–146, VA–10	2	O	C1	A	66		
27	D3	2/FS–6413	ARR	B–208–146, VA–04	2	C	C1	A			TIME DELAY
28	D4	J809–3/GA	LP	B–208–097, IA–01	2	C	C1	A	68		
29	D5	J810–3/GA	LP	B–208–097, IA–02	2	C	C1	A	TB14–1 TB14–C40		
30	D6	PY/6595B & C, PY/6597B & C	BOP–PCS	B–208–146, VA–18	2	O	C4SF	A	2		
31	D7	2/FS–6604	ARR	B–208–146, VA–13	2	O	C1	A	3		TIME DELAY
32	D8	AE–6620	F	B–208–146, VA–18	2	C	C1	A	4		
33	E1	AIR LOCK LIMIT SW	F	B–208–125, SC–01	2	O	C6SF	A	5		
34	E2	AIR LOCK LIMIT SW	F	B–208–125, SC–02	2	O	C2SF	A	6		
35	E3	AIR LOCK LIMIT SW	F	B–208–125, SC–01	2	O	C2SF	A	7		
36	E4	K852CC5/2CRC61–R1	LP	B–208–146, VA–10	2	O	C1	A	8		
37	E5	SPARE							9		
38	E6	CH942CAB/WD	C	816–301, Ch. 150	2	C	C1	A	10		
39	E7	CH942CAB/3NF	C	816–301, Ch. 150	2	C	C1	A	11		
40	E8	K852CC5/2CRC61–R2	F	B–208–146, VA–18	2	O	C1	A	12		

S.O. 395

24-01-2024

Original Design Firm: WESTINGHOUSE
Replaced Manual Drawing: 1462F87 SH:20
Last Revision And Date: A 06/11/1980

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY!

NO.	DATE	BY	REVISION	COD. BY	LE APPR.
19	03/03/16	M.K.	REVO PER MOD. 1107–SP–L	M.M.	B.P.
18	03/01/16	M.K.	REVO PER MOD. 1107–SP–L	M.M.	B.P.
17	02/03/16	M.K.	REVO PER MOD. 1107–SP–L	M.M.	B.P.
16	05/01/15	V.S.	REVO PER MOD. 1107–SP–L	M.M.	B.P.
15	03/06/15	M.L.	REVO PER MOD 1080–SP–L	J.K.	B.P.
14	05/11/13	D.A.	REV PER MOD 689–FP–L	D.I.	N.L.

NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRŠKO

ALB19

ANNUNCIATOR ENGRAVING & SYSTEMS INFO.

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRŠKO
MADE
CHECKED
KRŠKO, SLOVENIA
LE APPROVAL

REFERENCE DRAWINGS:

1462F87
DRAWING NUMBER

SCALE: SYSTEM: 120 18

1	2	3	4	5	6	7	8	9	
1 110KV POLJE SYEB01 LOKALNO KRMILJENJE	2 110KV POLJE SYEB01 IZPAD 220VDC ZA KRMILJENJE IN SIGNALIZACIJO	3 110KV POLJE SYEB01 IZPAD FAZE	4 T1 VISOKA TEMP NAVITJA	5 T1 MOTNJE	6 T1 PREKLOPNIK STOPENJ V POGONU	7 T1 HLADILNA SKUPINA V OKVARI	8	9 T1 IZPAD NAP. ZA HLAJENJE	A
10 110KV POLJE SYEB01 NAPAKA NA ODKLOPNIKU SYEB01Q0	11 110KV POLJE SYEB01 IZPAD 220VDC ZA POGON LOC. IN. OZEM.	12 110KV POLJE SYEB01 BLOKADA ZAŠČITE PRED IZPADOM FAZE	13 T2 VISOKA TEMP NAVITJA	14 T2 MOTNJE	15 T2 PREKLOPNIK STOPENJ V POGONU	16 T2 HLADILNA SKUPINA V OKVARI	17	18 T2 IZPAD NAP. ZA HLAJENJE	B
19 110KV POLJE SYEB01 IZPAD ODKLOPNIKA SYEB01Q0	20 110KV POLJE SYEB01 IZPAD 220VDC	21	22	23 T3 PLINSKI RELE TR. ALI REG. STIKALA IZKLOP	24 T3 VISOK TLAK V KOTLU ALI REG. STIKALU	25 T3 NIVO OLJA V KOTLU ALI REG. STIKALU MINIMUM	26 T3 IZPAD NAP. ZA HLAJENJE	27 T3 VISOKA TEMP. NAVITJA	C
28 110KV POLJE SYEB01 NIZEK TLAK PLINA SF6	29 110KV POLJE SYEB01 IZPAD 230VAC	30	31	32 T3 PLINSKI RELE TR. POVIŠAN TLAK	33 T3 VISOKA TEMP. OLJA	34 T3 REGULATOR NAPETOSTI BLOKIRAN	35 T3 REGULATOR NAPETOSTI MOTNJA	36 T3 REG. STIKALO LOKALNO KRMILJENJE	D
37 110KV POLJE SYEB01 OKVARA 11/SYEB01 ALI 87L/SYEB01 ALI 11/M1-M2	38 110KV POLJE SYEB01 IZPAD MERILNE NAPETOSTI 100VAC	39	40	41 T3 RELE GORLJIVIH PLINOV AKTIVIRAN	42	43	44	45	E

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	11/SYEB01	PRB	B-208-138, SY-26	2	C	C1	A	TB1-1, TB1-C4		
2	A2	11/SYEB01, FU15	PRB	B-208-138, SY-26	2	C	C2PF	A	TB1-2, TB1-C4		
3	A3	11/M1-M2	LP	B-208-138, SY-25	2	C	C1	A	TB1-3, TB1-C4		
4	A4	C41	LP	B-208-052, EE-85	2	C	C1	A	TB1-4, TB1-C4		
5	A5	C41, C42, C43, C44	LP	B-208-052, EE-85	5	C	C4PA	A	TB1-5, TB1-6, TB1-7, TB1-8, TB1-C4		RF13 (816-336 sh.195)
6	A6	C45	LP	B-208-052, EE-85	2	C	C1	A	TB1-9, TB1-C4		
7	A7	C32, C34, C36	LP	B-208-052, EE-85	4	C	C3PA	A	TB1-10, TB1-11, TB1-12, TB1-C4		RF14 (816-336 sh.195)
8	A8										
9	A9	C31	LP	B-208-052, EE-85	2	C	C1	A	TB1-16, TB1-C4		
10	B1	11/SYEB01	LP	B-208-138, SY-26	2	C	C1	A	TB1-17, TB1-C4		
11	B2	11/SYEB01	LP	B-208-138, SY-26	2	C	C1	A	TB1-18, TB1-C4		
12	B3	43/OPCMS	LP	B-208-138, SY-06	2	C	C1	A	TB1-19, TB1-C4		
13	B4	C41	LP	B-208-052, EE-85	2	C	C1	A	TB1-20, TB1-C4		
14	B5	C41, C42, C43, C44	LP	B-208-052, EE-85	5	C	C4PA	A	TB1-21, TB1-22, TB1-23, TB1-24, TB1-C4		RF16 (816-336 sh.195)
15	B6	C45	LP	B-208-052, EE-85	2	C	C1	A	TB1-25, TB1-C4		
16	B7	C32, C34, C36	LP	B-208-052, EE-85	4	C	3CPA	A	TB1-26, TB1-27, TB1-28, TB1-C4		RF17 (816-336 sh.195)
17	B8										
18	B9	C31	LP	B-208-052, EE-85	2	C	C1	A	TB1-32, TB1-C4		
19	C1	11/SYEB01	LP	B-208-138, SY-26	2	C	C1	A	TB1-33, TB1-C4		
20	C2	3/LA	LP	B-208-138, SY-26	2	C	2CPF	A	TB1-34, TB1-C4		
21	C3										
22	C4										
23	C5	K14, K16	LP	B-208-052, EE-85	2	C	C2PF	A	TB1-37, TB1-C4		
24	C6	63P-1, 63P-2	LP	B-208-052, EE-85	2	C	C2PF	A	TB1-38, TB1-C4		
25	C7	K17, K19	LP	B-208-052, EE-85	2	C	C2PF	A	TB1-39, TB1-C4		
26	C8	K21	LP	B-208-052, EE-85	2	C	C1	A	TB1-40, TB1-C4		
27	C9	TIS1, TIS2, TIS3	LP	B-208-052, EE-85	2	C	C3PF	A	TB1-41, TB1-C4		
28	D1	11/SYEB01	LP	B-208-138, SY-26	2	C	C1	A	TB1-42, TB1-C4		
29	D2	11/SYEB01	LP	B-208-138, SY-26	2	C	C1	A	TB1-43, TB1-C4		
30	D3										
31	D4										
32	D5	K15	LP	B-208-052, EE-85	2	C	C1	A	TB1-46, TB1-C4		
33	D6	TI1	LP	B-208-052, EE-85	2	C	C1	A	TB1-47, TB1-C4		
34	D7	3-4/AVR	LP	B-208-052, EE-85	2	C	C1	A	TB1-48, TB1-C4		
35	D8	3-1/AVR, 3-2/AVR, 3-3/AVR	LP	B-208-052, EE-85	2	C	C3PF	A	TB1-49, TB1-C4		
36	D9	S132	LP	B-208-052, EE-85	2	C	C1	A	TB1-50, TB1-C4		
37	E1	11/SYEB01, 87L/SYEB01, 11/M1-M2	LP	B-208-138, SY-26	2	O	3CSF	A	TB1-51, TB1-C4		
38	E2	11/SYEB01	LP	B-208-138, SY-26	2	C	C1	A	TB1-52, TB1-C4		
39	E3										
40	E4										
41	E5	K23	LP	B-208-052, EE-85	2	C	C1	A	TB1-55, TB1-C4		
42	E6										
43	E7										
44	E8										
45	E9										

Original Design Firm:
Nuclear Electrical Services
Last Revision And Date:

NEK
N/A
N/A

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	DES. BY	DRF. BY	E. APPR.
5	10.2020	F.F.	REVD PER MOD 1055-21-L	D.S.	B.P.	
4	10.2020	BE	REVD PER MOD 1055-21-L	D.S.	B.P.	
3	12.2013	BE	REVD PER MOD 798-SY-L	D.S.	B.P.	
2	11.2010	BE	REVD PER MOD 771-SY-L	D.S.	B.P.	
1	3.09.09	F.F.	ISSUED PER MOD 629-AS-L	M.S.	N.I.	
0						

NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRSKO

I & C ANNUNCIATOR LIST

SWITCHYARD CONTROL BOARD CB102BRDK701

ANNUNCIATOR WINDOW ENGRAVING ALB-E01

DESIGN ENGINEERING

NUCLEAR POWER PLANT KRSKO

KRSKO, SLOVENIA

	MADE	CHECKED	LE APPROVAL
1.	F. PAVIN		
2.		M. SUŠNIC	
3.			N. IVKOVIČ

REFERENCE DRAWINGS

SPARE

DRAWING NUMBER	SYSTEM	SH. NO.	REV.
D-200-521	4	4	

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 17-08-2023
Log Number: 240007

SP-ES1455

Appendix 1 - Existing AS system essential drawings

1	2	3	4	5	6	7	8	9	10	
1 400kV G1 IZPAD MERILNE NAPETOSTI ZA MERITVE	2 400kV POLJE SYCA02 IZPAD ODKLOPNIKA SYCA02Q0	3 400kV POLJE SYCA02 OKVARA 11/SYCA02 ALI 87T/SYCA02	4	5 400kV POLJE SYCA01 IZPAD ODKLOPNIKA SYCA01Q0	6 400kV POLJE SYCA01 OKVARA 11/SYCA01 ALI 87T/SYCA01	7	8	9 LR STIKALIŠČA PODNAPETOST EE106PNLC914 230/400 V	10 LR STIKALIŠČA POD/PRENAPETOST DC101PNLC902 220 V = "A"	A
11 400kV G1 IZPAD MERILNE NAPETOSTI ZA SINHRONIZACIJO	12 400kV POLJE SYCA02 NIZEK TLAK SF6 NA ODKLOPNIKU SYCA02Q0	13 400kV POLJE SYCA02 IZPAD 220VDC	14	15 400kV POLJE SYCA01 NIZEK TLAK SF6 NA ODKLOPNIKU SYCA01Q0	16 400kV POLJE SYCA01 IZPAD 220VDC	17	18	19 LR STIKALIŠČA PODNAPETOST EE106PNLC915 230/400 V	20 LR STIKALIŠČA POD/PRENAPETOST DC101PNLC903 220 V = "B"	B
21 400kV G2 IZPAD MERILNE NAPETOSTI ZA MERITVE	22 400kV POLJE SYCA02 NENAVITA VZMET NA ODKLOPNIKU SYCA02Q0	23 400kV POLJE SYCA02 IZPAD 400VAC	24	25 400kV POLJE SYCA01 NENAVITA VZMET NA ODKLOPNIKU SYCA01Q0	26 400kV POLJE SYCA01 IZPAD 400VAC	27	28	29 LR STIKALIŠČA DIESEL VKLJUČEN	30 LR STIKALIŠČA POD/PRENAPETOST EE106PNLG939 125 V =	C
31 400kV G2 IZPAD MERILNE NAPETOSTI ZA SINHRONIZACIJO	32 400kV POLJE SYCA02 IZPAD POGONA ALI OGREVANJA NA ODKLOPNIKU SYCA02Q0	33 400kV POLJE SYCA02 IZPAD MERILNE NAPETOSTI 100VAC	34	35 400kV POLJE SYCA01 IZPAD POGONA ALI OGREVANJA NA ODKLOPNIKU SYCA01Q0	36 400kV POLJE SYCA01 IZPAD MERILNE NAPETOSTI 100VAC	37	38	39 LR STIKALIŠČA NAPAKA NA DIESELU	40	D
41 400kV IZPAD FAZE	42	43 400kV POLJE SYCA02 LOKALNO KRMILJENJE	44	45	46 400kV POLJE SYCA01 LOKALNO KRMILJENJE	47	48	49 LR STIKALIŠČA POD/PRENAPETOST EE106PNLG938 230 V	50 LR STIKALIŠČA NAPAKA NA USMERNIKU RAZSMERNIKU	E

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	F401	LP	B-208-138, SY-26	2	C	C1	A	TB2-1, TB2-C6		
2	A2	11/SYCA02	LP	B-208-138, SY-103	2	C	C1	A	TB2-6, TB2-C6		816-324 Sh. 29
3	A3	11/SYCA02	LP	B-208-138, SY-103	2	O	C1	A	TB2-11, TB2-C6		816-324 Sh. 29
4	A4										
5	A5	11/SYCA01	LP	B-208-138, SY-66	2	C	C1	A	TB2-21, TB2-C6		816-324 Sh. 19
6	A6	11/SYCA01	LP	B-208-138, SY-66	2	O	C1	A	TB2-26, TB2-C6		816-324 Sh. 19
7	A7										
8	A8										
9	A9	27/EE106PNLC914	LP	B-208-138, SY-111	2	C	C1	A	TB2-52, TB2-C6		
10	A10	27/59/DC101PNLC902	LP	B-208-138, SY-111	2	C	C1	A	TB2-57, TB2-C6		
11	B1	(F202)	LP	B-208-138, SY-26	2	C	C1	A	TB2-2, TB2-C6		
12	B2	11/SYCA02	LP	B-208-138, SY-103	2	C	C1	A	TB2-7, TB2-C6		816-324 Sh. 29
13	B3	11/SYCA02, (3/LA, 3/LB)	LP	B-208-138, SY-103	2	C	(C3PF)	A	TB2-12, TB2-C6		816-324 Sh. 29
14	B4										
15	B5	11/SYCA01 AS-BUILT	LP	B-208-138, SY-66	2	C	C1	A	TB2-22, TB2-C6		816-324 Sh. 19
16	B6	11/SYCA01 (3/LA, 3/LB, 3/SX41A, 3/SX41B)	LP	B-208-138, SY-66	2	C	(C5PF)	A	TB2-27, TB2-C6		816-324 Sh. 19
17	B7										
18	B8										
19	B9	27/EE106PNLC915	LP	B-208-138, SY-111	2	C	C1	A	TB2-53, TB2-C6		
20	B10	27/59/DC101PNLC903	LP	B-208-138, SY-111	2	C	C1	A	TB2-59, TB2-C6		
21	C1	F451	LP	B-208-138, SY-26	2	C	C1	A	TB2-3, TB2-C6		
22	C2	11/SYCA02	LP	B-208-138, SY-103	2	C	C1	A	TB2-8, TB2-C6		816-324 Sh. 29
23	C3	11/SYCA02	LP	B-208-138, SY-103	2	C	C1	A	TB2-13, TB2-C6		816-324 Sh. 29
24	C4										
25	C5	11/SYCA01	LP	B-208-138, SY-66	2	C	C1	A	TB2-23, TB2-C6		816-324 Sh. 19
26	C6	11/SYCA01	LP	B-208-138, SY-66	2	C	C1	A	TB2-28, TB2-C6		816-324 Sh. 19
27	C7										
28	C8										
29	C9	(IGR/2) SY901DSL-PNL1	LP	B-208-138, SY-111	2	C	C1	A	TB2-54, TB2-C6		
30	C10	27/59/EE106PNLG939	LP	B-208-138, SY-111	2	C	C1	A	TB2-61, TB2-C6		
31	D1	(F212)	LP	B-208-138, SY-26	2	C	C1	A	TB2-4, TB2-C6		
32	D2	11/SYCA02	LP	B-208-138, SY-103	2	C	C1	A	TB2-9, TB2-C6		816-324 Sh. 29
33	D3	11/SYCA02	LP	B-208-138, SY-103	2	C	C1	A	TB2-14, TB2-C6		816-324 Sh. 29
34	D4										
35	D5	11/SYCA01	LP	B-208-138, SY-66	2	C	C1	A	TB2-24, TB2-C6		816-324 Sh. 19
36	D6	11/SYCA01	LP	B-208-138, SY-66	2	C	C1	A	TB2-29, TB2-C6		816-324 Sh. 19
37	D7										
38	D8										
39	D9	(CAR) SY901DSL-PNL1 (1) SY901DSL-LIS (dP) SY901DSL-DPS	LP	B-208-138, SY-111	2	C	C3PF	A	TB2-55, TB2-C6		
40	D10										
41	E1	/EE106PNLB938-K2	LP	B-208-138, SY-65	2	C	C1	A	TB2-10, TB2-C6		
42	E2										
43	E3	11/SYCA02	LP	B-208-138, SY-103	2	C	C1	A	TB2-15, TB2-C6		816-324 Sh. 29
44	E4										
45	E5										
46	E6	11/SYCA01	LP	B-208-138, SY-66	2	C	C1	A	TB2-30, TB2-C6		816-324 Sh. 19
47	E7										
48	E8										
49	E9	27/59/EE106PNLG938	LP	B-208-138, SY-111	2	C	C1	A	TB2-56, TB2-C6		
50	E10	(MCU 2500) EP900UPSC001	LP	B-208-138, SY-111	2	C	C1	A	TB2-64, TB2-C6		

Appendix 1 - Existing AS system essential drawings

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 13-12-2022
Log Number: 250995

Original Design Firm: IBE
Replaced Manual Drawing: N/A
Last Revision Had Been:

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

no.	date	BY	REVISION	CHK. BY & APPR.
3	11/2021	BSE	REVD TBS MOD. 1145-SY-L & 1195-SY-L	D.S.
2	12/2018	BSE	REVD PER MOD. 797-SY-L, FIGURES	D.S.
1	06/2019	BSE	REVD PER MOD. 797-SY-L	D.S.
0	01/2014	BSE	ISSUE PER MOD. 786-SY-L	D.S.

NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRSKO
I & C ANNUNCIATOR LIST
SWITCHYARD CONTROL BOARD CB102BRDK701
ANNUNCIATOR WINDOW ENGRAVING ALB-E02

MADE: 1. IBE
CHECKED: 2. D. SKRIVANJK
APPROVED: 3. B. REVEC
DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO
KRSKO, SLOVENIA
I.E. APPROVAL

REFERENCE DRAWING(S):
SIZE: D
DRAWING NUMBER: D-200-521
SYSTEM: 200
SHEET NO.: 1
REV.: 3

SP-ES-135

	1	2	3	4	5	6	7
A	1 GT1 MOTNJE	2 GT2 MOTNJE	3 GLBS SF6 DENSITY (LOW)	4 GLBS DRIVE MECHANISM TROUBLE	5 GLBS Q81 MOTOR TRIP	6 GT1/GT2 REGULATOR NAPETOSTI MOTNJA	7
B	8 GT1 VISOKA TEMP. NAVITJA	9 GT2 VISOKA TEMP. NAVITJA	10 GLBS SF6 DENSITY LO-LO TRIP/CLOSE BLOCKED	11 GLBS DRIVE MECH PUMP DC VOLTAGE FAULT	12 GLBS Q82 MOTOR TRIP	13 GT1/GT2 REGULATOR NAPETOSTI BLOKIRAN	14
C	15 GT1 IZPAD NAP. ZA HLAJENJE	16 GT2 IZPAD NAP. ZA HLAJENJE	17 GLBS TRIP CIRCUIT 1 DC VOLTAGE FAULT	18 GLBS AUX HEATING AC VOLTAGE FAULT	19 GLBS TRIP BLOCKED	20 GT1/GT2 REGULACIJSKI STIKALI V RAZLIČNIH STOPNJAH	21
D	22 GT1 HLADILNA SKUPINA V OKVARI	23 GT2 HLADILNA SKUPINA V OKVARI	24 GLBS TRIP CIRCUIT 2 DC VOLTAGE FAULT	25 GLBS Q9, Q81 & Q82 INCORRECT PHASE WIRING	26 GLBS CLOSE BLOCKED	27 GT1/GT2 REGULACIJSKO STIKALO LOKALNO KRMILJENJE	28 GEN HLAD. VODA STATORJA IZOST. 110s
E	29 GT1 PRETOK OLJA NE DELUJE	30 GT2 PRETOK OLJA NE DELUJE	31 GLBS TRIP 1 CIRCUIT FAULT	32 GLBS Q9, Q81 & Q82 DC VOLTAGE FAULT	33 GLBS CONTROL IN LOCAL	34	35 GEN HLAD. VODA STATORJA IZOST. 175s
F	36 GT1 NADZORNI SISTEM (TMS) MOTNJA	37 GT2 NADZORNI SISTEM (TMS) MOTNJA	38 GLBS TRIP 2 CIRCUIT FAULT	39 GLBS Q9 MOTOR TRIP	40 GLBS TEMPERATURE TOO HIGH	41	42 GEN HLAD. VODA STATORJA IZOST. 1h
G	43	44 GT2 PROTIEKSPLOZIJSKA ZAŠČITA MOTNJA	45 GLBS LOCAL CONTROL PANEL TROUBLE	46	47	48	49

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	K31, K32, K33, K34, K35, K36, K37, K38, K41	LP	B-208-159, XR-04	6	C	C5PA	A	TB3-1, TB3-2, TB3-3, TB3-4, TB3-5, TB3-C7		816-336 Sh. 53, 153
2	A2	K56, K57, K58, K59, K60, K61, K62, K63, K65, K66	LP	B-208-159, XR-18, 19, 20, 23	6	C	C5PA	A	TB3-17, TB3-18, TB3-19, TB3-20, TB3-21, TB3-C7		816-336 Sh. 53, 153
3	A3	GN905PNL-K4	LP	B-208-080, GN-61	4	C	C3PA	A	TB3-33, TB3-C7		816-336 Sh. 54, 154
4	A4	GN905PNL-K8	LP	B-208-080, GN-64	2	C	C1	A	TB3-41, TB3-C7		816-336 Sh. 54, 154
5	A5	GN905PNL-Q810	LP	B-208-080, GN-66	2	C	C1	A	TB3-47, TB3-C7		816-336 Sh. 54, 154
6	A6	AVR1, AVR2	LP	B-208-159, XR-02	2	C	C2PF	A	TB2-48, TB2-C6		816-336 Sh. 52, 152
7	A7					C					
8	B1	K42	LP	B-208-159, XR-04	2	C	C1	A	TB3-6, TB3-C7		816-336 Sh. 53, 153
9	B2	K67, K69, K71	LP	B-208-159, XR-20, 23	2	C	C1	A	TB3-22, TB3-C7		816-336 Sh. 53, 153
10	B3	GN905PNL-K3	LP	B-208-080, GN-61	2	C	C1	A	TB3-36, TB3-C7		816-336 Sh. 54, 154
11	B4	GN905PNL-K52	LP	B-208-080, GN-64	2	C	C1	A	TB3-42, TB3-C7		816-336 Sh. 54, 154
12	B5	GN905PNL-Q820	LP	B-208-080, GN-67	2	C	C1	A	TB3-48, TB3-C7		816-336 Sh. 54, 154
13	B6	AVR1, AVR2	LP	B-208-159, XR-02	2	C	C1	A	TB2-49, TB2-C6		816-336 Sh. 52, 152
14	B7										
15	C1	K39, K40	LP	B-208-159, XR-04	2	C	C1	A	TB3-7, TB3-C7		816-336 Sh. 53, 153
16	C2	K73, K74	LP	B-208-159, XR-21, 23	2	C	C1	A	TB3-23, TB3-C7		816-336 Sh. 53, 153
17	C3	GN905PNL-K50	LP	B-208-080, GN-62	2	C	C1	A	TB3-37, TB3-C7		816-336 Sh. 54, 154
18	C4	GN905PNL-K54	LP	B-208-080, GN-71	2	C	C1	A	TB3-43, TB3-C7		816-336 Sh. 54, 154
19	C5	GN104CBKQ0A-S1	LP	B-208-080, GN-61	4	C	C3PA	A	TB3-49, TB3-C7		816-336 Sh. 54, 154
20	C6	AVR1, AVR2	LP	B-208-159, XR-02	2	C	C2PF	A	TB2-50, TB2-C6		816-336 Sh. 52, 152
21	C7										
22	D1	K21.1, FT1-4, GM1-4, K22.1, FT5-8, GM5-8, K23.1, FT9-12, GM9-12, K25.1, FT17-20, GM17-20; K24.1, FT13-16, GM13-16	LP	B-208-159, XR-04	5	C	C4PA	A	TB3-8, TB3-9, TB3-10, TB3-11, TB3-C7		816-336 Sh. 53, 153
23	D2	K21, F11, G1, GK-7; K22, K22C, F12, G2, GK-8; K23, K23C, F13, G3, G10-11; K24, K24C, F14, G4, G12-13; K25, F17, G5, G14-15	LP	B-208-159, XR-13, 14, 15, 16, 23	5	C	C4PA	A	TB3-24, TB3-25, TB3-26, TB3-27, TB3-C7		816-336 Sh. 53, 153
24	D3	GN905PNL-K51	LP	B-208-080, GN-63	2	C	C1	A	TB3-38, TB3-C7		816-336 Sh. 54, 154
25	D4	GN905PNL-K57A	LP	B-208-080, GN-71	2	C	C1	A	TB3-44, TB3-C7		816-336 Sh. 54, 154
26	D5	GN104CBKQ0A-S1	LP	B-208-080, GN-61	2	C	C1	A	TB3-52, TB3-C7		816-336 Sh. 54, 154
27	D6	S132A/GT1, S132A/GT2	LP	JST 1015689 sh.2, B-208-159, XR-25	2	C	C2PF	A	TB2-51, TB2-C6		816-336 Sh. 52, 152
28	D7	TU104CAB-AR3	PDEH	B-208-080, GN-39	2	C	C1	A	TB3-62, TB3-C7		816-336 Sh. 54, 154
29	E1	K26, K27, K28, K29, K30	LP	B-208-159, XR-04	5	C	C4PA	A	TB3-12, TB3-13, TB3-14, TB3-15, TB3-C7		816-336 Sh. 53, 153
30	E2	K51, K52, K53, K54, K55	LP	B-208-159, XR-18, 23	5	C	C4PA	A	TB3-28, TB3-29, TB3-30, TB3-31, TB3-C7		816-336 Sh. 53, 153
31	E3	GN905PNL-K101	LP	B-208-080, GN-62	2	C	C1	A	TB3-39, TB3-C7		816-336 Sh. 54, 154
32	E4	GN905PNL-K53	LP	B-208-080, GN-68	2	C	C1	A	TB3-45, TB3-C7		816-336 Sh. 54, 154
33	E5	43/GN905PNL-S2	LP	B-208-080, GN-61	2	C	C1	A	TB3-53, TB3-C7		816-336 Sh. 54, 154
34	E6										
35	E7	TU104CAB-AR5	PDEH	B-208-080, GN-39	2	C	C1	A	TB3-63, TB3-C7		816-336 Sh. 54, 154
36	F1	K101	LP	B-208-159, XR-23	2	C	C1	A	TB3-16, TB3-C7		816-325 Sh. 04
37	F2	K101	LP	B-208-159, XR-23	2	C	C1	A	TB3-32, TB3-C7		816-325 Sh. 09
38	F3	GN905PNL-K102	LP	B-208-080, GN-63	2	C	C1	A	TB3-40, TB3-C7		816-336 Sh. 54, 154
39	F4	GN905PNL-Q900	LP	B-208-080, GN-65	2	C	C1	A	TB3-46, TB3-C7		816-336 Sh. 54, 154
40	F5	GN905PNL-GMS600	LP	B-810-080, Sh. 13	2	C	C1	A	TB3-54, TB3-C7		816-336 Sh. 54, 154
41	F6										
42	F7	TU104CAB-AR4	PDEH	B-208-080, GN-39	2	C	C1	A	TB3-64, TB3-C7		816-336 Sh. 54, 154
43	G1										
44	G2	KS1B, K15, K5B, KPLC, KT, KSDP, KSDE, KD2, K2B	LP	B-208-159, XR-26, 27	2	C	C1	A	TB3-56, TB3-C7		816-336 Sh. 54, 154
45	G3	GN905PNL-K55, F19	LP	B-208-080, GN-68	2	C	C2PF	A	TB3-55, TB3-C7		816-336 Sh. 54, 154
46	G4										
47	G5	h15	LP	B-208-080, GN-29, 36	2	C	C1	A	TB3-55, TB3-C7		816-336 Sh. 54, 154
48	G6										
49	G7										

Appendix 1 - Existing AS system essential drawings

SPES1465

Original Design Firm: IBE
Replaced Manual Drawing: N/A
Last Revision Are Date: N/A

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

no.	DATE	BY	REVISION	DES. & ENG. APPR.
4	06.2018	IBE	REVD PER MOD 1051-GH-1 PART 1 - TOOLS	B.P.
3	10.2016	IBE	REVD PER MOD 1153-GH-1 & 1151-GH-1	B.P.
2	10.2015	IBE	REVD PER MOD 1123-TH-1	B.P.
1	155.15	D.A.	REVD PER MOD 796-SY-L & 799-NR-L	B.P.
0	01.2014	IBE	ISSUE PER MOD 796-SY-L & 799-NR-L	B.P.

