

Enrico MAINARDI

SHORT OVERVIEW

I have more than 25 years of professional experience in international projects (private/public sectors) in the Regulatory Agency, Nuclear Industry, Research&Development Laboratories, Academia and Associations. I have a strong background in engineering/technical/scientific aspects together with expertise in the fields of Nuclear Safety (NS), Radiation Protection (RP), Research, Decommissioning & Waste Management (D&WM), Fusion (FUS) / Fission (FIS) energy, Quality Assurance (QA). Now I am working for ISIN. I have a Nuclear Engineering degree & PhD in Energetics.

WORK EXPERIENCE

ISIN; Roma, ITALY (Public Administration)

2023.1 - now

Nuclear Engineer Ph.D. (Tecnologo Livello III)

National Inspectorate for Nuclear Safety and Radiation Protection, Plant Nuclear Safety Area, research centers. Assessment and inspection activities on Italian nuclear installations, decommissioning and waste management projects (Ispra1, JRC-INE), Research Reactors (AGN, LENA TRIGA, TAPIRO, RC1 TRIGA). International activities in relation with IAEA (Nuclear Safety Convention), ENSREG/European Commission (Topical Peer Review on Fire protection and fire prevention at nuclear installations) WENRA (research reactors). National Contact Point with the United States Nuclear Regulatory Commission (US-NRC) and coordinator of National Users of the CAMP (Code Application and Maintenance Program), CSARP (Cooperative Severe Accident Research Program), RAMP (Radiation Protection Computer Code Analysis and Maintenance Program) codes.

AnsaldoNucleare s.p.a.; Genova, ITALY (Private Sector)

2008.5 – 2023.1

participations in several projects for Ansaldo and its clients:

- **NS Manager for ITER TB13** Emergency Electrical Power Distribution Design/Installation with AMC (Ansaldo Nucleare-Monsud-Comes) consortium, **ITER Tokamak Assembly TAC2** with the European consortium DYNAMIC
- **AMW** (Ansaldo Nucleare S.p.A, Mangiarotti S.p.A and Walter Tosto S.p.A) European consortium to supply sectors of the **ITER Vacuum Vessel**. (NS Manager but initially as Engineering/quality reference for ENSA supplier).
- Development and Supply of the **ITER Cask and Plug Remote Handling System (CPRHS)** (NS and quality)
- **QA Manager for R&I project ATHENA** (pool-type installation for experiments/thermohydraulic tests) as a supporting research infrastructure for ALFRED - Advanced Lead Fast Reactor European Demonstrator) in collaboration with other companies and research Institutions of Italy and Romania.
- **JRC-Ispra**: Licensing & technical documents, Systems & Components Integration activities for Specific contracts. Participation in the elaboration of Technical offer proposal; Technical Coordinator for Specific contracts.
- **SOGIN**: For NPPs and other nuclear facilities: Design Guide, licensing documents, events& safety analysis, Radioactive Waste Management Guide and analyses, Systems & Components Integration.
- **European Bank for Reconstruction and Development (EBRD)**: consultant services contract for the Ukrainian NPP Upgraded Program (Lenders Monitoring Consultant) - Designated Safety and Licensing Expert. Review of Technical requirements Packages
- **China LEAd-based Reactor (CLEAR)** Accelerator Driven System proposed by the Institute of Nuclear Energy Safety Technology (INEST), Chinese Academy of Sciences (CAS). Review of design criteria, definition requirements.
- **ENEL/SE, Mochovce 3&4 NPP**: Surveillance on the issuing of CEQP (Classified Equipment Quality Plan), QAIP (Quality Assurance Individual Plan) and related technical and licensing documents for manufacturing and erection. Quality and Process Engineering.
- **WESTINGHOUSE**: Project Manager for Tasks aimed at determining specific design features for the European version of AP1000 (EPP), and to reduce licensing risks for European Utilities.
- **Other Activities**: Participation in the elaboration of several Technical offers and in the main following Working Groups with preparation and presentation of documents, analyses and studies: FORATOM (European Nuclear Forum) for R&D; UNICEN norms and guides "Systems and components qualification", "Environmental Impact Assessment", "Site Selection"; EnergyLab "AP 1000 CASE STUDY"; European Nuclear Energy Forum (ENEF) - WorkingGroup 'Opportunities' - Sub WG 'Nuclear Legal Roadmap'; CNR & Finmeccanica SERIT (SEcurity Research in Italy). Organize meetings, seminars, conferences, presentations. Author of reports, analyses, papers.

APAT; Roma, ITALY (Public Administration)

2005.12 - 2008.5

Nuclear Engineer Ph.D.(Tecnologo Livello III)

International project management in EU support projects (PHARE & TACIS); support to Nuclear Safety Authorities of Eastern European Countries to develop their regulatory capabilities on the basis of Western safety principles and practices. Experience as team leader in the field of cooperation to Russia/Ukraine/Armenia/Georgia to strengthen the regulatory authorities, to promote an effective nuclear safety culture at all levels, to improve the management policies on spent fuel and radioactive waste. International principles and practices on safety culture, analyst of safety systems and of nuclear facilities, safety evaluation for licensing review; transport of radioactive material. These contracts allowed me to know/identify/evaluate organization systems, existing technologies, critical areas, possible improvements. For APAT I have also worked on the assessment and inspection activities on Italian nuclear installations, decommissioning and waste management projects, as well as for approving detailed designs or activities related to nuclear facilities, which are part of the general licenses.

