Radiation Safety Information Computational Center

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"Losers quit when they fail. Winners fail until they succeed."

--Robert Kiyosaki

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CHANGES TO THE RSICC CODE AND DATA COLLECTION

There is one update to the RSICC catalog for those individuals that may be interested.

DLC-237/SINBAD 2017.12

OECD Nuclear Energy Agency Data Bank, Boulogne-Billancourt, France and ORNL Radiation Safety Information Computational Center (RSICC), Oak Ridge, Tennessee, USA, contributed an updated version of this electronic database, which was developed to store a variety of radiation shielding benchmark data so that users can easily retrieve and incorporate the data into their calculations. SINBAD began in 1992-93, prompted by the continued closure of experimental facilities worldwide. The loss of benchmark experimental facilities jeopardizes the future of new shielding data. Further, the loss of lab notes and/or logbook records from poor document storage and/or aging, together with the loss of guidance from retirements of key experimental staff, complete benchmark data becomes a premium under today's strict quality assurance needs. The decision was made to collect, recompile, and distribute benchmark information in formats acceptable to the international community in an attempt to preserve and disseminate the information. The data integrity was checked and reference sources examined for self-consistency. At times, full benchmark information was gathered from multiple sources including personal contacts and laboratory logbooks.

The guidelines developed by the Benchmark Problems Group of the American Nuclear Society Standards Committee (ANS-6) on formats for benchmark problem description have been followed.

SINBAD data includes benchmark information on (1) the experimental facility and the source; (2) the benchmark geometry and composition; and (3) the detection system, measured data, and an error analysis. A reference section is included with the data. Relevant graphical information, such as experimental geometry or spectral data, is included. All information that is compiled for inclusion with SINBAD has been verified for accuracy and reviewed by two scientists.

The data in the RSICC SINBAD-2017.12 package were received through the NEADB and corresponds to NEA Data Bank packages:

- NEA-1517 SINBAD REACTOR (Abstract last modified 14-JUN-2017)

This release includes consistency changes and an update for package NEA1517/94, Winfrith Water/Iron Benchmark Experiment (ASPIS-PCA REPLICA).

SINBAD is an electronic database developed to store a variety of radiation shielding benchmark data so that users can easily retrieve and incorporate the data into their calculations. The high accuracy of benchmark experimental data allows checks for quality assurance in user's computations or with new experimental results. The user may find a lack of experimental data in some energy regions which could become a focus for future computations and experiments. New data libraries containing revised cross sections may be verified and validated, drawing comparisons to previous cross-section data releases. New information on benchmark results, i.e. new computations, revised data results, errors in data generation, will be provided as updates to this library, so users will find up to date applications in computational ready formats.

The experimental results are distributed in tabular ASCII format that can easily be exported to different computer environments for further use. PC, UNIX Workstations, MAC (D00237MNYCP05).

END USE STATEMENT

Customers are strongly encouraged to provide full and complete information regarding the intended end use of the software being requested. End use statements that specify that the code is for research, training or educational activities are not sufficient. RSICC's regulators need to know explicitly for what purpose you intend to use the codes and detail needs to be provided. Requests that lack sufficient detail will be rejected.

REGISTRATION REQUIREMENTS

RSICC does not permit individuals to "pre-register" or "pre-order" software for use at a temporary or alternate location. The single user license and export control agreements are specific to the individual's end use and the location at which the software will be used. During the registration process, individuals are required to provide the name of the institution at which they will use the software, an institutional mailing address and an institutional e-mail address. As an example, students that work at a location other than their university are required to update their registration with RSICC and submit a new request for any software that they intend to use after they have begun work at the new location.

SINGLE-USER LICENSE AGREEMENT
REVISED

The single-user license agreement has been revised to address concerns regarding changes in end-use and employment changes of individuals that have received packages from RSICC. In some instances, individuals obtain approvals from our Federal regulators for use of software packages for very specific purposes or while employed or associated with specific organizations. To address this concern, the single-user license agreement has been modified to indicate that the license is only valid for the end-use as stated in the Licensee's request and only while associated with the organization under which the request is being made. After February 1, 2015, the individual's single-user license would no longer be valid if they change their end-use or are no longer associated with the organization for which they obtained the original license. In these cases, the individual would need to submit a new request to RSICC for the package for the new end-use or the new affiliation.