REFERENCE DRAWINGS:

MAKE	CHECKED	APPROVAL
IBE	2. D. SHRIVAVAK	3. B. PEVEC

NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRSKO

I & C ANNUNCIATOR LIST

SWITCHYARD CONTROL BOARD CB102BRDK701

ANNUNCIATOR WINDOW ENGRAVING ALB-E03

DESIGN ENGINEERING

INDUSTRIJA NUKLEARNIH ELEKTRARN KRŠKO, SLOVENIJA

D-200-521

DRAWING NUMBER

8 4

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 28-06-2019
Log Number: 2309 96

1	2	3	4	5	6	7	8	
1 SAFETY INJ PMP ROOM A AHU FLOW LO	2 AUX BLDG PMP ROOMS AHU PULL TO LOCK	3 PDP PUMP ROOM AHU IN LOCAL	4 SFP SUPPLY FAN 1A FLOW LO	5 SFP SUPPLY FAN 1B FLOW LO	6 BATT ROOMS AHU PULL TO LOCK	7 DIESEL GEN ROOMS FAN PULL TO LOCK	8 COMP COOL BLDG FAN PULL TO LOCK	A
9 SAFETY INJ PMP ROOM B AHU FLOW LO	10 POS DISP PMP ROOM AHU A PULL TO LOCK	11 STEAM HDR ROOM (AHU 1) FLOW LO	12 SFP EXHAUST FLOW LO	13 SFP FAN PULL TO LOCK	14 BATT ROOMS AHU 1A FLOW LO	15 DIESEL GEN ROOMS FAN LOCAL	16 COMP COOL BLDG FAN LOCAL	B
17 RHR PMP ROOM A AHU FLOW LO	18 POS DISP PMP ROOM AHU B PULL TO LOCK	19 STEAM HDR ROOM (AHU 2) FLOW LO	20 SFP CHAR PLM 1A DISCH FLOW LO	21 SFP CHAR PLM 1A DISCH SMOKE	22 BATT ROOMS AHU 1B FLOW LO	23 DIESEL GEN ROOM A TEMP HI	24 COMP COOL BLDG FAN 1A FLOW LO	C
25 RHR PMP ROOM B AHU FLOW LO	26 CENT CHG PMP ROOM A AHU FLOW LO	27 SOUTH STEAM HEADER ROOM TEMP HI	28 SFP CHAR PLM 1B DISCH FLOW LO	29 SFP CHAR PLM 1B DISCH SMOKE	30	31 DIESEL GEN ROOM B TEMP HI	32 COMP COOL BLDG FAN 1B FLOW LO	D
33 SPRAY PMP ROOM A AHU FLOW LO	34 CENT CHG PMP ROOM B AHU FLOW LO	35 NORTH STEAM HEADER ROOM TEMP HI	36 SFP EXHAUST FAN 1A FLOW LO	37 SFP EXHAUST FAN 2A FLOW LO	38 TURB BLDG VENT PNL TROUBLE	39 AF TURBINE PMP ROOM TEMP HI-HI	40 COMP COOL BLDG SYSTEM A SMOKE	E
41 SPRAY PMP ROOM B AHU FLOW LO	42 POS DISP PMP ROOM AHU FLOW LO	43 POS DISP CHRG PMP AHU TRANS SW MISMATCH	44 SFP EXHAUST FAN 1B FLOW LO	45 SFP EXHAUST FAN 2B FLOW LO	46 LS100PNLJ06DC EMER LIGHTING PNLJ TROUBLE	47 AUX/HTG STM VALVE CLOSED	48 COMP COOL BLDG SYSTEM B SMOKE	F

AUX. BLDG. PUMP ROOMS, SFP, D/G ROOMS, BATT. ROOMS AND
COMP. COOLING BLDG. VENT. SYSTEMS
(6 X 8)
PC100CME001

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	2/FS6688	ARR	B-208-146, VA-35	2	O	C1	A			
2	A2	1/VA251AHU01A, 01B; 252-1A, 1B; 253,254,255,256	VB	B-208-146, VA-40	2	C	C8PF	A			
3	A3	43/VA257AHU01CA, B	LP	B-208-146, VA-42	2	O	C2SF	A			
4	A4	2/FS6733	ARR	B-208-146, VA-101	2	O	C1	A			
5	A5	2/FS6734	ARR	B-208-146, VA-102	2	O	C1	A			
6	A6	1/VA581AHU01A, 1/VA582AHU01B	VB	B-208-146, VA-124	2	C	C2PF	A			
7	A7	1/VA701FAN01A, 01B	VB	B-208-146, VA-116	2	C	C2PF	A			
8	A8	1/VA751FAN01A, 01B	VB	B-208-146, VA-141	2	C	C2PF	A			
9	B1	2/FS6689	ARR	B-208-146, VA-36	2	O	C1	A			
10	B2	1/VA257AHU01CA	VB	B-208-146, VA-41	2	C	C1	A			
11	B3	2/FS6715	ARR	B-208-146, VA-106	2	O	C1	A			
12	B4	3/FS6746, 3/FS6747	VB	B-208-146, VA-137	2	C	C2SF	A			
13	B5	1/VA431FAN01A, 01B; 441-01A, 1B, 2A, 2B	VB	B-208-146, VA-102	2	C	C6PF	A			
14	B6	2/FS6914	ARR	B-208-146, VA-123	2	O	C1	A			
15	B7	43/VA701FAN01A, 01B	LP	B-208-146, VA-116	2	O	C2SF	A			
16	B8	43/VA751FAN01A, 01B	LP	B-208-146, VA-140	2	O	C2SF	A			
17	C1	2/FS6690	ARR	B-208-146, VA-37	2	O	C1	A			
18	C2	1/VA257AHU01CB	VB	B-208-146, VA-42	2	C	C1	A			
19	C3	2/FS6716	ARR	B-208-146, VA-107	2	O	C1	A			
20	C4	2/FS6758, FS6759	F	B-208-146, VA-137	2	O	C2SF	A			
21	C5	AE6762	F	B-208-146, VA-137	2	O	C1	A			
22	C6	2/FS6913	ARR	B-208-146, VA-124	2	O	C1	A			
23	C7	3/TS7002	ARR	B-208-146, VA-115	2	C	C1	A			
24	C8	2/FS7050	ARR	B-208-146, VA-140	2	O	C1	A			
25	D1	2/FS6691	ARR	B-208-146, VA-38	2	O	C1	A			
26	D2	2/FS6673	ARR	B-208-146, VA-32	2	O	C1	A			
27	D3	TS6723	F	B-208-146, VA-106	2	O	C1	A			
28	D4	FS6760, FS6761	ARR	B-208-146, VA-137	2	O	C2SF	A			
29	D5	AE6763	F	B-208-146, VA-137	2	O	C1	A			
30	D6	SPARE				C					
31	D7	3/TS7003	ARR	B-208-146, VA-116	2	C	C1	A			
32	D8	2/FS7051	ARR	B-208-146, VA-141	2	O	C1	A			
33	E1	2/FS6692	ARR	B-208-146, VA-39	2	O	C1	A			
34	E2	2/FS6674	ARR	B-208-146, VA-33	2	O	C1	A			
35	E3	TS6724	F	B-208-146, VA-107	2	O	C2SF	A			
36	E4	FS6764, 2/VA441FAN01A	ARR	B-208-146, VA-129	2	O	C2SF	A			
37	E5	FS6765, 2/VA441FAN02A	ARR	B-208-146, VA-130	2	O	C2PF	A			
38	E6	LOCAL PANEL ANNUNCIATOR (GB11)	LP	B-208-149, VA-19	2	C	C2PF	A			
39	E7	TS7160	F	B-208-146, VA-208	2	C	C1	A			
40	E8	3/AE7058	F	B-208-146, VA-142	2	C	C1	A			
41	F1	2/FS6693	LP	B-208-146, VA-40	2	O	C1	A			
42	F2	2/FS6675A, B	LP	B-208-146, VA-42	2	O	C2SF	A			
43	F3	3/EE 904 SWG. 002A,B; 903 SWG. 001, 002	F	B-208-143, VA-41	2	C	C4-2S//2S	A			
44	F4	FS6766, 2/VA441FAN01B	LP	B-208-146, VA-131	2	O	C2PF	A			
45	F5	FS6767, 2/VA441FAN02B	LP	B-208-146, VA-132	2	O	C2PF	A			
46	F6	PANEL LS100PNLJ06DC	LP	E-220-422, sh.1	2	O	C10SF	A			
47	F7	VARIOUS AUX RELAYS	ARR	B-208-123, SA-04, S-05	2	C	C8PF	A			
48	F8	3/AE7059	F	B-208-146, VA-143	2	C	C1	A			

Appendix 1 - Existing AS system essential drawings

Nuklearna Elektrarna
MASTER DOCUMENT
Date Received: 09-03-2023
Log Number: 18339

Original Design Firm: Gilbert Associates, Inc.
Original Drawing Number: 2
Original Drawing Date: 29.03.1979
THIS S.A.P. CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY
Last Revision And Date: 15-12-22 V.K.

NO.	DATE	BY	REVISION	CHD. BY	E.C. APPR.
9	15.12.22	V.K.	REVD PER MOD. 782-VA-L		
8	20.06.18	V.K.	REVD PER MOD. 1907-20-L		
7	05.09.13	D.K.	REVD PER MOD. 689-TP-L	D.I.	N.I.
6	01.09.11	F.F.	REVD PER CAP. 2311-2688	D.S.	N.I.
5	15.11.10	K.K.	REVD PER MOD. 640-DG-L	B.K.	B.P.

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO
I & C ANNUNCIATOR LIST AUX BLDG PUMP RM,SFP,D/G RM,BTRY RM AND CMPNT CLG BLDG VENTILATING SYS ANN — PC100CME001
NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO
DESIGN ENGINEERING
MADE 1. MFP
CHECKED 2.
APPROVAL 3. LE
KRSKO, SLOVENIA
REFERENCE DRAWINGS:
SCALE: NONE
D-804-611
DRAWING NUMBER
SHEET 1 OF 1
SPLES1455

Appendix 1 - Existing AS system essential drawings

	1	2	3	4	5	6	
	1 ESS SERV PMP HOUSE FAN PULL TO LOCK	2 ESS SERV PMP HOUSE FAN 1A FLOW LO	3 CHILLED WATER CHILL/PMP 1A PULL TO LOCK BRK DISCON OR TROUB	4 CHILLED WATER PMP 1A FLOW LO	5 CHILLED WATER CHILLER 1A DISCH TEMP LO	6 CONTAINMENT H2 CONTROL SYS PULL TO LOCK	A
	7 ESS SERV PMP HOUSE FAN LOCAL	8 ESS SERV PMP HOUSE FAN 1B FLOW LO	9 CHILLED WATER CHILL/PMP 1C-A PULL TO LOCK/BRK DISCON OR MOT TRIP	10 CHILLED WATER PMP 1B FLOW LO	11 CHILLED WATER CHILLER 1A DISCH TEMP HI	12 CONTAINMENT H2 CONTROL SYS A FLOW HI	B
	13 ESS SERV PMP HOUSE RETURN A TEMP HI	14 CHILLED WATER CHEM FEED TNK LEVEL LO	15 CHILLED WATER CHILL/PMP 1C-B PULL TO LOCK/BRK DISCON OR MOT TRIP	16 CHILLED WATER PMP 1C FLOW LO	17 CHILLED WATER CHILLER 1B DISCH TEMP LO	18 CONTAINMENT H2 CONTROL SYS B FLOW HI	C
	19 ESS SERV PMP HOUSE RETURN B TEMP HI	20 CHILLER 1C TROUBLE ALARM	21 CHILLED WATER CHILLER/PMP LOCAL	22 CHILLED WATER CHILLER/PUMP 1C MISMATCH	23 CHILLED WATER CHILLER 1B DISCH TEMP HI	24 CONTAINMENT H2 CONTROL SYS RELIEF A DP HI/LO	D
	25 ESS SERV PMP HOUSE TEMP HI	26 CHILLED WATER EXP TANK A LEVEL LO	27 CHILLED WATER EXP TANK A LEVEL LO-LO	28 CHILLED WATER EXP TANK A LEVEL HI-HI	29 CHILLED WATER CHILLER 1C DISCH TEMP LO	30 CONTAINMENT H2 CONTROL SYS RELIEF B DP HI/LO	E
	31 ESS SERV PMP HOUSE TEMP LO	32 CHILLED WATER EXP TANK B LEVEL LO	33 CHILLED WATER EXP TANK B LEVEL LO-LO	34 CHILLED WATER EXP TANK B LEVEL HI-HI	35 CHILLED WATER CHILLER 1C DISCH TEMP HI	36 CONTAINMENT H2 CONTROL SYS A FLOW LO	F
	37	38	39 CHILLED WATER CHILL/PMP 1B PULL TO LOCK BRK DISCON OR TROUB	40	41	42 CONTAINMENT H2 CONTROL SYS B FLOW LO	G

ESS SER. PMP. HOUSE, CHILLED WATER, AND CONTAINMENT
HYDROGEN CONTROL SYSTEMS
(7 X 6)
PC100CME002

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	1/VA721FAN01A, 01B	VB	B-208-146, VA-147	2	C	C2PF	A			
2	A2	2/FS7015	LP	B-208-146, VA-146	2	O	C1	A			
3	A3	1/CZ841CHL01A, K10, K15, OTS, 33 43/CZ841CHL01A-PWR	CB,SWG, LP	B-208-042, CZ-06,10,24	2	C	SP1 (816-336, AS-196)	A			816-636, AS-04
4	A4	2/FIS7106	LP	B-208-042, CZ-06	2	O	C1	A			
5	A5	TIS7102	F	B-208-042, CZ-24	2	O	C1	A			
6	A6	1/VA161FAN01A, 01B	VB	B-208-146, VA-188,189	2	C	C2PF	A			
7	B1	43/VA721FAN01A, 01B	LP	B-208-146, VA-147	2	O	C2SF	A			
8	B2	2/FS7016	LP	B-208-146, VA-147	2	O	C1	A			
9	B3	1/CZ841CHL01CA; OTS, 33	VB,SWG	B-208-042, CZ-16,21	2	C	SP2 (816-336, AS-196)	A			816-636, AS-04
10	B4	2/FIS7107	LP	B-208-042, CZ-11	2	O	C1	A			
11	B5	TIS7102, 1/CZ841CHL01A, 33	SWG,F,CB	B-208-042, CZ-06,10,24	2	O	SP3 (816-336, AS-196)	A			816-636, AS-04
12	B6	3/FS7227	ARR	B-208-146, VA-188	2	O	C1	A			
13	C1	TS7023	F	B-208-146, VA-148	2	O	C1	A			
14	C2	LS3513	F	B-208-026, CF-10	2	O	C1	A			
15	C3	1/CZ841CHL01CB, OTS, 33	VB,SWG	B-208-042, CZ-17,22	2	C	SP4 (816-336, AS-196)	A			816-636, AS-04
16	C4	3/FIS7108, 2/FIS7108A, 2/FIS7108B	LP	B-208-042, CZ-16	2	O	C2PF	A			
17	C5	TIS7103	F	B-208-042, CZ-24	2	O	C1	A			
18	C6	3/FS7228	ARR	B-208-146, VA-189	2	O	C1	A			
19	D1	TS7024	F	B-208-146, VA-149	2	O	C1	A			
20	D2	K10, K15, 43/CZ841CHL01C-PWR	LP	B-208-142, CZ-18	2	C	SP9 (816-336, AS-196)	A			816-636, AS-04
21	D3	43/CZ841CHL01A, 01B, 01CA, 01CB, 43/CZ841CHL01A-Q0, 01B-Q0, 01C-Q0	LP	B-208-042, CZ-17	2	O	C7SF	A			
22	D4	CONTACTS 33 & 43	LP,SWG	B-208-042, CZ-21	2	C	C2PF	A			(AND/OR COMBINED ALARM)
23	D5	TIS7103, 1/CZ841CHL01B, 33	SWG,F,CB	B-208-042, CZ-11,15,24	2	O	SP5 (816-336, AS-196)	A			816-636, AS-04
24	D6	3/DPS7229	ARR	B-208-146, VA-194	2	O	C1	A			
25	E1	TS7019	F	B-208-146, VA-150	2	O	C1	A			
26	E2	LY/7100A	BOP-PCS	B-208-042, CZ-24	2	O	C1	A			
27	E3	LY/7100C	BOP-PCS	B-208-042, CZ-24	2	O	C1	A			
28	E4	LY/7100F	BOP-PCS	B-208-042, CZ-24	2	O	C1	A			
29	E5	TIS7104	F	B-208-042, CZ-24	2	O	C1	A			
30	E6	3/DPS7230	ARR	B-208-146, VA-196	2	O	C1	A			
31	F1	TS7020	F	B-208-146, VA-150	2	O	C1	A			
32	F2	LY/7101A	BOP-PCS	B-208-042, CZ-24	2	O	C1	A			
33	F3	LY/7101C	BOP-PCS	B-208-042, CZ-24	2	O	C1	A			
34	F4	LY/7101F	BOP-PCS	B-208-042, CZ-24	2	O	C1	A			
35	F5	TIS7104, 1/CZ841CHL01CA, 1/CZ841CHL01CB, 33	SWG,F,CB	B-208-042, CZ-16,17,21,22,24	2	O	SP6 (816-336, AS-196)	A			816-636, AS-04
36	F6	FY/7225	BOP-PCS	8814D91, Sh. 27	2	O	C1	A			
37	G1	SPARE				C		A			
38	G2	SPARE				C		A			
39	G3	1/CZ841CHL01B, K15, K10, OTS, 33 43/CZ841CHL01A-PWR	CB,SWG, LP	B-208-042, CZ-11,15,24	2	C	SP7 (816-336, AS-196)	A			816-636, AS-04
40	G4	SPARE				C		A			
41	G5	SPARE				C		A			
42	G6	FY/7226	BOP-PCS	8814D92, Sh. 31	2	O	C1	A			

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. 5

- WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
- ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
- ENGRAVING HAS BEEN CHANGED ON WINDOW NO. 9, 15 AND 20
- ALARM COND HAS BEEN CHANGED FOR FOLLOWING WINDOWS NO.: 15, 37, 38, 39, 40, 41

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 31-03-2022
Log Number: 18340

Original Design Firm: Gai-Gilbert Associates, Inc.
Registered Manual Drawing: D-804-611
Last Revision And Date: 3 24.06.1979

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	Des.	BP	LE APPR.
9	06.03.21	MM	REVD PER MOD 1246-CZ-L	B.P.	GAI	
8	04.04.14	K.K.	REVD PER CAP 2013-3357	N.B.	N.L.	
7	10.12.09	B.Z.	REVD PER MOD 182-CZ-L	B.P.	N.L.	
6	11.09.09	F.F.	REVD PER MOD 629-AS-L	M.S.	N.L.	
5	22.08.06	SPRO	REVD PER MOD 432-AS-L	M.S.	B.S.	

NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRŠKO

I & C ANNUNCIATOR LIST ESSENTIAL
SERVICE PUMP HOUSE, CHILLED WATER AND
CONT. HYDROGEN CONTROL SYSTEM-PC100CME002

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRŠKO

DRAWN	KRŠKO, SLOVENIA
MFP	
CHECKED	
	LE APPROVAL
	WLW

REFERENCE DRAWINGS:

SCALE

D-804-612

DRAWING NUMBER

REVISION STATUS: 9

SP-ES1455

1	2	3	4	5	6	7	8	
1 PURGE SUPPLY FAN 1 FLOW LO	2 H_2 MONITOR SAMP PNL A TROUBLE	3 CONTROL BLDG FAN/AHU PULL TO LOCK	4 CRDM CONTROL ROOM RETURN SMOKE	5 MCR AHU 1A DISCH SMOKE	6 MCR AHU 1B DISCH SMOKE	7 MCR AHU 1A FLOW LO	8 CONTROLLED ACCESS AREA SUPPLY AHU FLOW LO	A
9 PURGE SUPPLY FAN 2 FLOW LO	10 H_2 MONITOR SAMP PNL B TROUBLE	11 CONTROL BLDG FAN/AHU LOCAL	12 CABLE SPREADING AREA A RETURN SMOKE	13 MCR RETURN A SMOKE	14 MCR RETURN B SMOKE	15 MCR AHU 1B FLOW LO	16 CONTROLLED ACCESS AREA FUME HOOD SUPPLY AHU FLOW LO	B
17 PURGE EXHAUST FAN 1 FLOW LO	18 H_2 MONITOR PNL A CONTAIN H_2 CONC HI	19	20 CABLE SPREADING AREA B RETURN SMOKE	21 ELECT ROOMS AHU 1A DISCH SMOKE	22 ELECT ROOMS AHU 1B DISCH SMOKE	23 ELECT ROOMS AHU 1A FLOW LO	24 CONTROLLED ACCESS AREA EXHAUST FANS FLOW LO	C
25 PURGE EXHAUST FAN 2 FLOW LO	26 H_2 MONITOR PNL B CONTAIN H_2 CONC HI	27 MCR CHARCOAL CLEANUP INTAKE DAMPERS OVERRIDE	28 ELECT ROOMS AHU 1A DISCH TEMP HI	29 RELAY AND SWGR ROOM B SMOKE	30 RELAY AND SWGR ROOM A SMOKE	31 ELECT ROOMS AHU 1B FLOW LO	32 CONTROLLED ACCESS AREA SMOKE	D
33 PURGE EXHAUST FAN 3 FLOW LO	34 MCR CHARCOAL FAN 1 OR 2 PULL TO LOCK	35 MCR INTAKE HEATER TRIP	36 ELECT ROOMS AHU 1B DISCH TEMP HI	37 MCR CHARCOAL CLEANUP INTAKE SMOKE	38 MCR CHARCOAL CLEANUP DISCH SMOKE	39 MCR CHARCOAL CLEANUP FAN 1A FLOW LO	40 CONTROLLED ACCESS AREA EXHAUST SMOKE	E
41 PURGE SUPPLY SMOKE	42 PURGE EXHAUST SMOKE	43 MAIN CONTROL ROOM PRESS LO	44 CONTROL BLDG ANC ROOM EXHAUST SMOKE	45 CONTROL BLDG LOCKER RM AREA EXHAUST SMOKE	46 MCR CHARCOAL CLEANUP FAN 1B FLOW LO	47 CONTROLLED ACCESS AREA HOOD SUPPLY SMOKE	48 CONTROLLED ACCESS AREA SUPPLY SMOKE	F

PURGE, HYDROGEN MONITORING, AND CONTROL BUILDING
VENTILATION SYSTEMS
(6 X 8)
PC100CME003

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	2/FS6572	ARR	B-208-146, VA-85	2	O	C1	A			
2	A2	H_2 SAMPLING PANEL	LP	B-208-092, HC-07	2	O	C1	A			
3	A3	1/VA531AHU01A, 1B; 541-01A, 01B	VB	B-208-146, VA-158	2	C	C4PF	A			
4	A4	AE6860	F	B-208-146, VA-175	2	O	C1	A			
5	A5	AE6820	F	B-208-146, VA-168	2	O	C1	A			
6	A6	AE6821	F	B-208-146, VA-168	2	O	C1	A			
7	A7	2/FS6812	ARR	B-208-146, VA-158	2	O	C1	A			
8	A8	2/FS6878	ARR	B-208-146, VA-110	2	O	C1	A			
9	B1	2/FS6573	ARR	B-208-146, VA-86	2	O	C1	A			
10	B2	H_2 SAMPLING PANEL	LP	B-208-092, HC-07	2	O	C1	A			
11	B3	43/VA531AHU01A	VB	B-208-146, VA-158	2	O	C1	RF			
		43/VA531AHU01B	VB	B-208-146, VA-159	2	O	C1	RF			
		43/VA541AHU01A	VB	B-208-146, VA-170	2	O	C1	RF			
		43/VA542AHU01B	VB	B-208-146, VA-171	2	O	C1	RF			
12	B4	AE6858	F	B-208-146, VA-175	2	O	C1	A			
13	B5	AE6826	F	B-208-146, VA-168	2	O	C1	A			
14	B6	AE6827	F	B-208-146, VA-168	2	O	C1	A			
15	B7	2/FS6813	ARR	B-208-146, VA-159	2	O	C1	A			
16	B8	2/FS6886	ARR	B-208-146, VA-111	2	O	C1	A			
17	C1	2/FS6578	ARR	B-208-146, VA-83	2	O	C1	A			
18	C2	H_2 SAMPLING PANEL	LP	B-208-092, HC-07	2	O	C1	A			
19	C3	(SPARE)				O		A			
20	C4	AE6857	F	B-208-146, VA-175	2	O	C1	A			
21	C5	AE6838	F	B-208-146, VA-175	2	O	C1	A			
22	C6	AE6839	F	B-208-146, VA-175	2	O	C1	A			
23	C7	2/FS6830	ARR	B-208-146, VA-170	2	O	C1	A			
24	C8	2/FS6896	ARR	B-208-146, VA-119	2	O	C1	A			
25	D1	2/FS6579	ARR	B-208-146, VA-84	2	O	C1	A			
26	D2	H_2 SAMPLING PANEL	LP	B-208-092, HC-07	2	O	C1	A			
27	D3	1/6804A, 1/6800A	VB	B-208-146, VA-156	2	O	C2SF	A			
28	D4	TY/6836	BOP-PCS	B-208-146, VA-175	2	O	C1	A			
29	D5	AE6855	F	B-208-146, VA-175	2	O	C1	A			
30	D6	AE6854	F	B-208-146, VA-175	2	O	C1	A			
31	D7	2/FS6831	ARR	B-208-146, VA-171	2	O	C1	A			
32	D8	3/AE6890	F	B-208-146, VA-120	2	O	C1	A			
33	E1	2/FS6593	ARR	B-208-146, VA-82	2	O	C1	A			
34	E2	1/VA521FAN01A, 522-01B	LP	B-208-146, VA-153	2	C	C2PF	A			
35	E3	OTS CONTACT	SWGR	B-208-146, VA-167	2	C	C1	A			
36	E4	TY/6837	BOP-PCS	B-208-146, VA-175	2	O	C1	A			
37	E5	AE6796	F	B-208-146, VA-157	2	O	C1	A			
38	E6	AE6795	F	B-208-146, VA-157	2	O	C1	A			
39	E7	2/FS6797	ARR	B-208-146, VA-153	2	O	C1	A			
40	E8	3/AE6897	F	B-208-146, VA-120	2	O	C1	A			
41	F1	AE6575	F	B-208-146, VA-93	2	O	C1	A			
42	F2	AE6580	F	B-208-146, VA-93	2	O	C1	A			
43	F3	DPS6829	F	B-208-146, VA-158	2	C	C1	A			
44	F4	AE6783	F	B-208-146, VA-187	2	O	C1	A			
45	F5	AE6784	F	B-208-146, VA-187	2	O	C1	A			
46	F6	2/FS6798	LP	B-208-146, VA-154	2	O	C1	A			
47	F7	AE6888	ARR	B-208-146, VA-109	2	O	C1	A			
48	F8	AE6887	F	B-208-146, VA-109	2	O	C1	A			

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 16-10-2018
Log Number: 18341

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY
Original Design Firm: Gilbert Associates, Inc.
Original Design Drawing: 2 - 20.0.1979
Last Revision And Date:

NO.	DATE	BY	REVISION	Des. By	Lic. Eng.	Lic. Appr.
5	24.01.01	MK.	REVD PER EDAR 98-108	S.L.		
9	30.4.18	V.K.	REVD PER 1007-9-L	M.D.		
8	05.09.13	DA	REVD PER MOD 69-FP-L	M.D.		
7	22.08.08	SPRO	REVD PER MOD 432-AS-L	M.S.		
6	31.03.04	MK.	REVD PER EDAR 99-227	B.B.		

NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRŠKO
I & C ANNUNCIATOR LIST PURGE
HYDROGEN MONITORING AND CONTROL BUILDING
VENTILATION SYSTEM ANNUNCIATOR-PC100CME003
DESIGN ENGINEERING
NUCLEAR POWER PLANT KRŠKO
KRŠKO, SLOVENIA
MADE: MFP
CHECKED:
LE APPROVAL: WLW
REFERENCE DRAWINGS:
SCALE
D-804-613
DRAWING NUMBER
REV 9

	1	2	3	4
A A–Z	1 2 AF PMP 1A, FCV3003A, FCV3003B CONTROL IN ECR	3 4 20000A, 11096 FCV3019 CONTROL IN ECR	5 6 AF PMP 2B, FCV3004A, FCV3004B CONTROL IN ECR	7 8 AF TURB PMP TRIP CONTROL IN ECR
A–S	PCV3702, 20124 CONTROL IN ECR	PCV655A, 8000A, PRZR HTR GROUP A CONTROL IN ECR	20000B, 11105, FCV3020 CONTROL IN ECR	PCV3703, 20125 CONTROL IN ECR
B B–Z	9 10 LCV665, 8121 8133 CONTROL IN ECR	11 12 LCV112B, LCV112C CONTROL IN ECR	13 14 8000B PRZR HTR GROUP B CONTROL IN ECR	15 16 8122, 8123 CONTROL IN ECR
B–S	CENT CHG PMP 1 CHG PMP ROOM A FAN CONTROL IN ECR	PCV135 CONTROL IN ECR	CENT CHG PMP2, CHG PMP ROOM B FAN CONTROL IN ECR	8135 CONTROL IN ECR
C C–Z	17 18 BAT PMP 1, CONTROL IN ECR	19 20 FCV205 CONTROL IN ECR	21 22 BAT PMP 2 CONTROL IN ECR	23 24 8358, HCV218 CONTROL IN ECR
C–S	RH PMP 1, RH PMP ROOM A FAN CONTROL IN ECR	8701A, FCV851 CONTROL IN ECR	RH PMP 2, RH PMP ROOM B FAN CONTROL IN ECR	8702A, FCV852 CONTROL IN ECR
D D–Z	25 26 8701B, HCV864 CONTROL IN ECR	27 28 SI PMP1, CONTROL IN ECR	29 30 8702B, HCV865 CONTROL IN ECR	31 32 SI PMP 2 CONTROL IN ECR
D–S	8815A, 8808A, 8811A CONTROL IN ECR	CI PMP 1, 9103A CONTROL IN ECR	8815B, 8808B, 8811B CONTROL IN ECR	CI PMP 2, 9130B CONTROL IN ECR
E E–Z	33 34 SW PMP 1A, SW PMP 3C–A, CONTROL IN ECR	35 36 RB RECIRC FAN 1A, RB RECIRC FAN 2A CONTROL IN ECR	37 38 SW PMP 2B, SW PMP 3C–B CONTROL IN ECR	39 40 RB RECIRC FAN 1B, RB RECIRC FAN 2B CONTROL IN ECR
E–S	CRDM COOL FAN 1 CONTROL IN ECR	CC PMP 1A, CC PMP 3C–A CONTROL IN ECR	CRDM COOL FAN 2 CONTROL IN ECR	CC PMP 2B, CC PMP 3C–B CONTROL IN ECR
F F–Z	41 42 10048 & 10066 CONTROL IN ECR	43 44 10367 & 10369, 10366 & 10368, 10370 CONTROL IN ECR	45 46 10049 & 10067 CONTROL IN ECR	47 48 10373 & 10376, 10374 & 10375, 10371 CONTROL IN ECR
F–S	10045 & 10064, 10050 & 10068 CONTROL IN ECR	10087 CONTROL IN ECR	10046 & 10065, 10051 & 10069 CONTROL IN ECR	10184 CONTROL IN ECR

