



BELARUSIAN
STATE
UNIVERSITY

INFORMATIONAL AND ANALYTICAL SUPPORT OF THE CHEMICAL COMPONENT FOR NUCLEAR KNOWLEDGE PORTAL BeINET

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Svetlana Sytova, Siarhei Charapitsa

14th CHERNE Workshop, June 1th, 2018

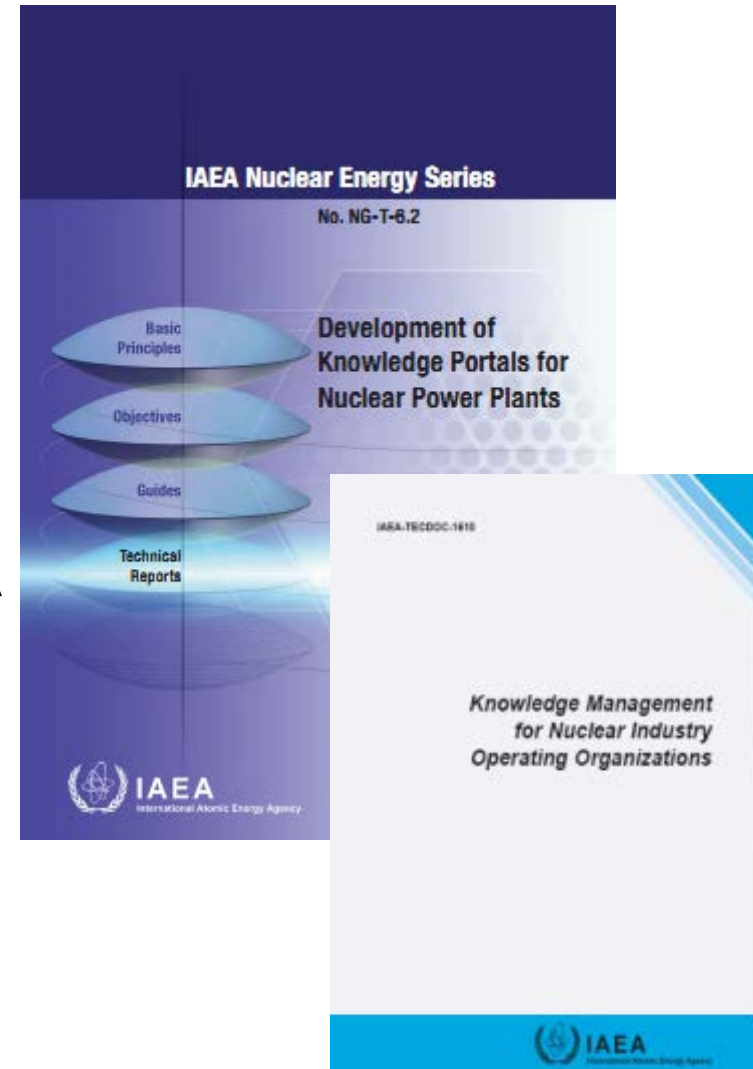


iGeneration, Gen Tech



Every country with its own nuclear industry has to create and maintain a national portal of nuclear knowledge integrated into the global system of nuclear knowledge management.

Nowadays under the auspices of IAEA numerous national and international portals of nuclear knowledge are created in Europe, Asia, Africa and America.





