

Studsvik Scandpower June 2024 Newsletter

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Studsvik

JUNE 2024 NEWSLETTER

INTRODUCTION

Now is an exciting time to be involved in the enhancement and improvement of nuclear energy for the benefit of our communities, families, and humanity. Here at Studsvik Scandpower, we enjoy sharing your journey to plant improvements and/or new design ideas. Similarly, our team is aiming to bring new tools to your toolboxes every year as we aim to:

- Manage fuel cycle economics better
- Identify Lithium and Boron pickup for corrosion and crud risks
- Streamline spent fuel pool criticality with SIMULATE to eliminate the time and expense of MCNP/KENO/SHIFT analyses with your team or contractors
- Gain more information on your core performance as GARDEL core monitoring and reactivity management software grows rapidly in global acceptance
- Streamline linking of physics codes with automated linkages that meet your needs
- Develop the first ever NQA-1 Continuous Energy Monte Carlo Transport code, PEACOCK, due for its first release in 2025

Our team is intrinsically motivated to improve operational knowledge, calculations, and responses at your site. If there are more things you wish existed in nuclear software space, feel free to give us a note; you might be surprised how much faster we can bring you to the finish line.

Sincerely,

Art Wharton
President and CEO of Studsvik Scandpower

CODE UPDATES

Studsvik Scandpower continues to release updates for its CMS5 software suite. Highlights of new features and capabilities, as well as minor software corrections available in these new versions, can be found in the Changes and Release Notes documents in the "Software Updates" section of the [Studsvik Support Site](https://info.studsvik.com/e/1015762/2024-06-03/fdrw/630034355/h/Kdi9OnCLjzMNifiDLAoZnRuCwYdmWr3J97MEKxW8aig) (login required).

(<https://info.studsvik.com/e/1015762/2024-06-03/fdrw/630034355/h/Kdi9OnCLjzMNifiDLAoZnRuCwYdmWr3J97MEKxW8aig>)

CMS5 software has been qualified under the Studsvik, Inc. NQA1 1994, 10 CFR 50 Appendix B, 10 CFR 21 Quality Assurance Program and HELIOS2 under ISO-9001.

Current code versions for other Studsvik software include:

CASMO5_VVER v3.08.00, SIMULATE5_VVER v2.06.00, SIMULATE5-K_VVER v2.06.00, SIMULATE-3 v6.24.00, S5POST v1.00.00, CMSView5 v1.0.6, NORDIC v3.03.00

If you would like to receive an update to your software under your current software maintenance agreement, please contact your Studsvik representative.



CASMO5 v3.08.00 (December 2023)

2D lattice physics transport code for PWR and BWR (VVER capability available in a separate version)

Key Updates:

- Support of the optional, commercially available cross-section uncertainty library.
- Improved support for control blades in PWRs for unique designs.
- Several fixes for user-reported bugs.



HELIOS2 v2.04.01 (September 2023)

2D general geometry lattice physics transport code

Key Updates:

- Improved isotopic weighting factors for fission neutron emission
- Optional reduced burnup chains
- Multithreaded computation
- Linear source Method of Characterization (MoC) solution
- Optional 8-family delayed neutron data



SIMULATE5 v2.06.00 (December 2023)

3D steady state nodal simulator code for PWR and BWR

Key Updates:

- Support of optional BWR TMOL (Thermo-Mechanical Operational Limits) capability. The new model allows users to define TMOL limits vs. burnup separately for UO2 and Gd pins in different fuel assembly designs.
- Implementation of modeling of cruciform control blades in PWRs, including the control blade's depletion tracking and its feedback to the neutronic solution through cross-sections.
- Various new edits and error checks are implemented.



SIMULATE5-K v2.05.02 (November 2023)

3D transient analysis code for PWRs and BWRs

Key Features:

- Implementation of the BWR vessel models.
- Implementation of the BWR steam line models.
- Implementation of the plant control and protection systems.