TRANSFER PANELS SWITCHES STATUS
SYSTEM
(12 X 4)
PC100CME004

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1Z	43/AF102PMP01A, 43/FCV3003B, 43/FCV3003A	LP	B–208–014, AF–01,07,12	2	O	RF31	RF			
2	A1S	43/PCV3702, 43/20124	LP	B–208–105, MS–04,11	2	O	RF32	RF			
3	A2Z	43/20000A, 43/FCV3019, 43/11096	LP	B–208–014, AF–09,12,16	2	O	RF33	RF			
4	A2S	43/PCPR1, 43/PCV655A, 43/8000A	LP	B–208–118, RC–04,11,15	2	O	RF34	RF			
5	A3Z	43/AF102PMP02B, 43/FCV3004B, 43/FCV3004A	LP	B–208–014, AF–02,08,13	2	O	RF35	RF			
6	A3S	43/20000B, 43/FCV3020, 43/11105	LP	B–208–014, AF–10,13,17	2	O	RF36	RF			
7	A4Z	43/AF101PMP03C	LP	B–208–014, AF–21	2	O	C1	A			
8	A4S	43/PCV3703, 43/20125	LP	B–208–105, MS–05,12	2	O	RF37	RF			
9	B1Z	43/LCV665, 43/8121, 43/8133	LP	B–208–035, CS–03,08,11	2	O	RF38	RF			
10	B1S	43/CSAPCH01, 43/VA255AHU01A	LP	B–208–035, CS–29 B–208–146, VA–32	2	O	RF39	RF			
11	B2Z	43/LCV112B, 43/LCV112C	LP	B–208–035, CS–40,41	2	O	RF40	RF			
12	B2S	43/PCV135	LP	B–208–035, CS–97	2	O	C1	A			
13	B3Z	43/PCPR2, 43/8000B	LP	B–208–118, RC–05,16	2	O	RF41	RF			
14	B3S	43/VA256AHU01B, 43/CSAPCH02	LP	B–208–146, VA–33 B–208–035, CS–30	2	O	RF42	RF			
15	B4Z	43/8122, 43/8123	LP	B–208–035, CS–09,10	2	O	RF43	RF			
16	B4S	43/8135	LP	B–208–035, CS–13	2	O	C1	A			
17	C1Z	43/CSAPBA01	LP	B–208–035, CS–64	2	O	C1	A			
18	C1S	43/VA252AHU01A, 43/RHAPRH01	LP	B–208–146, VA–37 B–208–119, RH–01	2	O	RF45	RF			
19	C2Z	43/FCV205	LP	B–208–035, CS–96	2	O	C1	A			
20	C2S	43/8701A, 43/FCV851	LP	B–208–119, RH–05,10	2	O	RF47	RF			
21	C3Z	43/CSAPBA02	LP	B–208–035, CS–65	2	O	C1	A			
22	C3S	43/VA252AHU01B, 43/RHAPRH02	LP	B–208–146, VA–38 B–208–119, RH–02	2	O	RF48	RF			
23	C4Z	43/8358, 43/HCV218	LP	B–208–035, CS–48,96	2	O	RF49	RF			
24	C4S	43/8702A, 43/FCV852	LP	B–208–119, RH–07,10	2	O	RF50	RF			
25	D1Z	43/HCV864, 43/8701B	LP	B–208–119, RH–03,06	2	O	RF51	RF			
26	D1S	43/8808A, 43/8811A, 43/8815A	LP	B–208–131, SI–19,25,32	2	O	RF52	RF			
27	D2Z	43/SIAPSI01			2	O	C1	A			
28	D2S	43/CIAPCS01, 43/9103A	LP	B–208–028, CI–01,09	2	O	RF53	RF			
29	D3Z	43/HCV865, 43/8702B	LP	B–208–119, RH–04,08	2	C	RF54	RF			
30	D3S	43/8808B, 43/8811B, 43/8815B	LP	B–208–131, SI–20,26,33	2	C	RF55	RF			
31	D4Z	43/SIAPSI02	LP	B–208–131, SI–02	2	O	C1	A			
32	D4S	43/CIAPCS02, 43/9103B	LP	B–208–028, CI–02,10	2	C	RF56	RF			
33	E1Z	43/SW101PM01A, 43/SW101PMP03CA	LP	B–208–136, SW–01,03	2	O	RF57	RF			
34	E1S	43/VA121FAN001	LP	B–208–146, VA–45	2	O	C1	A			
35	E2Z	43/VA101AHU01A, 43/VA101AHU02A	LP	B–208–146, VA–01,02	2	O	RF58	RF			
36	E2S	43/CC102PMP01A, 43/CC102PMP03CA	LP	B–208–023, CC–01,03	2	O	RF59	RF			
37	E3Z	43/SW101PMP02B, 43/SW101PMP03CB	LP	B–208–136, SW–02,04	2	O	RF60	RF			
38	E3S	43/VA122FAN001	LP	B–208–146, VA–46	2	O	C1	A			
39	E4Z	43/VA101AHU01B, 43/VA101AHU02B	LP	B–208–146, VA–03,04	2	O	RF61	RF			
40	E4S	43/CC102PMP02B, 43/CC102PMP03CB	LP	B–208–023, CC–02,04	2	O	RF62	RF			
41	F1Z	43/10048&10066	LP	B–208–023, CC–06	2	O	C1	A			
42	F1S	43/10045&10064, 43/10050&10068	LP	B–208–023, CC–13,15	2	O	RF63	RF			
43	F2Z	43/10366&10368, 43/10367&10369, 43/10370	LP	B–208–023, CC–23,24,25	2	O	RF64	RF			
44	F2S	43/10087	LP	B–208–023, CC–35	2	O	C1	A			
45	F3Z	43/10049&10067	LP	B–208–023, CC–08	2	O	C1	A			
46	F3S	43/10046&10065, 43/10051&10069	LP	B–208–023, CC–14,16	2	O	RF66	RF			
47	F4Z	43/10371, 43/10374&10375, 43/10373&10376	LP	B–208–023, CC–26,29,30	2	O	RF67	RF			
48	F4S	43/10184	LP	B–208–023, CC–36	2	O	C1	A			

Appendix 1 - Existing AS system essential drawings

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 16-JUN-2022
Log Number: 18342

Original Design Firm: Gai-Tronics Associates, Inc.
Replaced Manual Drawing: D-804-614
Last Revision And Date: 3 06.1991

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION
10	05.03.18	D.K.	REVD PER MOD. 686–PP–L
9	12.2017	SPREJ	REVD PER MOD. 686–PP–L
8	12.2007	M.K.	REVD PER MOD. 1007–3H–L
12	15.09.22	M.K.	CORRECTION PER MOD. 1007–3H–L
11	20.06.18	V.S.	REVD PER MOD. 1007–3H–L

NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRSKO
I & C ANNUNCIATOR LIST
TRANSFER PANELS ALARMS
ANNUNCIATOR SYSTEM–PC100CME004

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO
MADE: MFP
CHECKED: D.J. 2.
APPROVED: M.K. 3.
KRSKO, SLOVENIA
LE APPROVAL: WLW
REFERENCE DRAWINGS:
DRAWING NUMBER: D–804–614
SHEET: 12

SP-ES-1455 Rev 0

Appendix 1 - Existing AS system essential drawings

	1	2	3	4	5	6	
	1 SFP CHARCOAL EXHAUST PLM 1A CHARCOAL TEMP HI	2 REAC BLDG CHAR CLEANUP PLM 1 CHARCOAL TEMP HI	3 ANNULUS CHARCOAL EXHAUST PLM 1A CHARCOAL TEMP HI	4 SECONDARY COMP FAN PULL TO LOCK	5 NORTH SECONDARY COMP FAN 1 FLOW LO	6 DRY STORAGE BUILDING TROUBLE	A
	7 SFP CHARCOAL EXHAUST PLM 1A CHARCOAL TEMP HI-HI	8 REAC BLDG CHAR CLEANUP PLM 1 CHARCOAL TEMP HI-HI	9 ANNULUS CHARCOAL EXHAUST PLM 1A CHARCOAL TEMP HI-HI	10 NORTH SECONDARY COMP SMOKE	11 NORTH SECONDARY COMP FAN 2 FLOW LO	12	B
	13 SFP CHARCOAL EXHAUST PLM 1B CHARCOAL TEMP HI	14 REAC BLDG CHAR CLEANUP PLM 2 CHARCOAL TEMP HI	15 ANNULUS CHARCOAL EXHAUST PLM 1B CHARCOAL TEMP HI	16 SOUTH SECONDARY COMP SMOKE	17 SOUTH SECONDARY COMP FAN 1 FLOW LO	18	C
	19 SFP CHARCOAL EXHAUST PLM 1B CHARCOAL TEMP HI-HI	20 REAC BLDG CHAR CLEANUP PLM 2 CHARCOAL TEMP HI-HI	21 ANNULUS CHARCOAL EXHAUST PLM 1B CHARCOAL TEMP HI-HI	22 PRESSURIZER COMPARTMENT SMOKE	23 SOUTH SECONDARY COMP FAN 2 FLOW LO	24	D
	25 MCR CHARCOAL CLEANUP PLM CHARCOAL TEMP HI	26 CONTR ACC AREA CHAR EXHAUST PLM CHARCOAL TEMP HI	27 AIR INTAKE CHLORINE HI	28 CHLORINE MONITORING SYSTEM TROUBLE	29 PRESSURIZER COMPARTMENT SUPPLY FLOW LO	30	E
	31 MCR CHARCOAL CLEANUP PLM CHARCOAL TEMP HI-HI	32 CONTR ACC AREA CHAR EXHAUST PLM CHARCOAL TEMP HI-HI	33 AIR INTAKE CHLORINE HI-HI	34	35	36	F

CHARCOAL FILTER PLENUMS&SECONDARY
COMPARTMENT VENTILATION SYSTEM
(6 X 6)
PC100CME005

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	TM6750	F	B-208-146, VA-137	2	C	C1	A			
2	A2	TM6449	F	B-208-146, VA-22	2	C	C1	A			
3	A3	TM6605	F	B-208-146, VA-18	2	C	C1	A			
4	A4	1/VA151FAN001,002; 152-001, 002	VB	B-208-146, VA-54	2	C	C4PF	A			
5	A5	2/FS6545	ARR	B-208-146, VA-54	2	O	C1	A			
6	A6	DS100PLC-A140.12.CH0	F	B16-362, DS-38A	2	O	C1	A			
7	B1	TM6750	F	B-208-146, VA-137	2	C	C1	A			
8	B2	TM6449	F	B-208-146, VA-22	2	C	C1	A			
9	B3	TM6605	F	B-208-146, VA-18	2	C	C1	A			
10	B4	AE6547	F	B-208-146, VA-58	2	O	C1	A			
11	B5	2/FS6546	ARR	B-208-146, VA-57	2	O	C1	A			
12	B6	SPARE				C		A			
13	C1	TM6751	F	B-208-146, VA-137	2	C	C1	A			
14	C2	TM6450	F	B-208-146, VA-22	2	C	C1	A			
15	C3	TM6606	F	B-208-146, VA-18	2	C	C1	A			
16	C4	AE6551	F	B-208-146, VA-58	2	O	C1	A			
17	C5	2/FS6550	ARR	B-208-146, VA-56	2	O	C1	A			
18	C6	SPARE				C		A			
19	D1	TM6751	F	B-208-146, VA-137	2	C	C1	A			
20	D2	TM6450	F	B-208-146, VA-22	2	C	C1	A			
21	D3	TM6606	F	B-208-146, VA-18	2	C	C1	A			
22	D4	AE6553	F	B-208-146, VA-58	2	O	C1	A			
23	D5	2/FS6549	ARR	B-208-146, VA-55	2	O	C1	A			
24	D6	SPARE				C		A			
25	E1	TM6791	F	B-208-146, VA-157	2	C	C1	A			
26	E2	TM6892	F	B-208-146, VA-120	2	C	C1	A			
27	E3	AY/6861A-Q2 (AIQB6861A-A1 OR AIQB6879-A1) OR AY/6861B-Q2 (AIQB6861B-A1 OR AIQB7240-A1)	LP	B-208-146-VA-211	1	C	C2PF	A			
28	E4	AY/6861A-Q1 (AIQB6861A-A3 OR AIQB6879-A3) OR AY/6861B-Q1 (AIQB6861B-A3 OR AIQB7240-A3)	LP	B-208-146-VA-211	1	O	C2SF	A			
29	E5	FS6556	F	B-208-146, VA-58	2	O	C1	A			
30	E6	SPARE				C		A			
31	F1	TM6791	F	B-208-146, VA-157	2	C	C1	A			
32	F2	TM6892	F	B-208-146, VA-120	2	C	C1	A			
33	F3	AY/6861A-Q3 (AIQB6861A-A2 OR AIQB6879-A2) OR AY/6861B-Q3 (AIQB6861B-A2 OR AIQB7240-A2)	LP	B-208-146-VA-211	1	C	C2PF	A			
34	F4	SPARE				C		A			
35	F5	SPARE				C		A			
36	F6	SPARE				C		A			

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. 6

- WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
- ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
- ALARM COND. HAS BEEN CHANGED FOR FOLLOWING WINDOWS NO.: 6, 12, 18, 24, 27, 28, 30, 31, 32, 33, 34, 35, 36
- WINDOWS NO. 6, 12, 18 AND 24 HAVE BECOME SPARE

SE Nuclear 18 343

APPROVED FOR USE
15-07-2024

NO.	DATE	BY	REVISION	CHD. BY	E. APPR.
4	25.01.95		CAD CONV. REV. 3 & AS BUILT		
8	01.03.23	[illegible]	REVD PER MOD 1217-481-L	[illegible]	[illegible]
7	15.09.99	T.T.	REVD PER MOD 629-45-L	M.S.	M.S.
6	22.10.98	[illegible]	REVD PER MOD 1217-45-L	M.S.	M.S.
5	30.05.03	[illegible]	REVISED PER MOD 386-44-L	[illegible]	[illegible]

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

Original Design Firm: Gibbs-Gilbert Associates, Inc.
Replaced Manual Drawing: D-804-615
Last Revision And Date: 3 30.01.1995

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO

I & C ANNUNCIATOR LIST

CHARCOAL FILTER PLENUMS AND SECONDARY COMPARTMENT VENTILATION SYSTEM-PC100CME005

DESIGN ENGINEERING

	NAME	DATE
1.	MFP	
2.	CHECKED	
3.	MLM	

NUCLEAR POWER PLANT KRSKO

REFERENCE DRAWINGS:

SCALE:

D-804-615

DRAWING NUMBER

KRSKO, SLOVENIA

I. E. APPROVAL

8

Sheet 1 of 1

6

	A	B	C	D	E	F
1	REAC BLDG CHAR CLEANUP FLM 1 INLET SMOKE	MCR/ELECT. ROOMS PURGE SWITCH IN SMOKE	REAC COMP FAN PULL TO LOCK	AUX BLDG CHAR EXHAUST FLOW LO	CRDM FAN PULL TO LOCK	6 AUX BLDG SUPPLY AHU 1 FLOW LO
7	REAC BLDG CHAR CLEANUP FLM 1 DISCH SMOKE	CONTROL BLDG EXHAUST FAN 1 FLOW LO	REAC COMP FAN 1 FLOW LO	AUX BLDG CHAR EXHAUST SMOKE	CRDM FAN 1 FLOW LO	12 AUX BLDG SUPPLY AHU 2 FLOW LO
13	REAC BLDG CHAR CLEANUP FLM 2 INLET SMOKE	CONTROL BLDG EXHAUST FAN 2 FLOW LO	REAC COMP FAN 2 FLOW LO	AUX BLDG HEPA EXHAUST FLOW LO	CRDM FAN 2 FLOW LO	18 AUX BLDG SUPPLY AHU 1 SMOKE
19	REAC BLDG CHAR CLEANUP FLM 2 DISCH SMOKE			AUX BLDG HEPA EXHAUST SMOKE	CRDM FANS SUPERVISORY ALERT	24 AUX BLDG SUPPLY AHU 2 SMOKE
25		REAC BLDG CHAR CLEANUP FAN 1 FLOW LO	(RWS & YWB HVAC) SYSTEM TROUBLE	RB VENTILATION SUPERVISORY SYSTEM TROUBLE		30 FUEL HDLG BLDG/ OUTDOOR ΔP LO
31		REAC BLDG CHAR CLEANUP FAN 2 FLOW LO	REAC COMP SUPPLY SMOKE	SCREEN WASH PUMP BLDG TEMP HI	CRDM SMOKE	36 COND. RET. UNIT SUMPS LEVEL HI

1 2 3 4 5

REACTOR BLDG. AUX. BLDG. AND CONTROL BLDG. VENTILATION SYSTEMS (6 X 6) PC100CME006

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS	ANN OUTPUT TEMINALS	REMARKS
1	A1	AE6451	F	B-208-146, VA-22	2	O	C1	A			
2	A2	1/FCV7209, 1/FCV7210	VB	B-208-146, VA-181	2	O	C2SF	A			
3	A3	1/VA131FAN001, 002	VB	B-208-146, VA-24	2	C	C2PF	A			
4	A4	2/FS6641	ARR	B-208-146, VA-28	2	O	C1	A			
5	A5	1/VA121FAN001; 122-001	VB	B-208-146, VA-46	2	C	C2PF	A			
6	A6	2/FS6639	ARR	B-208-146, VA-51	2	O	C1	A			
7	B1	AE6435	F	B-208-146, VA-22	2	O	C1	A			
8	B2	2/FS6780	ARR	B-208-146, VA-179	2	O	C1	A			
9	B3	2/FS6492	ARR	B-208-146, VA-24	2	O	C1	A			
10	B4	AE6662	F	B-208-146, VA-30	2	O	C1	A			
11	B5	2/FS6475	ARR	B-208-146, VA-45	2	O	C1	A			
12	B6	2/FS6640	ARR	B-208-146, VA-52	2	O	C1	A			
13	C1	AE6452	F	B-208-146, VA-22	2	O	C1	A			
14	C2	2/FS6781	ARR	B-208-146, VA-180	2	O	C1	A			
15	C3	2/FS6493	ARR	B-208-146, VA-15	2	O	C1	A			
16	C4	2/FS6653	ARR	B-208-146, VA-96	2	O	C1	A			
17	C5	2/FS6474	ARR	B-208-146, VA-46	2	O	C1	A			
18	C6	3/AE6641	F	B-208-146, VA-51	2	C	C1	A			
19	D1	AE6436	F	B-208-146, VA-22	2	O	C1	A			
20	D2	SPARE				C		A			
21	D3	SPARE				C		A			
22	D4	AE6652	F	B-208-146, VA-98	2	O	C1	A			
23	D5	VA10DPLC-K2	F	816-344/ 3	2	O	C1	A			
24	D6	3/AE6642	F	B-208-146, VA-52	2	C	C1	A			
25	E1	SPARE				C		A			
26	E2	2/FS6439	LP	B-208-146, VA-20	2	C	C1	A			
27	F3	SPARE				C		A			
28	E4	VA00DPLC-A100.3-01	LP	816-350/ 19	2	C	C1	A			
29	E5	VA10DPLC-K3	F	816-644/ 3	2	O	C1	A			
30	E6	DPS6644	F	B-208-146, VA-53	2	C	C1	A			
31	F1	SPARE				C		A			
32	F2	2/FS6440	LP	B-208-146, VA-21	2	O	C1	A			
33	F3	AE6494	F	B-208-146, VA-26	2	O	C1	A			
34	F4	TS7032	F	B-208-146, VA-80	2	O	C1	A			
35	F5	AE6476, AE6477	F	B-208-146, VA-47	2	O	C2SF	A			
36	F6	LS-6115, LS-6116	F	B-208-060 FD-07	2	O	C2SF	A			

Nuklearna Elektrarna Krsko
MASTER DOCUMENT
Date Received: 04-12-2020
Log Number: 18344

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. 5

- WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
- ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
- ENGRAVING HAS BEEN CHANGED ON WINDOW NO. 23, 29 AND 30
- ALARM COND HAS BEEN CHANGED FOR FOLLOWING WINDOWS NO.: 20, 21, 23, 25, 27, 28, 29, 31
- WINDOWS NO. 21, 25, 27, 28 AND 31 HAVE BECOME SPARE

Original Design Firm: GAI-Gilbert Associates, Inc.
Replaced Manual Drawing: D-804-618
Last Revision And Date: 2 10.08.1982

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

NO.	DATE	BY	REVISION	CKD. BY	LE APPR.
4	15.03.04	K.K.	REV'D PER EEAR 96-012	B.B.	D.V.
6	12.2020	GK	REV'D PER MOD. 714-AB-L, FDCR-101	D.V.	
7	03.09.13	G.A.	REV'D PER MOD 689-FP-L	D.I.	N.L.
8	15.09.09	F.F.	REV'D PER MOD 629-AS-L & 475-VA-L	M.S.	N.L.
5	22.08.06	SIPRO	REV'D PER MOD 432-AS-L	M.S.	B.S.

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO

I & C ANNUNCIATOR LIST

REACTOR BUILDING, AUXILIARY BUILDING, AND CONT. BUILDING VENTILATION SYS.-PC100CME006

DESIGN ENGINEERING
NUCLEAR POWER PLANT KRSKO KRSKO, SLOVENIA

MADE	CHECKED	LE APPROVAL
1. MFP	2.	3. WLW

REFERENCE DRAWINGS:

SCALE

D-804-616 8

DRAWING NUMBER SHEET REV.

FILE: 80461600 DWG, SPREJEL:

PC100CME007

	1	2	3	4	5	6	7	8
A	1/2 FIRE PROTECTION SYSTEM ALARM	3 COMP COLLING BUILDING FIRE	5 ESS SERV WATER BUILDING FIRE	7 REAC COOL PMP A FIRE	9 VA571PLM-001 DEL VLV FCV7485A WATER FLOW	11 AB EL.94 SPKLR SYS WATER FLOW	13 CB EL.104 & 111 SPKLR SYS WATER FLOW	15 ELECT FIRE PUMP RUNNING
		4 DIESEL GENERATOR 1 BUILDING FIRE	6 DIESEL GENERATOR 2 BUILDING FIRE	8 REAC COOL PMP B FIRE	10 VA521PLM-001 DEL VLV FCV7485B WATER FLOW	12 DRUMMING AREA SPKLR SYS WATER FLOW	14 CB EL.100 SPKLR SYS WATER FLOW	16 ELECT FIRE PUMP TROUBLE
B	17/18 FIRE PROTECTION SYSTEM TROUBLE	19 BUNKERED BUILDING 1 (BB1) FIRE	21 TRANSFORMERS GT1 GT2 T1 T2 T3 FIRE	23 VA111PLM-001 DEL VLV FCV7485H WATER FLOW	25 FEEDWATER PMPS AREA FIRE	27 AB. EL.96 TRAIN A SPKLR SYS WATER FLOW	29 ESW PMPS SPKLR SYS WATER FLOW	31 DIESEL FIRE PUMP RUNNING
		20 400kV RELAY HOUSE FIRE	22 110kV SWITCHGEAR HOUSE FIRE	24 VA111PLM-002 DEL VLV FCV7485J WATER FLOW	26 T/G SET BRGS FIRE	28 AB. EL.96 TRAIN B SPKLR SYS WATER FLOW	30 FP DIESEL PUMP ROOM SPKLR SYS WATER FLOW	32 DIESEL FIRE PUMP TROUBLE
C	33 REACTOR BUILDING FIRE	35 DECONTAMINATION BUILDING FIRE	37 YARD FIRE	39 VA181PLM-01A DEL VLV FCV7485D WATER FLOW	41 H2 SEAL OIL UNIT FIRE	43 TB EL.100-EAST SPKLR SYS WATER FLOW	45 BB1 SPKLR SYS WATER FLOW	47 DIESEL FIRE PUMP SWITCH NOT IN AUTO
	34 AUX BUILDING FIRE	36 RAD WASTE STORAGE BUILDING FIRE	38 RD HOSES FIRE	40 VA181PLM-01B DEL VLV FCV7485E WATER FLOW	42 MAIN XFMR GT1 FIRE	44 TB EL.100-WEST SPKLR SYS WATER FLOW	46 HEALTH PHYS BLDG SPKLR SYS WATER FLOW	48
D	49 INTMD BUILDING FIRE	51 CIRC WATER BUILDING FIRE	53 COOLING TOWER SWITCHGEAR HOUSE FIRE	55 VA441PLM-01A DEL VLV FCV7485F WATER FLOW	57 MAIN XFMR GT2 FIRE	59 TB EL.107-EAST SPKLR SYS WATER FLOW	61 AD3 WAREHOUSES SPKLR SYS WATER FLOW	63 FP104PMP RUNNING
	50 CONTROL BUILDING FIRE	52 WATER TREATMENT BUILDING FIRE	54 WASTE MANIPULATION BUILDING FIRE	56 VA441PLM-01B DEL VLV FCV7485G WATER FLOW	58 UNIT XFMR T1 FIRE	60 TB EL.107-WEST SPKLR SYS WATER FLOW	62 DRY STORAGE BUILDING FIRE	64 FP104PMP TROUBLE
E	65 FUEL HANDLING BUILDING FIRE	67 HEALTH PHYS BUILDING FIRE	69 REAC COOL PMP A SPKLR ACTUATION	71 DIESEL GEN 1 ROOM FIRE	73 UNIT XFMR T2 FIRE	75 TB OIL RESERV ROOM SPKLR SYS WATER FLOW	77 BUNKERED BUILDING 2 – BB2 FIRE	79
	66 TURBINE BUILDING FIRE	68 AUX BOILER BUILDING FIRE	70 REAC COOL PMP B SPKLR ACTUATION	72 DIESEL GEN 2 ROOM FIRE	74 AUX XFMR T3 FIRE	76 AUX BOILER HOUSE SPKLR SYS WATER FLOW	78 OPERATION SUPPORT CENTER BUILDING FIRE	80

FIRE PROTECTION AND FIRE DETECTION SYSTEM
(10 X 8)
PC100CME007

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS		ANN TEMINALS	REMARKS
1/2	A1	K852/PSC12	LP	B-208-063, FP-59	2	O	C1		TB4-C10	TB4-175		
3	A2Z	K852CC5/2CRC62-R2	LP	816-316, SH. 47	2	O	C1		TB7-14	TB7-13		
4	A2S	K852CC5/2CRC62-R3	LP	816-316, SH. 47	2	O	C1		TB7-16	TB7-15		
5	A3Z	K852CC5/2CRC62-R4	LP	816-316, SH. 47	2	O	C1		TB7-18	TB7-17		
6	A3S	K852CC5/2CRC62-R5	LP	816-316, SH. 47	2	O	C1		TB7-20	TB7-19		
7	A4Z	K854CC5/2CRC63-R2	LP	B-208-063, FP-59	2	O	C1		TB7-91	TB7-92		
8	A4S	K854CC5/2CRC63-R3	LP	B-208-063, FP-59	2	O	C1		TB7-93	TB7-94		
9	A5Z	AS8781	LP	B-208-063, FP-07	2	C	C1		TB3-150	TB3-C9		
10	A5S	AS8783	LP	B-208-063, FP-08	2	C	C1		TB3-151	TB3-C9		
11	A6Z	K853CC5/2CRC61-R1	LP	B-208-063, FP-59	2	O	C1		TB7-62	TB7-61		
12	A6S	K853CC5/2CRC61-R2	LP	B-208-063, FP-59	2	O	C1		TB7-64	TB7-63		
13	A7Z	K854CC5/2CRC61-R2	LP	B-208-063, FP-59	2	O	C1		TB7-82	TB7-81		
14	A7S	K854CC5/2CRC61-R3	LP	B-208-063, FP-59	2	O	C1		TB7-84	TB7-83		
15	A8Z	E842-EB1	LP	B-208-063, FP-02	2	C	C1		TB4-169	TB4-C10		
16	A8S	E842-EB1	LP	B-208-063, FP-02	2	O	C1		TB4-170	TB4-C10		
17/18	B1	K852CC5/2-PSC12	LP	B-208-063, FP-59	2	O	C1		TB4-C10	TB7-176		
19	B2Z	K852CC5/2CRC63-R1	LP	816-316, SH. 48	2	O	C1		TB7-24	TB7-23		
20	B2S	K852CC5/2CRC63-R2	LP	816-316, SH. 48	2	O	C1		TB7-26	TB7-25		
21	B3Z	K852CC5/2CRC63-R3	LP	816-316, SH. 48	2	O	C1		TB7-28	TB7-27		
22	B3S	K853CC5/2CRC62-R1	LP	816-316, SH. 93	2	O	C1		TB7-24	TB7-23		
23	B4Z	AS8794	LP	B-208-063, FP-34	2	C	C1		TB3-141	TB3-C8		
24	B4S	AS8793	LP	B-208-063, FP-13	2	C	C1		TB3-142	TB3-C8		
25	B5Z	AS8819	LP	B-208-063, FP-25	2	C	C1		TB3-149	TB3-C9		
26	B5S	AS8807	LP	B-208-063, FP-19	2	C	C1		TB3-156	TB3-C9		
27	B6Z	K853CC5/2CRC61-R3	LP	B-208-063, FP-59	2	O	C1		TB7-66	TB7-65		
28	B6S	K853CC5/2CRC61-R4	LP	B-208-063, FP-59	2	O	C1		TB7-68	TB7-67		
29	B7Z	K854CC5/2CRC61-R4	LP	B-208-063, FP-59	2	O	C1		TB7-86	TB7-85		
30	B7S	K854CC5/2CRC61-R5	LP	B-208-063, FP-59	2	O	C1		TB7-88	TB7-87		
31	B8Z	EE106PNLK704-3/K8	LP	B-208-063, FP-04	2	O	C1		TB4-177	TB4-C10		
32	B8S	EE106PNLE841-K4	LP	B-208-063, FP-56	2	O	C1		TB4-178	TB4-C10		
33	C1Z	K853CC5/2CRC62-R2	LP	816-316, SH. 93	2	O	C1		TB7-32	TB7-31		
34	C1S	K853CC5/2CRC62-R3	LP	816-316, SH. 93	2	O	C1		TB7-34	TB7-33		
35	C2Z	K853CC5/2CRC62-R4	LP	816-316, SH. 93	2	O	C1		TB7-36	TB7-35		
36	C2S	K853CC5/2CRC62-R5	LP	816-316, SH. 93	2	O	C1		TB7-38	TB7-37		
37	C3Z	K853CC5/2CRC62-R6	LP	816-316, SH. 93	2	O	C1		TB7-40	TB7-39		
38	C3S	K853CC5/2CRC63-R1	LP	816-316, SH. 94	2	O	C1		TB7-42	TB7-41		
39	C4Z	AS8785	LP	B-208-063, FP-09	2	C	C1		TB3-145	TB3-C8		
40	C4S	AS8787	LP	B-208-063, FP-10	2	C	C1		TB3-146	TB3-C8		
41	C5Z	AS8805	LP	B-208-063, FP-18	2	C	C1		TB3-166	TB3-C9		
42	C5S	AS8811	LP	B-208-063, FP-21	2	C	C1		TB3-154	TB3-C9		
43	C6Z	K853CC5/2CRC61-R5	LP	B-208-063, FP-59	2	O	C1		TB7-70	TB7-69		
44	C6S	K853CC5/2CRC61-R6	LP	B-208-063, FP-59	2	O	C1		TB7-72	TB7-71		
45	C7Z	K854CC5/2CRC63-R4	LP	B-208-063, FP-59	2	O	C1		TB7-96	TB7-97		
46	C7S	K854CC5/2CRC63-R5	LP	B-208-063, FP-59	2	O	C1		TB7-98	TB7-99		
47	C8Z	CSW	LP	B-208-063, FP-57	2	O	C4P		TB3-185	TB4-C10		
48	C8S	SPARE										
49	D1Z	K853CC5/2CRC63-R2	LP	816-316, SH. 94	2	O	C1		TB7-44	TB7-43		
50	D1S	K853CC5/2CRC63-R3	LP	816-316, SH. 94	2	O	C1		TB7-46	TB7-45		
51	D2Z	K854CC5/2CRC62-R1	LP	816-316, SH. 138	2	O	C1		TB7-48	TB7-47		
52	D2S	K854CC5/2CRC62-R2	LP	816-316, SH. 138	2	O	C1		TB7-50	TB7-49		
53	D3Z	K854CC5/2CRC62-R3	LP	816-316, SH. 138	2	O	C1		TB7-52	TB7-51		
54	D3S	K852CC5/2CRC63-R4	LP	816-316, SH. 48	2	O	C1		TB7-10	TB7-9		
55	D4Z	AS8789	LP	B-208-063, FP-11	2	C	C1		TB3-147	TB3-C8		
56	D4S	AS8791	LP	B-208-063, FP-12	2	C	C1		TB3-148	TB3-C8		
57	D5Z	AS8809	LP	B-208-063, FP-20	2	C	C1		TB3-153	TB3-C9		
58	D5S	AS8815	LP	B-208-063, FP-23	2	C	C1		TB3-156	TB3-C9		
59	D6Z	K853CC5/2CRC63-R4	LP	B-208-063, FP-59	2	O	C1		TB7-74	TB7-73		
60	D6S	K853CC5/2CRC63-R5	LP	B-208-063, FP-59	2	O	C1		TB7-76	TB7-75		
61	D7Z	K854CC5/2CRC61-R6	LP	B-208-063, FP-59	2	O	C1		TB7-90	TB7-89		
62	D7S	(K852CC5/2CRC64-R2)	LP	(816-316, SH. 49)	(2)	(O)	(C1)		(TB7-106)	TB7-105)		
63	D8Z	52a	LP	B-208-063, FP-39	2	C	C1		TB3-179	TB4-C10		
64	D8S	OTS	LP	B-208-063, FP-39	2	C	C1		TB4-180	TB4-C10		
65	E1Z	K854CC5/2CRC62-R4	LP	816-316, SH. 138	2	O	C1		TB7-54	TB7-53		
66	E1S	K854CC5/2CRC62-R5	LP	816-316, SH. 138	2	O	C1		TB7-56	TB7-55		
67	E2Z	K854CC5/2CRC62-R6	LP	816-316, SH. 138	2	O	C1		TB7-58	TB7-57		
68	E2S	K854CC5/2CRC63-R1	LP	816-316, SH. 139	2	O	C1		TB7-60	TB7-59		
69	E3Z	AS8797	LP	B-208-063, FP-14	2	O	C1		TB3-159	TB3-C9		
70	E3S	AS8799	LP	B-208-063, FP-15	2	O	C1		TB3-168	TB3-C9		
71	E4Z	AS8801	LP	B-208-063, FP-16	2	C	C1		TB3-144	TB3-C8		
72	E4S	AS8803	LP	B-208-063, FP-17	2	C	C1		TB3-152	TB3-C9		
73	E5Z	AS8813	LP	B-208-063, FP-22	2	C	C1		TB3-155	TB3-C9		
74	E5S	AS8817	LP	B-208-063, FP-24	2	C	C1		TB3-157	TB3-C9		
75	E6Z	K853CC5/2CRC63-R6	LP	B-208-063, FP-59	2	O	C1		TB7-78	TB7-77		
76	E6S	K854CC5/2CRC61-R1	LP	B-208-063, FP-59	2	O	C1		TB7-80	TB7-79		
77	E7Z	K852CC5/2CRC62-R6	LP	816-316, SH. 47	2	O	C1		TB7-102	TB7-101		
78	E7S	K852CC5/2CRC64-R1	LP	(816-316, SH. 49)	2	O	C1		TB7-104	TB7-103		
79	E8Z	SPARE										
80	E8S	SPARE										

ORIGINAL DOCUMENT
Date Received: 15-01-2024
EC Number: 257203

Original Design Firm: SPIRO INŽENIRING D.O.O.
Replaced Manual Drawing: N/A
Last Revision And Date: N/A

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY!

