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Search Terms: "small modular reactor (smr) AND emergency core cooling system (ECCS) AND passive cooling"
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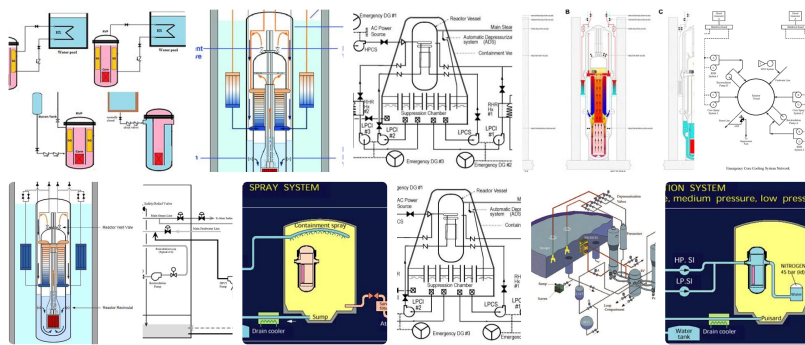
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PDF Passive Safety Systems of Light Water Smr Plants - Lut

Jun 2, 2024 · Keywords: **SMR**, LWR, iPWR, **Passive Safety Systems** The goal of the thesis is to present and compare major global light water **small modular reactor (SMR)** plants and their **passive safety systems**. The thesis provides theory on **SMR** plants and their **passive safety systems** on a general lev...

Images for small modular reactor (smr) AND emergency core cooling s...



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gda.rolls-royce-smr.com

https://gda.rolls-royce-smr.com/assets/documents/documents/rr-smr-e3s-case-chapter-6-...

PDF E3S Case Chapter 6: Engineered Safety Features - English

Features of the Rolls-Royce **Small Modular Reactor (RR SMR)**. It outlines the arguments and preliminary evidence ... revision of the E3S Case include the **Emergency Core Cooling System (ECCS)** [JN01], **Passive Decay Heat** ... 6.1.1 **Emergency Core Cooling System** 6 6.1.2 **Passive Decay Heat Removal** 18...



NRC

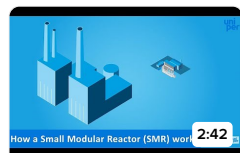
https://www.nrc.gov/docs/ML1535/ML15357A327.pdf



PDF U.s. Nuclear Regulatory Commission Design-specific Review...

The **NuScale** design is an integral pressurized-water, **small modular reactor (SMR)** with the **reactor**, helical coil steam generator, pressurizer, and control rod drives all located in a single ... that serves as the ultimate heat sink for the **passive emergency core cooling system (ECCS)**, the **passive containme...**

Videos for small modular reactor (smr) AND emergency core cooling s...



How a Small Modular Reactor (SMR) works

5.3K views

YouTube | 3yr



Look Inside the Westinghouse AP300TM Small Modular Reacto...

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Emergency Core Cooling System

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Pre small (SMR)

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*Keywords : **Small Modular Reactor**, Design of **Emergency Core Cooling System** Valve, Regulatory Audit 1. Introduction **NuScale** **Small Modular Reactor (SMR)** has been developed that adopted **passive Emergency Core Cooling System (ECCS)** with a different concept from **ECCS** applied to existing large...

 **ScienceDirect**
<https://www.sciencedirect.com/science/article/pii/S0029549322004393> ...



Small modular reactors and insights on passive mitigation strate...

The analyses of **system** behaviors and component interactions in the RCS (CSNI, NUREG-1230, 1988, Thermohydraulics of **Emergency Core Cooling** in Light Water **Reactors**: a State of the Art Report (SOAR), 1989, Validation Matrix for the Assessment Of Thermal-Hydraulic Codes For VVER LOCA And...

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<https://pdfs.semanticscholar.org/6e3f/98d05454518036520d042ca297cfee5acae.pdf> ...



PDF Design Safety Considerations for Water-cooled Small Modul...

Assure safety on multiple **reactors** or modules plant Diversity in **emergency core cooling systems** following loss of all AC power onsite Ensure diversity in depressurization means for high pressure transient Confirm independence in **reactor** trip and **ECCS** for sensors, power supplies and actuation...

 International Atomic Energy Agency
<https://www.iaea.org/newscenter/news/new-crp-design-and-performance-assessment-of-pas...> ...



NEW CRP: Design and Performance Assessment of Passive Eng...

