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SAFETY RELATED (SR)	x
QUALITY RELATED (QR)	
NON-SAFETY RELATED (NSR)	

LEVEL OF USE: REFERENCE

PROCUREMENT OF PROCESS CHEMICALS

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LIST OF CHANGES

Revision	Page	Description of change
7	updates from PCN-1	Appendix 5.1: 7. Changed QA requirements; added requirement for a boron-10 analysis report from an ISO 17025 accredited laboratory.
	updates from PCN-2	Appendix 5.9: 1. 1. Performance Requirements updated; phosphate compliance confirmation added; phosphate concentration corrected.
	8	New Non-Safety Related Item with Augmented Quality added.
	8	Reference updated.
	11	New specification sheet added (5.24).
	App. 5.24	New process chemical added: Mixed Powdered Ion Exchange Resin.

Revision	Page	Description of change
6	App. 5.1: pages 1, 2, 3, 4, 5	2. Inspection and tests: Text added; changed QA requirements for isotopic analysis; 5. Records: changed titles and telephone numbers; changed and added text; 6. Rights of Access: text added; 7. QA Program Requirements: a part of text withdrawn; 9.10CFR21 Reporting/ 10. Supplier Documentation Requirements: changed titles and telephone numbers; 12. Shipping Requirements: text added
	App. 5.2: pages 2, 3, 4	5. Records: changed titles and telephone numbers and text changed; 6. Right of Access: text added; 7. QA Requirements: a part of text withdrawn; 9. 10CFR21 Reporting/10. Supplier Documentation Requirements: changed titles and telephone numbers;

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6	App. 5.3: page 1, 2, 3, 4	1. Performance Requirements: changes in chemical requirements in accordance with product data, missing requirement for chloride added; 3. Marking and Identifications: text added; 5. Records/10. Supplier Documentation Requirements: changed titles and telephone numbers; 6. Right of Access: text added; 7. QA Requirements: changed text applicable for AQ chemical; 9. 10CFR21 Reporting: text withdrawn; 11. Non Conformance Report: text withdrawn.	
6	App. 5.4: page 1, 2, 3, 4, 5	1. Performance Requirements: change in chemical requirements in accordance with product data; 5. Records/10. Supplier Documentation Requirements: changed titles and telephone numbers; 6. Right of Access: text added; 7. QA Requirements: changed text applicable for AQ chemical; 9. 10CFR21 Reporting: text withdrawn; 11. Non Conformance Report: text withdrawn.	
6	App. 5.5: page 2, 3, 4, 5	5. Records/10. Supplier Documentation Requirements: changed titles and telephone numbers; 6. Right of Access: text added; 7. QA Requirements: changed text applicable for AQ chemical; 9. 10CFR21 Reporting: text withdrawn; 11. Non Conformance Report: text withdrawn.	
6	App. 5.6: page 2, 3, 4	5. Records/10. Supplier Documentation Requirements: changed titles and telephone numbers; 6. Right of Access: text added; 11. Non Conformance Report: text withdrawn.	
6	App. 5.7: page 1, 2, 3, 4, 5	1. Performance Requirements: changes in chemical requirements (sulphate added); 5. Records/10. Supplier Documentation Requirements: changed titles and telephone numbers; 6. Right of Access: text added; 11. Non Conformance Report: text withdrawn	
6	App. 5.8: page 1, 2, 3, 4, 5	2. Inspection and tests: text added; 5. Records/10. Supplier Documentation Requirements: changed titles and telephone numbers; 6. Right of Access: text added; 11. Non Conformance Report: text withdrawn	

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6	App. 5.9, 5.10: page 1, 2, 3, 4, 5	1. Performance Requirements: changes in chemical requirements (several requirements added); 2. Inspection and tests: text added; 5. Records/10. Supplier Documentation Requirements: changed titles and telephone numbers; 6. Right of Access: text added; 11. Non Conformance Report: text withdrawn
6	App. 5.11, 5.13, 5.14, 5.15, 5.16, 5.17, 5.18: page 2, 3, 4, 5	5. Records/10. Supplier Documentation Requirements: changed titles and telephone numbers; 6. Right of Access: text added; 11. Non Conformance Report: text withdrawn
6	App. 5.12: page 1, 2, 3, 4	1. Performance Requirements: changes in chemical requirements for chlorides; 5. Records/10. Supplier Documentation Requirements: changed titles and telephone numbers; 6. Right of Access: text added; 11. Non Conformance Report: text withdrawn
6	App. 5.19, 5.20, 5.21, 5.22, 5.23: page 1, 2, 3, 4, 5	3. Marking and Identification: text added; 5. Records/10. Supplier Documentation Requirements: changed titles and telephone numbers, requirements added; 6. Right of Access: text added; 8. Shelf Life: requirements added; 11. Non Conformance Report: text withdrawn; 12. Shipping Requirements: requirements added