NO.	DATE	BY	REVISION
7	15.03.23	F.F.	REVO PER CAP 2021-2226
6	18.08.22	A.K.	REVO PER MOD 1224-FO-L
5	8.6.2022	M.S.	REVO PER MOD.1356-NA-L
4	20.01.22	A.K.	REVO PER MOD. 1217-RE-L
3	21.01.21	A.K.	REVO PER MOD. 1217-RE-L
DOC. BY & APPR.		B.P.	G.J.

NUKLEARNA ELEKTRARNA KRŠKO
NUCLEAR POWER PLANT KRSKO
I & C ANNUNCIATOR LIST
FIRE PROTECTION SYSTEM
ANNUNCIATOR PANEL ASSEMBLY – PC100CME007
DESIGN ENGINEERING

MADE:	NUCLEAR POWER PLANT KRSKO	KRSKO, SLOVENIA
1. V. SMIČ	2. G. GRGIČEVIĆ D. ILIJAŠ	3. LE. APOSTOLOV N. MIKOVIĆ

REFERENCE DRAWINGS:

SCALE:

D-804-626
DRAWING NUMBER

REV. 8

SPIRES 1455

Replaced Manual Drawing: SS-200-521, SH. 1
Original Design Firm: GAI-GILBERT ASSOCIATES, INC
Last Revision And Date: B, 09.04.1976

FILE: 20052101 DWG, SPREJEL: _____

REV	MADE	CH	APPS	DATE
D				27.08.97
REVISED FOR SIMULATOR PURPOSE				
E				13.02.03
REV'D PER: MOD. 327-TZ-L-DMP15				
F	SPRG	M.S.	B.Š.	22.08.06
REV'D PER: MOD. 432-AS-L				
G	K.K.	S.J.	V.D.	17.11.06
REV'D PER: CAP 2002-7582				
H	F.F.	M.S.	N.I.	15.09.09
REV'D PER: MOD 629-AS-L				
I	M.S.	B.R.		10.10.12
REV'D PER: MOD 599-EE-L				

NUKLEARNA ELEKTRARNA KRSKO
NUCLEAR POWER PLANT KRSKO

ELECTRICAL BLOCK DIAGRAMS

ELECTRICAL CONTROL BOARD CB102BRDK503

ANNUNCIATOR WINDOW ENGRAWING

MADE	CHKD	DRAWING NUMBER	REV
		SS-200-521	I

PDS | ENG INTRF 1. 2. | DESIGN ENGINEERING NUCLEAR POWER PLANT KRSKO KRSKO, SLOVENIA

SCALE

W.O.

ENGINEER APPROVAL						DEPT			DATE
REV	MADE	CH	PDS	APP	DATE	REV	MADE	CH	PDS	APP	DATE
I	M.S.	B.R.		B.R.	10.10.12	H	F.F.	M.S.		N.I.	15.09.09

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

SHEET: 1 OF 6

ANNUN. SECTION X

1	2	3	4	5	
1 MCC FEEDER BREAKER OUT OF SERVICE/TRIP	2 400V SWGR BREAKER OUT OF SERVICE/TRIP	3 BUSES L11 AND L21 PARALLELED	4 6.3KV SWGR BREAKER OUT OF SERVICE/TRIP	5 CW901DSL STARTED/ ALARM/ SHUTDOWN	A
6 BUS L11 UNDERVOLTAGE	7 BUS L11 GROUND	8 BUS L21 UNDERVOLTAGE	9 BUS L21 GROUND	10 BREAKER L21T AUTO TRIP	B

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS
1	1A	OTS-L11-3B, 1/MCC111, OTS-L21-3B, 1/MCC211, OTS-L11-4B, 1/MCC112, OTS-L21-4A, 1/MCC212, OTS-L11-3A, 1/MCC113, OTS-L21-3A, 1/MCC213	ECB, SWG	B-208-052 (EE46)	2	C	C12PF	A	TB27-7, K
2	2A	OTS-L21-1B, OTS-L11-1B, 1/L11 1/L12, 33-L11-1B, 33-L21-1B	ECB, SWG	B-208-052 (EE27)	2	C	C6PF	A	TB28-3, K
3	3A	52a	SWG	B-208-052 (EE34)	2	C	C1	A	TB18-1, K
4	4A	33-M1-4, 1/M1-11, 86-M1-4, 1/M1-12, 86-M1-11, 1/M2-22, 86-M2-4 33-M2-11, 1/M2-21, 86-M2-11, 33-M1-11, 33-M2-4	ECB, SWG	B-208-052 (EE17)	2	C	C12PF	A	TB26-1, K
5	5A	X928-PLC (CONTROLLER)	TP3, DG ROOM	B-208-158 (TZ02)	2	O	C1	A	TB18-11, K
6	1B	27Y-1/L11	SWG	B-208-052 (EE70)	2	C	C1	A	TB18-4, K
7	2B	51G-L11, ICS	SWG	B-208-052 (EE27)	2	C	C2PF	A	TB18-5, K
8	3B	27Y-1/L21	SWG	B-208-052 (EE71)	2	C	C1	A	TB18-7, K
9	4B	51G-T21, ICS	SWG	B-208-052 (EE29)	2	C	C2PF	A	TB18-9, K
10	5B	OTS-L21-4B, 1/L21T	ECB, SWG	B-208-052 (EE34)	2	C	C2SF	A	TB8-11, K

MASTER DOCUMENT
Date Received: 05-12-2013
Log Number: 12500

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. F
- WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
- ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS

REV	MADE	CH	APPS	DATE
E	SSPRO	M.Š.	B.Š.	22.08.06

REV'D PER:
MOD. 432-AS-L

REV	MADE	CH	APPS	DATE
F	K.K.	S.J.	V.D.	17.11.06

REV'D PER:
CAP 2002-7582

REV	MADE	CH	APPS	DATE
G	F.F.	M.Š.	N.I.	15.09.09

REV'D PER:
MOD 629-AS-L

REV	MADE	CH	APPS	DATE
H	K.K.	B.K.	B.P.	15.11.10

REV'D PER:
MOD 640-DG-L

REV	MADE	CH	APPS	DATE
I				10.10.12

REV'D PER:
MOD 599-EE-L

Replaced Manual Drawing:
Original Design Firm:
Last Revision And Date:

SS-200-521, SH. 2
GAI-GILBERT ASSOCIATES, INC.
B, 09.04.1976

FILE: 20052102 DWG, SPREJEL:

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. E
- 1 - WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
- 1 - ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
- 1 - ENGRAVINGS HAVE BEEN CHANGED ON WINDOWS NO. 9, 13 AND 15
- 1 - ALARM COND HAS BEEN CHANGED FOR WINDOWS NO. 8 AND 16

05-12-2013
42502

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS
1	1A	OTS-LD11-2D, 1/MCC0111, 33-LD11-2D OTS-LD12-4B, 1/MCC0121, 33-LD12-4B 1/MCC0113, 33-LD11-4B, OTS-LD12-4A, OTS-LD11-4C, 1/MCC0123, 33-LD12-4A, OTS-LD11-5C, OTS-LD12-4C, 1/MCC0122, OTS-LD11-4B, 1/MCC0112, OTS-LD12-3A, 1/MCC0124	EOB, SWG	B-208-052 (EE52)	2	C	C18PF	A	TB40-1, K
2	2A	OTS-LD11-1B, 1/LD11, 33-LD11-1B, OTS-LD12-1B, 1/LD12, 33-LD12-1B, OTS-LD13-1B, 1/LD13	EOB, SWG	B-208-052 (EE23)	2	C	C8PF	A	TB40-9, K
3	3A	27Z/LD11, 27Y-2/LD11	SWG	B-208-052 (EE64)	2	C	C2PF	A	TB38-1, K
4	4A	51G-LD11, ICS	SWG	B-208-052 (EE21)	2	C	C2PF	A	TB38-3, K
5	5A	33-4, 1/MD1-DG1, 52S3/MD1-DG1	EOB, SWG	B-208-052 (EE09)	3	C	C3PF	A	TB37-3, K
6	6A	FS	SWG	B-208-047 (DG12)	2	C	C1	A	TB38-5, K
7	7A	52S1/MD1-DG1, 52S2/MD1-T1, 52S2/MD1-T3	SWG	B-208-052 (EE09)	2	C	C2SF	A	TB38-7, K
8	8A	TS-TD11	F	B-208-052 (EE11)	2	O	C1	A	TB38-9, K
9	1B	33-12, 1/MD1-11, 86-12, 33-13, 1/MD1-12, 86-13, 33-14, 1/MD1-13, 86-14	EOB, SWG	B-208-052 (EE11)	2	C	C9PF	A	TB40-11, K
10	2B	52G/LD21T	SWG	B-208-052 (EE31)	2	C	C2PF	A	TB38-11, K
11	3B	27Z/LD12, 27Y-2/LD12	SWG	B-208-052 (EE62)	2	C	C2PF	A	TB39-1, K
12	4B	51G-LD12, ICS	SWG	B-208-052 (EE22)	2	C	C1	A	TB39-3, K
13	5B	27X-AB/LD13	SWG	B-208-052 (EE68)	2	C	C1	A	TB39-5, K
14	6B	AR3	F	B-208-047 (DG55)	2	C	C1	A	TB39-7, K
15	7B	OTS-LD21T-5B, 1/LD22T	EOB, SWG	B-208-052 (EE31)	3	C	C2SF	A	TB37-1, TB36-12
16	8B	TS-TD12	F	B-208-052 (EE12)	2	O	C1	A	TB39-9, K

ANNUN. SECTION A

1	2	3	4	5	6	7	8
1 MCC FEEDER BREAKER OUT OF SERVICE/TRIP	2 400V SWGR BREAKER OUT OF SERVICE/TRIP	3 BUS LD11 UNDERVOLTAGE	4 BUS LD11 GROUND	5 DIESEL GEN 1 BREAKER MD1-DG1 OUT OF SERVICE/ TRIP	6 DIESEL GEN 1 FAIL TO START	7 DIESEL GEN 1 BREAKER MD1-DG1 PARALLEL	8 TRANSFORMER TD11 HI TEMP
9 6.3KV SWGR BREAKER OUT OF SERVICE / TRIP UNIT MD1-13	10 BUSES LD11 AND LD12 PARALLELED	11 BUS LD12 UNDERVOLTAGE PZR HTR	12 BUS LD12 GROUND	13 BUS LD13 UNDERVOLTAGE PZR HTR	14 DIESEL GEN 1 TROUBLE OR SWITCH NOT IN AUTO	15 BREAKER LD12T AUTO TRIP	16 TRANSFORMER TD12 HI TEMP

A B

	NUKLEARNA ELEKTRARNA KRSKO NUCLEAR POWER PLANT KRSKO
	ELECTRICAL BLOCK DIAGRAMS
	ELECTRICAL CONTROL BOARD CB102BRDK503
	ANNUNCIATOR WINDOW ENGRAWING

MADE	CH'KD	DRAWING NUMBER	REV
POS		SS-200-521	1
POS 1. 2. ENG UNIT		DESIGN ENGINEERING NUCLEAR POWER PLANT KRSKO KRSKO, SLOVENIA	

REV	MADE	CH	POS	APP	DATE	REV	MADE	CH	POS	APP	DATE
W.O.	ENGINEER APPROVAL				DEPT	DATE					
SCALE											
1	M.Š.	B.Š.	M.Š.		10.10.12	H	K.K.	B.K.		B.P.	15.11.10

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

SHEET: 2 OF 6

NUKLEARNA ELEKTRARNA KRSKO NUCLEAR POWER PLANT KRSKO	MADE	CHKD	DRAWING NUMBER	REV
ELECTRICAL BLOCK DIAGRAM			SS-200-521	I
ELECTRICAL CONTROL BOARD CB102BRDK503	PDS		ENG INTRF 1. 2.	DESIGN ENGINEERING NUCLEAR POWER PLANT KRSKO KRSKO, SLOVENIA
ANNUNCIATOR WINDOW ENGRAWING	SCALE			
	W.O.			

ENGINEER APPROVAL						DEPT					DATE
REV	MADE	CH	PDS	APP	DATE	REV	MADE	CH	PDS	APP	DATE
I	M.Š.	B.P.		B.P.	10.10.12	H	K.K.	B.K.		B.P.	15.11.10

THIS IS A CAD DRAWING AND SHOULD NOT BE REVISED OR MODIFIED MANUALLY

SHEET: 3 OF 6

ANNUN. SECTION B

1	2	3	4	5	6	7	8	
1 MCC FEEDER BREAKER OUT OF SERVICE/TRIP	2 400V SWGR BREAKER OUT OF SERVICE/TRIP	3 BUS LD21 UNDERVOLTAGE	4 BUS LD21 GROUND	5 DIESEL GEN 2 BREAKER MD2-DG2 OUT OF SERVICE/ TRIP	6 DIESEL GEN 2 FAIL TO START	7 DIESEL GEN 2 BREAKER MD2-DG2 PARALLEL	8 TRANSFORMER TD21 HI TEMP	A
9 6.3KV SWGR BREAKER OUT OF SERVICE/TRIP UNIT MD2-23	10 BUSES LD21 AND LD22 PARALLELED	11 BUS LD22 UNDERVOLTAGE	12 BUS LD22 GROUND	13 BUS LD23 UNDERVOLTAGE PZR HTR	14 DIESEL GEN 2 TROUBLE OR SWITCH NOT IN AUTO	15 BREAKER LD22T AUTO TRIP	16 TRANSFORMER TD22 HI TEMP	B

WINDOW NO.	WINDOW COORD	INITIATING DEVICE	LOC.	REFERENCE DRAWING	NO. OF INPUT TERM.	ALARM COND.	CONTACT CONFIGURATION	SEQ. TYPE	FIELD INPUT TERMINALS
1	1A	OTS-LD21-2D, 1/MCCD211, 33-LD21-2D, OTS-LD22-4B, 1/MCCD221, 33-LD22-4B OTS-LD22-3B, 1/MCD0222, OTS-LD21-4B, 1/MCCD213, 33-LD21-4B, OTS-LD21-5C 1/MCCD212, OTS-LD22-3A, 1/MCCD223	ECB, SWG	B-208-052 (EE54)	2	C	C15PF	A	TB40-1, K
2	2A	OTS-LD23-1B, 1/LD23, OTS-LD22-1B, 1/LD22, 33-LD22-1B, OTS-LD21-1B, 1/LD21, 33-LD21-1B	ECB, SWG	B-208-052 (EE26)	2	C	C8PF	A	TB40-9, K
3	3A	27Z/LD21, 27Y-2/LD21	SWG	B-208-052 (EE65)	2	C	C2PF	A	TB38-1, K
4	4A	51G-LD21, ICS	SWG	B-208-052 (EE25)	2	C	C2PF	A	TB38-3, K
5	5A	33-4, 1/MD2-DG2, 52S3/MD2-DG2	ECB, SWG	B-208-052 (EE10)	3	C	C3PF	A	TB37-3, K
6	6A	FS	SWG	B-208-047 (DG33)	2	C	C1	A	TB38-5, K
7	7A	52S1/MD2-DG2, 52S2/MD2-T2, 52S2/MD2-T3	SWG	B-208-052 (EE10)	2	C	C2SF	A	TB38-7, K
8	8A	TS-TD21	F	B-208-052 (EE15)	2	O	C1	A	TB38-9, K
9	1B	33-14, 1/MD2-23, 86-14, 33-15, 1/MD2-22, 86-15, 33-12, 1/MD2-21, 86-12	ECB, SWG	B-208-052 (EE16)	2	C	C9PF	A	TB40-11, K
10	2B	52a/LD22T	SWG	B-208-052 (EE32)	2	C	C1	A	TB38-11, K
11	3B	27Z/LD22, 27Y-2/LD22	SWG	B-208-052 (EE63)	2	C	C2PF	A	TB39-1, K
12	4B	51G-LD22, ICS	SWG	B-208-052 (EE24)	2	C	C2PF	A	TB39-3, K
13	5B	27X-AB/LD23	SWG	B-208-052 (EE69)	2	C	C1	A	TB39-5, K
14	6B	AR3	F	B-208-047 (DG55)	2	C	C1	A	TB39-7, K
15	7B	OTS-LD22T-5B, 1/LD12T	ECB, SWG	B-208-052 (EE32)	3	C	C2SF	A	TB37-1, TB36-12
16	8B	TS-TD22	F	B-208-052 (EE14)	2	O	C1	A	TB39-9, K

Nuclear Regulatory Authority
MASTER DOCUMENT
Date Received: 05-12-2013
Log Number: 12503

THE FOLLOWING CHANGES HAVE BEEN DONE BY REV. E

- WINDOW COORDINATION HAS BEEN ADDED FOR ALL WINDOWS
- ENGRAVINGS HAVE BEEN ALIGNED TO CENTER FOR ALL WINDOWS
- ENGRAVINGS HAVE BEEN CHANGED ON WINDOWS NO. 9 NAD 13
- ALARM COND HAS BEEN CHANGED FOR WINDOWS NO. 8 AND 16

REV	MADE	CH	APPS	DATE
E	SPRO	M.Š.	B.Š.	22.08.06

REV'D PER: MOD. 432-AS-L

REV	MADE	CH	APPS	DATE
F	K.K.	S.J.	V.D.	17.11.06

REV'D PER: CAP 2002-7582

REV	MADE	CH	APPS	DATE
G	F.F.	M.Š.	N.Ž.	15.09.09

REV'D PER: MOD 629-AS-L

REV	MADE	CH	APPS	DATE
H	K.K.	B.K.	B.P.	15.11.10

REV'D PER: MOD 640-DG-L

REV	MADE	CH	APPS	DATE
I				10.10.12

REV'D PER: MOD 599-EE-L

Replaced Manual Drawing: SS-200-521
Original Design Firm: GAI-GILBERT ASSOCIATES, INC.
Last Revision And Date: B 09.04.1976

FILE: 20052103 DWG, SPREJEL: ___

Appendix 2

List of existing AS system documentation (upon request)

DOCUMENT_NO	SHEET	REVISION	Title	Document Type Description	Rev Date	Pdf
1143E75	1	/	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	7.08.1979	N
1143E75	5	1	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	7.08.1979	N
1143E75	4	/	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	7.08.1979	N
1143E75	6	1	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	8.08.1979	N
1143E75	2	/	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	7.08.1979	N
1143E75	3	/	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	7.08.1979	N
1190E28	3	1	CONTROL BOAD PROCESS WIRING	ASSEMBLY DRAWINGS	24.06.1974	N
1190E28	6	1	CONTROL BOAD PROCESS WIRING	ASSEMBLY DRAWINGS	24.06.1974	N
1190E28	1	1	CONTROL BOAD PROCESS WIRING	ASSEMBLY DRAWINGS	24.06.1974	N
1190E28	4	1	CONTROL BOAD PROCESS WIRING	ASSEMBLY DRAWINGS	24.06.1974	N
1190E28	5	1	CONTROL BOAD PROCESS WIRING	ASSEMBLY DRAWINGS	24.06.1974	N
1190E28	2	1	CONTROL BOAD PROCESS WIRING	ASSEMBLY DRAWINGS	24.06.1974	N
1191E18	14	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	11	1	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	5.12.1975	Y
1191E18	20	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	13	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	8	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	17	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	19	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	18	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	10	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	9	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	21	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	5	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	15	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	7	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	16	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	4	3	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	20.03.1997	Y
1191E18	2	3	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	20.03.1997	Y
1191E18	6	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	3	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	12	2	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	17.03.1976	Y
1191E18	1	3	MAIN CONTROL BOARD ASSEMBLY	ASSEMBLY DRAWINGS	20.03.1997	Y
1207E07	2	28	MAIN CONTROL BOARD FRONT VIEW SECTION A	PANELS & CONTROL BOARD CONNECTION DRAWINGS (210)	3.04.2018	Y
1207E07	1	21	MAIN CONTROL BOARD FRONT VIEW SECT. A	PANELS & CONTROL BOARD CONNECTION DRAWINGS (210)	8.12.2017	Y
1207E07	7	21	MAIN CONTROL BOARD FRONT VIEW SECTION E	PANELS & CONTROL BOARD CONNECTION DRAWINGS (210)	10.01.2019	Y
1207E07	6	13	MAIN CONTROL BOARD FRONT VIEW SECT. E	PANELS & CONTROL BOARD CONNECTION DRAWINGS (210)	8.12.2017	Y
1207E07	4	26	MAIN CONTROL BOARD FRONT VIEW SECTION C	PANELS & CONTROL BOARD CONNECTION DRAWINGS (210)	1.11.2022	Y
1207E07	5	19	MAIN CONTROL BOARD FRONT VIEW SECTION D	PANELS & CONTROL BOARD CONNECTION DRAWINGS (210)	24.01.2022	Y
1207E07	3	27	MAIN CONTROL BOARD FRONT VIEW SECTION B	PANELS & CONTROL BOARD CONNECTION DRAWINGS (210)	24.04.2021	Y
1207E07	12	3	MAIN CONTROL BOARD ITEM LIST SECTION E	PANELS & CONTROL BOARD CONNECTION DRAWINGS (210)	8.12.2017	Y
1207E07	0	0	MAIN CONTROL BOARD FRONT VIEW INDEX	PANELS & CONTROL BOARD CONNECTION DRAWINGS (210)	25.01.1996	Y
1207E07	8	23	MAIN CONTROL BOARD ITEM LIST SECTION A	PANELS & CONTROL BOARD CONNECTION DRAWINGS (210)	3.04.2018	Y
1207E07	9	18	MAIN CONTROL BOARD ITEM LIST SECTION B	PANELS & CONTROL BOARD CONNECTION DRAWINGS (210)	22.04.2021	Y
1207E07	10	18	MAIN CONTROL BOARD ITEM LIST SECTION C	PANELS & CONTROL BOARD CONNECTION DRAWINGS (210)	1.11.2022	Y
1207E07	11	17	MAIN CONTROL BOARD ITEM LIST SECTION D	PANELS & CONTROL BOARD CONNECTION DRAWINGS (210)	24.01.2022	Y
1207E07	13	21	MAIN CONTROL BOARD ITEM LIST SECTION E	PANELS & CONTROL BOARD CONNECTION DRAWINGS (210)	2.11.2021	Y
1210E70	7	14	CONTROL BOARD WIRING (ASELMB01A) MN CONT BOARD SECTION A	WIRING AND CONNECTION DIAGRAMS	1.03.2018	Y
1210E70	2	14	CONTROL BOARD WIRING (ASELMB01A) MN CONT BOARD SECTION A	WIRING AND CONNECTION DIAGRAMS	3.04.2018	Y
1210E70	4	17	ELECTRICAL CONTROL BOARD WIRING (ASELMB01A) MN CONT BOARD SECTION A	WIRING AND CONNECTION DIAGRAMS	1.01.2020	Y
1210E70	1	15	CONTROL BOARD WIRING SECTION A	WIRING AND CONNECTION DIAGRAMS	13.03.2018	Y
1210E70	6	16	ELECTRICAL CONTROL BOARD WIRING (ASELMB01A) MN CONT BOARD SECTION A	WIRING AND CONNECTION DIAGRAMS	3.04.2018	Y
1210E70	3	16	CONTROL BOARD WIRING SECTION A	WIRING AND CONNECTION DIAGRAMS	1.01.2020	Y

1210E70	5	7	CONTROL BOARD WIRING (ASELMB01A) MN CONT BOARD SECTION A	WIRING AND CONNECTION DIAGRAMS	28.09.2009	Y
1210E71	5	13	CONTROL BOARD WIRING SECTION B	WIRING AND CONNECTION DIAGRAMS	3.10.2017	Y
1210E71	4	16	CONTROL BOARD WIRING SECTION B	WIRING AND CONNECTION DIAGRAMS	22.04.2021	Y
1210E71	3	14	CONTROL BOARD WIRING SECTION B	WIRING AND CONNECTION DIAGRAMS	22.04.2021	Y
1210E71	2	15	CONTROL BOARD WIRING SECTION B	WIRING AND CONNECTION DIAGRAMS	22.04.2021	Y
1210E71	1	15	CONTROL BOARD WIRING SECTION B	WIRING AND CONNECTION DIAGRAMS	19.07.2018	Y
1210E72	5	8	MAIN CONTROL BOARD WIRING SECT. C	WIRING AND CONNECTION DIAGRAMS	22.05.2018	Y
1210E72	4	16	MAIN CONTROL BOARD WIRING SECT. C	WIRING AND CONNECTION DIAGRAMS	1.11.2022	Y
1210E72	3	17	MAIN CONTROL BOARD WIRING SECTION C	WIRING AND CONNECTION DIAGRAMS	16.11.2018	Y
1210E72	2	15	MAIN CONTROL BOARD WIRING SECTION C	WIRING AND CONNECTION DIAGRAMS	1.11.2022	Y
1210E72	1	16	MAIN CONTROL BOARD WIRING SECT. C	WIRING AND CONNECTION DIAGRAMS	12.08.2020	Y
1210E73	4	16	ELECTRICAL CONTROL BOARD WIRING SECT. D	WIRING AND CONNECTION DIAGRAMS	10.09.2015	Y
1210E73	3	15	MAIN CONTROL BOARD WIRING SECT. D	WIRING AND CONNECTION DIAGRAMS	5.05.2021	Y
1210E73	1	16	CONTROL BOARD WIRING SECTION D	WIRING AND CONNECTION DIAGRAMS	5.05.2021	Y
1210E73	5	11	CONTROL BOARD WIRING SECTION D	WIRING AND CONNECTION DIAGRAMS	10.09.2015	Y
1210E73	2	10	ELECTRICAL CONTROL BOARD WIRING SECTION D	WIRING AND CONNECTION DIAGRAMS	5.05.2021	Y
1210E74	2	12	CONTROL BOARD WIRING SECTION E	WIRING AND CONNECTION DIAGRAMS	10.01.2019	Y
1210E74	5	10	CONTROL BOARD WIRING SECT. E	WIRING AND CONNECTION DIAGRAMS	9.05.2000	Y
1210E74	3	8	CONTROL BOARD WIRING SECTION E	WIRING AND CONNECTION DIAGRAMS	17.12.2002	Y
1210E74	6	17	CONTROL BOARD WIRING SECT. E	WIRING AND CONNECTION DIAGRAMS	10.01.2019	Y
1210E74	4	10	MAIN CONTROL BOARD WIRING SECT. E	WIRING AND CONNECTION DIAGRAMS	17.12.2002	Y
1210E74	1	16	CONTROL BOARD WIRING SECTION E	WIRING AND CONNECTION DIAGRAMS	25.08.2014	Y
1210E74	7	6	CONTROL BOARD WIRING SECTION E	WIRING AND CONNECTION DIAGRAMS	28.08.2003	Y
1213E02	/	15	TRIP STATUS & BYPASS PERMISSIVE LAMP CABINET	DETAIL DRAWINGS	1.11.2022	Y
1213E60	2	15	MONITOR LIGHT BOX ENGRAVING LAYOUT DWG	INDICATOR LABELING	1.11.2022	Y
1213E60	1	11	MONITOR LIGHT BOX ENGRAVING LAYOUT DWG	INDICATOR LABELING	8.05.2013	Y
1213E60	3	20	MONITOR LIGHT BOX ENGRAVING LAYOUT DWG	INDICATOR LABELING	1.09.2017	Y
1462F87	6	28	ALB05 ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	20.02.2022	Y
1462F87	4	17	ALB03 ANNUNCIATOR ENGRAVING & SYSTEM INFO.	INDICATOR LABELING	9.02.2015	Y
1462F87	10	16	RCS ALB09 ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	3.11.2022	Y
1462F87	18	13	ALB17 - ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	20.06.2018	Y
1462F87	19	14	ALB18 ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	30.11.2022	Y
1462F87	17	17	ALB16 ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	12.12.2019	Y
1462F87	14	18	ALB13 ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	23.08.2023	Y
1462F87	20	17	ALB19 ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	12.12.2019	Y
1462F87	12	11	ALB11 ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	20.05.2020	Y
1462F87	3	13	ALB02 ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	28.09.2017	Y
1462F87	2	26	ALB01 ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	20.12.2022	Y
1462F87	13	9	ALB12 ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	26.10.2022	Y
1462F87	8	23	ALB07 ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	1.11.2022	Y
1462F87	11	7	ALB10 ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	1.07.2009	Y
1462F87	9	12	ALB08 - ANNUNCIATOR ENGRAVING & SYSTEM INFO.	INDICATOR LABELING	20.06.2018	Y
1462F87	5	15	ALB04 ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	15.05.2015	Y
1462F87	16	17	ALB15 - ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	20.06.2018	Y
1462F87	15	12	ALB14 - ANNUNCIATOR ENGRAVING & SYSTEM INFO.	INDICATOR LABELING	27.12.2017	Y
1462F87	7	20	ALB06 ANNUNCIATOR ENGRAVING & SYSTEMS INFO.	INDICATOR LABELING	20.06.2018	Y
816-136	2	10	PROCESS COMPUTER SYSTEM - PCS POWER SUPPLY DIAGRAM: ANNUN SYSTEM - MAIN SYSTEM AND VCB ALARMS	ONE-LINE AND RELAY DIAGRAMS (206)	3.02.2023	Y
816-136	3	4	PROCESS COMPUTER SYSTEM - PCS POWER SUPPLY DIAGRAM: ANNUN SYSTEM - MAIN CONTROL AND BOARD ALARMS	ONE-LINE AND RELAY DIAGRAMS (206)	28.10.2009	Y
816-136	4	3	PROCESS COMPUTER SYSTEM - PCS POWER SUPPLY DISTRIBUTION DIAGRAM: ANNUN SYSTEM - MAIN CONTROL AND BOARD ALARMS FCV DISTRIBUTION	ONE-LINE AND RELAY DIAGRAMS (206)	15.06.2009	Y
816-136	6	2	PROCESS COMPUTER SYSTEM - PCS / ONE LINE POWER SUPPLY DIAGRAM:ANNUN SYSTEM 230VAC SERVICE POWER	ONE-LINE AND RELAY DIAGRAMS (206)	26.03.2015	Y
816-136	5	6	PROCESS COMPUTER SYSTEM - PCS POWER SUPPLY DISTRIBUTION DIAGRAM: ANNUN SYSTEM - VAB/ECB ALARMS FCV DISTRIBUTIONDISTRIBUTION	ONE-LINE AND RELAY DIAGRAMS (206)	25.11.2018	Y
816-136	00	0	PROCESS COMPUTER SYSTEM - PCS / ONE LINE POWER SUPPLY DIAGRAM PLANT DIGITAL DISSTRIBUTED ANNOUNCIATION SYSTEM (QUALITROL/HATHWAY-QH) INDEX	ONE-LINE AND RELAY DIAGRAMS (206)	8.03.2010	Y
816-212	42	1	PROCESS COMPUTER SYSTEMS - PCS PCS CONFIGURATION & DATA LINKS DIAGRAM - PIS LEVEL 2 NETWORK - FIBER OPTIC PATCH CH984CAB-FOPP4	ONE-LINE AND RELAY DIAGRAMS (206)	15.03.2011	Y
816-236	1	7	PROCESS COMPUTER SYSTEM - PCS PCS DATA LINKS DIAGRAM - ANNUN SYSTEM SCANNERS, RLU DATA & CONFIG I/O COMM LINES	ONE-LINE AND RELAY DIAGRAMS (206)	16.12.2022	Y
816-236	12	0	PROCESS COMPUTER SYSTEMS - PCS PCS CONFIGURATION & DATA LINKS DIAGRAM - ANNUNCIATOR SYSTEM - FIBER OPTIC PATCH PANEL CB102BRDK701-FOPP1	ONE-LINE AND RELAY DIAGRAMS (206)	1.12.2013	Y