Belarus, Republic of

SUMMARY

Nuclear Power Reactors

Under Construction Operational

2

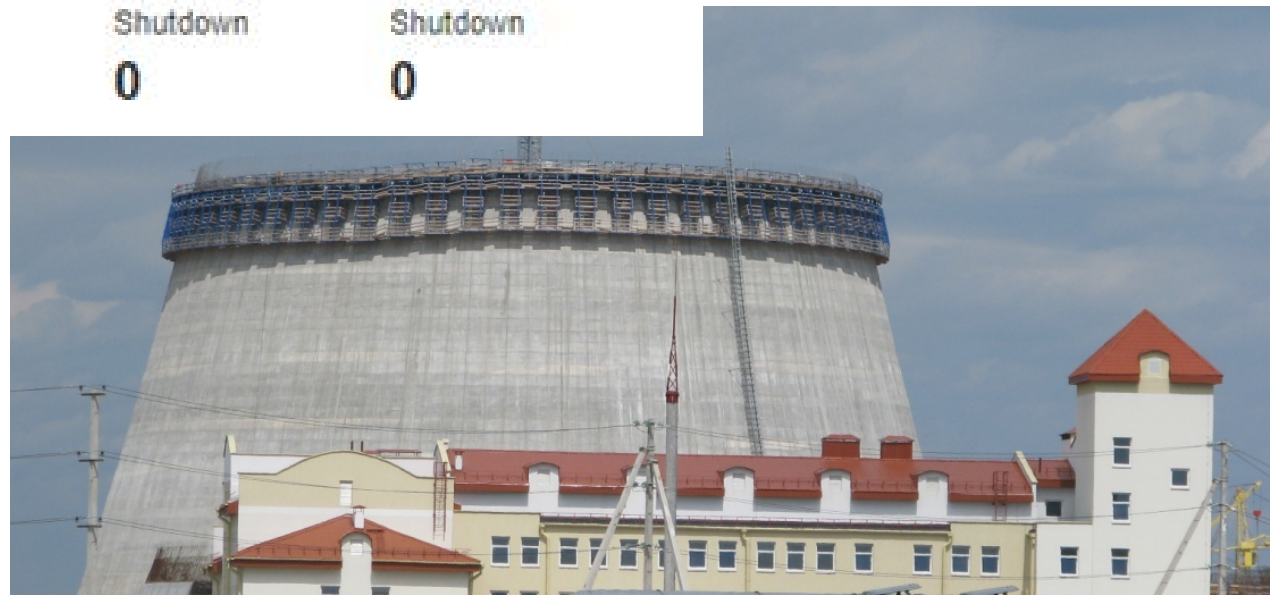
0

Long-Term
Shutdown

0

Permanent
Shutdown

0



- **Belarusian State University**
- International State Ecological University named after A.Sakharov
- Belarusian State University of Informatics and Radioelectronics
- Belarusian National Technical University





***QS World University
Rankings -354***



Rector – professor Andrei D. Karol



Belarus

RANKING WEB OF UNIVERSITIES

ranking	World Rank	University	Det.	Presence Rank*	Impact Rank*	Openness Rank*	Excellence Rank*
1	487	Belarusian State University / Белорусский государственный университет		282	342	238	840
2	2955	Belarusian National Technical University / Белорусский национальный технический университет		753	5242	3018	3300
3	2972	Academy of Public Administration of the President of the Republic of Belarus / Академия управления при Президенте Республики Беларусь		4362	11073	8932	969
4	3359	Yanka Kupala State University of Grodno / Гродненский государственный университет Янки Купалы		907	4384	2875	4162
5	3544	Belarusian State University of Informatics and Radioelectronics / Белорусский государственный университет информатики и радиоэлектроники		1663	6491	3967	3780

...is among **top 100 libraries** in the world



- **Research Institute for Nuclear Problems of BSU**
- **Faculty of Physics of BSU**
- **Faculty of Chemistry of BSU**
- **State Scientific Institution "THE JOINT INSTITUTE FOR POWER AND NUCLEAR RESEARCH - SOSNY"**


Belarusian Nuclear Education and Training Portal - BeINET



MAIN PAGE

INFORMATION CENTER

COLLABORATION



About the Project

Software of portal is free and based on electronic system eLab of client-server architecture.

Mission:

- formation of favorable information, socio-cultural, business and educational environments for sustainable development of nuclear energy in Belarus.

Tasks:

- accelerating search and access to data and information;
- creation of new knowledge and promotion of participation in research, education and training programs in nuclear area.



Basic principles:

- Discussion of the requirements to the Portal with all stakeholders before its development;
- Development of a hierarchical structure of Portal;
- Continuous improvement and control in order to meet technical requirements;
- Transparency.