Revision	Page	Description of change
5	1	Changed author and reviewers
5	4, 7, App. 5.9	New process chemical added: Hydrogen Peroxide, H ₂ O ₂ , 35%, SC:AQ
5	4, 7, App. 5.12	New process chemical added: Sodium tolytriazole based Corrosion Inhibitor, SC:AQ

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Revision	Page	Description of change
4	5, 7, App. 5.14	New process chemical added: 50% sodium hydroxide p.a.
	App. 5.3	Changes in chemical requirements due to industrial experience
	App. 5.4	Changes in chemical requirements due to industrial experience
	App. 5.6	Changes in chemical requirements due to WANO peer review 2019 recommendations (sodium added)
	App. 5.7	Changes in chemical requirements due to WANO peer review 2019 recommendations (sodium added)

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1.0 PURPOSE AND SCOPE

This procedure covers chemical and other requirements for procurement of process chemicals that are used in Nuclear Power Plant Krško. The suppliers shall provide these requirements.

Specification sheets for all process chemicals purchasing are listed separately in paragraph 5 as appendices.

This policy is established to prevent the use of process chemicals that could introduce potentially harmful impurities into plant areas or circuits, thereby affecting the coolant, auxiliary and safety systems, or other external surfaces. The intrusion of non-conforming chemicals into plant systems can result in deviations in the chemistry regime, leading to component and system damage or increase of dose rates.

1.1 Items to be included

List under this subheading describes process chemicals covered in this procedure:

1.1.1 Safety Related Items:

- Boric Acid, H_3BO_3 , SC:SR
- Lithium-7 Hydroxide Monohydrate, $^7LiOH \cdot H_2O$, SC:SR

1.1.2 Non-Safety Related Items with Augmented Quality Requirements:

- Ion Exchange Resin, Anion, Nuclear Grade, SC:AQ
- Ion Exchange Resin, Cation, Nuclear Grade, SC:AQ
- 7Li Hydroxide Ion Exchange Resin, Mixed, Nuclear Grade, SC:AQ
- Ammonium hydroxide, NH_4OH , 25%, SC:AQ
- Hydrazine Hydrate, 55 %, (35 % H_2H_4), SC:AQ
- Hydrogen Peroxide, H_2O_2 , 30%, SC:AQ
- Hydrogen Peroxide, H_2O_2 , 35%, SC:AQ
- Hydrazine, N_2H_4 , 15%, SC:AQ
- Molybdate and Azole based Corrosion Inhibitor, SC:AQ
- Sodium tolytriazole based Corrosion Inhibitor, SC:AQ
- Non-oxidizing Biocide, SC:AQ

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- Potassium Hydroxide, KOH, SC:AQ - Sodium Hydroxide Solution, 50% NaOH, SC:AQ - Sodium Hydroxide Solution 50% p.a., 50% NaOH p.a., SC:AQ - Sodium Nitrite, NaNO₂, SC:AQ - di-Sodium Tetraborate Decahydrate, Na₂B₄O₇·10H₂O, SC:AQ - Hydrogen Gas Type 5, SC:AQ - Oxygen Gas Type 3.5, SC:AQ - 99.9 % Nitrogen Gas, SC:AQ - 99.5 % Nitrogen Gas, SC:AQ - 99.5 % Carbon Dioxide, SC:AQ - Mixed Powdered Ion Exchange Resin, SC:AQ		
1.2	<u>Items not included</u> Adding into systems, disposal, labelling and specific quality verification analysis performed by NEK laboratory of received process chemicals, is not included in this procedure.	
2.0	REFERENCES	
2.1	ADP-1.2.104, Priprava, pregled in odobritev novih postopkov v NE Krško	
2.2	ADP-1.10.006, Proces nabave blaga za tehnološki del NE Krško	
2.3	PD-1, Program nabave	
2.4	KRK 5-1, Chemistry criteria and specifications	
2.5	QS-610, General quality assurance program requirements	
3.0	RESPONSIBILITIES	
Responsibilities for the purchasing process of goods and services for the technological part of the plant are defined in the procedure ADP-1.10.006 "Izvajanje nabave blaga za tehnološki del NE Krško" and in program PD-1 "Program Nabave".		