816-336	01	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S1A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	02	4	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S1A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	6.09.2021	Y
816-336	03	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S2A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	6.09.2021	Y
816-336	04	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S2A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	05	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S3A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	5.09.2013	Y
816-336	06	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S3A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	07	3	PROCESS COMPUTER SYSTEMS - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S4A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	27.07.2022	Y
816-336	08	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S4A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	1.08.2014	Y
816-336	09	0	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S5A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	10.04.2009	Y
816-336	10	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S5A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	24.10.2017	Y
816-336	11	4	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S6A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	20.02.2023	Y
816-336	12	6	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S6A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	1.03.2023	Y
816-336	15	8	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S8A(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	20.12.2022	Y
816-336	16	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S8A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	15.01.2019	Y
816-336	17	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S9A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	25.11.2016	Y
816-336	18	4	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S9A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	25.11.2016	Y
816-336	19	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S10A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2018	Y
816-336	20	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S10A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2018	Y
816-336	21	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S11A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	22	4	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S11A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	1.11.2022	Y
816-336	23	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S12A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	24	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S12A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	3.11.2022	Y
816-336	25	5	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S13A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	20.01.2023	Y
816-336	26	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S13A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	28.10.2010	Y
816-336	27	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S14A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	28	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S14A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	29	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S15A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	3.11.2022	Y
816-336	30	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S15A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	23.08.2023	Y
816-336	31	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S16A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	22.12.2017	Y
816-336	32	4	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S16A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	33	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S17A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	34	7	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S17A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	4.08.2020	Y
816-336	35	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S18A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	16.10.2017	Y
816-336	36	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S18A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	30.11.2022	Y
816-336	39	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S20A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	24.10.2017	Y
816-336	40	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S20A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	6.09.2021	Y
816-336	47	4	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S24A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	26.01.2021	Y
816-336	48	6	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S24A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	23.02.2023	Y
816-336	49	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S25A (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2023	Y
816-336	50	5	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S25A (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2023	Y
816-336	101	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S1B (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	102	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S1B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	6.09.2021	Y
816-336	103	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S2B (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	6.09.2021	Y
816-336	104	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S2B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	105	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S3B (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	5.09.2013	Y
816-336	106	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S3B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	107	3	PROCESS COMPUTER SYSTEMS - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S4B (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	28.07.2022	Y
816-336	108	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S4B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	19.11.2012	Y
816-336	109	0	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S5B (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	10.04.2009	Y
816-336	110	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S5B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	24.10.2017	Y
816-336	111	4	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S6B (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	20.02.2023	Y
816-336	112	6	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS CB103RCKK802-S6B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	1.03.2023	Y
816-336	115	8	PROCESS COMPUTER SYSTEMS - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S8B(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	20.12.2022	Y
816-336	116	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S8B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	15.01.2019	Y
816-336	117	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S9B (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	25.11.2016	Y

816-336	118	4	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S9B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	25.11.2016	Y
816-336	119	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S10B (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2018	Y
816-336	120	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S10B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2018	Y
816-336	121	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S11B(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	122	4	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S11B(J3)	ONE-LINE AND RELAY DIAGRAMS (206)	1.11.2022	Y
816-336	123	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S12B(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	124	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S12B(J3)	ONE-LINE AND RELAY DIAGRAMS (206)	3.11.2022	Y
816-336	125	6	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S13B(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	20.01.2023	Y
816-336	126	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S13B(J3)	ONE-LINE AND RELAY DIAGRAMS (206)	28.10.2010	Y
816-336	127	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S14B(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	128	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S14B(J3)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	129	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S15B(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	3.11.2022	Y
816-336	134	7	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S17B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	4.08.2020	Y
816-336	135	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S18B (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	16.10.2017	Y
816-336	136	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S18B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	30.11.2022	Y
816-336	137	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S19B (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	1.06.2015	Y
816-336	138	0	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S19B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	10.04.2009	Y
816-336	139	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S20B (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	24.10.2017	Y
816-336	140	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S20B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	6.09.2021	Y
816-336	147	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S24B (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	26.01.2021	Y
816-336	130	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S15B(J3)	ONE-LINE AND RELAY DIAGRAMS (206)	23.08.2023	Y
816-336	148	6	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S24B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	23.02.2023	Y
816-336	149	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S25B (J2)	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2023	Y
816-336	150	5	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S25B (J3)	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2023	Y
816-336	131	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S16B(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	22.12.2017	Y
816-336	195	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, OVERVIEW OF COMBINED ALARMS	ONE-LINE AND RELAY DIAGRAMS (206)	15.01.2019	Y
816-336	196	8	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, OVERVIEW OF COMBINED ALARMS	ONE-LINE AND RELAY DIAGRAMS (206)	6.09.2021	Y
816-336	132	4	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S16B(J3)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	133	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S17B(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	37	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S19A(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	1.06.2015	Y
816-336	38	0	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A04-S19A(J3)	ONE-LINE AND RELAY DIAGRAMS (206)	10.04.2009	Y
816-336	201	8	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 1 LOGIC CARD 0A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	20.12.2022	Y
816-336	202	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 1 LOGIC CARD 0A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.01.2019	Y
816-336	216	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 4 LOGIC CARD 14A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	217	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 5 LOGIC CARD 16A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	218	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 5 LOGIC CARD 16A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	203	4	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 1 LOGIC CARD 2A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	19.12.2016	Y
816-336	219	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 5 LOGIC CARD 18A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	220	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 5 LOGIC CARD 18A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	204	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 1 LOGIC CARD 2A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	19.12.2016	Y
816-336	205	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 2 LOGIC CARD 4A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	13.05.2015	Y
816-336	206	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 2 LOGIC CARD 4A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	207	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 2 LOGIC CARD 6A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2018	Y
816-336	208	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 2 LOGIC CARD 6A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	3.04.2018	Y
816-336	221	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 6 LOGIC CARD 20A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	3.11.2022	Y
816-336	222	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 6 LOGIC CARD 20A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	223	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 6 LOGIC CARD 22A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	23.08.2023	Y
816-336	209	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 3 LOGIC CARD 8A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	224	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 6 LOGIC CARD 22A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	225	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 7 LOGIC CARD 24A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	22.12.2017	Y
816-336	226	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 7 LOGIC CARD 24A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	227	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 7 LOGIC CARD 26A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	228	4	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 7 LOGIC CARD 26A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	16.10.2017	Y
816-336	229	5	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 8 LOGIC CARD 28A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	4.08.2020	Y
816-336	230	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 8 LOGIC CARD 28A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y

816-336	231	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 8 LOGIC CARD 30A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	232	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 8 LOGIC CARD 30A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	233	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A07, RLU 9 LOGIC CARD 32A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	22.04.2015	Y
816-336	234	6	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A07, RLU 9 LOGIC CARD 32A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	9.05.2023	Y
816-336	235	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A07, RLU 9 LOGIC CARD 34A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2023	Y
816-336	236	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A07, RLU 9 LOGIC CARD 34A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2023	Y
816-336	237	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, PC100CME001 LOGIC CARD 36A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	238	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, PC100CME002 LOGIC CARD 38A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	239	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, PC100CME003 LOGIC CARD 40A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	240	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, PC100CME004 LOGIC CARD 42A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	4.08.2020	Y
816-336	241	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, PC100CME005 LOGIC CARD 44A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	242	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, PC100CME006 LOGIC CARD 46A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	243	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, ALB22 LOGIC CARD 48A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	5.09.2013	Y
816-336	244	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, ALB22 LOGIC CARD 48A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	5.09.2013	Y
816-336	299	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS ALB WIRING (AS A-TRAIN) - INTERNAL JUMPERS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	210	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 3 LOGIC CARD 8A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	211	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 3 LOGIC CARD 10A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	1.11.2022	Y
816-336	212	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 3 LOGIC CARD 10A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	3.11.2022	Y
816-336	213	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 4 LOGIC CARD 12A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	24.04.2018	Y
816-336	214	4	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 4 LOGIC CARD 12A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	20.01.2023	Y
816-336	215	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 4 LOGIC CARD 14A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	301	8	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 1 LOGIC CARD 1B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	20.12.2022	Y
816-336	302	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 1 LOGIC CARD 1B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.01.2019	Y
816-336	303	4	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 1 LOGIC CARD 3B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	19.12.2016	Y
816-336	304	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 1 LOGIC CARD 3B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	19.12.2016	Y
816-336	305	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 2 LOGIC CARD 5B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	13.05.2015	Y
816-336	306	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 2 LOGIC CARD 5B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	307	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 2 LOGIC CARD 7B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2018	Y
816-336	308	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 2 LOGIC CARD 7B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	3.04.2018	Y
816-336	309	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 3 LOGIC CARD 9B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	310	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 3 LOGIC CARD 9B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	311	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 3 LOGIC CARD 11B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	1.11.2022	Y
816-336	312	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 3 LOGIC CARD 11B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	3.11.2022	Y
816-336	313	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 4 LOGIC CARD 13B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	24.04.2018	Y
816-336	314	5	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 4 LOGIC CARD 13B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	20.01.2023	Y
816-336	315	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 4 LOGIC CARD 15B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	316	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A05, RLU 4 LOGIC CARD 15B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	317	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 5 LOGIC CARD 17B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	318	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 5 LOGIC CARD 17B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	319	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, REMOTE LOGIC UNIT 5 LOGIC CARD 19B	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	320	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 5 LOGIC CARD 19B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	321	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 6 LOGIC CARD 21B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	3.11.2022	Y
816-336	322	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 6 LOGIC CARD 21B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	323	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 6 LOGIC CARD 23B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	23.08.2023	Y
816-336	324	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 6 LOGIC CARD 23B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	325	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 7 LOGIC CARD 25B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	22.12.2017	Y
816-336	326	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 7 LOGIC CARD 25B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	327	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 7 LOGIC CARD 27B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	328	4	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 7 LOGIC CARD 27B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	16.10.2017	Y
816-336	329	5	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 8 LOGIC CARD 29B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	4.08.2020	Y
816-336	330	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 8 LOGIC CARD 29B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	331	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 8 LOGIC CARD 31B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	332	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A06, RLU 8 LOGIC CARD 31B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	333	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A07, RLU 9 LOGIC CARD 33B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	22.04.2015	Y
816-336	334	6	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A07, RLU 9 LOGIC CARD 33B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	9.05.2023	Y

816-336	335	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A07, RLU 9 LOGIC CARD 35B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2023	Y
816-336	336	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS ASELAL01A07, RLU 9 LOGIC CARD 35B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2023	Y
816-336	337	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, PC100CME001 LOGIC CARD 37B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	338	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, PC100CME002 LOGIC CARD 39B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	339	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, PC100CME003 LOGIC CARD 41B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	340	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, PC100CME004 LOGIC CARD 43B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	4.08.2020	Y
816-336	341	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, PC100CME005 LOGIC CARD 45B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	342	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, PC100CME006 LOGIC CARD 47B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	343	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, ALB22 LOGIC CARD 49B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	5.09.2013	Y
816-336	344	1	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, ALB22 LOGIC CARD 49B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	5.09.2013	Y
816-336	399	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS ALB WIRING (AS B-TRAIN) - INTERNAL JUMPERS	ONE-LINE AND RELAY DIAGRAMS (206)	15.04.2009	Y
816-336	100	0	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM: ANNUNCIATOR SYSTEM CB103RCKK802 RELAY TERMINAL WIRING DIAGRAM	ONE-LINE AND RELAY DIAGRAMS (206)	10.04.2009	Y
816-336	00	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM PLANT DIGITAL DISTRIBUTED ANNOUNCIATION SYSTEM (QUALITROL/HATHWAY-QH) INDEX	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	0A	0	PROCESS COMPUTER SYSTEMS - PCS- AS SYSTEM - BLOCK DIAGRAM OF AS SYS OVERALL I/O STRUCTURE & REFERENCES	ONE-LINE AND RELAY DIAGRAMS (206)	16.12.2009	Y
816-336	0B	2	PROCESS COMPUTER SYSTEMS - PCS- AS SYSTEM - TABLES OF AS SYS INPUT STRUCTURE & REFERENCES	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	0C	3	PROCESS COMPUTER SYSTEMS - PCS- AS SYSTEM - TABLES OF AS SYS OUTPUT STRUCTURE & REFERENCES	ONE-LINE AND RELAY DIAGRAMS (206)	5.11.2021	Y
816-336	51	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S26A(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2023	Y
816-336	52	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S26A(J3)	ONE-LINE AND RELAY DIAGRAMS (206)	24.10.2017	Y
816-336	53	0	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S27A(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	1.11.2013	Y
816-336	54	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S27A(J3)	ONE-LINE AND RELAY DIAGRAMS (206)	1.05.2018	Y
816-336	151	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S26B(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2023	Y
816-336	152	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S26B(J3)	ONE-LINE AND RELAY DIAGRAMS (206)	24.10.2017	Y
816-336	153	0	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAM AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S27B(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	1.11.2013	Y
816-336	154	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S27B(J3)	ONE-LINE AND RELAY DIAGRAMS (206)	1.05.2018	Y
816-336	249	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS CB102BRDK701, ALB-E02 LOGIC CARD 54A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	14.05.2015	Y
816-336	250	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS CB102BRDK701, ALB-E02 LOGIC CARD 54A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2023	Y
816-336	251	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS CB102BRDK701, ALB-E03 LOGIC CARD 56A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.09.2016	Y
816-336	252	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS CB102BRDK701, ALB-E03 LOGIC CARD 56A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	1.08.2018	Y
816-336	349	1	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS CB102BRDK701, ALB-E02 LOGIC CARD 55B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	14.05.2015	Y
816-336	350	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS CB102BRDK701, ALB-E02 LOGIC CARD 55B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	1.02.2023	Y
816-336	351	3	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS CB102BRDK701, ALB-E03 LOGIC CARD 57B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	15.09.2016	Y
816-336	352	2	PROCESS COMPUTER SYSTEM - PCS / PCS I/O LOOP WIRING DIAGRAMS CB102BRDK701, ALB-E03 LOGIC CARD 57B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	1.08.2018	Y
816-336	348	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, FP101CAB-RLU10 LOGIC CARD 51B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	5.09.2013	Y
816-336	347	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, FP101CAB-RLU10 LOGIC CARD 51B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	20.06.2022	Y
816-336	346	4	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, FP101CAB-RLU10 LOGIC CARD 49B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	1.03.2023	Y
816-336	345	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, FP101CAB-RLU10 LOGIC CARD 49B OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	20.02.2023	Y
816-336	248	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, FP101CAB-RLU10 LOGIC CARD 50A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	5.09.2013	Y
816-336	247	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, FP101CAB-RLU10 LOGIC CARD 50A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	20.06.2022	Y
816-336	246	3	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, FP101CAB-RLU10 LOGIC CARD 48A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	1.03.2023	Y
816-336	245	2	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS AS SYSTEM, FP101CAB-RLU10 LOGIC CARD 48A OUTPUTS	ONE-LINE AND RELAY DIAGRAMS (206)	20.02.2023	Y
816-336	55	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS - AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S28A(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	56	0	PROCESS COMPUTER SYSTEMS - PCS PCS I/O LOOP WIRING DIAGRAMS - AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S28A(J3)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	155	0	PROCESS COMPUTER SYSTEM - PCS PCS I/O LOOP WIRING DIAGRAMS - AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S28B(J2)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-336	156	0	PROCESS COMPUTER SYSTEM - PCS PCS I/O LOOP WIRING DIAGRAMS - AS SYSTEM, DIGITAL SCANNER INPUTS ASELAL01A07-S28B(J3)	ONE-LINE AND RELAY DIAGRAMS (206)	25.04.2018	Y
816-636	00	2	PROCESS COMPUTER SYSTEM - (PCS) PROGRAM LOGIC & FUNCTIONAL DIAGRAMS: AS INDEX	ONE-LINE AND RELAY DIAGRAMS (206)	15.10.2016	Y
816-636	01	0	PROCESS COMPUTER SYSTEM - (PCS) PROGRAM LOGIC & FUNCTIONAL DIAGRAMS: AS SYMBOLS	ONE-LINE AND RELAY DIAGRAMS (206)	16.04.2008	Y
816-636	02	0	PROCESS COMPUTER SYSTEM - (PCS) PROGRAM LOGIC & FUNCTIONAL DIAGRAMS: AS ALM SOUND INHIBIT CTRL ASELAL01A01 -KY1 (PROGRAMMABLE MODULE)	ONE-LINE AND RELAY DIAGRAMS (206)	16.04.2008	Y
816-636	03	0	PROCESS COMPUTER SYSTEM - (PCS) PROGRAM LOGIC & FUNCTIONAL DIAGRAMS: AS ALB22 STATUS ALARM ASELAL01A04 -KY2 (PROGRAMMABLE MODULE)	ONE-LINE AND RELAY DIAGRAMS (206)	16.04.2008	Y
816-636	04	2	PROCESS COMPUTER SYSTEMS - PCS PROGRAM LOGIC & FUNCT DIAGRAM: AS SYSTEM CHILLERS ALARMS	ONE-LINE AND RELAY DIAGRAMS (206)	6.09.2021	Y
816-636	05	1	PROCESS COMPUTER SYSTEMS - PCS PROGRAM LOGIC & FUNCT DIAGRAM: CHILLERS ALARMS ON PIS	ONE-LINE AND RELAY DIAGRAMS (206)	6.09.2021	Y
816-636	06	0	PROCESS COMPUTER SYSTEM - (PCS) PROGRAM LOGIC & FUNCTIONAL DIAGRAMS : IPB H2 INGRESS ALARM TO ANNUN ALB01 WINDOW 19 (D1)	ONE-LINE AND RELAY DIAGRAMS (206)	15.10.2016	Y
B-809-099	00	1	I&C EQUIPMENT ARRANGEMENT - ELECTRICAL CABINET LAYOUT - INDEX	PANEL/RACK DRAWINGS (809)	20.09.2020	Y
B-809-099	01	2	I&C EQUIPMENT ARRANGEMENT - ELECTRICAL CABINET LAYOUT - AS SYSTEM CABINET CB102RCKK802 LAYOUT	PANEL/RACK DRAWINGS (809)	13.03.2023	Y
B-809-099	02	1	I&C EQUIPMENT ARRANGEMENT - ELECTRICAL CABINET LAYOUT - AS SYSTEM CABINET ASELAL01A04 LAYOUT	PANEL/RACK DRAWINGS (809)	26.10.2009	Y
B-809-099	03	1	I&C EQUIPMENT ARRANGEMENT - ELECTRICAL CABINET LAYOUT - AS SYSTEM CABINET ASELAL01A05 LAYOUT	PANEL/RACK DRAWINGS (809)	26.10.2009	Y

B-809-099	04	1	I&C EQUIPMENT ARRANGEMENT - ELECTRICAL CABINET LAYOUT - AS SYSTEM CABINET ASELAL01A06 LAYOUT	PANEL/RACK DRAWINGS (809)	26.10.2009	Y
B-809-099	05	1	I&C EQUIPMENT ARRANGEMENT - ELECTRICAL CABINET LAYOUT - AS SYSTEM CABINET ASELAL01A07 LAYOUT	PANEL/RACK DRAWINGS (809)	26.10.2009	Y
B-809-099	06	1	I&C EQUIPMENT ARRANGEMENT - ELECTRICAL CABINET LAYOUT - AS SYSTEM CABINET ASELAL01A01 THRU ASELAL01A03	PANEL/RACK DRAWINGS (809)	26.03.2015	Y
B-809-099	07	2	I&C EQUIPMENT ARRANGEMENT - ELECTRICAL CABINET LAYOUT - AS SYSTEM CABINET CB103RCKK804	PANEL/RACK DRAWINGS (809)	20.11.2013	Y
BX-11006-3AR6/KN	/	/	MAIN CONTROL BOARD MANUAL	INSTRUCTION MANUALS	1.06.1977	Y
C-209-053	EI09	5	ELECTRICAL - CABINET LAYOUT & WIRING TERMINAL BOX CONNECTION DIAGRAM EI ELECT. INTERCONN. SYSTEM - EIT359	TERMINAL BOX & CONNECTION DIAGRAMS (209)	3.03.2023	Y
D-200-521	4	4	SWITCHYARD CONTROL BOARD CB102BRDK701 ANNUNCIATOR WINDOW ENGRAWING ALB-E01	ELECTRICAL ARRANGEMENTS INSTALLATION (200,201)	1.02.2023	Y
D-804-612	/	9	I&C ANNUNCIATOR LIST ESSENTIAL SERVICE PUMP HOUSE, CHILLED WATER AND CONTAINMENT HYDROGEN CONTROL SYSTEM - PC100CME002	INSTRUMENT LISTS (804)	6.09.2021	Y
D-804-614	/	12	I&C ANNUNCIATOR LIST-TRANSFER PANELS ALARMS ANNUNCIATOR SYSTEM -PC100CME004	INSTRUMENT LISTS (804)	15.09.2022	Y
D-804-615	/	8	I&C ANNUNCIATOR LIST-CHARCOAL FILTER PLENUMS SECONDARY COMPARTMENT VENTILATION SYSTEM PC100CME005	INSTRUMENT LISTS (804)	1.03.2023	Y
D-804-616	/	8	I&C ANNUNCIATOR LIST-REACTOR BUILDING, AUXILIARY BUILDING VENTILATION - PC100CME006	INSTRUMENT LISTS (804)	1.12.2020	Y
D-804-626	/	8	I&C ANNUNCIATOR LIST - FIRE PROTECTION SYSTEM ANNUNCIATOR PANEL ASSEMBLY - PC100CME007	INSTRUMENT LISTS (804)	21.03.2023	Y
DAL-950115-001	/	F	BETALARM 1500 ANNUNCIATOR WINDOWS DISPLAY UNITS	INSTRUCTION MANUALS	21.06.2004	Y
ESP-2.850	/	1	VZDRZEVANJE KONFIGURACIJE AS SISTEMA	PROCESS COMPUTER SYSTEMS ESP-2.800-2.999	12.06.2020	Y
PMI-4.111	/	0	SER 4100 LOGIC POWER SUPPLY TEST PROCEDURE	PREVENTIVE MAINTENANCE (I & C) PMI-4.001-4.999	8.09.2021	Y
S-67707	/	3	ALL SOLID STATE ANNUNCIATOR MODEL # 1000 SERIES	INSTRUCTION MANUALS	14.05.1998	Y
SS-211-053	A-43	C	ELECTRICAL BLOCK DIAGRAMS - SYSTEM-EI - ELECTRICAL INTERCONECTIONS	BLOCK DIAGRAMS (211, 250)	15.10.2018	Y
SS-211-054	K-105	C	ELECTRICAL BLOCK DIAGRAMS - SYSTEM EP - ELECT MISC AC DIST & POWER SYSTEM BOP	BLOCK DIAGRAMS (211, 250)	26.03.2015	Y
SS-224-527	1	1	ELECTRICAL - ANNUN SYSTEM - PREFABRICATED CABLES FOR LAMP BOXES	COMB.EL.DIA.-COMM(218),GROUND(219),HEAT TR(217),LGHT(220),MISC(224)	1.03.2009	Y
SS-224-527	2	0	ELECTRICAL - ANNUN SYSTEM - PREFABRICATED CABLES FOR FIELD CONTACT INPUTS	COMB.EL.DIA.-COMM(218),GROUND(219),HEAT TR(217),LGHT(220),MISC(224)	10.07.2006	Y
SS-224-527	3	0	ELECTRICAL - ANNUN SYSTEM - FIBER OPTIC PREFABRICATED CABLES	COMB.EL.DIA.-COMM(218),GROUND(219),HEAT TR(217),LGHT(220),MISC(224)	10.07.2006	Y
SS-224-527	4	0	ELECTRICAL - ANNUN SYSTEM PREFABRICATED CABLES - CABLES FOR LAMP BOXES	COMB.EL.DIA.-COMM(218),GROUND(219),HEAT TR(217),LGHT(220),MISC(224)	10.07.2006	Y
SS-224-527	5	0	ELECTRICAL - ANNUN SYSTEM CABINET CB103RCKK802 - RELAY TERMINAL PANELS WIRING DETAILS	COMB.EL.DIA.-COMM(218),GROUND(219),HEAT TR(217),LGHT(220),MISC(224)	20.02.2007	Y
TM-AS01	/	3	NEK SER4100 EVENT RECORDER OPERATING AND MAINTENANCE MANUAL (4 PARTS)	INSTRUCTION MANUALS	20.09.2017	N
TM-AS02	/	0	NEK SER 4100 EVENT RECORDER TRAINING MANUAL	INSTRUCTION MANUALS	30.03.2010	N
TM-AS03	/	0	NEK CENTRAL ALARM SYSTEM EXPANSION R-2012 PROJECT MANUAL	INSTRUCTION MANUALS	10.01.2014	Y
TM-AS04	/	0	NEK CENTRAL ALARM SYSTEM EXPANSION R-2013 PROJECT MANUAL	INSTRUCTION MANUALS	10.01.2014	Y

Appendix 3

Project Schedule

No.	Activity / Milestone	Finish date	2024											2025											2026			
			2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
1	**Contract signed**	T0+0																											
2	**PMM and PQP**	T0+1																											
3	**Design Input Documents**	T0+2																											
4	**Basic Design**	T0+3																											
5	**DMP submitted for review**	T0+5																											
6	**DMP preparation and approval**	T0+6																											
7	**Installation Package and Work Safety Plan preparation**	T0+8																											
8	**Installation Package and Work Safety Plan approval**	T0+9																											
9	**FAT**	T0+12																											
10	**Hardware manufacture and delivery on site**	T0+14																											
11	**Installation of temporary AS and Test**	T0+16																											
12	**Installation of AS system**	RE25 (H9 / 9 days)																											
13	**Essential Drawings preparation and submittal**	30.10.2025																											
14	**SAT**	RE25 (H9 / 9 days)																											
15	**TOP submitted for review**	RE25 + 2																											
16	**TOP preparation and approval**	RE25 + 3																											
17	**Project closeout**	RE25 + 3																											
					*																		**						

**RE24 - April 2024*
***RE25 - October 2025*

Appendix 4

PMM (sample)

NUCLEAR POWER PLANT KRŠKO

Project Modification _____

Project Name

Contractor Logo

PROJECT MANAGEMENT MANUAL (PMM)
Rev 0

	Name	Org. Unit	Signature	Date
Approved by (NEK):				
Approved by (*Contractor*)				
Reviewed by:				

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1. REVISION CONTROL LOG

No.	Change	Rev #

2. CROSS-REFERENCES

- Project Quality Plan for Project _____

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4. ABBREVIATIONS, PURPOSE AND APPLICABILITY OF THE DOCUMENT

Abbreviation	Description
AC	Award of Contract
AIL	Action item list (list with major issues which need to be resolved)
Contract PM	Contract Project Manager
CHO	Change order
CPM	Commercial Project Manager
DCM	Document Control Management (by NEK)
DC	Document controller
DMP	Design modification package
DOR	Date of Release
IPS	Integrated Project Schedule
MPR	Monthly Project Report
MS	Microsoft (applicable in respective software products)
mths	months
NEK	Nuklearna Elektrarna Krsko
NPP	Nuclear power plant
OPS	Overall Project Schedule
PDR	Problem / Deficiency Report
PG	Power Generation
PM	Project Manager
PMM	Project Management Manual
PQP	Project Quality Plan
PQST	Project QST
PSC	Project Steering Committee
QA	Quality Assurance
QC	Quality Control
QIR	Quality incident report
QMM	Quality Management Manual
QST	Quality assurance specification turbogenerators
SPWAR	System Performance Warranty Action Report
tbd	To be decided
TPM	Technical Project Manager
TTL	Technical Team Lead
wks	weeks
Workflow	predefined sequence of activities within the project-organization

WP	Work-package
PS	Project Scheduler

Enclosure 1: List of abbreviations and definitions

4.1. PURPOSE AND APPLICABILITY

The PMM serves as guidance for the project implementation from Award of contract until the end of warranty period. It does not limit nor change in any form contractual requirements.
The PMM is worked out in close cooperation between NEK and *Contractor* for ensuring a fertile, effective and efficient cooperation for achieving the projects goals for both parties benefit. The PMM is approved by *Contractor* and NEK Project Managers.
The PMM will be reviewed, which means changed and replenished, during the project course for following exemplary reasons:

- Some data is not yet available (e.g. certain handling procedures, FAT procedure). They will be referred to as soon as available.
- Changes in workflows or organization, especially the design of software which is used during the project for correspondence and filing (share-point-platform) often triggers new revisions because of customization.
- Contract/ scope changes (e.g. optional scope)

4.2. RELATION TO OTHER DOCUMENTS

The three most important guidelines for project implementation are the PMM, the PQP and the IPS.
All overall *Contractor* quality related issues are part of the offer as a QMM 602. The PQP (Project Quality Plan) is more project-specific and shows quality related activity during the entire project course with referenced procedures and standards. The PMM however shows document deliverables which are linked to the PQP. Referenced documents which are necessary for project controlling and implementation, e.g. Problem/ deficiency reports, are explained and attached. Processes which are more into the details of non-conforming products are described in the PQP. The PDR and SPWAR can be seen as the main interface between the *Contractor* internal quality processes and NEK processes.

5. PROJECT DESCRIPTION

To be fulfilled by the Contractor.

5.1. PROJECT SCOPE

To be fulfilled by the Contractor.

The Scope of the project is described in SP-XXXXX in detail.

5.2. PHASES OF PROJECT

Single phases of the project are:

1. Design and Engineering
2. Material procurement (if applicable)
3. Manufacturing (if applicable)
4. Transport (if applicable)
5. (Assembly at NEK-site) only applicable for Stator Project (if applicable)
6. Lifting (if applicable)
7. Erection, Commissioning & Testing (if applicable)
8. Trial run (if applicable)
9. Hand-over
   referring to documentation and other details (e.g. spare parts)
10. Warranty period (separately for main contract and CHO)

The project phases are visible in the monthly provided integrated project schedule, taking the above mentioned phases into account.

Kategory	Aspect	Improvement	Previous situation
Organization	Meetings of Project Steering Committee		
	PSC Members		
	Quality management within the project		
	Communication		
	Personnel, intercultural understanding		
Project management	Project management personnel and location of PMs		
	Requirement management		
	Outage planning		
Quality management	Understanding of quality requirements on both sides		
	Supplier management (control of suppliers)		

6. PROJECT ORGANIZATION

6.1. PROJECT TEAMS

Enclosure 2: Project Team NEK

Enclosure 3: Project Team *Contractor*

Enclosure 4: Project Organizational-Chart *Contractor*

Enclosure 5: Project Organization- Chart NEK

6.1.1. SITE TEAM

During the implementation of the project, the Site Project Manager is the main point of contact for NEKs Project Manager and Site Manager. This revision of the PMM will be amended with details of the site team as well as the site organization as soon as the team is assigned.