The motto is “Easy to use – easy to update”



Legislation



IAEA Safety Standards for protecting people and the environment Regulations for the Safe Transport of Radioactive Material 2012 Edition Specific Safety Requirements

International Atomic Energy Agency

These Regulations establish standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to persons, property and the environment that are associated with the transport of radioactive material. These

[Подробнее...](#)



IAEA International Law Series No. 2 Amendment to the convention on the physical protection of nuclear material

International Atomic Energy Agency

[Подробнее...](#)



Code of conduct on the safety and security of radioactive sources 放射源安全和保安行为准则 Code de conduite sur la sûreté et la sécurité des sources radioactives Кодекс поведения по обеспечению безопасности и сохранности радиоактивных источников Código de conducta sobre seguridad tecnológica y física de las fuentes radiactivas

International Atomic Energy Agency

[Подробнее...](#)



Glossary



Glossary of Nuclear Terms

Forschungszentrum Karlsruhe GmbH

Glossary of nuclear terms [Подробнее...](#)



IAEA Safety Glossary. Terminology Used in Nuclear Safety and Radiation Protection

International atomic energy agency

The primary purpose of the Safety Glossary is to harmonize terminology and usage in the IAEA safety standards for protecting people and the environment from harmful effects of ionizing radiation, and in their application. Once definitions of terms have [Подробнее...](#)



ГЛОССАРИЙ МАГАТЭ ПО ВОПРОСАМ БЕЗОПАСНОСТИ. ТЕРМИНОЛОГИЯ, ИСПОЛЬЗУЕМАЯ В ОБЛАСТИ ЯДЕРНОЙ БЕЗОПАСНОСТИ И РАДИАЦИОННОЙ ЗАЩИТЫ

МЕЖДУНАРОДНОЕ АГЕНТСТВО ПО АТОМНОЙ ЭНЕРГИИ

Главная цель Глоссария по вопросам безопасности заключается в том, чтобы унифицировать терминологию и ее употребление в нормах МАГАТЭ по безопасности для защиты людей и охраны окружающей среды от вредного воздействия ионизирующих излучений, а также в пр

[Подробнее...](#)



Reports



ОТЧЕТ О НАУЧНО-ИССЛЕДОВАТЕЛЬСКОЙ РАБОТЕ «Разработка концепции, методов и компьютерных технологий создания электронного портала ядерных знаний учреждений образования Республики Беларусь с базой ядерных знаний и системой дистанционного обучения» ГПНИ «Информатика и космос, научное обеспечение безопасности и защиты от чрезвычайных ситуаций»

С.В. Черепица, С.Н. Сытова, А.Л. Мазаник, А.Н.Коваленко, Н.М.Макоед, Н.В.Кулевич, И.Я.Дубовская, А.И.Тимошенко, М.Д.Дежурко, Т.А. Савицкая, И.М.Кимленко, Н.А.Кумачев, И.В.Резников, В.Г.Жмура