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4.0

DEFINITIONS AND ABBREVIATIONS

4.1

Definitions

4.1.1

Safety Related Item (SR)

Any structure, system, component, or part used in a nuclear power plant that is relied upon during or following design basis events to assure the integrity of the reactor coolant pressure boundary, the capability to shutdown the reactor and maintain it in a safe shutdown condition, or the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to those referred in 10CFR100.

4.1.2

Augmented Quality Requirements (AQ)

Any item that does not perform a safety-related function and whose failure would not prevent the accomplishment of a safety-related function. An optional subset of the classification category NSR is Augmented quality, which can be applied to any item that is subject to non-safety-related regulatory requirements or special requirements imposed by NEK. The scope of the classification category AQ includes specific items that are very important for plant reliability and operability. For these items, the supplier shall ensure compliance with the requirements of international standards as ISO 9001, ISO/IEC 17025 or other relevant recognized standards.

4.1.3

Chemical composition

Chemical composition refers to the arrangement, type and ratio of atoms in molecules of substances. The chemical composition of a substance determines the properties of the substance.

4.1.4

Percent by weight

This means the percent by weight of solute in the total weight of solution.

4.1.5

Atomic percent

The number of atoms of an element in 100 atoms representative of a substance.

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4.1.6 Part per million (ppm)

The number of milligrams of solute per kg of solution is one ppm, since 1 mg is 10^{-3} g and 1 kg is 10^3 g. Parts per million concentrations are essentially mass ratios (solute to solution) x a million (10^6). In this sense, they are similar to percent by weight, which could be thought of as parts per hundred.

4.1.7 Pro Analysis (p.a)

Products with a guarantee certificate and/or suitable for the stated analytical application. This is the ideal quality for laboratory purposes meeting the requirements of international standards as ACS, ISO and/or Reag. Ph Eur. Batch to batch reproducibility is specially controlled to guarantee consistent analytical results.

4.1.8 Percent by volume (%)

Percent by volume is a measure of concentration of a substance in solution expressed as the ratio of the volume of the solution to the total volume of the solution multiplied by 100%.

4.1.9 Dew point

The temperature below which water droplets begin to condense and dew can form.

5.0 SPECIFICATION SHEETS FOR PROCESS CHEMICAL PURCHASING

5.1 Boric Acid, H_3BO_3 , SC:SR

5.2 Lithium-7 Hydroxide Monohydrate, $^7LiOH \cdot H_2O$, SC:SR

5.3 Ion Exchange Resin, Anion, Nuclear Grade, SC:AQ

5.4 Ion Exchange Resin, Cation, Nuclear Grade, SC:AQ

5.5 7Li Hydroxide Ion Exchange Resin, Mixed, Nuclear Grade, SC:AQ

5.6 Ammonium hydroxide, NH_4OH , 25%, SC:AQ

5.7 Hydrazine Hydrate, 55 %, ($35 \% H_2H_4$), SC:AQ

5.8 Hydrogen Peroxide, H_2O_2 , 30%, SC:AQ

5.9 Hydrogen Peroxide, H_2O_2 , 35%, SC:AQ

5.10 Hydrazine, N_2H_2 , 15%, SC:AQ

5.11 Molybdate and Azole based Corrosion Inhibitor, SC:AQ

5.12 Sodium Tolytriazole based Corrosion Inhibitor, SC:AQ

5.13 Non-oxidizing Biocide, SC:AQ

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5.14 Potassium Hydroxide, KOH, SC:AQ 5.15 Sodium Hydroxide Solution, 50% NaOH, SC:AQ 5.16 Sodium Hydroxide Solution 50% p.a., 50% NaOH p.a., SC:AQ 5.17 Sodium Nitrite, NaNO₂, SC:AQ 5.18 di-Sodium Tetraborate Decahydrate, Na₂B₄O₇·10H₂O, SC:AQ 5.19 Hydrogen Gas Type 5, SC:AQ 5.20 Oxygen Gas Type 3.5, SC:AQ 5.21 99.9 % Nitrogen Gas, SC:AQ 5.22 99.5 % Nitrogen Gas, SC:AQ 5.23 99.5 % Carbon Dioxide, SC:AQ 5.24 Mixed Powdered Ion Exchange Resin, SC:AQ		