Typical design configurations of **passive emergency core cooling system** to cope with design basis accident, being adopted by water-cooled **SMRs** with integrated nuclear steam supply **system**. The majority of **Small Modular Reactor (SMR)** designs for near-term deployment adopt advanced **passive**...

 small-modular-reactors.org
<https://small-modular-reactors.org/smr-passive-safety> ...

SMR passive safety | small-modular-reactors.org

May 10, 2023 · With less decay heat to manage, **SMRs** can rely on **passive cooling systems**, such as natural convection, to remove heat from the **reactor core**, reducing the risk of overheating and **core** meltdown. 2. Gravity-Driven **Cooling Systems**. Many **SMR** designs feature gravity-driven **cooling**...

 ResearchGate
https://www.researchgate.net/figure/NuScale-reactor-Emergency-Core-Cooling-System-1_fig1... ...



NuScale reactor Emergency Core Cooling System [1] - Research...

NuScale is one of the most developed **Small Modular Reactor (SMR)** design basing on natural circulation and **passive safety systems**. The first NuScale modules will be constructed in Idaho in 2020s.

 **ScienceDirect**
<https://www.sciencedirect.com/science/article/pii/B9780128239162000217> ...



Small modular reactors (SMRs): The case of the United States of...

The NuScale **emergency core cooling system (ECCS)** is made up of two independent **reactor** recirculation valves and three independent **reactor** vent valves. When a loss-of-coolant accident occurs inside containment, the **ECCS** returns coolant from the containment vessel to the **reactor** vessel, whic...

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Evaluating direct vessel injection accident-event ... - ScienceDir...

Jun 1, 2024 · Examples of water-cooled **SMR** PSSs are the **passive emergency core-cooling system (ECCS)**, **passive containment cooling system (PCCS)**, and **passive decay-heat removal system**, the designs of which vary based on **reactor system**-design requirements. However, understanding the...

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https://www.sciencedirect.com › science › article › pii › S0149197021000202



Analysis of loss of coolant accident without ECCS and DHRS in ...

For this analysis, the integral Pressurized Water **Reactor** (IPWR) from NuScale was chosen. This design is based on well-known Light Water **Reactor** technology; however, it introduces significant simplifications and innovations (Worrall, 2015; NuScale Power, 2014) such as **passive safety systems**...

ScienceDirect
https://www.sciencedirect.com › science › article › pii › S0029549324000682



Light water SMR development status in Korea - ScienceDirect

Apr 1, 2024 · **Small Modular Reactors (SMR)** are primarily utilized, with sizes proposed by the IAEA and a strong emphasis on the significance of the module concept. ... The **Emergency Core Cooling System (ECCS)** is composed of **Emergency Depressurization Valves (EDVs)** and **Emergency Recirculation**...

small-modular-reactors.org
https://small-modular-reactors.org › smr-coolant-systems



SMR coolant systems | small-modular-reactors.org

May 10, 2023 · Explore **SMR** coolant **systems**, their types, advantages, and challenges to understand their role in safe, efficient nuclear power generation. Understanding **SMR Coolant Systems**: A Comprehensive Overview Introduction to **Small Modular Reactors**. **Small Modular Reactors (SMRs)**...

ScienceDirect
https://www.sciencedirect.com › science › article › abs › pii › S0306454916305485



Assessment of passive safety system of a Small Modular React...

The China **Small Modular Reactor** ACP100 is an integral pressurized water reactor with a **passive core cooling system**. Analyses have been carried out to evaluate the ability to remove decay heat and to prevent boric acid precipitation during the long term **cooling** phase post-LOCA.

ScienceDirect
https://www.sciencedirect.com › science › article › pii › B9780128205884000268



Small Modular Reactors (SMRs) - ScienceDirect

LW-SMRs can be considered in the category of Generation III + (Gen-III +). Some of the **LW-SMRs**, such as Westinghouse **Small Modular Reactor (W-SMR)**, have inherited some safety features of licensed Gen-III + **reactors**, such as the AP1000, which is the licensed commercial design. **LW-SMRs** generally use...

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Assessment of passive safety system of a Small Modular React...

For these transients, response of **reactor** vessel, **emergency core cooling system (ECCS)** and **RHRS** have been studied. Integral test facility REX-10 (Lee et al., 2013) is constructed to assess natural circulation for the steady-state operation and also to investigate behavior of the **reactor** under design...

ResearchGate
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Performance analysis of heat pipe-based passive in-core decay...

Dec 15, 2023 · Attention and demand for the **SMR**, which stands for a **small modular reactor**, are rapidly increasing worldwide. ... Eliminating the primary coolant pumps enhances the **reactor's** resistance to loss of flow accidents and simplifies the **emergency core cooling system (ECCS)** design. ...