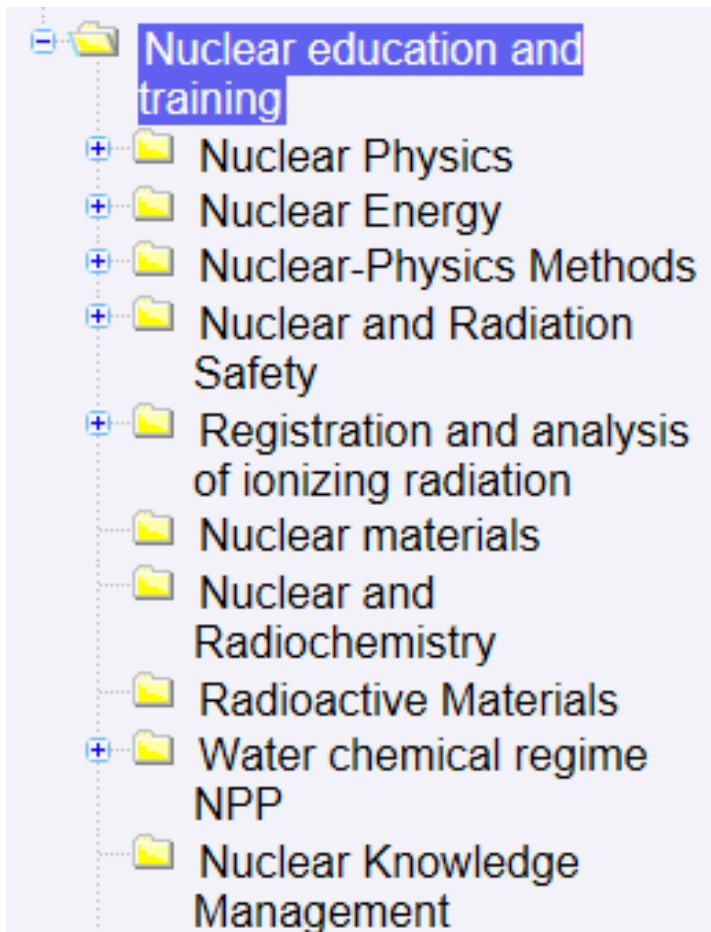
Объектом исследования является структура и таксономия портала ядерных знаний; требования и условия функционирования портала; информационная модель и архитектура портала. Цель работы – создание электронного портала ядерных знаний учреждений образования Р
[Подробнее...](#)

2014-10-23

Доклад на IV Межд.конф.«Ядерные технологии XXI века»

А. С. Лобко, С. Н. Сытова, С.В.Черепица

Применение фреймворка eLab в атомной энергетике [Подробнее...](#)



Учебная программа по курсу "Радиохимия" для специальности "Химия высоких энергий" [Read more...](#)

Процессы экстракции в радиохимии

Кимленко И.М.

[Read more...](#)

Состояние радионуклидов в различных фазах и методы его определения

Кимленко И.М.

[Read more...](#)

- [-] Water chemical regime NPP
- [+] Водоподготовка на АЭС
- [+] Водно-химический режим первого контура АЭС
- [+] Водно-химический режим второго контура АЭС

Водоподготовка в атомной энергетике/ Водоподготовка и водно-химические режимы АЭС



Для студентов специальности «Химия высокой энергии»

Лекции – 20 ч.
Лабораторные – 12 ч.
Практические – 7 ч.
КСР – 4

Лекция 2

Доцент Савицкая Татьяна Александровна



Навигация

- Основные принципы
 - Глоссарий
 - Термины и определения**
 - Коллекция
 - Ядерное образование и обучение
 - Ядерное образование и обучение
 - Научно-популярная литература
 - Ядерное образование и обучение

Электронная библиотека
Информационный центр » Основные принципы » Глоссарий » Термины и определения

Язык оригинала: английский

Наименование
 Авторы

А В С D E F G H I J K L M N O P Q R S T U V W X Y Z A B B Г Д Е Ж З И Й К Л М Н О П Р С Т У Ф Х Ц Ч Ш Щ Ъ Ы Ь Э Ю Я 0 1 2
3 4 5 6 7 8 9 (\ / [- _ + * . !

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Semipermeable membrane

a type of biological or synthetic, polymeric membrane that will allow certain molecules or ions to pass through it by diffusion or occasionally by more specialized processes of facilitated diffusion, passive transport or active transport. [Подробнее...](#)

Ultrafiltration

a variety of membrane filtration in which forces like pressure or concentration gradients lead to a separation through a semipermeable membrane. Suspended solids and solutes of high molecular weight are retained in the so-called retentate, while water and... [Подробнее...](#)

Microfiltration

a type of physical filtration process where a contaminated fluid is passed through a special pore-sized membrane to separate microorganisms and suspended particles from process liquid. The operational pressure is 0.01-0.1 MPa. The microfiltration membrane... [Подробнее...](#)

Reverse osmosis

a water purification technology that uses a semipermeable membrane to remove ions, molecules, and larger particles from water. In reverse



Электронный портал ядерных знаний Республики Беларусь

Belarusian Nuclear Education and Training Portal - BelNET



[Главная страница](#) [Информационный центр](#) [Сотрудничество](#)