SCIENCE EDUCATION PROGRAMS AT
# OAK RIDGE NATIONAL LABORATORY

Looking for an internship or post-graduate opportunity at Oak Ridge National Laboratory? The Science Education Programs at Oak Ridge National Laboratory provide paid opportunities for undergraduates, grad students, recent graduates, and faculty to participate in high-quality research alongside world-class scientists to solve real-world problems. Opportunities are available for internships and co-ops, research appointments, and sabbaticals. You can access all available opportunities through the website at http://www.orau.org/ornl. The Talent and Opportunity System allows you to create a profile, and then answer only 5 or 6 questions for each program or job posting for which you apply.   All levels of participants from undergraduates to faculty are encouraged to publish research papers with their mentors. Please browse through the Research Profiles on the different participants and their research experiences at the right-hand side of the bottom of the web site listed above. Also, there is a video of research participants at ORNL sharing their thoughts on how access to world-class research facilities and staff has catapulted their careers in science and technology. You can find it on YouTube at http://ow.ly/2EQLz.

CONFERENCES, TRAINING COURSES,
SYMPOSIA

RSICC attempts to keep its customers and contributors advised of conferences, courses, and symposia in the field of radiation protection, transport, and shielding through this section of the newsletter. Should you be involved in the planning/organization of such events, feel free to send your announcements and calls for papers via email walkersy@ornl.gov with "**Conferences for RSICC Newsletter**" in the subject line by the 15th of each month. Please include the announcement in its native format as an attachment to the message. Please provide a website address for the event if one is available. Every attempt is made to ensure that the links provided in the Conference and Calendar sections of this newsletter are correct; however, if the links become unavailable, please call the point of contact for the event.

CONFERENCES

PHYSOR 2018
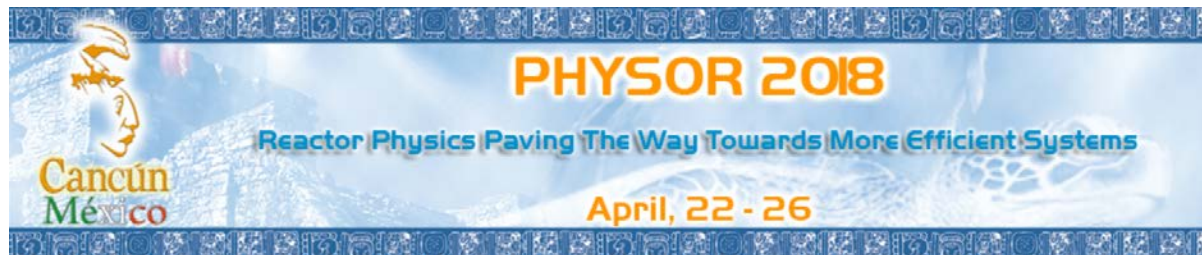
The American Nuclear Society Reactor Physics Division Topical Meeting, PHYSOR 2018, will be held at the Marriott Casa Magna Hotel, Cancun, Mexico, on **April 22 - 26, 2018**. PHYSOR 2018 will be a venue focusing on both modeling/simulation and experimental aspects of reactor physics, where common aspects and requirements of these two focus areas will be explored. The meeting will also include plenary discussions, technical tours, workshops, and sessions in other topics relevant to the physics of nuclear reactor systems.

Papers are solicited in the following topics:

1. Reactor Analysis Methods
2. Deterministic Transport Theory
3. Monte Carlo Methods
4. Fuel Cycle and Nuclear Criticality Safety
5. Reactor Physics Experiments and Nuclear Data
6. Reactor Concepts and Designs
7. Reactor Operation and Safety
8. Transient and Safety Analysis
9. Education, Research Reactors and Spallation Sources
10. Radiation Applications and Nuclear Safeguards

For more information about PHYSOR 2018, please visit http://www.physor2018.mx/.

BEPU 2018

The Best Estimate Plus Uncertainty International Conference will be held **May 13-19, 2018**, in Lucca, Italy. The objective of the Conference is to provide a forum to exchange experience and views among professionals in the nuclear industry in the development and use of Best Estimate Plus Uncertainty (BEPU) methods in safety analyses and design of nuclear installations. Please see the website for more information www.nineeng.com/bepu.