CMSLink5 v1.22.00 (December 2023)

Linking code between CASMO5 and SIMULATE5/3, SIMULATE5-K/3-K

Key Updates:

- Extended the BWR hot case matrix cross-section functionalization to include explicit coolant temperature in K and density in g/cc.
- Maximum number of segments allowed in the library is increased to 9999.



SNF v1.08.02 (February 2024)

3D spent nuclear fuel isotopics and decay heat tracking

Key Features:

- Irradiation history modifiers to address missing or incomplete history
- Upgraded and extended set of isotopic uncertainties based on CASMO5
- Improvement in processing of asymmetric assemblies

SIMULATE3K v2.11.00 (February 2024)

S3K is an advanced, two-group nodal code for transient analysis of LWRs using SIMULATE3 methodology.

Key Updates:

- Correction in the evaluation of the fuel thermal conductivity using the external material tables.
- Correction in the evaluation of the energy per fission in the decay heat model.
- Improvements for Sandwich Type Shielding assembly.



CMSBuilder v2.00.00 (July 2023)

CMSBuilder is a graphical fuel management and loading pattern design suite that provides core design engineers with a sophisticated interface to simplify assembly design, fuel shuffling and loading pattern evaluation.

Key Updates:

- Implementation of BWR Core Design Projects
- Core Average Axial Plots
- Plots View - Core parameters versus cycle exposure
- Mark Minimum and Maximum Core Values from the Main UI
- Display the Average Value of the Primary Core Parameter
- Display Batch Labels in Inventory View Core Parameter
- Display Batch Labels in Inventory View

UPCOMING CONFERENCES AND EVENTS

Studsвик Scandpower staff are planning to attend a variety of industry events throughout 2024 - feel free to contact us and chat about your favorite topics.

- **2024 ANS Annual Conference** – June 16 – 19, 2024 (Las Vegas, NV)
- **2024 USA Alliance Summit** – June 25 - 28, 2024 (Naples, FL)

- **2024 Annual Studsvik User Group Meeting** – July 29 – August 1, 2024 (Miami, FL)
- **2024 ANS Utility Working Conference** – August 4 - 7, 2024 (Marco Island, FL)
- **2024 WNA Symposium** – September 4 - 6, 2024 (London, UK)
- **NEA Conference** – September 10 – 12, 2024 (Philadelphia, PA)
- **IAEA General Conference** – September 16 - 20, 2024 (Vienna, Austria)
- **TopFuel 2024 Conference** – September 29 – October 3, 2024 (Grenoble, France)
- **2024 ENS PWR Conference** – October 8 -9, 2024 (Prague, Czech Republic)
- **2024 PBNC Conference** – October 7 – 10, 2024 (Idaho Falls, ID)
- **2024 ANS Winter Meeting** – November 17 – 21, 2024 (Orlando, FL)

DID YOU KNOW?

Did You Know? SIMULATE5 can be used to power GARDEL online core monitoring for complete consistency with your fuels group.

CASMO5 CROSS SECTIONS

CASMO5 now supports cross section uncertainty calculations

With the release of CASMO5 v3.08.00 in December 2023, CASMO5 can propagate nuclear data uncertainty onto its results using a statistical sampling approach. This feature may be helpful to existing CASMO5 customers doing UQ analysis. For example, the uncertainties for isotopic compositions computed by CASMO5 have already been used by SNF to calculate decay heat uncertainties.