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Safety analysis of an advanced passively-cooled small modular ...

The **emergency core cooling system (ECCS)** of this design includes five valves that are actuated via the **module protection system (MPS)**. These include three **reactor vent valves (RVV)** that are connected to the upper part of the pressurizer for steam discharge and two **reactor recirculation valves (RRV)** for th...

small-modular-reactors.org

https://small-modular-reactors.org > smr-operation

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SMR operation | small-modular-reactors.org

May 10, 2023 · One such feature is **passive cooling**, which relies on natural processes such as convection and conduction to cool the **reactor core** without the need for active mechanical **systems**. In the event of a loss of coolant or power, **passive cooling systems** can help maintain the **reactor's**...

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(PDF) Integral PWR-Type Small Modular Reactor ... - ResearchGa...

Cooling System (ECCS), injection **systems**, and containment **cooling/spray systems**. The IMR **reactor** The IMR **reactor control system** is designed for a 100% load rejection capability, and enable s a ...

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Advanced passive design of small modular reactor cooled by h...

If an accident breaks out and the reactivity shutdown **systems** actuates by the **reactor protection system**, and residual heat including decay heat can be removed by two **passive systems**: (1) the primary coolant natural circulation, and (2) the **reactor vessel auxiliary cooling system (RVACS)**. RVACS is a...

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On the nuclear safety improvement by post-inerting small modu...

In this study, a Loss-of-Coolant Accident (LOCA) aggravated by the complete failure of the **Emergency Core Cooling System (ECCS)** is analyzed for a **Small Modular Reactor (SMR)**. Post-accident injection of inert gas into the containment is used as one of the hydrogen control **systems**, to enhance safety...

INL Research Library Digital Repository

https://inldigitallibrary.inl.gov > sites > sti > sti > Sort_101191.pdf

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PDF Evaluating Direct Vessel Injection Accident-Event Progressi...

ECCS emergency core-cooling system SIT safety injection tank FOM figure of merit **SMART system-** integrated **modular advanced reactor** INL Idaho National Laboratory **SMR small modular reactor** IRWST in-containment refueling water storage tank **SMR-160 small modular reactor-160 MWe** ITL integral test...

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Small modular reactors (SMRs): The case of Japan - ScienceDir...

To introduce the **passive** safety features, such as the natural circulation **core cooling** and the gravity feed **emergency core cooling system (ECCS)** effectively into the **reactor** design, taking into account balance with the economic aspects, the smaller size of the **reactor**, typically less than about 500 MWe...



Frontiers
<https://www.frontiersin.org/journals/energy-research/articles/10.3389/fenrg.2023.1160150> ...



Unique safety features and licensing requirements of the NuSc...

2.2 **Passive** safety systems. At the **core** of the **NuScale** safety case are three primary safety systems: (1) the decay heat removal system (DHRS), which removes heat from the **reactor** coolant system (RCS) via the steam generators; (2) the **emergency core cooling system (ECCS)**, which vents the **reactor** vessel ...



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<https://www.sciencedirect.com/science/article/pii/S0306454923004103> ...



Performance analysis of heat pipe-based passive in-core decay...

Dec 15, 2023 · Various safety systems based on **passive** operational principles were proposed to enhance the degree of safety of the LWR-based **reactor** (Zeliang et al., 2020, Kang et al., 2012, Ha et al., 2017, Schulz, 2006) and plan to be applied to future **SMR** designs. Most of the proposed **passive** syste...



ScienceDirect
<https://www.sciencedirect.com/science/article/pii/S1738573324004856> ...



Heat pipe type double-containment vessel as passive safety sy...

Mar 1, 2025 · This multiple failure event can seriously affect the **reactor** systems and even the **reactor core** [37] since DHRS and **ECCS** are traditional safety systems in the reference **SMR** design [16, 17]. This failure means that decay heat removal and **core** water level compensation are not carried out, even...



NRC
<https://www.nrc.gov/docs/ML2021/ML2021M386.pdf> ...



PDF Report on the Safety Aspects of the NuScale Small Modular ...

ultimate heat sink. Each NPM is a **small**, integrated, natural-circulation pressurized water **reactor** (PWR) composed of a shrouded **reactor core** and riser, a pressurizer, and two helical-tube steam generators within a **reactor** pressure vessel, and housed integral to a high-strength, steel containment vessel tha...



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<https://www.nrc.gov/docs/ML1535/ML15355A536.pdf> ...