ESARDA Workshop on Numerical Modelling

The ESARDA Non-Destructive Assay (NDA) Working Group is organizing an international workshop on the topics of computer simulation applied to the modelling of NDA instrumentation and methods for nuclear safeguards applications. It will be held **May 17-18, 2018** in Luxembourg. The two-day event aims to cover a broad range of topics and present a unique opportunity for the safeguards community interested in recent advances and in lessons learned from practical cases. The information about the event can be found at
http://www.nusaset.org/index.php?option=com_content&view=article&id=878&Itemid=470.

PHYTRA4

The Fourth International Conference on Physics and Technology of Reactors and Applications will be held **September 17-19, 2018,** in Marrakech, Morocco. This conference will be organized by the Moroccan Association for Nuclear Engineering and Reactor Technology (GMTR) with the collaboration of the National Centre for Energy, Sciences and Nuclear Techniques (CNESTEN) and the Moroccan Agency for Nuclear and Radiological Safety and Security (AMSSNuR) after the resounding success which the previous editions had met. Please see their website for more information at http://phytra4.gmtr.ma/.

American Nuclear Society & Health Physics Society Joint Topical

The American Nuclear Society and Health Physics Society are co-sponsoring a scientific conference on "Radiation Response Models to Low Dose Protection Standards," in Pasco, Washington, **September 30 - October 3, 2018**. For additional information contact Alan Waltar, conference chair, alan.waltar@gmail.com, or Darrell Fisher, technical program co-chair, at darrell.fisher@versantphysics.com.

NURER 2018

The 6th International Conference on Nuclear and Renewable Energy Resources (NURER2018) will be held **September 30 - October 3, 2018,** in Juju, Korea. This is recognized as one of the major international conferences for the exchange of information on scientific, engineering, and other technical aspects of innovative nuclear and renewable energy science and technology. For more details on this conference, please visit their website at http://nurer2018.org.

TRAINING COURSES

LANL MCNP6 Class Schedule

Website: https://laws.lanl.gov/vhosts/mcnp.lanl.gov/classes/classinformation.shtml

Jan 8-12, 2018 Los Alamos, NM	Introduction to MCNP6 Non-US citizens must register by 2017-10-16 | Mon 10:00 - Fri 12:00	$1800 or $1500*
Feb 26 - Mar 2 Los Alamos, NM	Criticality Calculations with MCNP6 Non-US citizens must register by 2017-12-04 | Mon 10:00 - Fri 12:00	$1800 or $1500*
Apr 2-6, 2018 Los Alamos, NM	Introduction to MCNP6 Non-US citizens must register by 2018-01-08 | Mon 10:00 - Fri 12:00	$1800 or $1500*
Apr 10-13, 2018 Los Alamos, NM	Using NJOY to Create MCNP® ACE Files & Visualize Nuclear Data Non-US citizens must register by 2018-01-15 | Tues 10:00 - Fri 5:00	$1500 or $1200*
Apr 30 - May 4, 2018 Los Alamos, NM	Practical MCNP® for the Health Physicist, Medical Physicist, and Radiological Engineer The above link goes to the LANL Radiation Protection website. See the RP website for class information & registration.	$1800
May 15-18, 2018 Los Alamos, NM	Unstructured Mesh with Attila4MC Non-US citizens must register by 2018-02-19 | Tues 12:30 - Fri 4:30	$1500 or $1200*
June 4-8, 2018 Los Alamos, NM	Introduction to MCNP6 Non-US citizens must register by 2018-03-12 | Mon 10:00 - Fri 12:00	$1800 or $1500*
Aug 6-10, 2018 Los Alamos, NM	Criticality Calculations with MCNP6 Non-US citizens must register by 2018-05-14 | Mon 10:00 - Fri 12:00	$1800 or $1500*
Aug 13-17, 2018	Introduction to MCNP6 Non-US citizens must register by 2018-05-21 | Mon 10:00 - Fri 12:00	$1800 or $1500*
Aug 20-24, 2018	Variance Reduction with MCNP6 Non-US citizens must register by 2018-05-28 | Mon 10:00 - Fri 12:00	$1800 or $1500*