Навигация

- Ядерное образование и обучение
 - Ядерная физика
 - Ядерная энергетика
 - Ядерно-физические методы
 - Ядерная и радиационная безопасность
 - Регистрация и анализ ионизирующих излучений
 - Ядерные материалы
 - Ядерная и радиохимия
 - Радиационное материаловедение
 - Водно-химические режимы АЭС
 - Водоподготовка на АЭС
 - Системы ВПУ на Белорусской АЭС

Электронная библиотека

[Главная страница](#) » [Свежие поступления](#) » [Ядерное образование и обучение](#) » [Водно-химические режимы АЭС](#) » [Водоподготовка на АЭС](#) » [Системы ВПУ на Белорусской АЭС](#)

Язык оригинала:

Наименование Авторы

А В С D E F G H I J K L M N O P Q R S T U V W X Y Z A B B Г Д Е Ж З И Й К Л М Н О П Р С Т У Ф Х Ц Ч Ш Щ Ъ Ы Э Ю Я 0 1 2 3 4 5 6 7 8 9 (\ / [_ + * . !

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Система регенерации и промывки установок мембранной очистки (GDP)

[Подробнее...](#)

Система предварительной очистки исходной воды (GDB)

[Подробнее...](#)

Система подачи реагентов для установок мембранной очистки (GDN)

[Подробнее...](#)

Система обессоливания предпочищенной воды методом обратного осмоса (GDF)

[Подробнее...](#)



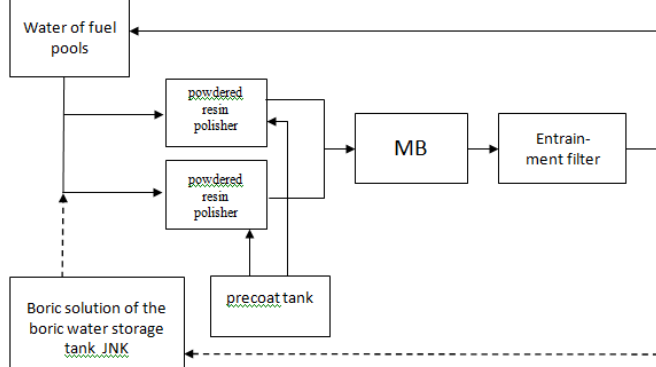
Purification system of the fuel pools and water of boric water storage tank (FAL)

Purification system of the fuel pools and water of boric water storage tank provides WCR quality parameters of the fuel pools and pit-tanks of low concentration boric water storage.

Functions of FAL system are:

- purification of fuel pool water from mechanic and dissolved impurities with purpose to reduction of it's activity and to improvement of transparency;
- purification of low concentration boric water storage pit-tanks from mechanic and dissolved impurities.

The FAL system contain refrigerant of boric water, pumps of boric water supply on purification powdered resin polisher, MB, entrainment filter, pumps of layer support, pump of powdered resin polisher powder with mixing device armature, pipelines. The principle scheme of FAL system is showed on the picture.



Scheme 1. The principal technological scheme of FAL system
(JNK – system of high concentration boric water storage; MB – mixed bed)

The system works constantly at reactor overload. At other reactor regimes one works at certain intervals according to the water quality parameters.

System of steam generator blowdown water purification LCQ-2

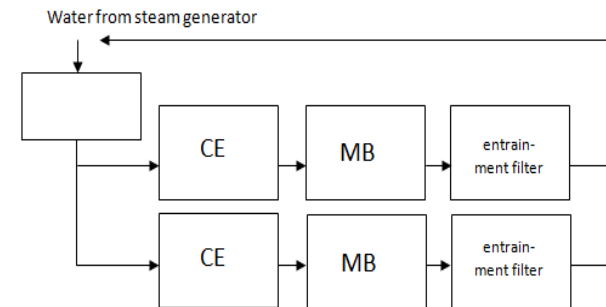
The function of LCQ-2 system is steam generator blowdown water purification from mechanical and dissolved impurities.