PDF U.s. Nuclear Regulatory Commission Design-specific Revie...

The **NuScale** **small modular reactor (SMR)** makes extensive use of **passive** systems to meet ... The DHR function is included as a safety-related **passive** system for use during transients, and to provide a similar function as the auxiliary feedwater ... and also by the **emergency core cooling system (ECCS)**...



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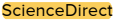
An alternative cooling solution during loss of coolant accident ...

Apr 1, 2024 · In this study, the evaluated **reactor** is the NUSCALE considering that it is a **small modular reactor**, having innovative design and potentially to become the **reactor** of choice in the future (Hidayatullah et al., 2015). NUSCALE is a pressurized water **reactor** (PWR) type in which the nuclear...



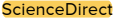
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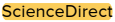
Effect evaluation on performance issues of passive safety syste...

Sep 1, 2023 · **Passive emergency core cooling system**. Author links open overlay panel Jeehee ... In addition, SMART100 (Bae et al., 2021), which is a **Small Modular Reactor (SMR)**, has introduced new safety systems such as **Passive** ... The PECCS is a representative concept of a PSS that is designed to...

  <https://www.sciencedirect.com/science/article/pii/S0029549323004065> ...

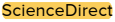
Conceptual design and analysis of a combined passive cooling ...

Dec 1, 2023 · Germany proposed the SWR1000 **reactor** design concept, which utilizes a **passive core cooling system**, employing four **emergency** condensers for the **passive** removal of **reactor** residual heat (Stosic et al., 2008). The ESBWR, designed by General Electric Company, is a natural circulation...

  <https://www.sciencedirect.com/science/article/pii/B9780081001493000203> ...

Advanced small modular reactors - ScienceDirect

In addition, the **passive reactor vessel auxiliary cooling system (RVACS)** is the primary heat removal during not only anticipated transients without scram, but also all design basis accident conditions. Like NuScale's **ECCS**, PRISM's safety **system** can remove the decay heat in infinite time by using **passive**...

  <https://www.sciencedirect.com/science/article/pii/S0149197023001324> ...

Integral and Separate Effects Test Facilities To Support Water C...

Jun 1, 2023 · LOFT was an advanced test facility equipped with real nuclear fuel rods that could be operated over an extended range of power, flow, and heat rates. The **reactor core** height was half as high as a commercial prototype **reactor**, but the **emergency core-cooling system** was similar.

 NRC <https://www.nrc.gov/docs/ML1535/ML15355A313.pdf> ...

PDF DESIGN-SPECIFIC REVIEW STANDARD for NuScale SMR D...

The **NuScale** integral pressurized water **small modular reactor (SMR)** makes extensive use ... The DHR **system** function is included as a safety-related **passive system** that provides a similar function as the auxiliary feedwater **system** at a typical, large ... alongside the NuScale **emergency core cooling syste**...

 inl.elsevierpure.com <https://inl.elsevierpure.com/en/publications/evaluating-direct-vessel-injection-accident-event...> ...

Evaluating direct vessel injection accident-event progression of ...

Examples of water-cooled **SMR** PSSs are the **passive emergency core-cooling system (ECCS)**, **passive** containment **cooling system (PCCS)**, and **passive** decay-heat removal **system**, the designs of which vary based on **reactor system**-design requirements.

 YouTube <https://www.youtube.com/watch?v=I7-GNwe3WEQ> ...

Emergency Core Cooling System - YouTube

The NuScale Power Module™ and power plant design incorporates several simple, redundant, and independent safety features — setting a new standard for nuclear...

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Development of an on-demand flooding safety system achievin...

Jul 1, 2024 · The steam condenses on the inner wall of the MCV and accumulated in the gap. When a sufficient water level is attained, the coolant is supplied to the RPV again through the recirculation valves. The **emergency core cooling system (ECCS)** concept is sustainable as long as the MCV is...



ScienceDirect

<https://www.sciencedirect.com/science/article/pii/S1364032115000167>

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Small and Medium sized Reactors (SMR): A review of technology

The acronym **SMR** is used often to describe a **small modular reactor** [4] because its size should be adequate to be built and assembled in a factory, then shipped to the location. However, according to the International Atomic Energy Agency (IAEA), it now stands for **Small and Medium sized Reactor** [5],...



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Experimental study on accident transients and flow instabilities i...

Recently, **Small Modular Reactors (SMR)** have received considerable worldwide attention. ... In addition, the two-phase natural circulation flow is essential to the **emergency core cooling system (ECCS)** for the decay heat removal in reactors with **passive safety system** designs. Therefore, failure to predict the...