Nov 27-30, 2018 Los Alamos, NM	[Using NJOY to Create MCNP® ACE Files & Visualize Nuclear Data](#) Non-US citizens must register by 2018-09-03 | Tues 10:00 - Fri 5:00	$1500 or $1200*
Dec 3-7, 2018 Los Alamos, NM	[Introduction to MCNP6](#) Non-US citizens must register by 2018-09-10 | Mon 10:00 - Fri 12:00	$1800 or $1500*

MCNP6 Training

For more information, see the website: http://mcnpvised.com/train_mcnp.html

Current Classes (tuition for all US classes is $2800 with an early payment discount of $300)			
Date (Click Date for Info)	**Class**	**Course Content**	**Location**
March 26-30, 2018	**MCNP6 Intermediate Workshop**	**To see an outline for the course,** Click Here**.**	**Paris, France**
September 10-14, 2018	**Intermediate MCNP6 Workshop**		**Seattle, WA**

Beginning/Advanced Visual Editor Training

For more information, see the website: http://mcnpvised.com/train.html

Date (Click Date for Info)	**Workshop** (40 Cont. Ed. credits through American Academy of Health Physics. **Click here for AAHP Site**. Class number is 2008-00-026 for Vised classes and 2011-00-022 for MCNPX Team Workshops)	**Level of Difficulty**	**Workshop Content**	**Location**
February 19-23, 2018	**Intermediate Visual Editor for Shielding Calculations**	LEVEL 2+	**Detailed Description**	**Barcelona, Spain**
March 19-23, 2018	**Beginning Visual Editor. The NEA handles registration for this workshop.**	LEVEL 1	**Detailed Description**	**Paris, France**

April 9-13, 2018	**Beginning Visual Editor.**	LEVEL 1	**Detailed Description**	Las Vegas, NV
April 16-20, 2018	**Using Nucwiz for Rapid Geometry Development and Advanced Analysis**	LEVEL N	**About Nucwiz**	Las Vegas, NV
April 23-27, 2018	**Advanced Visual Editor with Applications in Mesh Tallies and Variance Reduction.**	LEVEL 4	**Detailed Description**	Las Vegas, NV
June 4-8, 2018	**Using Nucwiz for Rapid Geometry Development and Advanced Analysis**	LEVEL N	**About Nucwiz**	Prague, Czech Republic
June 11-15, 2018	**Advanced Visual Editor with Applications in Mesh Tallies and Variance Reduction.**	LEVEL 4	**Detailed Description**	Prague, Czech Republic
August 13-17, 2018	**Using Nucwiz for Rapid Geometry Development and Advanced Analysis**	LEVEL N	**About Nucwiz**	Las Vegas, NV
August 20-24, 2018	**Beginning Visual Editor.**	LEVEL 1	**Detailed Description**	Las Vegas, NV
August 27-31, 2018	**Advanced Visual Editor with Applications in Mesh Tallies and Variance Reduction.**	LEVEL 4	**Detailed Description**	Las Vegas, NV

Safety Analysis Report for Packaging (SARP)

Shielding/Criticality Safety Generalist and Analyst Courses

Developed and Conducted by Oak Ridge National Laboratory

Radioactive Material Package Shielding Evaluation and Nuclear Criticality Safety Evaluation Training

The U.S. Department of Energy (DOE) Packaging Certification Program (PCP), Office of Packaging and Transportation, is offering Safety Analysis Report for Packaging (SARP) shielding and nuclear criticality safety (NCS) courses for SARP generalists and analysts.

The **SARP Generalist Course** will be held at the National Transportation Research Center, Oak Ridge National Laboratory, Oak Ridge, TN, **June 4 -8**, **2018.** This course is designed for project managers, supervisors, NCS/shielding subject matter experts (SME), or SMEs in non-NCS/shielding technical areas (e.g., structural, thermal, package design, etc.) who need to better understand how the NCS/shielding analyses fit in the broader SARP documentation. Specifically, the Generalist Course provides an overview of the regulations and guidelines for the criticality and shielding analysis for a SARP, and the course shows how the NCS/shielding chapters integrate with the other parts of the SARP. Students in the Generalist Course will review an actual SARP document after the course material is presented to emphasize the key elements of the shielding and criticality analyses. The registration cost for all students is $2000. Those interested can register for the course at the following website, https://utconferences.eventsair.com/safety-analysis-report-for-packaging-sarp-shielding-criticality-safety-generalist-course/sarp/Site/Register.