The LCQ-2 system consists of two H-cation exchangers, two MB, two entrainment filter, pipelines, armature.

Steam generator blowdown water purification is carried out at a rate of no more 100 t/h in the reactor plant equipment operational period.

Steam generator blowdown water with temperature 50°C after blowdown expansion tank and cooler goes to cation exchanger, where blowdown water is purified from mechanical impurities and from ammonia and ethanoline cations. Then steam generator blowdown water is introduced on MB, where blowdown water is purified from dissolved cation and anion impurities.

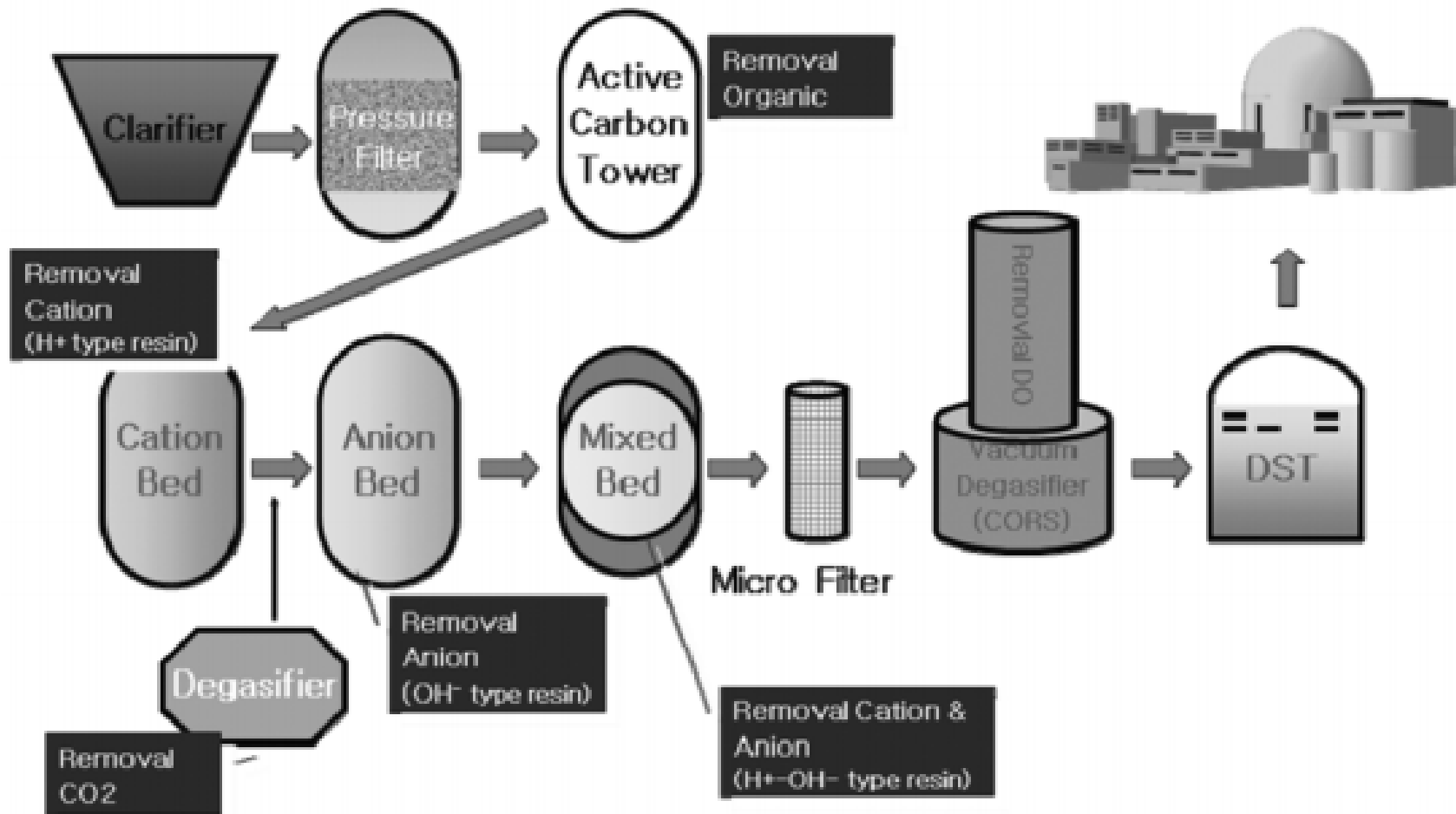
Purified water after the entrainment filter is replaced by pumps.