ScienceDirect

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Scaling challenges in small modular reactor - ScienceDirect

Jun 1, 2023 · In MASLWR design, a nominal loss of coolant accident (LOCA) is characterized by three periods - the blowdown phase, **emergency core cooling system (ECCS)** operation phase and long-term **cooling process**, as shown in Fig. 3. **ECCS** actuation time and peak containment pressure are the...



MDPI

<https://www.mdpi.com/1996-1073/13/11/2898>

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Integral PWR-Type Small Modular Reactor Developmental Statu...

In recent years, the trend in **small modular reactor (SMR)** technology development has been towards the water-cooled integral pressurized water **reactor (iPWR)** type. The innovative and unique characteristics of iPWR-type **SMRs** provide an enhanced safety margin, and thus offer the potential to...



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https://www.kns.org/files/pre_paper/52/24A-407-장은희.pdf

...



Regulatory Issue in the NuScale SMR ECCS Valve with Focu...

*Keywords: **Small Modular Reactor**, NuScale, **Emergency core cooling System**, Regulatory 1.

Introduction There is many ongoing research into **small modular reactors (SMR)** around the world, with **NuScale SMR** being a prominent example. The NuScale **SMR** is the first light-water **reactor SMR** to...



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<https://www.sciencedirect.com/science/article/pii/S0029549323002340>

...



Seismic resilience assessment of Small Modular Reactors by a ...

Aug 15, 2023 · The cNPP comprises a single, large **reactor** unit that bears the entire plant generation capacity. We assume that the unit has a forced circulation **Reactor Coolant System (RCS)** equipped with two safety systems, the **Emergency Core Cooling System (ECCS)** and the Residual Heat Removal...



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Coolant flow rate instability during extended station blackout ac...

According to the obtained results, SBO in the NuScale can be classified into five stages. These include initial transients, the formation of the new balance, water level reduction between baffle plate and riser, flow fluctuations in the primary system and, activation of the emergency core cooling system.

NRC
https://www.nrc.gov > docs > ML2021 > ML20212L586.pdf



PDF United States Nuclear Regulatory Commission Advisory Co...

Rather than active systems with pumps and valves, each NPM relies on five passive ECCS valves that open when appropriate signals are received or when electric power is lost. Successful natural circulation cooling of the core is provided if one-of-three reactor vent valves open and one-of-two...

ScienceDirect
https://www.sciencedirect.com > science > article > pii > S0306454920304734



On the nuclear safety improvement by post-inerting small modu...

In this study, a Loss-of-Coolant Accident (LOCA) aggravated by the complete failure of the Emergency Core Cooling System (ECCS) is analyzed for a Small Modular Reactor (SMR). Post-accident injection of inert gas into the containment is used as one of the hydrogen control systems, to enhance safety...

ResearchGate
https://www.researchgate.net > profile > Anuj-Trivedi-3 > publication > 335453443_LOCA-type_Sc...



PDF LOCA-type Scenario Simulation for NuScale-SMR with

The NuScale reactor safety is maintained mostly by the passive safety systems, with two most important: Decay Heat Removal System and Emergency Core Cooling System (ECCS).

ScienceDirect
https://www.sciencedirect.com > science > article > abs > pii > S0149197021000202



Analysis of loss of coolant accident without ECCS and DHRS in ...

For this analysis, the integral Pressurized Water Reactor (IPWR) from NuScale was chosen. This design is based on well-known Light Water Reactor technology; however, it introduces significant simplifications and innovations (Worrall, 2015; NuScale Power, 2014) such as passive safety systems...

NuScale Power
https://www.nuscalepower.com > hubfs > Website > Files > Technical Publications > analysis-of-blo...



PDF Analysis of Blowdown Event in Small Modular Natural Circul...

ECCS = emergency core cooling system EXP = experimental HTP = heat transfer plate LOCA = loss of coolant accident NIST = NuScale Integral System Test OSU = Oregon State University RPV = reactor pressure vessel SMR = small modular reactor HCSG = helical coil steam generator REFERENCES 1. S....

ScienceDirect
https://www.sciencedirect.com > science > article > abs > pii > S0306454920301687



Safety analysis of an advanced passively-cooled small modular ...

This study explores the effectiveness of using Passive IN-core Cooling Systems (PINCs) for Small Modular Reactors (SMRs) during Station Blackout (SBO) conditions. An introduction to the concept of PINCs, along with strategies for their application to SMRs with design modifications, is presented.

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