The **SARP Analyst Course** is scheduled for **September 17 - 21, 2018** at the National Transportation Research Center, Oak Ridge National Laboratory, Oak Ridge, TN. This course will provide detailed training on the radioactive material package shielding analyses and NCS evaluation fundamentals needed by analysts/practitioners (i.e., safety analysts and/or technical reviewers) to prepare and/or review technical analyses for the SARP documentation. The Analyst Course also provides an overview of regulations and guidelines in addition to detailed in-class exercises associated with the package shielding and NCS analyses. Regarding the in-class exercises, analysis teams will be faced with "staged" SARP examples in which important decision processes in the generation of a SARP will be demonstrated and discussed. The registration cost for all students is $2000. Information regarding the course is available at the following website, https://public.ornl.gov/conferences/sarp/index.shtml. A registration link will be available by March 2018.

Please contact the ORNL SARP Course Point-of-Contact if you have questions about the courses. Douglas G. Bowen, Oak Ridge National Laboratory, bowendg@ornl.gov,(865) 576-0315.

SCALE Training Courses – Spring 2018

Training is provided by developers and expert users from the SCALE team. Courses provide a review of theory, description of capabilities and limitations of the software, and hands-on experience running problems of varying levels of complexity. All attendees MUST be licensed users of SCALE version 6.2.1 or 6.2.2. SCALE is available from ORNL/RSICC in the USA, the OECD/NEA Data Bank in France, and the RIST/NUCIS in Japan. All currently scheduled SCALE Courses are described below.

Date	Course Name and Description	Location	Cost
February 5-9, 2018	**SCALE Polaris Lattice Physics, Depletion and Uncertainty Analysis** Polaris, the new 2-D lattice physics capability for LWR analysis, provides an easy-to-use input for defining lattice geometries, material compositions, and reactor state conditions. For the first three days of this five days course, attendees will learn how to model typical PWR and BWR assemblies: develop geometry models, perform depletion simulations, setup branch and history calculations to generate few-group cross sections for full-core nodal diffusion analysis, and perform reflector calculations. Next, attendees will learn how to use the Sampler new uncertainty analysis capability to quantity the uncertainty in lattice physics quantities calculated with Polaris (reactivity, nodal cross sections, isotopic inventories) from a broad range of input uncertainty sources (nuclear data, geometry, composition, and reactor condition). No prior knowledge of SCALE is required.	ORNL Oak Ridge, TN USA	$2000*
February 12-16, 2018	**SCALE ORIGEN Fuel Depletion, Activation, and Source Term Analysis** This is a hands-on class that covers the use of ORIGEN for isotopic depletion, decay, decay heat, and radiation source-terms calculations. The course features the use of the Fulcrum consolidated SCALE graphical interface and Fulcrum plotting capabilities for displaying nuclear data and results. The class includes solving activation, spent fuel, and nuclear safeguards and security analyses. This class provides an introduction to the ORIGAMI tool for convenient characterization of spent nuclear fuel with radially and axially varying burnup. Advanced applications including simulation of chemical processing, continuous feed and removal are also covered.	ORNL Oak Ridge, TN USA	$2000*