6.2. PROJECT STEERING COMMITTEE (IF APPLICABLE)

6.2.1. PURPOSE AND GOALS

The Project Steering Committee (PSC) (if applicable) supervises the work of the Project Management. The Project Management reports in regular PSC-meetings on project progress and critical issues if existing. It is comprised of management personnel from NEK and the *Contractor* as shown in below Enclosure 6: Project Steering Committee.

Enclosure 6: Project Steering Committee

6.2.2. PSC-MEETINGS

Meeting-Period: every 3-6 months. Initial meeting to be called by NEK, officially communicated approximately 3 weeks prior to the meeting date (please see Enclosure 7: Project-meetings and characteristics).

Agenda: To be created by NEK and the *Contractor* Project Managers. The proposal has to be sent to all members well in advance (two weeks) of the date for commenting and approval.
Location: The meeting will be hosted alternating by NEK and the *Contractor* on locations of their choice taking travel conditions and requirements for meeting purposes for all members into account.
Minutes of meeting: Minutes will be prepared by hosting PM directly in the meeting for common approval and signature afterwards. They will be signed by NEK and the *Contractor* managers.

6.3. PROJECT MEETINGS AND CONFERENCES

Name	Tasks and purposes	Owner	Attendants	Frequency	Invitation due date by owner
PSC meetings (if applicable)	Management review of project				
PM meetings	Regular meetings with *Contractor* and NEK PMs, held as telephone conferences or personal meetings according to needs. Project Management for Project-controlling and status updating				
Site Readiness Review Meeting	Preparation of outage. Verification that all requirements for successful outage are fulfilled.				
Safety meeting (site)	Safety controlling at site				
Job Mobilization meeting	Preparation of Outage work				
Bi-monthly quality telcon	Vendor quality and production schedule follow up. Coordination of WPs, PDRs and quality proceedings				
Technical Meetings	Discuss and solve technical problems				

Enclosure 7: Project-meetings and characteristics

6.4. SUB-CONTRACTING

Sub-contractors will be managed by team-members who are responsible for respective scope. A list of current subcontractors with contact and scope information can be found as Attachment 1: List of subcontractors and potential subcontractors, on page I.
Subcontractors are chosen in accordance with respective, applicable quality requirements (please compare PQP). NEK receives copies of technical specifications for subcontractors without commercial information. The *Contractor* intellectual property rights have to be protected and respected.
As per main contract, The *Contractor* shall notify to NEK the names of the subcontractors proposed to perform a part of the Scope of Supply and shall not award any principal part of the Scope of Supply to any subcontractor without prior written approval of NEK. The refusal should be justified by NEK. Full overall responsibility always remains on The *Contractor's* side concerning participation of Slovenian and non-Slovenian companies as The *Contractor's* subcontractors. Approval for hardware subcontractors which are listed in this revision of the PMM are deemed as "approved by NEK".

6.5. CORRESPONDENCE AND DOCUMENT TRANSMISSION

6.5.1. COMMUNICATION CHANNELS

Item/ topic	Formal trans-mittal	Medium/ format	Direct Addressee	Copy to
All commercial contractual matters (e.g. Invoices)	yes	Optional: Postal Letter Email with scanned letter		
All requests related to contractual obligations (Change-requests, Change-orders etc.)	yes			
Technical information with direct contractual relevance	yes	optional		
Technical information without direct contractual relevance	normally no	Email		
Results of technical information exchanges (e.g. design input)	yes	Email		

Project specific issues, deficiencies, non-conformances of any type (NCR, PDR, SPWAR) please see chapter 7.4	yes	Email, to be confirmed by receiver		

Enclosure 8: Correspondence requirements related to topic

Technical information with direct contractual relevance refers to input-data of high significance e.g. design data as input for calculations which determine design of components. All exchanged design input data or information must display its respective source.
Technical information without direct contractual relevance is related to e.g. explanations for understanding, comments if easily and quickly to implement and without high significance. Quickly to implement provides, that misunderstandings will be discovered quickly without causing damage. Providing the possibility of exchanging technical information without the obligation of formal record has the purpose to facilitating information flow.
All mentioned people might be temporarily replaced. Respective names have to be communicated to the other party according to the correspondence requirements.
Internal project correspondence box
The *Contractor* Share-point portal for the project, which hosts project related documents and information, provides a library for filing all email communication. Outgoing mails from the *Contractor* are copied to the box (cc). Incoming mails to the *Contractor* are forwarded from the account of the PM by using a MS-Outlook forwarding rule. Internal alerts will be implemented. The library and respective procedures ensure a high level of information-availability and security of communication within the project team.

6.5.2. PROJECT CORRESPONDENCE

Contractor and NEK use a specific tracking system for the correspondence within this project (i.e. Numbering system). The following basic rules will be followed when assigning letters, email, or file numbers:

YY-BBB-CCC-XXX, where:

a. YY stands for project subject
b. BBB three letters abbreviation for the sender (i.e. NEK)
c. CCC three letters abbreviation for the receiver, (i.e. for the *Contractor*)
d. XXX current number of the letter or email.

Formal coding of correspondence is used if content could need to be referenced, because of contractual relevance. To be transmitted formally: Invoicing, Non-conformance reports, PDRs, SPWARs, change-requests, change-orders, minutes of meetings except for informally handled minutes of PM-telcons.

Document which have to be provided by the *Contractor* to NEK in hardcopy or (vice versa) e.g. Drawings, Reports, Calculations, Lists etc. will be sent by post accompanied with a formal letter number. The accompanying letter for a transmittal will include the following data: Addresses of sender and receiver, name of sender PM with signature, date, purpose of transmittal (for approval <FA>, for commenting <FC>, for information <FI>). For attached documents: Document no, Document Rev., Document Title, Document Issuer, Document format, Document Type, Transmittal no.
A template can be found as Attachment 7: Transmittal Sheet, page VII.
In the further course of the project the *Contractor* may be granted access to certain parts of NEK Share-point portal through which documents could be provided during the commenting and review processing.

6.5.3. AUTHORIZED PERSONS

Transmittals are normally sent by the Project managers. Other *Contractor* persons entitled are: Technical Project manager, Quality Manager, Documentation Control and others, who are entitled by the PM. Transmittals which contain final contractual deliverables from the *Contractor* to NEK as per contract, are send by the Local PM or entitled persons from the *Contractor* who is the contract partner of NEK.

6.5.4. EXTERNAL SHAREPOINT PAGE

NEK established an external data storage page which the *Contractor* can access. If *Contractor* personnel need access to that page, respective instructions will be provided by NEK engineer. Respective persons will then be enrolled as users and can access the page via user login and Tokencode provided via RSA SECURID.
The page is used to provide files which exceed normal file sizes which can be transmitted via email. The party which provides documents to the other party uses an official transmittal mail (numbered) to inform the other party about the upload and the location where the file is stored (most convenient is sending a link with the transmittal mail).
The URL for the page is:

To be filled later by NEK.

6.6. IT-TOOLS AND SOFTWARE

Software shown in, Enclosure 9: List of software for project management, will (some optional) be used within the project implementation with regard to project management and communication on technical matters.

To be filled by the Contractor.

Enclosure 9: List of software for project management

7. PROJECT CONTROLLING

7.1. PROJECT PLANNING AND SCHEDULING

7.1.1. TYPES OF SCHEDULES

An **overall integrated project schedule** for the complete project from contract signing until end of warranty was developed. The planning unit for this overall schedule is “day”. This schedule refers to the project phases described in section 5.2 Phases of project, p.2.
A separated schedule is to be created for the **installation and commissioning** phases. Planning period is “hour”. It starts with the outage start (NEK) and finishes with the outage end of the plant. In between dismantling, transport, installation and commissioning activities are addressed.

7.1.2. UPDATING AND FOLLOW-UP

The **overall integrated project schedule** is updated regularly and is provided to NEK each month for project reporting. The contract dates in the original contract schedule are valid throughout the project as per contract. However a *Contractor* baseline is to be communicated to NEK for official approval, showing the current status of the baseline dates. Explanations on deviations shall be included (e.g. reason, background, consequences). An approved schedule gets a formal major revision number. Schedules for each monthly update only get minor revision numbers (separated by a dot behind the major revision number). Details of schedule documentation are determined (within contract range) by the assigned project scheduler, however. Changes in the schedule dates between two monthly reports are outlined. Input-information is retrieved from various partners (internal and external) by adequate tools / programs as digital information or via direct communication, e.g. phone supported by online-conferencing with MS-netmeeting.
The **outage schedule** shall be updated daily or more often if required by specific problem situations, with reliable methods of communication. This will be described in site-instructions and procedures. A schedule overview will be added to the Monthly Project Report.

7.1.3. PROJECT SCHEDULE FEATURES

The *Contractor* schedule has the following features:

- Critical path logic diagram for all work activities prior to the outage
- Identify the duration of these activities
- Indicate changes in the critical path during the job
- Identify slack time in work activities
- Allocate major resources where they are most needed
- Provide updated progress and activity reports during the project

- Accept, change and update as frequently as daily (outage schedule) or monthly (project schedule), to evaluate scope and/or schedule changes as they occur

7.2. PROJECT REPORTING

The *Contractor* provides written status reports on a bi-monthly basis for the work being performed. These reports will contain brief information but will convey all necessary information to the NEK Project Manager for evaluation the overall status and progress of the project.

The overall status of the work reports include:

1. Overall status of the project
2. Accomplishments from the previous report issued.
3. Technical, quality, management or other concerns, or emerging issues that could impact schedule, costs, or quality of work.
4. Work-arounds, or planned remedial actions and "path-forward" to ensure milestone dates are met.
5. Four (4) week look-ahead, including the dates of measuring, testing and inspections of the equipment per the QST.
6. Overall project management assessment.
7. Project Schedule (overall view of the IPS)

Please see Attachment 2: Content of Project Reports, page I. Bi-Monthly Project Reports (MPR) will be provided approximately each 1st to 5th day of the 2nd month and report on the past months issues.

7.3. ACTION ITEM HANDLING AND ISSUE TRACKING

An Action Item list is administrated as a living document by the *Contractor* (assigned person). This document is attached to the bi-monthly progress report with its current status. The document will be update for action item tracking in PM-telcons.
Updates can be made available more often to NEK if necessary and if feasible with reasonable effort. Each time an Action item comes up it will be included into the AIL (Action item list). It can be communicated on an informal way (phone, email, direct verbal communication etc.) or formally, if necessary. To ensure proper recording and traceability it will come up in the monthly report next following the first occurrence and be discussed/ tracked in regular progress meetings until being closed which will be declared in mutual agreement.

7.4. CONTROLLING OF PROJECT SPECIFIC ISSUES, DEFICIENCIES AND NON-CONFORMANCES

The generator uprating project specific issue and deficiency controlling is specified for two periods: (a) from project beginning until SAT completion period and (b) after the SAT completion until end of warranty period.

7.4.1. PROBLEM/ DEFICIENCY REPORT (PDR)

Applicability: The PDR is used for problems/ deficiencies or technical issues in the project period from project beginning until SAT completion. Furthermore all deviations from the contractual documents are handled by PDRs, including Technical Specification SP-Exxxx rev.0, if not requiring contract amendments (to be mutually agreed). Both sides, i.e. NEK and *Contractor* can initiate a PDR for addressing problems/ deficiencies, technical issues or deviations to the other party. In the PDR it is shown by whom it was initiated.

If a technical issue and/or problem/ deficiency are discovered by *Contractor* or its subcontractors, *Contractor* internally uses its standard issue reporting and issue resolution / disposition tools. These are described in the PQP. In case a PDR needs to be issued to NEK, the internal form will not be attached to the PDR but its content will be entered in respective PDR fields and send to NEK officially. *Contractor* is permitted to hide proprietary/ confidential information.

In case that NEK detects a technical issue or problem/ deficiency, it is reported to *Contractor* using the same PDR form with the only difference that it will be identified in the document head that it is initiated by NEK. Respectively NEK is author of included comments. For tracking purposes, the PDR form will have its unique PDR number and priority assignment. Numbering will be consecutively regardless by whom it was initiated. The basic workflow outlined as shown below applies.
Basic workflow for PDR, e.g. initiated by NEK:

- Detection of problem/ deficiency or technical issue or other deviation
- Rating (priority, A,B,C or D)
- Communicating to *Contractor* responsible
- Confirmation of reception to be sent to NEK
- Assigning capable personnel for resolving (*Contractor*)
- Including issue in the “Action item list” with category PDR, due date according to priority (*Contractor*)
- Workflow for PDR to be followed (share-point workflow: message, confirmation, status reporting). Contacting NEK personnel if necessary for resolution.
- Starting related *Contractor* internal quality workflows (such as PCM depending on issue, please see PQP)

- Follow up until resolution. Quality –controlled documentation
- Communication in Project reports.

PDR Priority	Required response time	Sender	Receiver at *Contractor*	Communication (all to be applied)	AIL priority
A	< 2 days	NEK PM	XXXX	Email with high priority Phone-call (reaching one of the receivers personally) Formal letter (sent or handed over)	High
B	< 5 working days			Email with high priority Phone-call (reaching one of the receivers personally) Formal letter (sent or handed over)	High
C	< 2 wks			Email with normal priority Formal letter (sent or handed over)	Normal
D	< 4 wks			Email with normal priority Formal letter (sent or handed over)	Normal

Enclosure 10: PDR priorities and handling

The following are the available priority assignments:

PDR Priority A: The issue needs urgent (within two days as maximum) response from *Contractor* / NEK technical personnel. System performance is degraded and ongoing (test) activity cannot be completed or the tasks that were planned to follow can not be executed.

PDR Priority B: The issue needs prompt response (within five working days as maximum). Considering some plan adjustments and rescheduling, part of the planned and scheduled work can be continued but not with the full system performance and not with the full system functionality as designed. If the issue is not resolved within the available time, (FAT & SAT) activities will have to be rescheduled for some another time.

PDR Priority C: The identified issue has no influence on ongoing activities and no influence on scope of work that is in progress. However, the system demonstrates obvious technical issue or deficiency that has to be resolved. The major part of problems, deviations and/or deficiencies that would belong to this priority group that are issues related to the manufacture and or assembly of the generator and related components. The appropriate time window for resolution of problems / deficiencies from the Priority 3 group is up to two weeks.

PDR Priority D: Minor issues that do not affect system functionality and system performance (equipment, cable, materials, inconsistencies in non-essential documentation). Those problems, deviations and/or deficiencies can not be seen by the NEK operators. The problem resolution should be achieved within 4 weeks.

All PDR's of priority 1 and 2 shall be closed while small number of the lower priority (3 & 4) PDRs (less than twenty) may still be open before taking-over the unit by NEK and starting the warranty period.

7.4.2. SYSTEM PERFORMANCE / WARRANTY ACTION REQUEST (SPWAR)

The SPWAR is used for all respective issues coming up between SAT completion and end of Warranty period, i.e. project phase-groups E (please see paragraph 7.4.1 Problem/ Deficiency Report (PDR), page 16).

For any technical issues and/or deficiencies in the works subject to warranty service discovered by NEK during the warranty period, NEK uses the form SPWAR provided in Attachment 5: System performance / Warranty Action Request (SPWAR), page I, to capture such findings. For tracking purposes, the SPWAR form will have its unique SPWAR number and priority assignment. The available priority assignments are shown in 7.4.1, page 16 (please compare PDR).

SPWAR Priority	Required response time	Sender	Responsible Persons at *Contractor*	Modalities	AIL priority
A	< 2 days	NEK PM	XXXXX	Unit performance seriously degraded or system inoperable	High
B	< 5 working days			Unit performance below design requirements and/ or part of the unit unavailable	High
C	no later than next maintenance outage			System performance/ functionality not significantly affected. Minor adjustments required.	Normal
D	< 4 wks			All minor issues that do not affect system functionality/ performance. Not visible for NEK operators / maintenance personnel	Normal

Enclosure 11: SPWAR Priorities and modalities

7.4.3. NONCONFORMING PRODUCT

Handling of nonconforming products and related procedures are included or respectively referenced in the PQP.

8. PROJECT CHANGE MANAGEMENT

8.1. CONTROL OF DESIGN AND DEVELOPMENT CHANGES

All changes of the contractual requirements triggered by NEK are performed according to the Contract Section XXX. Fore those triggered by *Contractor* section XXX applies.

No.	Action	Responsibility
SCOPE IDENTIFIED IN ADVANCE OF OUTAGE		
1	Identify scope change which is outside of the existing contract.	NEK + *Contractor*
2	Agree on scope to be quoted by *Contractor* and DOR	NEK + *Contractor*
3	Submit offer for additional scope to be provided	*Contractor*
4	Review offer and provide feedback to *Contractor*	NEK
5	Finalize scope, schedule, DOR and final price of additional scope	NEK + *Contractor*
6	Issue contract modification to *Contractor* for additional scope	NEK
7	*Contractor* to provide scope as defined in the contract change modification	*Contractor*
SCOPE IDENTIFIED DURING OUTAGE		
1	Identify scope change which is outside of the contract scope of supply	NEK + *Contractor*
2	Agree on scope to be quoted by *Contractor* and DOR	NEK + *Contractor*
3	Provide budget estimate for the work to be performed	*Contractor*
4	NEK to sign authorization for extra work to be performed	NEK
5	Perform work as needed to prevent adverse affects to the outage schedule.	*Contractor*
6	Provide finalized offer to NEK for work performed	*Contractor*
7	Issue contract modification to *Contractor* for additional work performed	NEK

Enclosure 12: Division of responsibility on scope changes

Enclosure 12: Division of responsibility on scope changes shows the workflows for changes on design and development. Workflow starts with the identification of the matter and respective necessity. Different activities have to be performed by NEK or/ and *Contractor* to reach the final contractual fixed change as outlined in above show table.

9. QUALITY ASSURANCE

The QA and QC approach is described according to applicable sections in SP-Exxxx and applicable sections in QS 610 from NEK in the separate PQP (Project Quality Plan) for the project. The Project Quality Plan is briefly described in 4.2, p. 6. In some areas property rights from *Contractor* have to be regarded, especially for some detailed technical procedures which will be addressed in the PQP. *Contractor* standard procedures will not be changed. To ensure project specific implementation, workpackages which are basis for processing activities related to procedures may be changed.
There are three major QSTs for the project which are applicable on: (a) Phases 1,2,3,4, i.e. from design and manufacturing until end of transport (b) for Assembly at site (Krsko NPP) and lifting, which are Phase 5 and 6 and (c) for Installation and commissioning.
The part of the PQP for installation and commissioning requires detailed work-packages and work-plans which are to be developed according to document delivery schedule (please see section11, page 21). Therefore this part of the PQP is only crucially covered at the project start.
A list of testing procedures from *Contractor* is being administrated and updated during the project. To each procedure, its number, title, revision and owner are displayed.

10. SITE WORK

10.1. PLANNING

For planning of site work work-packages, work-plans and a respective outage are issued according to the document delivery schedule.

10.2. LOGISTICS

The amount of new equipment, materials and personnel, as well as old equipment handling during the Generator replacement project, requires close cooperation between *Contractor's* site management/logistics personnel with NEK security and receiving personnel.
Logistics coordination entails:

- receipt of equipment (forms, data, security issues etc.)
- development of the laydown plan
- pre-job set-up
- inspection and staging of material (tagging, protocols etc.)

Detailed workflows and interfaces will be identified in respective procedures. Since content of procedures is mostly confidential and intellectual property, contractual agreements on this matter apply. Confidential procedures could be looked at. Copies can not be provided.

11. DOCUMENT DELIVERABLES AND TRANSMITTAL SCHEDULE

11.1. DRAWING AND DOCUMENT NUMBERING SYSTEM

Drawings and documents which are included in the DMP use the NEK DCM numbering system. Documents will also show *Contractor* document numbers in respective fields for document control and designation.

11.2. DOCUMENT STATUS (*CONTRACTOR*)

- Preliminary release
  Documents which are provided to NEK for review will have the status "preliminary release". This means that responsible *Contractor* personnel have approved the preliminary release to NEK.
- Final release
  As soon as comments by NEK have been regarded and all issues are clarified/ solved, the documents will be sent to NEK for approval in the status of "final release". The highest status for documents which were commented and the very comments replied by *Contractor*, is final release.
- Approved for construction
  After having received written approval, all applicable documents will get the status approved for construction. This applies for NEK and *Contractor* documents. Approval of documents is to be made visible by stamping the hardcopy of the document.

11.3. DOCUMENT REVIEW BY NEK

11.3.1. PROCESS

Contractor will provide documents for review in electronic form to NEK. With the goal to make review effective and efficient NEK accepts marked up drafts, which should however be self-explaining and adequate.

Documents which are provided to NEK by *Contractor* for review in the status of preliminary release should be returned to *Contractor* redlined, red-circled or anyhow highlighted with accompanying comments explaining the matter of concern and change request. NEK returns the transmittal sheet (please see) with respective remarks and assigns the NEK approval status to the document. NEK provides comments to *Contractor* documents in pdf files with the "commenting" function ("note" or "text box").
Contractor replies to comments using the "reply to" function directly assigned to the comment of NEK.
After a document was rejected, *Contractor* provides the next higher revision with NEK comments applied as well as the commented file with replies to the comments. The respective

file shall be added a "_c" after NEK incorporated comments and an additional "-r_" when being replied by *Contractor*. Respective letters are added each time when commenting / replying is performed.

11.3.2. NEK APPROVAL STATUS

- Approval status "rejected"
  This status constitutes that the provided document does not meet the contractual requirements as per NEK perspective.
- Approval status "approved with comments"
  If NEK has comments on provided documents, they can be "approved" with comments if the significance of the comments is low, i.e. not affecting *Contractor* procurement specifications negatively with regard to fulfillment of final contract requirements or in general not affecting schedule, costs and technical solution.
  Respective comments shall be corrected by *Contractor* as soon as feasible and reasonable, but for sure well before issuing of the final DMP so that any aspects of the comments will be regarded. This document status constitutes that the content of the document is in compliance with the contractual requirement and justifies invoicing if an installment is associated with.
- Approval status "approved"
  The final status constitutes that the document is in full compliance with contractual requirements. No further changes are needed on the document itself (however the document might have to be adopted during further processing within the DMP/ instruction book incorporation).

11.4. DOCUMENT TRANSMITTAL SCHEDULE

The applicable document transmittal schedule for the *Name of the project* is shown in SP-Exxxx, as Attachment x, page xx.

12. PROVISIONAL ACCEPTANCE PARAMETERS

Respective parameters are provided in SAT procedure.

13. ATTACHMENTS

Attachment 1: List of subcontractors and potential subcontractors

Attachment 2: Content of Project Reports

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4 Potential negative impacts (technical, quality, management) 3
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Attachment 3: Project Schedule

Attachment 4: Problem/ Deficiency Report (PDR)

NUCLEAR POWER PLANT KRŠKO PROJECT Project Number
Project Name

PDR – Problem/Deficiency Report

Contactor Logo

PDR Number (*nnn*):	Priority (A-D):	Date of PDR Issue (*dd/mm/yy*):

Initiated by NEK ☐ / *Contractor* ☐

NEK/XXX: PDR Issue				
PROBLEM TITLE:				
Affected Components:				
Reference documents:				

NEK/ Contractor: Scenario Identification

Environment description and order of events that were predecessors to the problem appearance:

Identified by:

NEK/ Contractor: Description of the Problem or Deficiency

Problem/deficiency existence verified and approved by:	Date (*dd/mm/yy*):	Problem is repeatable:	YES	NO	N/A
			☐	☐	☐

Contractor: Troubleshooting and Problem/Deficiency Root Cause Explanation

Troubleshooting and Explanation Provided by:	Date (*dd/mm/yy*):

Contractor: Corrective Action Proposal and Corrective Action Tracking Log and Tracking References

Corrective Action Description:

Corrective Action Performed by:		Date (*dd/mm/yy*):	
Contractor Track Changes References:			
Other Applicable Documentation References and Attachments:			

NEK: Resolution and/or Answer Acceptance

NEK Comments:

Accepted by:	Date (*dd/mm/yy*):

Template file: *PDR.docx* Page 1 of 1

Attachment 5: System performance / Warranty Action Request (SPWAR)

NUCLEAR POWER PLANT KRŠKO PROJECT Project Number
Project Name

SPWAR – System Performance/Warranty Action Request

CONTRACTOR's LOGO

SPWAR No. (*nnn*):	Priority (1-4):	SPWR Issue date (*dd/mm/yy*):		

Form to be issued by NEK as problem reporting and problem resolution tracking tool during the generator warranty period

NEK: SPWAR Issue				
PROBLEM TITLE:				
Affected Components:				
Reference documents:				

NEK: Scenario Identification

Environment description and order of events that were predecessors to the problem appearance:

Identified by:

NEK: Description of the Problem or Deficiency

Problem/deficiency existence verified and approved by:	Date (*dd/mm/yy*):	Problem is repeatable:	YES ☐	NO ☐	N/A ☐

Contractor: Troubleshooting and Problem/Deficiency Root Cause Explanation

Troubleshooting and Explanation Provided by:	Date (*dd/mm/yy*):

Contractor: Corrective Action Description, Corrective Action Tracking Log and Tracking References

Corrective Action Description:

Corrective Action Performed by:		Date (*dd/mm/yy*):	
Contractor Track Changes References:			
Other Applicable Documentation References and Attachments:			

NEK: Resolution and/or Answer Acceptance

NEK Comments:

Accepted by:	Date (*dd/mm/yy*):

Template file: *SPWAR.docx* Page 1 of 2

Attachment 6: Work-package content

WORK PACKAGE CONTENTS

- Activity Identification Number(s)
- Technical Information
  - Drawings
  - Process specifications
  - Field procedures
  - Availability Information Bulletins (AIB's)
  - Operation and Maintenance Memos (OMM's)
  - Action Items List (AIL) = List of open points (LOP)
- Contingency Plans
- Special Tool Requirements
- Safety Requirements
- QA/QC Checklists - hold/verification points for work in progress
- Data Sheets - recording work performed and inspection findings
- Attachments - including special materials

Attachment 7: Transmittal Sheet

Attachment 8: Document-Cover-Sheet

SPWAR – System Performance/Warranty Action Request

CONTRACTOR's LOGO

SPWAR No. (*nnn*):	Priority (1-4):	SPWR Issue date (*dd/mm/yy*):		

Form to be issued by NEK as problem reporting and problem resolution tracking tool during the generator warranty period

NEK: SPWAR Issue				
PROBLEM TITLE:				
Affected Components:				
Reference documents:				

NEK: Scenario Identification	
Environment description and order of events that were predecessors to the problem appearance:	
	Identified by:

NEK: Description of the Problem or Deficiency					
Problem/deficiency existence verified and approved by:	Date (*dd/mm/yy*):	Problem is repeatable:	YES ☐	NO ☐	N/A ☐

***Contractor*: Troubleshooting and Problem/Deficiency Root Cause Explanation**	
Troubleshooting and Explanation Provided by:	Date (*dd/mm/yy*):

***Contractor*: Corrective Action Description, Corrective Action Tracking Log and Tracking References**			
Corrective Action Description:			
Corrective Action Performed by:		Date (*dd/mm/yy*):	
Contractor Track Changes References:			
Other Applicable Documentation References and Attachments:			

NEK: Resolution and/or Answer Acceptance	
NEK Comments:	
Accepted by:	Date (*dd/mm/yy*):

PDR – Problem/Deficiency Report

Contactor Logo

PDR Number (*nnn*):	Priority (A-D):	Date of PDR Issue (*dd/mm/yy*):		

Initiated by NEK ☐ / *Contractor* ☐

NEK/*XXX*: PDR Issue				
PROBLEM TITLE:				
Affected Components:				
Reference documents:				

NEK/ *Contractor*: Scenario Identification

Environment description and order of events that were predecessors to the problem appearance:

Identified by:

NEK/ *Contractor*: Description of the Problem or Deficiency

Problem/deficiency existence verified and approved by:	Date (*dd/mm/yy*):	Problem is repeatable:	YES ☐	NO ☐	N/A ☐

***Contractor*: Troubleshooting and Problem/Deficiency Root Cause Explanation**

Troubleshooting and Explanation Provided by:	Date (*dd/mm/yy*):

***Contractor*: Corrective Action Proposal and Corrective Action Tracking Log and Tracking References**

Corrective Action Description:

Corrective Action Performed by:		Date (*dd/mm/yy*):	
Contractor Track Changes References:			
Other Applicable Documentation References and Attachments:			

NEK: Resolution and/or Answer Acceptance

NEK Comments:

Accepted by:	Date (*dd/mm/yy*):

Appendix 5

QS-610 Generic Quality Assurance Program Requirements

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 04 -11- 2020
Log Number: 236045

NUCLEAR POWER PLANT KRŠKO

QA SPECIFICATION

GENERIC QUALITY ASSURANCE PROGRAM REQUIREMENTS

QS-610, Rev. 2

Safety Related

Prepared by: _____ Datum: 22/10/2020
Romeo Bišćan, QA Engineer

Reviewed by: _____ Datum: 27/10/2020
Janez Novak, QA Superintendent

Approved by: _____ Datum: 4/11/2020
Darko Kavšek,
Quality and Nuclear Oversight Director

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Attachment A – QA Program Requirements, Cross Reference Table 21

1.0 GENERAL

1.1 This specification establishes the requirements for Supplier's QA program that shall apply to all activities affecting the quality of the supplied equipment, materials, or services.

1.2 Supplier shall ensure that its Subsuppliers conform to the applicable requirements of this specification.

1.3 For Safety Related products and services (SR), Supplier shall ensure compliance with the requirements of Title 10, Code of Federal Regulations, Part 50, Appendix B (10CFR50, Appendix B), "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants", and ANSI/ASME N45.2-1977, "Quality Assurance Program Requirements for Nuclear Facilities" or ASME NQA-1-2008, Addenda 2009/2011, "Quality Assurance Requirements for Nuclear Facility Applications". Additionally, IAEA GSR part 2, 2016 "Leadership and Management for Safety" and all other codes or standards referenced herein and in the purchase order could be applied.

1.4 For SR ASME Code Section III components, Supplier shall ensure compliance with the requirements of ASME Code Section III, NCA-4000 "Quality Assurance" and NCA-3800 "Metallic Material Organization's Quality System Program". In addition to ASME Code Section III requirements, Supplier shall ensure compliance with the requirements of 10CFR50 Appendix B and 10CFR Part 21.

1.5 The reporting and posting requirements of Title 10, Code of Federal Regulations, Part 21 (10CFR21), "Reporting of Defects and Noncompliance", shall apply for SR products and services.

1.6 For Non-Safety Related products and services with Augmented Quality requirements (AQ), Supplier shall ensure compliance with the requirements of international standards as ISO 9001, "Quality management systems – Requirements" or ISO/IEC 17025, "General requirements for the competence of testing and calibration laboratories" or other relevant recognized standards. Compliance with the requirements of international standards shall be certified by accredited organization. Additional QA requirements to the Supplier commercial QA Program shall be specified and selected in accordance with this Quality Specification and scope of supply referenced in the purchase order.

1.7 The Purchaser shall have the right of access to enter the premises of the Supplier to witness inspection/test activities or to conduct surveillances or quality assurance audits. This right shall extend to the Subsuppliers and will be coordinated through the Supplier.

2.0 DEFINITIONS

2.0 Definitions shall be as stated in ANSI N45.2.10-1973, "Quality Assurance Terms and Definitions" and in other standards referenced herein.

2.1 PURCHASER - Utility issuing the purchase order.

2.2 SUPPLIER - The person or organization to whom a purchase order from the Purchaser has been issued.

2.3 SUBSUPPLIER - The person or organization that furnishes items and services to the Supplier that will be used to complete the Purchaser's purchase order requirements.

2.4 ABREVIATIONS:

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
CFR	Code of Federal Regulation, USA
ILAC MRA	International Laboratory Accreditation Cooperation Mutual Recognition Arrangement
ISO	International Organization for Standardization
NEK	Nuclear Power Plant Krško
NRC	Nuclear Regulatory Commission, USA
QA	Quality Assurance
SR	Safety Related
USA	United States of America

3.0 DOCUMENTS FOR SUBMISSION

3.1 The Supplier shall submit a full description of its QA program, proposed for the scope of work to be performed, as controlled copy document, for the Purchaser's review and acceptance/approval.