Scheme 1. The principal technological scheme of LCQ-2 system
(CF – cation exchanger; MB – mixed bed)

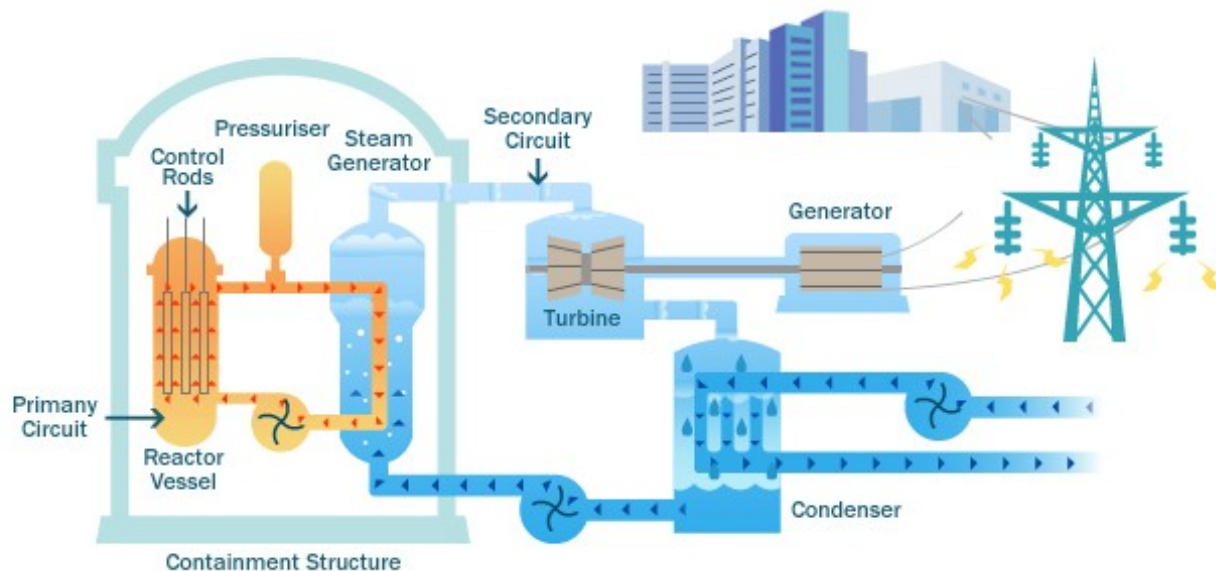


Typical water treatment facility





- **Types of NPP using water**
- **Pros and cons of water use**
- **Water purification stages**
- **Water chemical regime**



WChR has to:

- Ensure the integrity of barriers to prevent possible radioactive fallouts into the environment;
- Prevent corrosion and erosive effects of coolant and other media on structural materials;
 - Minimize formation of deposits on the heat transfer surfaces of equipment and pipelines.



- The concept of the portal, its structure and taxonomy according to IAEA requirements have been developed.
- The bilingual content of portal is an absolutely unique and includes information in nuclear physics, radiochemistry, radiation protection, water chemical regime but it constantly requires updates and maintenance.
- Portal is a necessary tool in the present-day educational environment. It will help improving the quality of education, the motivation of learners and economy of academic hours along with deeper mastering a subject.

At the National Level:

Combination of BelNET and portal developed by the Department for Nuclear and Radiation Safety of the Ministry for Emergency Situations of the Republic of Belarus

At the International Level:

Mutual links at BelNET and CHERNE platform at the first stage, further cooperation has to be discussed.



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FOR YOUR ATTENTION**