The nuclear data uncertainty is stored in a commercially available library, cov.e8r0.95.20231026.bin. CASMO5 perturbs the nuclear data internally, including the fission, capture, and scattering cross sections, the neutrons per fission and fission spectrum, and depletion parameters such as energy per fission and fission yields. More

details can be found in the SMP entry in the User Manual and Chapter 13 of the Methodology Manual or in the following papers:

- Hykes, Wemple, and Ferrer, Nuclear data uncertainty methods in CASMO5 using ENDF/B-VIII covariances, PHYSOR 2024, San Francisco, USA.
- Simeonov, Wemple, and Hykes, Uncertainties quantification in decay heat power in Studsvik's system for spent fuel analyses, BEPU 2024, Lucca, Italy.
- Hykes, et al., Nuclear Data Uncertainty Quantification Analysis at Studsvik Scandpower, Annals of Nuclear Energy, submitted.

CMSBUILDER WEBINAR ANNOUCEMENT



Join us for our upcoming webinar to learn about **CMSBuilder**, our point-and-click loading pattern design tool. **CMSBuilder** integrates advanced neutronics with user-friendly graphic visualization to aid nuclear core design.

The webinar will cover how **CMSBuilder** enables core designers to efficiently evaluate multiple loading patterns and receive immediate graphical feedback on essential design modifications. Features such as interactive core maps and the ability to easily adjust fuel assemblies are highlighted. The webinar will also demonstrate how **CMSBuilder** enhances the design process while ensuring the accuracy necessary for reload licensing.

Learn how **CMSBuilder** can help streamline your core design process and reduce overall design time!

When: June 26, 2024, from 10:00 - 11:00 am Eastern U.S. time

Link to register: [CMSBuilder Webinar Registration](#)

NEW HIRES

Studs vik Scandpower expands team!



Matt Adler

Matt Adler joined Studsvik Scandpower in January 2024 as a Senior Nuclear Engineer in the Operations & Engineering group. His primary responsibility is product development in the area of Multiphysics, simulation and coupled codes. Matt comes to Studsvik with over 20 years of experience in reactor core design, analysis, and reload safety methods in the U.S. commercial nuclear power industry. He has received Bachelor's and Master's Degrees in Nuclear Engineering from the Missouri University of Science and Technology.

Welcome to the team, Matt!



Petra Malá

Petra Malá joined Studsvik Scandpower in April 2024 as a Senior Nuclear Engineer in the Methods Development group. Her primary responsibility is the development of the 3D, multi-group, advanced nodal code SIMULATE5. Prior to joining Studsvik Scandpower, Petra attended the École Polytechnique Fédérale de Lausanne where she earned her doctorate degree. She also held the position of Postdoctoral Researcher at the Paul Scherrer Institute and most recently worked at a fuel vendor as a development engineer performing neutronic analysis of new assembly designs, fuel design optimization using genetic algorithms, and validation of nodal codes.

Welcome to the team, Petra!



UGM 2024

Join us for the annual UGM July 29 – August 1!

The 2024 Studsvik Scandpower International Users Group Meeting (UGM) will be held in Miami, Florida!

We're looking forward to welcoming you July 29 – August 1, 2024 at the Hyatt Regency Miami to find out what's been going on with all of the state-of-the-art Studsvik codes and applications.

Visit the UGM website for information on the meeting, registration, and more.

Studsvik UGM 2024 Website

(<https://info.studsvik.com/e/1015762/2024-06-03/fdrs3/630034355/h/Kdi9OnCLjzMNifiDLAoZnRuCwYdmWr3J97MEKxW8aig>)

TEODOSI SIMEONOV RECOGNIZED BY INDUSTRY



Teodosi Simeonov has been nominated as an expert to the Spent Fuel Isotopic Composition (SFCOMPO) TRG. SFCOMPO TRG is an initiative of NEA data bank to collect, evaluate and publish measurements related to spent fuel analyses, PIEs and decay heat power.

Teo's contributions to the group's activities are much appreciated and well acknowledged by other participants. Teo's notable contributions since 2021 to the success of the SFCOMPO TRG are valuable and acknowledged by his peers. The contributions included reviewing draft evaluations, contributing with reviews as member of the task force on decay heat, and actively participating to the ongoing effort of the task force on evaluation guidance.

Congratulations, Teo!

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