3.2 If the Purchaser has already approved the Supplier's QA program, it does not have to be submitted for acceptance/approval. However, if the Purchaser's copy of the QA program is not current, all portions of the program that have been revised since the Purchaser's previous approval shall be submitted for review and acceptance/ approval.

4.0 QUALITY ASSURANCE PROGRAM REQUIREMENTS

Supplier shall develop and implement a QA program consistent with the requirements defined herein and in the purchase order. As a minimum, the program shall encompass the following quality assurance criteria.

4.1 Organization

The organizational structure, functional responsibilities, levels of authority and lines of communication for personnel performing activities affecting quality shall be documented in organizational charts and written procedures.

4.1.1 Quality Assurance and Quality Control inspection and audit personnel shall have sufficient and well-defined responsibility, authority, and organizational freedom to identify and evaluate quality problems, to require implementation of approved corrective action, and to verify implementation of corrective actions. Such persons or organizations shall report to a management level so that required authority and organizational freedom are provided, including sufficient independence from cost and schedule considerations.

4.1.2 Personnel responsible for verifying if Supplier's work conforms to established requirements shall not have direct responsibility for the work being performed.

4.1.3 Where more than one organization is involved in the execution of activities, the responsibilities, interfaces, and authority of each organization shall be clearly defined and documented. The external interfaces between organizations and the internal interfaces between organizational units, and changes thereto, shall be documented.

4.2 QA Program

The documented QA program shall be planned, implemented, and maintained to identify the items and services to which it applies and to comply with requirements of the relevant Code and/or Standard (See Attachment A).

4.2.1 The program shall provide for planning and accomplishing activities which affect quality under suitably controlled conditions. Controlled conditions include the use of appropriate equipment, suitable environmental conditions for accomplishing the activity, and assurance that prerequisites for the given activity have been satisfied.

4.2.2 The program shall provide for any special controls, processes, test equipment, tools, and skills necessary to attain the required quality and provide for verification of quality by inspection and test, as necessary.

4.2.3 The program shall provide for indoctrination and training of personnel, who is performing activities affecting quality, to ensure that suitable proficiency is achieved and maintained.

4.2.4 The Supplier's management shall regularly review the status and adequacy of the documented QA program.

4.2.5 For items which are supplied to the Purchaser as "Commercial Grade," the Supplier's program, as a minimum, shall contain procedures, processes, etc., necessary to ensure the Purchaser that the items being supplied meet

industry standards, purchase order requirements, and performance or technical requirements specified in the Suppliers catalog.

4.3 Design Control

The Supplier's program for controlling design activities shall satisfy the requirements of ANSI N45.2.11-1974, "Quality Assurance Requirements for the Design of Nuclear Power Plants," or requirements of relevant Code and Standard (See Attachment A), and shall include as a minimum, the following:

4.3.1 Design activities shall be prescribed and accomplished in accordance with procedures of a type sufficient to ensure that applicable design inputs are correctly translated into specifications, drawings, procedures, or instructions.

4.3.2 Interface between organizations performing work, affecting quality of design, shall be identified in writing and shall include those organizations that provide criteria, design, specifications, and technical direction.

4.3.3 Applicable design inputs, such as design bases, regulatory requirements, codes and standards, shall be identified, documented, and their selection reviewed and approved. Changes from specified design inputs, including the reasons for the changes, shall be identified, approved, documented, and controlled.

4.3.4 Documentation of design/analysis shall be verifiable and include the following:

1. The objective of the analysis,
2. Design inputs and their sources,
3. Results of reference document searches or other applicable background data,
4. Assumptions with indication of those that must be verified as the design proceeds,
5. Computer calculations, including computer type, computer program identification, revision, inputs, evidence of, or reference to computer program verification, and the bases, or reference thereto, supporting the application of the computer program to the specific problem,
6. Independent review and approval.

4.3.5 Design verification methods shall be established to provide assurance that the design meets the specified design inputs. Acceptable verification methods include design reviews, alternate calculations, and qualification testing.

4.3.6 Design verification shall be performed by individuals or groups other than those who performed the original design. This verification may be performed by the originator's supervisor, if the supervisor is the only individual in the organization competent to perform the verification, and the need is documented and approved in advance by the supervisor's management.

4.3.7 Changes to design documents shall be reviewed and approved by the same organizations that performed the original review and approval, unless other organizations are specifically designated. This shall ensure that the impact of the change is carefully considered, required actions documented, and information concerning the change transmitted to the affected persons and organizations.

4.3.8 When material substitutions or modifications in the design are made, Supplier shall:

1. Review prior design qualification tests to determine any adverse effect,

2. Evaluate whether or not new qualification tests are required,

3. Provide documented justification for not having to perform new qualification tests.

4.3.9 The software design process is documented, approved by the responsible design organization, and controlled in accordance with criteria defined in ASME NQA-1, "Quality Assurance Requirements for Nuclear Facility Applications", Part I: Requirement 3, Section 800 – Software Design Control, Part II: Subpart 2.7, or equal standard.

4.3.10 To procure and utilize a Commercial Grade items and services for nuclear power plants pursuant to 10CFR21, dedication activities and controls shall be implemented in accordance with ASME NQA-1, "Quality Assurance Requirements for Nuclear Facility Applications", Subpart 2.14 to ensure the item or service is adequate for its intended safety function.

4.4 Procurement Document Control

The Supplier's program for controlling procurement documents of items and services, which are not considered to be Commercial Grade, shall satisfy the requirements of ANSI N45.2.13-1976, "Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants" or requirements of relevant Code and Standard (See Attachment A), and shall include as a minimum, the following:

4.4.1 Applicable design bases, quality assurance requirements, and other requirements necessary to ensure adequate quality shall be included or referenced in documents for procurement of items and services.

4.4.2 Procurement documents shall require Subsuppliers to have a QA program consistent with the applicable requirements of this specification.

4.4.3. The procurement documents shall provide for access to the Subsupplier's facilities and records for inspection or audit by Supplier's and Purchaser's representatives.

4.4.4. Procurement documents shall identify the documentation required to be submitted.

4.4.5. Procurement documents shall include the Purchaser's requirements for reporting and approving dispositions of nonconformances.

4.4.6. A review of the procurement documents shall be performed to ensure that the documents include appropriate technical and quality requirements.

4.4.7. Procurement document changes that affect technical or quality requirements shall be subject to the same degree of control as used in preparing the original document.

4.4.8. Procurement documents for Safety-Related equipment or services shall include statement informing Subsuppliers of their responsibility to report any defect of basic component in accordance with 10CFR21 Requirements.

4.4.9. Procurement documents shall include the Purchaser's requirements for ordering materials, parts or components from original Subsuppliers/ Manufacturers and/or authorized distributors, to prevent supply of counterfeit/fraudulent material, items or components.

4.5 Instructions, Procedures, and Drawings

4.5.1 The Supplier shall ensure that all activities affecting quality and services are prescribed by and performed in accordance with documented instructions, procedures, or drawings that include or reference appropriate quantitative or qualitative criteria for determining that prescribed activities have been satisfactorily accomplished.

4.5.2 The need for and level of detail in written procedures or instructions shall be determined based upon complexity of the task, the significance of the item or activity, work environment, and worker proficiency and capability (education, training, experience).

4.6 Document Control

The Supplier shall ensure that quality-related documents, including changes, are reviewed for adequacy, approved for release by authorized personnel, and properly distributed to and used at locations where the prescribed activity is performed.

4.6.1 Document changes shall be reviewed and approved by the same organization that performed the original review and approval, unless other organizations are specifically designated.

4.6.2 Procedures governing document control shall be established and provide for:

1. The identification of controlled documents,

2. The specified distribution of controlled documents for use at the appropriate location,

3. The identification of individuals responsible for the preparation, review, approval, and distribution of controlled documents,

4. Changes to documents shall be reviewed and approved by the same organizations that performed the original review and approval unless other organizations are specifically designated,

5. The review of controlled documents for adequacy, completeness, and approval prior to distribution,

6. A method to ensure the correct documents are being used.

4.7 Control of Purchased Items and Services

The Supplier's program for controlling purchased items and services shall satisfy the requirements of ANSI N45.2.13-1976, "Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants" or requirements of relevant Code and Standard (See Attachment A), and shall include as a minimum, the following:

4.7.1 The selection of Subsuppliers shall be based on evaluation of their capability to provide items or services in accordance with the requirements of the procurement documents.

4.7.2. Methods to be utilized in evaluation of Subsuppliers, and the results therefrom shall be documented and shall include the following:

1. Evaluating the Subsupplier's history of providing a product which performs satisfactorily in actual use.

2. Determining the Subsupplier's technical and quality capability by a review of its QA program and a direct evaluation of its facilities and the QA program implementation.

3. Verifying if Subsupplier possesses an ASME Certificate of Authorization for the items/services, or other relevant Certificate/ Accreditation related to the scope of supply.

4.7.3. Procedures shall be established and implemented for verification activities (surveillance, receipt inspection, and audit) as appropriate, to ensure conformance of procured items and services to identified requirements.

4.7.4. Where acceptance is based on certifications from Subsuppliers, the Supplier shall validate the certifications via surveillance, audit and/or independent testing.

4.7.5 When Commercial Grade items or services are utilized in SR applications, the dedicating entity shall apply requirements in accordance with ASME NQA-1, "Quality Assurance Requirements for Nuclear Facility Applications", Subpart 2.14, "Quality Assurance Requirements for Commercial Grade Items and Services" to ensure the item or service is adequate for its intended safety function. The Supplier shall:

1. Identify the critical characteristics (form, fit, function, material and process) of the commercial grade items and the methods for verifying that these critical characteristics have been met.

2. Establish and document measures to ensure that any changes (by Subsuppliers) in materials, product, design or manufacturing are identified and evaluated.

4.8 Identification and Control of Items

Supplier shall establish and document measures to identify and control materials, parts and components. These measures shall prevent the use of an incorrect or defective item, and suspicious (including counterfeit/fraudulent) material, parts or components that may not be as ordered. Items for production shall be identified (batch, lot, component, part) from the initial receipt and fabrication of items up to and including installation and use. This identification shall relate an item to an applicable design or other pertinent specifying document.

4.8.1 Traceability for these items shall be maintained with records and/or markings. Physical identification shall be used to the maximum extent possible, but if physical identification on the item is impractical or insufficient, physical segregation, procedural control or other appropriate means shall be used. Identification markings shall be applied using materials and methods that provide a clear and legible identification and do not degrade the function or service life of the item. Markings shall be transferred to each part of an item when subdivided and shall not be obliterated or hidden by surface treatment or coating unless other means of identification are substituted.

4.9 Control of Special Processes

Supplier shall establish and document measures to ensure that special processes, including welding, heat treating, cleaning, coating and nondestructive examination, are accomplished under controlled conditions in accordance with applicable codes, standards, specifications, criteria, and other special requirements.

4.9.1 Special process personnel, procedures, and equipment shall be qualified and comply with the requirements of applicable codes and standards. For special processes not covered by existing codes or standards, or where item quality requirements exceed the requirements of established codes or standards, the

necessary qualifications of personnel, procedures, or equipment shall be defined.

4.9.2 All personnel performing nondestructive examination shall be qualified and certified in accordance with Recommended Practice ASNT SNT-TC-1A "Personnel Qualification and Certification in Nondestructive Testing" or shall be qualified in accordance with requirements of relevant Code and Standard (See Attachment A).

4.9.3 Documentation shall be maintained for currently qualified personnel, processes, or equipment in accordance with the requirements of pertinent codes and standards.

4.10 Inspection

The Supplier shall ensure that activities affecting quality are inspected for conformance to the documented instructions, procedures, and drawings used in the accomplishment of the activity.

4.10.1 Inspection activities shall be performed by persons other than those who performed the activity being inspected. Such persons shall not report directly to the immediate supervisors who are responsible for the work being inspected.

4.10.2 Inspection and test personnel shall be appropriately qualified. The program for qualifying inspection and test personnel shall be in accordance with the requirements of ANSI/ASME N45.2.6-1978, "Qualifications of Inspection, Examination, and Test Personnel for Nuclear Power Plants" or requirements of relevant Code and Standard (See Attachment A), and shall satisfy, as a minimum, the following:

1. Provisions shall be made for the indoctrination of inspection and test personnel as to the technical objectives of the work, the codes and standards that are to be used, and the quality assurance elements that are to be employed.

2. The need for formal training programs shall be determined, and such training activities shall be conducted, as required, to qualify inspection and test personnel.

3. Any special physical characteristics needed in order to perform inspection and test activities shall be identified. Inspection and test personnel requiring these characteristics shall have them verified by examination at intervals which shall not exceed one year.

4. The capabilities of inspection and test personnel shall be initially determined by an evaluation of the individual's education, experience training, test results, or proficiency demonstration.

5. The job performance of inspection and test personnel shall be reevaluated at periodic intervals not to exceed three years. Reevaluation

shall be performed by evidence of continued satisfactory performance or redetermination of capability in accordance with item 4, above.

6. Inspection and test personnel who have not performed inspection/test activities for a period of one year shall be reevaluated in accordance with item 4, above.

7. Inspection and test personnel shall be certified based on their qualifications. The certification shall be documented in an appropriate form including, as a minimum, the following information:

   a. Employer's name,

   b. Identification of the person being certified,

   c. Activities certified to perform,

   d. Basis used for certification (one or more of the following):

      i) Records of education, experience, and training,

      ii) Test results, where applicable,

      iii) Results of capability demonstration,

   e. Results of periodic evaluations,

   f. Results of physical examinations, when required,

   g. Signature of employer's designated representative who is responsible for such certification,

   h. Date of certification and date of certification expiration.

4.10.3 Written procedures shall require that inspections are performed according to instructions or checklists that are based on the instructions, procedures, and drawings used in accomplishing the inspected activity. Inspection procedures shall also require documentation of the qualitative or quantitative results of the specific parameters being inspected.

4.10.4 Examinations, measurements, or tests of items processed shall be performed for each work operation, where necessary to ensure quality. Where a sample is used to verify acceptability of a batch of items, the sampling procedure shall be based on recognized standard practices and adequately justify the sample size and selection process.

4.10.5 If inspection of processed items is impossible or disadvantageous, indirect control by monitoring processing methods, equipment, and personnel shall be provided. Process monitoring shall be performed by qualified personnel or qualified automated means. Both inspection and process monitoring shall be provided when control is inadequate without both.

4.10.6 Witness/hold points imposed by the Purchaser shall be indicated in appropriate documents.

4.10.7 Final inspection shall include a records review of the process results and resolution of nonconformances identified by prior inspection. Completed items shall be inspected for completeness, marking, calibration, adjustments, protection from damage, or other characteristics as required, to verify the quality and conformance of the item according to specified requirements. The acceptance of the item shall be approved by authorized personnel. Any modifications, repairs, or replacements of items performed subsequent to final inspection shall require reinspection or retest, as appropriate, to verify acceptability.

4.11 Test Control

The Supplier shall establish a test program to identify and document all testing required, demonstrating that the equipment will perform satisfactorily in service. All testing shall be performed in accordance with written test procedures that incorporate all requirements and test limits specified in the design documents.

4.11.1 Test procedures shall ensure that prerequisite such as calibrated instrumentation, appropriate equipment, qualified personnel, condition of test equipment and the item to be tested, suitable environmental conditions, and provisions for data acquisition, are met.

4.11.2 Test requirements, results, and acceptance criteria shall be documented and evaluated by authorized personnel to ensure that all requirements have been satisfied.

4.11.3 Equipment that fails testing shall be dispositioned to ensure appropriate corrective action and retest. If dispositioned as "use as is," adequate justification shall be documented.

4.11.4 Test personnel shall be qualified in accordance with the requirements of paragraph 4.10.2 of this specification.

4.11.5 Computer program test procedures shall provide for demonstrating the adherence of the computer program to documented requirements.

1. For computer programs used in design activities, computer program test procedures shall provide for assuring that the computer program produces correct results.

2. For computer programs used for operational control, computer program test procedures shall provide for demonstrating required performance over the range of operation of the controlled function or process.

3. The procedures shall also provide for evaluating technical adequacy through comparison of test results from alternative methods such as

hand calculation, calculations using comparable proven programs, or empirical data and information from technical literature.

4. In-use test procedures shall be developed and documented to permit confirmation of acceptable performance of the computer program in the operating system. In-use test procedures shall be performed after the computer program is installed on a different computer, or when there are significant changes in the operating system.

5. Periodic in-use manual or automatic self-check-in-use tests shall be prescribed and performed for those computer programs in which computer program errors, data errors, computer hardware failures, or instrument drift can affect required performance.

6. Test procedures or plans shall specify the following, as applicable:

   a. Required tests and test sequence,

   b. Required ranges of input parameters,

   c. Identification of the stages at which testing is required,

   d. Criteria for establishing test cases,

   e. Requirements for testing logic branches,

   f. Requirements for hardware integration,

   g. Anticipated output values,

   h. Acceptance criteria,

   i. Reports, records, standard formatting, and conventions.

7. Test results shall be documented and maintained. Test results shall be evaluated by the responsible authority to ensure that test requirements have been satisfied.

4.12 Control of Measuring and Test Equipment

The Supplier shall ensure that all tools, gauges, instruments, calibration standards, and other measuring and test equipment used in activities affecting quality are of the proper range, type, and accuracy to verify conformance to established requirements. Measuring and test equipment shall be controlled, calibrated, adjusted, and maintained at prescribed intervals against certified equipment having known valid relationships to nationally recognized standards. If no national standard exists, the basis for calibration shall be documented.

4.12.1 Documentation shall be maintained that provides the following information for measuring and test equipment used in activities affecting quality:

1. The identification of the items.
2. As-found calibration data or conditions.
3. As-left calibration data or conditions.
4. A list of the standards used to perform the calibration.
5. A statement or information that standards or equipment are traceable to the National Bureau of Standards or accepted values of natural physical constraints.
6. Calibration requirements that were not met.
7. Signature of the person within the calibrator's organization who is responsible for the quality of the service provided.

4.12.2 Suppliers of external calibration services must be accredited to ISO/IEC 17025 standard by a National Accreditation Body that is a signatory to the ILAC MRA. The service must be provided in accordance with their accredited ISO/IEC 17025 program and scope of accreditation. Subcontracting is prohibited. The customer must be notified of any conditions that adversely impact the laboratory's ability to maintain the scope of accreditation.

4.12.3 When measuring and test equipment is out-of-calibration, the validity of previous inspection or test results and of the acceptability of items previously inspected or tested shall be evaluated and documented.

4.12.4 Inspection, measuring, or test equipment consistently found to be out-of-calibration shall be repaired or replaced.

4.12.5 Records shall be maintained and equipment suitably marked to indicate calibration status.

4.12.6 Measuring and test equipment shall be properly handled and stored to maintain accuracy.

4.12.7 Measuring and test equipment shall be used and calibrated in environments that are controlled to the extent necessary to ensure that the required accuracy and precision are maintained.

4.13 Handling, Storage, and Shipping

The Supplier's program for handling, storage, cleaning, packaging, shipping, and preservation of items shall be controlled to prevent damage or loss and to minimize deterioration. These activities shall satisfy the requirements of ANSI/ASME N45.2.2-1978, "Packaging, Shipping, Receiving, Storage, and Handling of Items for Nuclear Power Plants" or requirements of relevant Code and Standard (See Attachment A), and shall include, as a minimum, the following:

4.13.1. When required for critical, sensitive, perishable, or high-value items, specific procedures for handling, storage, packaging, shipping, and preservation shall be used.

4.13.2. Item shall be stored within a fire resistant, weathertight, and well ventilated building or equivalent enclosure and shall be placed on skids or shoring to permit air circulation.

4.13.3 A preventive maintenance program for item in storage shall be maintained.

4.13.4 Item shall be suitably packaged to protect against detrimental contamination and physical damage during shipping. Caps and plugs shall be used to seal openings with sensitive internal surfaces and to protect threads and weld end preparations.

4.13.4 When required, special equipment (such as containers, shock absorbers, and accelerometers) and special protective environment (such as inert gas atmosphere, specific moisture content levels, and temperature levels) shall be specified and provided and their existence verified.

4.13.5 Special handling tools and equipment shall be utilized and controlled where necessary to ensure safe and adequate handling. Special handling tools and equipment shall be inspected and tested in accordance with procedures at specified time intervals or prior to use.

4.13.6 Marking or labeling shall be utilized as necessary to adequately maintain and preserve the item, including indication of the presence of special environments or the need for special controls.

4.14 Inspection, Test, and Operating Status

The Supplier shall establish measures to identify the status of inspection and test activities either on the items or in documents traceable to the items. These measures are necessary to ensure that required inspections and tests are performed and to ensure that items that have not passed the required inspections and tests are not inadvertently used.

4.14.1 Status shall be maintained through indicators such as physical location and tags, markings, shop travelers, stamps, inspection records, or other suitable means.

4.14.2 The authority for application and removal of tags, markings, labels, and stamps shall be specified.

4.15 Control of Nonconforming Items

The Supplier shall ensure that items, services, or activities that do not conform to requirements are identified, documented, evaluated and dispositioned (use-as-is, rework, repair, or reject) in accordance with documented procedures.

4.15.1 Written procedures shall define the responsibility and authority of those personnel involved in issuing and dispositioning nonconforming items or conditions.

4.15.2 Procedures shall provide for evaluation of nonconforming items or conditions for reportability in accordance with 10CFR21. For Safety Related items and/or services ordered from the USA, Supplier and Subsupplier reporting pursuant to 10CFR21 shall be made to the NRC and NEK. For Safety Related items and/or services supplied from outside the USA, Supplier and Subsupplier shall be subject to the reporting pursuant to 10CFR21 to the NEK, only.

4.15.3 Written descriptions of nonconformances dispositioned "use-as-is" or "repair" shall include appropriate technical justification to substantiate the disposition and shall be submitted to the Purchaser for review and acceptance of those changes affecting customer design requirements.

4.15.4 Repaired and reworked items shall be reexamined in accordance with applicable procedures and with the original acceptance criteria. Repaired items can be reexamined in accordance with alternate acceptance criteria, if disposition has been approved by the Purchaser.

4.15.5 When a nonconforming item has been dispositioned as "reject", controls shall be implemented and adequate records shall be maintained to verify the item has not been used.

4.15.6 Nonconforming items shall be segregated, when practical, by placing items in clearly identified and designated hold areas until properly dispositioned. When size, weight, or access limitations preclude segregation, other precautions shall be employed to prevent inadvertent use of the item.

4.15.7 Nonconforming items shall not be shipped or installed without the prior written approval of the Purchaser's responsible personnel.

4.16 Corrective Action

The Supplier shall ensure that conditions adverse to quality are promptly identified and corrected.

4.16.1 In the case of significant conditions adverse to quality, the cause of the condition shall be determined and corrective action taken to preclude recurrence.

4.16.2 The identification of significant conditions adverse to quality, the cause of the conditions, and the corrective action taken shall be documented and reported to appropriate levels of management. Follow-up action shall be taken to verify completion of corrective action.

4.16.3 Review of corrective actions shall be performed to determine if they were timely and effectively implemented.

4.17 Quality Assurance Records

The Supplier shall establish procedures to identify the specific records that will be generated and maintained and to prescribe their retention periods and storage requirements.

4.17.1 Records shall include drawings, specifications, purchase documents, work orders, material certifications, calculations, inspection and test reports, work procedures, nonconformance and corrective action reports, audit reports, software design verification and computer program testing records, personnel, process, and equipment qualification records.

4.17.2 Inspection, test, and work performance monitoring records shall indicate the nature of observations, the acceptable limits of parameters checked, the qualitative or quantitative results, the actions taken in connection with any identified deficiencies, the date of the observation, and the identity of personnel involved.

4.17.3 Required records shall be legible, identifiable, and retrievable.

4.17.4 A system for controlling and monitoring legibility and accuracy for radiograph reproductions shall be included in the quality assurance program. This system shall include procedures for exposure, scanning, focusing, contrast, resolution, and distinguishing film artifacts.

4.17.5 All maintained records shall have clear identification markings that can be traced to a specific job or item and shall be entered into a system that provides for timely retrieval.

4.17.6 Records retention periods and storage requirements shall satisfy the requirements of ANSI/ASME N45.2.9-1979, "Requirements for Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants" or requirements of relevant Code and Standard (See Attachment A), or the Supplier shall, as a minimum, transmit identifiable and reproducible copies of all records as delineated by Purchaser at the time of shipment.

4.18 Audits

The Supplier shall establish a system of audits to ensure compliance with all aspects of the quality assurance program and to determine its effectiveness. Written procedures and controls shall comply with the requirements of ANSI/ASME N45.2.12-1977, "Requirements for Auditing of Quality Assurance Programs for Nuclear Power Plants" or requirements of relevant Code and Standard (See Attachment A), and shall include, as a minimum, the following:

4.18.1 Audits shall be scheduled at a frequency commensurate with the status and importance of the activity.

4.18.2 An audit plan which identifies the audit scope, requirements, audit personnel, activities to be audited, organizations to be notified, applicable

documents scheduled and audit procedures or checklists shall be developed and documented for each audit.

4.18.3 Auditors shall not have any direct responsibility for performance of the activities they audit.

4.18.4 Audit team shall be identified prior to the beginning of the audit, consisting of one or more auditors, and shall include an individual, who is a qualified Lead Auditor, appointed to lead the team.

4.18.5 Audits shall be performed in accordance with written procedures or checklist.

4.18.6 Audit results shall be documented by the auditing personnel and shall be reviewed by management responsible for the area audited. Conditions requiring prompt corrective action shall be reported immediately to management of the audited organization.

4.18.7 Audit reports shall be signed by the audit team leader and shall include the following information:

1. Description of the audit scope.
2. Identification of the auditors.
3. Identification of persons contacted during audit activities.
4. Summary of audit results.
5. A statement on the effectiveness of the program elements which were audited.
6. Description of each reported adverse audit finding in sufficient detail to enable corrective action to be taken by the audited organization.

4.18.8 Follow-up action shall be taken to verify that corrective action is implemented as scheduled.

4.18.9 Audit records shall be maintained and shall include audit plans, audit reports, written replies, and the record of completion of corrective action.

4.18.10 Lead Auditors shall be qualified in accordance with the requirements of ANSI/ASME N45.2.23-1978, "Qualification of Quality Assurance Program Audit Personnel for the Nuclear Power Plants", or requirements of relevant Code and Standard (See Attachment A), and shall satisfy, as a minimum, the following requirements:

l. Lead Auditors shall be trained to the extent necessary to ensure their competence in auditing skills. Training in the following areas shall be given based upon management evaluation of the needs of each Lead Auditor: nuclear-related codes, standards and regulations; general structure of quality assurance programs; auditing techniques of examining, evaluating, and reporting; and audit planning.

2. Initial qualification of Lead Auditors shall be determined according to the individual's education, experience, training, auditing skills, and capabilities.

3. Lead Auditors shall pass an examination which shall evaluate their competence in auditing skills.

4. The proficiency of each Lead Auditor shall be assessed by management on an annual basis. Based on this assessment, management may extend the qualification, require retraining or require requalification.

5. The qualification of Lead Auditors shall be certified in writing in an appropriate form, including the following information:

   a. Employer's name,

   b. Lead Auditor's name,

   c. Date of certification or recertification,

   d. Basis for qualification (i.e., education, experience, training, examination, etc.),

   e. Signature of employee's designated representative who is responsible for this certification.

6. Records for each Lead Auditor shall be maintained and updated annually.

Attachment A
QA Program Requirements - Cross Reference Table

QA PROGRAM ELEMENTS	SAFETY RELATED ITEMS NON ASME CODE	SAFETY RELATED ITEMS ASME CODE		AUGMENTED QUALITY ITEMS	
	10CFR50 App. B ASME NQA-1/ANSI N45.2	ASME III NCA-4000	ASME III NCA-3800	ISO 9001*	ISO 17025*
1.0 GENERAL					
1.1; 1.2; 1.7	X	X	X	X	X
1.3	X				
1.4	X	X	X		
1.5	X	X	X		
1.6				X	X
2.0 DEFINITIONS	X	X	X	X	X
3.0 DOCUMENTS FOR SUBMISSION	X	X	X	X	X
4.0 QA PROGRAM REQUIREMENTS					
4.1 Organization	X	X	X	X	X
4.2 QA Program	X	X	X	X	X
4.3 Design Control					
4.3.1 – 4.3.9	X	X	X	X	
4.3.10	X	X	X		
4.4 Procurement					
4.4.1 – 4.4.7; 4.4.9	X	X	X	X	X
4.4.8	X	X	X		
4.5 Instructions, Procedures, and Drawings	X	X	X	X	X
4.6 Document Control	X	X	X	X	X
4.7 Control of Purchased Items and Services					
4.7.1 – 4.7.4	X	X	X	X	X
4.7.5	X	X	X		

Attachment A
QA Program Requirements - Cross Reference Table

QA PROGRAM ELEMENTS	SAFETY RELATED ITEMS NON ASME CODE	SAFETY RELATED ITEMS ASME CODE		AUGMENTED QUALITY ITEMS	
	10CFR50 App. B ASME NQA-1/ANSI N45.2	ASME III NCA-4000	ASME III NCA-3800	ISO 9001*	ISO 17025*
4.8 Identification and Control of Items	X	X	X	X	X
4.9 Control of Special Processes	X	X	X	X	X
4.10 Inspection	X	X	X	X	X
4.11 Test Control	X	X	X	X	X
4.12 Control of Measuring and Test Equipment	X	X	X	X	X
4.13 Handling, Storage, and Shipping	X	X	X	X	X
4.14 Inspection, Test, and Operating Status	X	X	X	X	X
4.15 Control of Nonconforming Items					
4.15.1; 4.15.3 – 4.15.7	X	X	X	X	X
4.15.2	X	X	X		
4.16 Corrective Action	X	X	X	X	X
4.17 Quality Assurance Records	X	X	X	X	X
4.18 Audits	X	X	X	X	X

Note: * Compliance with the requirements of international standards shall be certified by accredited organization.

Appendix 6

QS-600 Generic Software Quality Assurance Program Requirements

Nuclear Power Plant Krško

Quality Assurance Specification

Nuklearna Elektrarna Krško
MASTER DOCUMENT
Date Received: 09 -11- 2017
Log Number: 247741

Generic Software Quality Assurance Program Requirements

QS-600
Revision 1

Safety Related

Prepared by: Damijan Gregorič, QA Lead Engineer — Date: 27/10/2017

Reviewed by: Janez Novak, QA Superintendent — Date: 8/11/2017

ING.PI Superintendent — Date: 8/11/2017

Approved by: Darko Kavšek, Quality and Nuclear Oversight Director — Date: 9/11/2017

RECORD OF CHANGE

Revision	Description of the Change
1	Revision of the specification is based on recommendations in document INPO 12-014 *Nuclear Power Plant Software Quality Assurance* (Revision 1, April 2015). The revision of the specification is requested in NEK Corrective Action Program Request 2012-4380. The major changes in the specification: • Instead of the term Quality Assurance Program, the term Software Quality Assurance Program (SQAP) is used throughout the specification. • The definitions in section 2.0 are harmonized with definition in standards (ANSI N45.2.10-1973 and IEEE 610.5-1990), plant programs and plant procedures. • The section 4.0 (references) is new and contains all documents referenced in the specification. • Section 3.6 is corrected to emphasize Software Development Life Cycle as recommended in the document INPO 12-01. • In section 6.6.3, the required documents for Software Development Life Cycle are specified. The selection of required documents is based on the software quality level. • Sections 6.7, 6.12 and 6.13 are corrected in accordance with recommendation in the document INPO 12-014.
0	Initial issue.

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1. GENERAL

1.1. This specification establishes the Supplier's software quality assurance program requirements that shall apply to all activities affecting the quality of the items or services provided.

1.2. Supplier shall assure compliance with the requirements of this specification and all other codes or standards referenced herein and in the purchase order.

1.3. For Safety Related software and services on safety related item the following shall apply:

1.3.1. Supplier shall assure compliance with the requirements of Title 10, Code of Federal Regulations, Part 50, Appendix B (10CFR50, Appendix B), "*Quality Assurance Criteria for Nuclear Power Plants*".