	No prior knowledge of SCALE is required.		
February 19-23, 2018	**SCALE Criticality Safety Calculations (KENO-V.a and KENO-VI)** This course covers the use of SCALE Monte Carlo codes for criticality safety calculations and is appropriate for beginning through advanced users. KENO V.a is a fast and easy-to-use code that allows users to build complex geometry models using basic geometrical bodies. KENO-VI is a 3-D generalized geometry code that allows for versatile modeling of complex geometries. Both versions of KENO provide convenient, efficient methods for modeling repeated and nested geometry configurations such as lattices, and can be used to perform continuous energy or multigroup calculations. This class uses the Fulcrum user interface for interactive model setup, visualization, computation, and output review. No prior knowledge of SCALE is required.	ORNL Oak Ridge, TN USA	$2000*
February 26 - March 3, 2018	**Source Terms and Radiation Shielding for Spent Fuel Transportation and Storage Applications** Spent fuel as a complex neutron and photon source, as well as radioactive sources resulting from activation of non-fissile materials and components in a nuclear reactor, can be well characterized using the ORIGEN code. The variety of source terms generated with ORIGEN can be used for shielding analyses with the MAVRIC sequence, to estimate particle fluxes and dose rates outside of containers, to ensure that the safety requirements for transportation, storage and ultimate disposal of spent fuel or activated materials are met. The first two days of this one-week course will cover the use of ORIGEN for source terms generation. The next part of the course will focus on using MAVRIC for shielding analysis. This class uses the Fulcrum user interface for interactive model setup, visualization, computation, and output review. Previous experience with the SCALE/KENO geometry is required.	ORNL Oak Ridge, TN USA	$2000*
March 5-9, 2018	**SCALE Polaris Lattice Physics, Depletion and Uncertainty Analysis** Polaris, the new 2-D lattice physics capability for LWR analysis, provides an easy-to-use input for defining lattice geometries, material compositions, and reactor state conditions. For the first three days of this five days course, attendees will learn how to model typical PWR and BWR assemblies: develop geometry models, perform depletion simulations, setup branch and history calculations to generate few-group cross sections for full-core nodal diffusion analysis, and perform reflector calculations. Next, attendees will learn how to use the Sampler new uncertainty analysis capability to quantify the uncertainty in lattice physics quantities calculated with Polaris (reactivity, nodal cross sections, isotopic inventories) from a broad range of input uncertainty sources (nuclear data, geometry, composition, and reactor condition). No prior knowledge of SCALE is required.	NEADB Boulogne-Billancourt, France	€2000

	Source Terms and Radiation Shielding for Spent Fuel Transportation and Storage Applications Spent fuel as a complex neutron and photon source, as well as radioactive sources resulting from activation of non-fissile materials and components in a nuclear reactor, can be well characterized using the ORIGEN code. The variety of source terms generated with ORIGEN can be used for shielding analyses with the MAVRIC sequence, to estimate particle fluxes and dose rates outside of containers, to ensure that the safety requirements for transportation, storage and ultimate disposal of spent fuel or activated materials are met. The first two days of this one-week course will cover the use of ORIGEN for source terms generation. The next part of the course will focus on using MAVRIC for shielding analysis. This class uses the Fulcrum user interface for interactive model setup, visualization, computation, and output review. Previous experience with the SCALE/KENO geometry is required.		
March 12-16, 2018		NEADB Boulogne-Billancourt, France	€2000

*Full-time university students can register at a reduced rate._Both professional and student registration fees are discounted $200 for each course over one.

FOREIGN NATIONAL VISITORS TO ORNL *- Payment MUST be received at least one week prior to attending the training course. All foreign national visitors must register 40 days before the start date of the training course they plan to attend.*

For more information regarding this class, visit their website at

https://www.ornl.gov/scale/scale-training

SYMPOSIA

2018 CALENDAR

March
NRC Regulatory Information Conference (RIC), March 13-15, 2018, North Bethesda, Maryland. Website: https://www.nrc.gov/public-involve/conference-symposia/ric/.

June
2018 American Nuclear Society (ANS) Annual Meeting, June 17-21, 2018, Philadelphia, Pennsylvania. Website: http://www.ans.org/meetings/c_1.

HPS 63rd Annual Meeting, July 15-19, 2018, Cleveland. Ohio. Website: http://hps.org/meetings/meeting46.html.

26th International Conference on Nuclear Engineering - ICONE, July 22-26, 2018, London, England. Website: http://www.asme.org/events/icone.

August
20th Topical Meeting of the Radiation Protection & Shielding Division of ANS (RPSD-2018), August 26-31, 2018, Santa Fe, New Mexico. Website: http://rpsd2018.ans.org.

September
Pacific Basin Nuclear Conference, September 30-October 5, 2018, San Francisco, California. Website: http://pbnc.ans.org.

November
IEEE Nuclear Science Symposium, November 11-17, 2018, Sydney, Australia. Website: http://www.nssmic.org/2018/.

2018 American Nuclear Society (ANS) Winter Meeting, November 11-15, 2018, Orlando, Florida. Website: http://www.ans.org/meetings/c_1.

2019 CALENDAR

June
2019 American Nuclear Society (ANS) Annual Meeting, June 9-13, 2019, Minneapolis, Minnesota. Website: http://www.ans.org/meetings/c_1.