1.3.2. The reporting and posting requirements of Title 10, Code of Federal Regulations, Part 21 (10CFR21), "*Reporting of Defects and Noncompliance*".

1.4. NEK shall have the right of access to enter the premises of the Supplier to witness inspection/test activities or to conduct surveillances or quality assurance audits.

1.5. Supplier shall assure that its Subsuppliers conform to the requirements of this specification.

2. DEFINITIONS

The word *shall* identifies mandatory requirements strictly to be followed in order to conform to this specification. The words *should* and *may* indicate optional requirements that are not required in order to conform to this specification.

Definition shall be as stated in ANSI N45.2.10-1973, "*Quality Assurance Terms and Definition*" and IEEE 610.5-1990, "*IEEE Standard Glossary of Data Management Terminology*" with the following exceptions:

2.1. **Application software** – Software specifically produced for the functional use of a computer system; software for structural analysis, process control, etc.

2.2. **Audit** – An independent review for assessing compliance with software requirements, specifications, baselines, standards, procedures, instructions, codes, and contractual and licensing requirements.

2.3. **Augmented quality item** – An optional subset of the classification Non Safety Related applied to any item that is subject to non-safety related regulatory requirements or special requirements (seismic tests, analysis reports, commercial QA program, manufacturing and QC inspection plan ...) imposed by NEK. Classification category AQ includes specific items which are very important for plant reliability and operability (design and manufacturing of those items is specific and complex).

2.4. **Configuration management** – The process of identifying and defining the configuration items in a system, controlling the release and change of these items throughout the software development cycle, recording and reporting the status of configuration items and change requests.

2.5. **Critical digital asset** – Digital device or system that plays a role in the operation or maintenance of a critical system and can impact the proper functioning of the critical system. A CDA may be a component or a subsystem of a critical system, the CDA may itself be a critical system, or the CDA may have a direct or indirect connection to a critical system.

2.6. **Graded approach** – The selective assignment of the quality assurance elements the software must comply with, based on its assigned quality classification. The quality classification is determined by evaluation of the functional process(es) the software provides.

2.7. Item – An all-inclusive term used in place of any of the following: appurtenance, assembly, component, equipment, material, module, part, structure, subassembly, subsystem, system, or unit.

2.8. **Non-Safety related item** – Any item that does not perform a Safety Related function and the failure of which would not prevent the accomplishment of a Safety Related function.

2.9. **Quality assurance** – Planned and systematic actions necessary to provide adequate confidence that the computer software and hardware conforms to established technical requirements.

2.10. **Safety related item** – Any item used in a nuclear power plant that is relied upon during or following design basis events to ensure: the integrity of the reactor coolant pressure boundary; the capability to shut down the reactor and maintain it in a safe shutdown condition; or the capability to prevent or mitigate the consequences of accidents that could results in potential offsite exposures comparable to those referred to in 10 CFR 100.11.

2.11. **Service** – Carrying out software development cycle activities on an item.

2.12. **Software development cycle** – The period of time between the decision to develop a software product and the delivery of software product. The specific SQAP should identify and document the software development cycle and accompanying development cycle phases to be used. Although the typical development cycle phases are identified below, many types of software development cycles may be defined. Phases associated with software development may include the following:

- Planning — evaluation of options and coordination of activities to ensure successful deployment of software
- Requirements — specific and measurable characteristics that describe the intended use and performance of software
- Design — the collection of information (requirements, architecture, etc.) that define software Implementation
- Implementation — the process of translating the Design into software components
- Integration — the process of combining software components with other software and/or systems and to reduce the introduction of undesirable characteristics (errors, anomalies, hazards, security threats)
- Validation — specific and measurable tests to demonstrate that software meets the Requirements

– Installation placing software into the operational computing environment, documenting its baseline configuration, and performing final acceptance testing

2.13. **Software error** – A discrepancy between the computed, observed, or measured value or condition, and the true, specified, or theoretically correct value or condition.

2.14. **Software quality assurance** – The program that establishes quality controls for the development, procurement, operation, use, maintenance, and retirement of software, commensurate with its importance to nuclear safety.

2.15. **Software** – Computer programs and data files that contain programmer-specified constants, flags and setpoints. Software includes programs that generate displays of plant system configurations, technical specification applicability, and similar items that operators and technical personnel rely on when operating the plant.

2.16. **Software tool** – Refers to all computer programs, procedures and/or data files containing programmer specified constants, flags, and set-points. This includes programs that generate displays of the plant system configurations, provide information about technical specification applicability, and similar items relied upon by operators and technical personnel to operate the plant. All program files, sets of instructions and data files are considered as software, no matter if they are stored as a firmware or if they are stored as a data in a computer (PLC, controller) memory or other memory storage device.

2.17. **Testing** –The process of exercising or evaluating a system or system component by manual or automated means, to verify that it satisfies specified requirements or to identify differences between expected and actual results.

2.18. **Validation** – The process of providing evidence that the software and its associated products satisfy system requirements, allocated to software, at the end of each life cycle activity, solve the problem (e.g., correctly model physical laws, implement business rules, use the proper system assumptions) and satisfy intended use and user needs.

2.19. **Verification** – The process of providing objective evidence that the software and its associated products conform to requirements (e.g., for correctness, completeness, consistency, accuracy) for all life cycle activities during each Software Development Cycle phases; satisfy standards, practices, and conventions during Software Development Cycle phases; and successfully complete each Software Development Cycle activity and satisfy all the criteria for initiating subsequent life cycle activities (e.g., building the software correctly).

3. ABREVIATIONS:

10CFR21	abbreviation for reference 4.2
10CFR50, Appendix B	abbreviation for reference 4.1
ANSI	American National Standard Institute
AQ	Augmented quality
SQA	Software Quality Assurance
SQAP	Software Quality Assurance Program
SR	Safety related
NEK	Nuklearna elektrarna Krško – Krško Nuclear Power Plant

4. REFERENCES

4.1. Title 10, Code of Federal Regulations, Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants"

4.2. Title 10, Code of Federal Regulations, Part 21, "Reporting of Defects and Noncompliance"

4.3. ASME NQA-1-2008, Addenda 2009/2011 "Quality Assurance Requirements for Nuclear Facility Applications"

4.4. ANSI N45.2-1977, "Quality Assurance Program Requirements for Nuclear Power Plants"

4.5. ANSI N45.2.9-1979, "Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants".

4.6. INPO 12-014; Nuclear Power Plant Software Quality Assurance; Revision 1; April 2015

4.7. Title 10, Code of Federal Regulations, Part 73, "Physical Protection of Plants and Materials"

4.8. Regulatory guide RG 5.71, Cyber Security Programs for Nuclear Facilities, January 2010

4.9. Engineering Services Manual ED-11, Process Computer Configuration Control Program, rev. 2, June 2017

4.10. Security Manual SP-3, Cyber Security Program, Revision 1, Nuclear Power Plant Krško, February 2016

4.11. ESP-2.912, Documentation of New Application for Process Control and Process Computer Systems, current revision, Nuclear Power Plant Krško

4.12. ESP-2.950, Process Computer Design Change, Nuclear Power Plant Krško

4.13. ESP-2.602, Plant Design Modification, Nuclear Power Plant Krško

5. DOCUMENTS FOR SUBMISSION

Supplier shall submit for NEK review one controlled copy of the final approved Supplier's Software Quality Assurance Program (SQAP) for the scope of work to be performed.

6. SOFTWARE QUALITY ASSURANCE PROGRAM REQUIREMENTS

Supplier shall develop and implement Software Quality Assurance Program (SQAP) consistent with the requirements defined herein. As a minimum, the program shall address the following quality assurance criteria:

6.1. Organization

The organizational structure, functional responsibilities, levels of authority, and lines of communication for personnel performing activities that affect quality shall be documented in organizational charts and/or written procedures.

6.1.1. Supplier's Quality Assurance personnel shall have sufficient and well defined responsibility, authority, and organizational freedom to identify and evaluate quality problems, to demand implementation of approved corrective action, and to verify implementation of corrective actions. Such

persons or organizations shall report to a management level such that required authority and organizational freedom are provided, including sufficient independence from cost and schedule considerations.

6.1.2. Supplier's personnel responsible for verifying that Supplier's work conforms to the established requirements shall not have direct responsibility for the work performed.

6.2. Software Quality Assurance Program elements

The documented Software Quality Assurance Program (SQAP) shall be planned, implemented, and maintained to identify the items and services to which it applies.

6.2.1. The SQAP shall define scope and applicability of the SQAP.

6.2.2. The SQAP shall provide and document criteria to classify software to reflect in quality levels using a graded approach in accordance with NEK procedure ESP-2.950 (reference 4.12).

6.2.3. The program shall provide for planning and accomplishing activities affecting quality under suitably controlled conditions.

6.2.4. The program shall provide for any special controls, processes, and skills necessary to attain the required quality and provide for verification of quality by test, as necessary.

6.2.5. The program shall provide for indoctrination and training of personnel performing activities affecting quality to assure that suitable proficiency is achieved and maintained.

6.2.6. Supplier's management shall regularly review the status and adequacy of the documented quality assurance program.

6.2.7. Measures shall be established for the control and distribution of the documented quality assurance program.

6.3. Software Design, Development, Modification and Testing (Software Development Cycle)

Supplier's SQAP for controlling activities in software development cycle according to its quality classification shall satisfy the following requirements:

6.3.1. Identify and document the procedures for software design, development, modification and test activities.

6.3.2. Design development and modification activities shall satisfy the requirements of NEK Engineering Service Manual ED-11 (reference 4.9).

6.3.3. Those activities shall be prescribed to ensure that requirements of this specification and all other codes or standards referenced herein and in the purchase order are correctly transferred into Software Development Cycle.

6.3.4. The Software Development Cycle shall assure secure cyber environment in accordance 10 CFR 73.54 (reference 4.7) and RG 5.71 (reference 4.8). Those requirements are encapsulated in NEK Security Manual SP-3 (reference 4.10)

6.3.5. Identify and document the procedures by which technical and management reviews are conducted and documented to verify the software development

cycle activities utilized to demonstrate acceptable performance and the correctness of documentation, prior to the delivery of program capabilities to the customer.

6.3.6. Identify and document the procedures used to formally approve or certify the acceptability of performance, correctness of documentation and attainment of program requirements.

6.3.7. Require monitoring to assure compliance with its procedures.

6.3.8. Software development cycle documentation standards and practices to be used for software design, development, modification and test for all software shall be referenced or documented in the SQAP. The SQAP shall reference or document the procedures to be applied to assure compliance with standards, practices, and delivery of correct documentation and change information to the NEK.

6.3.9. The SQAP shall require independent review of documentation and designation of Supplier's approval authority.

6.3.10. Acceptance tests should be carried out at the vendor's facility and at the customer's facility to demonstrate that the software performs as expected.

6.3.11. The program shall identify and document the evaluation, review, change, test and acceptation of software tools used in software development cycle as part of the software development cycle.

6.4. Procurement

Supplier's SQAP for controlling procurement documents shall satisfy the following requirements:

6.4.1. Applicable design bases, quality assurance requirements, and other requirements necessary to assure adequate quality shall be included or referenced in documents for procurement of items and services.

6.4.2. Procurement documents shall require Subsupplier to have a quality assurance program consistent with the applicable requirements of this specification.

6.4.3. The procurement documents shall provide for access to the Subsupplier facilities and records for inspection or audit by the Supplier.

6.4.4. Procurement documents shall identify the documentation required to be submitted.

6.4.5. Procurement documents shall include Supplier's requirements for reporting and approving disposition of nonconformance.

6.4.6. A review of the procurement documents shall be performed to assure that the documents include appropriate technical and quality requirements.

6.4.7. Procurement document changes that affect technical or quality specifications shall be subject to the same degree of control as used in preparing the original document.

6.5. Instructions, Procedures, and Drawings

6.5.1. Instructions, Procedures, and Drawings prescribing software development cycle shall be reviewed, approved, and controlled.

6.5.2. Supplier shall assure that documented instructions, procedures, or drawings prescribe all software development cycle activities.

6.5.3. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative criteria for determining that software development cycle activities have been satisfactorily accomplished.

6.5.4. Instructions, procedures, or drawings shall define development cycle requirements based on the software quality level category.

6.5.5. Instructions, procedures, or drawings shall provide guidance for managing software errors.

6.5.6. Instructions, procedures, or drawings shall contain QA record storage requirements for software development cycle documentation

6.5.7. SQA procedures should identify roles and responsibilities for those who develop and/or procure, own, maintain, and use quality software.

6.6. Document and Records

Supplier shall assure that Software development cycle documents, including changes, are reviewed for adequacy, approved for release by authorized personnel, and properly distributed to and used at locations where the prescribed activity is performed.

In the software development cycle that is applied by Supplier the name of the particular documents and the number of documents can differ from the requirements in this specification. In that case the correlation shall be established between software development cycle documents required by this specification and software development cycle documents applied by Supplier.

6.6.1. Software development cycle documents changes shall be reviewed and approved by the same organization that performed the original review and approval, unless other organizations are specifically designated.

6.6.2. Procedure governing document control shall be established and provide for:

1. identification of individuals or organizations responsible for preparing, reviewing, approving, and issuing documents and revisions thereto,
2. identifying the proper documents to be used in performing the activity,
3. coordination and control of interface documents,
4. ascertaining that appropriate documents are being used,
5. establishing distribution lists.

6.6.3. Documents developed during the software development cycle to prove the quality of the software shall include one or more of the documents defined in NEK Engineering Service Manual ED-11 (reference 4.9) and NEK procedure ESP-2.912 (reference 4.11).

6.7. Configuration Management

6.7.1. Software Development Cycle Configuration Management shall comply with the requirement of NEK Engineering Service Manual ED-11 (reference 4.9).

6.7.2. The SQAP shall establish requirements for describing software to assure unique identification necessary to maintain configuration (name, version, platform ...).

6.7.3. The SQAP shall establish Software development cycle configuration change management control for ensuring the configuration control is maintained and that changes are evaluated and tested during the software development cycle activities (at the vendor facility) before the software is placed in service.

6.7.4. The SQAP shall reference or document the Supplier's procedures and controls for the control of configuration items, and permit traceability between configuration items of development cycle activities including development of upgrades for existing software, installation of new versions of software, or other activities that affect software version increments essential to establishing software baselines that define the basis for further development.

6.7.5. The SQAP shall establish baselines for software to define the basis for further development, allow control of configuration items, and permit traceability between configuration items.

6.7.6. The SQAP shall establish the requirements for configuration control of Software tools used in software development cycle. Changes to the software tool shall be evaluated for impact on the software product to determine the level of reviews and retesting that will be required. Software tools that do not affect the performance of the software need not be placed under configuration control.

6.8. Control of Purchased Items and Services

Supplier's program for controlling purchased items and services shall satisfy the following requirements:

6.8.1. The selection of Subsupplier shall be based on evaluation of their capability to provide items or services in accordance with the requirements of the procurement documents.

6.8.2. Methods to be utilized in evaluation of Subsupplier, and the results therefrom, shall be documented and shall include one or more of the following:

1. Evaluating the Subsupplier's history of providing a product, which performs satisfactorily in actual use.
2. Determining the Subsupplier's technical and quality capability by a review of is quality assurance program, and a direct evaluation of his facilities and the implementation of his quality assurance program.

6.8.3. Procedures shall be established and implemented for verification activities (surveillance, receipt inspection, and audit), as appropriate, to assure conformance of procured items and services to identified requirements.

6.8.4. Where acceptance is based on certifications from Subsupplier, the Supplier shall validate the certifications via surveillance, audit, and/or independent tests.

6.9. Corrective Action

Supplier shall assure that conditions adverse to quality are promptly identified and corrected.

6.9.1. In case of significant conditions adverse to quality, the cause of the condition shall be determined and corrective action taken to preclude recurrence.

6.9.2. Identification of significant conditions adverse to quality, the cause of the conditions, and the corrective action taken shall be documented and reported to appropriate levels of management. Follow-up action shall be taken to verify implementation of corrective action.

6.10. Software Error Management

6.10.1. The Supplier is responsible for analyzing software errors and notifying NEK of confirmed errors detected in Supplier software. The notification shall include a description of the error, advice on work-arounds for error avoidance, when applicable, a listing of all versions of the software that contained the error, when available, and the date the error was reported. Corrected errors will be noted.

1. Software error classification shall meet the following functional descriptions:
   A. Problem results in incorrect answers.
   B. Problem causes incomplete program execution or aborts.
   C. Documentation of procedure file errors, inconveniences, or cautions, cannot be classified in either of the above definitions.
2. A copy of each error notification will be sent to the individual(s) identified in the procurement document.

6.10.2. The Supplier shall promptly notify NEK when software errors are confirmed and again when the errors are removed or corrected.

6.10.3. The Supplier shall maintain a log of all software errors detected in software.

6.10.4. If errors invalidate any sections of the verification report, such that a program user or calculation checker could not depend on specific sections of a verification report when making engineering designs and analysis, the Supplier shall promptly revise the verification report accordingly.

6.11. Quality Assurance Records

Supplier's SQAP shall establish the procedures to identify the specific records that will be generated and maintained during software development cycle activities and to prescribe their retention periods and storage requirements.

6.11.1. Define document control and records management requirements for software development cycle documentation.

6.11.2. Develop documentation sufficient to prove the quality of the software during its development cycle.

6.11.3. Records shall include drawings, specifications, purchase documents, work orders, material certifications, calculations, inspection and test reports, work procedures, nonconformance and corrective action reports, audit reports, and personnel, process, and equipment qualification records.

6.11.4. Inspection, test, and work performance monitoring records shall indicate the nature of observations, the acceptable limits of parameters checked, the qualitative or quantitative results, the actions taken in connection with any identified deficiencies, the date of the observation, and the identity of personnel involved.

6.11.5. Required records shall be legible, identifiable, and retrievable.

6.11.6. All maintained records shall have clear identification markings that can be traced to a specific job or item and be entered into a system that provides for timely retrieval.

6.11.7. Record retention periods and storage requirements for safety related software and services shall satisfy the requirements of ANSI N45.2.9-1979, "*Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants*".

6.12. Review and Inspection

6.12.1. Seller's SQAP shall define the reviews and inspections to verify the software meets procurement specifications before it is released to NEK.

6.12.2. It shall establish controls to support reviews, testing and inspection of software and documentation prior to its release to NEK.

6.12.3. The supplier's SQAP shall reference or document procedures for assuring the accomplishment of the following:

1. Analysis of software requirements to determine testability.
2. Review of test requirements and criteria for adequacy, feasibility, and traceability and satisfaction of requirements.
3. Review of test plans, procedures, and specifications to determine that the level of testing is sufficient to determine acceptable program performance.
4. Verification that tests are conducted in accordance with approved test plans and procedures.
5. Verification that test results are the actual findings of the tests.
6. Review and verification of test reports.
7. Ensuring that test-related media and documentation are maintained to allow repeatability of tests.
8. The Supplier shall test all programs in a hardware and software environment equivalent to the operational environment at NEK.

6.13. Audits

Supplier's SQAP shall establish the measures for auditing the software development cycle process. The audit shall include the following assessments:

6.13.1. Measures are established to control software throughout the software development cycle.

6.13.2. Software development cycle activities are adequately and effectively reviewed.

6.13.3. Acceptance testing is adequate.

6.13.4. Measures are established and implemented to assure that software errors and failures from both internal and external sources are identified, documented, resolved, evaluated, assessed for impact on past and present applications, and resolved.

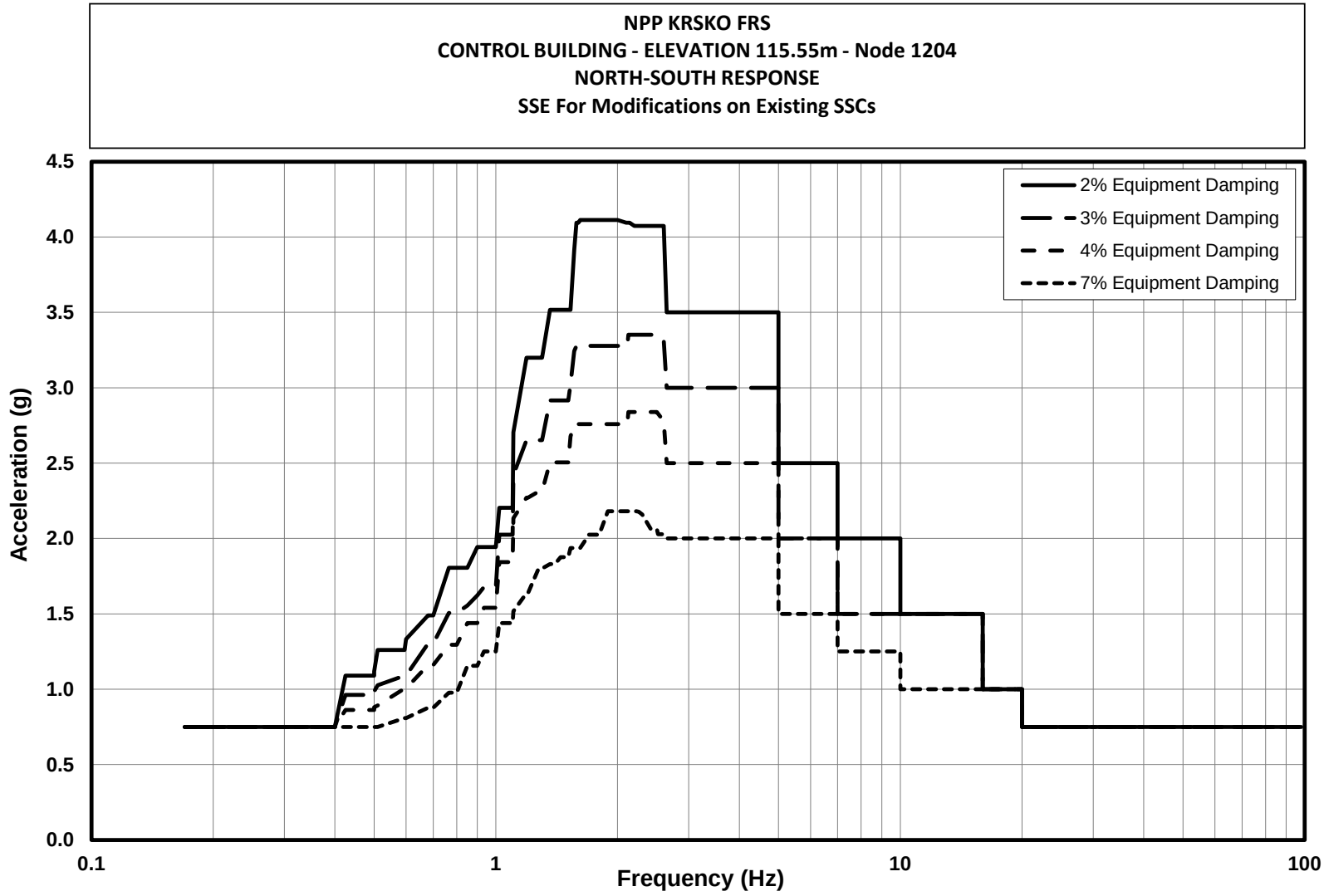
7. NEK AUDITS

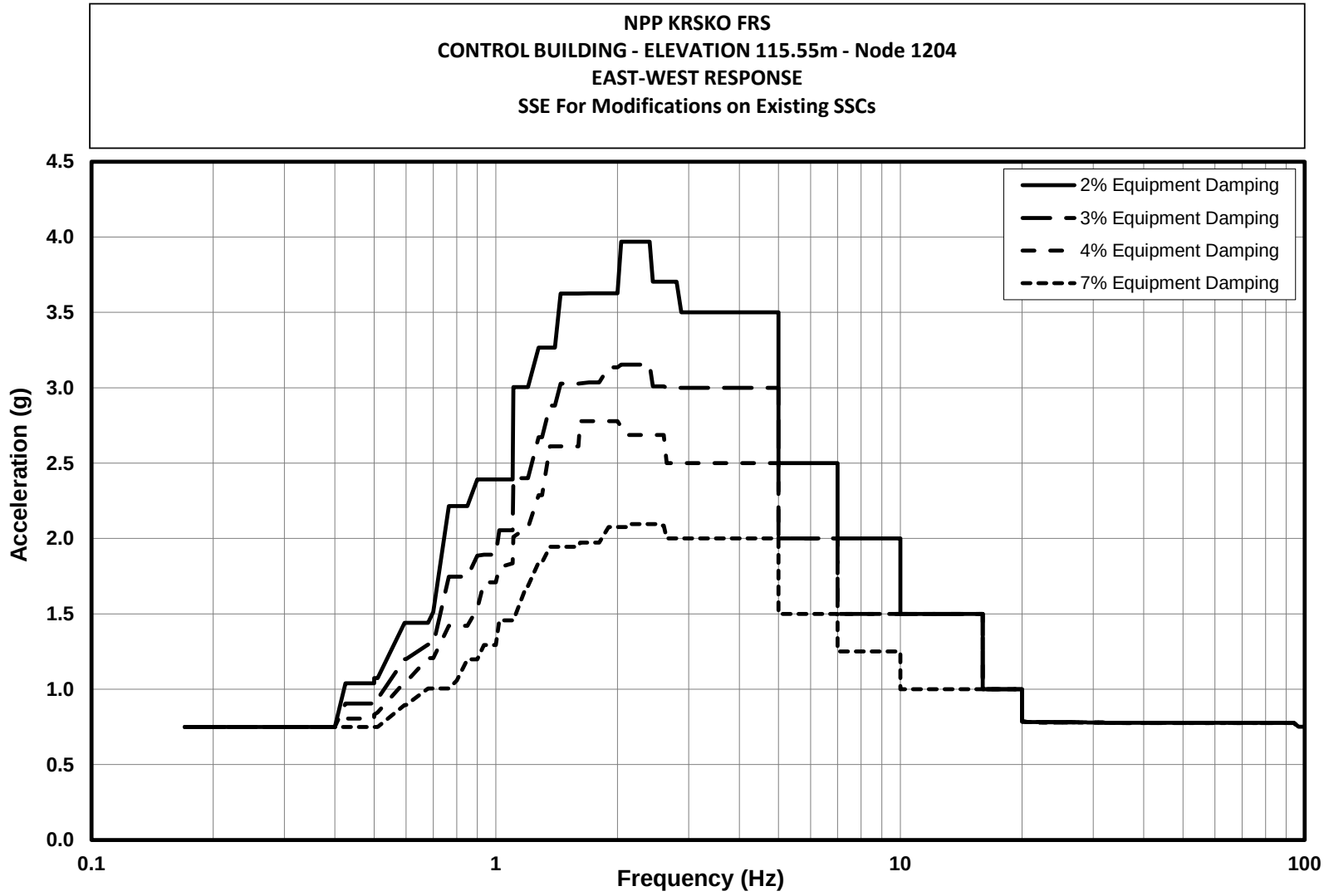
7.1. NEK has the right to conduct an audit of Supplier's SQAP to determine Supplier's capability of satisfying quality assurance requirements herein and to verify that Supplier is implementing the SQAP as defined in Supplier's SQAP manual accepted by NEK. Supplier shall provide access to Supplier's facilities for the purpose of conducting an audit.

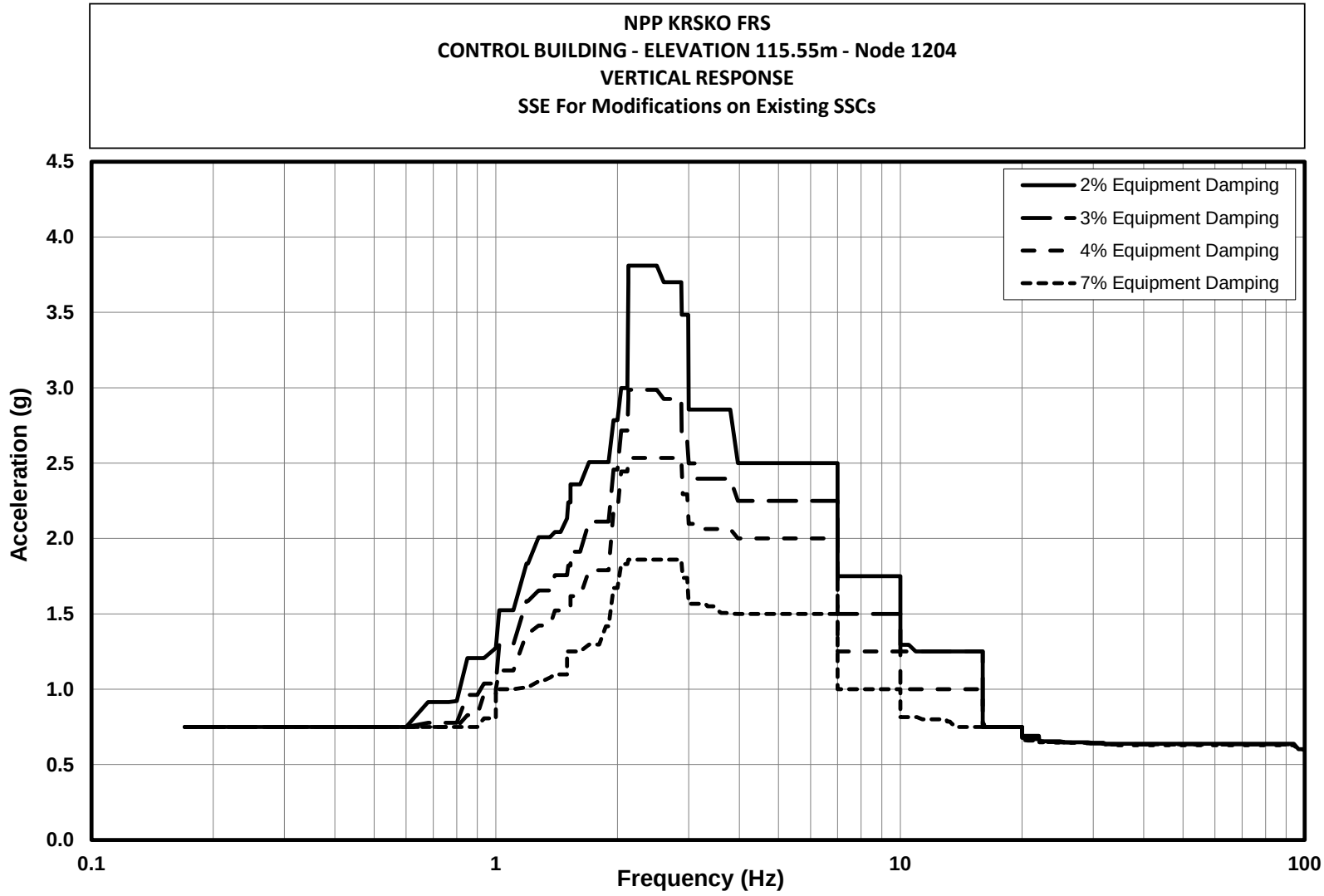
7.2. NEK may reject software, hardware and/or stop work, if it deems that software, hardware or service is not in accordance with the quality assurance requirements herein. Supplier shall not resume any work before completion off all corrective measures previously approved by NEK.

Appendix 7

Applicable Seismic Response Spectra


NPP KRSKO FRS
CONTROL BUILDING - ELEVATION 115.55m - Node 1204
NORTH-SOUTH RESPONSE
SSE For Modifications on Existing SSCs
2% Equipment Damping
3% Equipment Damping
4% Equipment Damping
7% Equipment Damping
Acceleration (g)
Frequency (Hz)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
0.1
1
10
100


NPP KRSKO FRS
CONTROL BUILDING - ELEVATION 115.55m - Node 1204
EAST-WEST RESPONSE
SSE For Modifications on Existing SSCs
2% Equipment Damping
3% Equipment Damping
4% Equipment Damping
7% Equipment Damping
Acceleration (g)
Frequency (Hz)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
0.1
1
10
100


NPP KRSKO FRS
CONTROL BUILDING - ELEVATION 115.55m - Node 1204
VERTICAL RESPONSE
SSE For Modifications on Existing SSCs
2% Equipment Damping
3% Equipment Damping
4% Equipment Damping
7% Equipment Damping
Acceleration (g)
Frequency (Hz)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
0.1
1
10
100