AIN; Roma, ITALY (Private Sector)**2004.1 - 2008.12**

Deputy secretary general of AIN (Associazione Italiana Nucleare or Italian Nuclear Association; Part-time job), President of INYG (Italian Nuclear Young Generation). Promotion of nuclear sciences and technologies in Italy, define and achieve AIN strategic objectives, adopt all the decisions proposed by the AIN directive organs, manage the AIN's budget and staff, draft policy analysis, assist decision-makers with written or oral contributions, negotiate cooperation agreements and sponsorship/expenses for organizing national and international events and publications, take care of public relations on all issues relating to AIN's mission, draw up and implement annual and multi-annual programmes, organize AIN meetings and an annual conference, participate in international meetings and conferences, establish contacts with national and international stakeholder representatives (e.g. universities, research and regulatory agencies, industries, operators), cooperate with international associations.

ENEA; Roma, ITALY (Public Administration)**2002.12 - 2005.12**

Nuclear Engineer

Computer analysis for the design of ITER components (in the frame of EFDA contracts), design of diagnostic systems; design and experimental measurements with neutrons and gamma detectors; Monte Carlo modeling and analysis; simulation in order to account the activated nuclear material and obtain information on the physical and radiological status of the ITER fusion Reactor; collaborations with researchers worldwide; writing publications in international journals, measurements & calculation reports, minutes of meetings, report of activities; presentations in meetings, seminars, conferences. Tasks supported by EFDA (e.g. VacuumVessel, Neutron Camera diagnostic systems, Divertor for ITER).

LBNL, Berkeley, California, USA (Public Administration)**4contracts in 1998.10 – 2003.9**

Positions as a research assistant

Four contracts in four periods in the years from 1998 to 2003 (basis for Laurea and PhD Thesis): Computer modeling and analysis, collaborations with researchers worldwide, publications in international journals, LBNL reports.

1. In the period 1998-99 (first full time contract): measurements and computer analysis for the design of inertial fusion reactor components, shields and diagnostic systems as a Graduate Student Research Assistant. Assessing the vulnerability of a superconducting magnetic lens system to heating and damage by fusion neutrons; numerical simulation in order to account the activated nuclear material and obtain information on the physical and radiological status of an Inertial Fusion Energy facility.

2,3,4. In the period 2001-03 (during 3summers with 3full time contracts): microdosimetric calculations in support of ongoing experimental measurements program at the LBNL Advanced Light Source synchrotron facility. Application of different Monte Carlo codes and of the creation of a specific user-code to calculate various microdosimetric quantities in very small volumes of biologically-important materials.

*. For all 4 contracts (1998-2003): collaborations with researchers worldwide and publications in international journals, LBNL reports, measurements & calculation notes, minutes of meetings, report of activities, presentation of results in meetings & conferences. These research works were the basis for Laurea and PhD Thesis.

EDUCATION AND TRAINING**Many Training/workshops (Various Organizations)****2000.1 – now**

Professional Trainings (ANN from 2008 to now),

RINA corsi K05G_Auditor Interni Sistemi di gestione: Metodologia di audit e Q24G_Auditor Interni Sistemi di Gestione per la Qualita'; EPR, Nuclear Safety&Security Courses (IAEA, 2020/21), Quality Course (APAT, 2006), Radioprotection Workshop (ENEA, 2005); Particle Transport Simulation Course (University of Florida, 2004); Communication Workshops (IAEA, 2004/05), Professional Engineering Trainings (Professional Board from 2000 to now).

Ph.D. in Energy Management (University of Rome "La Sapienza", ITALY)**2001.10 - 2004.3**

PhD Thesis Research at the LBNL (2001-2003) and ENEA (2002-2003) Laboratories with working contracts (see professional experience). Fellowship of the Italian Ministry of Education for PhD studies (2001-2004).

Master Degree in Nuclear Engineering (Laurea VO, University of Bologna, ITALY)**1993.10 – 1999.7**

Laurea Thesis Research at the LBNL Laboratory (year 1998/99). Fellowship of the University of Bologna for Laurea Thesis Research abroad (year 1998/99). Fellowship of the University of California Berkeley for Advanced courses in the framework of an exchange programme (year 1996/97).

PERSONAL SKILLS

Languages: Italian ●●●●● English ●●●●● French ●●●●● Spanish ●●●○○

Good oral and written communication skills gained through my experiences (e.g. as AIN deputy secretary general); Author of two books on Nuclear Applications ("Impieghi dell'energia nucleare", 2008, "Orizzonti della Tecnologia Nucleare in Italia", 2004). Author of more than 400 reports/papers/publications (including refereed scientific journals/technical magazines).

Good organisational / managerial skills and leadership gained through my experience (e.g. Project Manager, Technical Coordinator in several projects for Ansaldo and its clients and for APAT, AIN deputy secretary general, Navy officer).

ADDITIONAL INFORMATION

- Active participation in AIN as deputy secretary general (2004-2008); member of AIN from 1996.
- Teaching contracts at University of Genova, Rome "Tor Vergata", Piemonte Orientale "A. Avogadro" (from 2004 until now).
- Teaching contract at the Genova Engineer Professional Board (2024)
- PhD Thesis Research at the LBNL (years 2001-2003) and ENEA (years 2002-2003).
- Bologna and Genova Engineer Professional Board, ENS (European Nuclear Society), AIN (Italian Nuclear Association),

- SIPS (Italian Society for Science Progress), UNUCI (Italian Reserve Officers' Association).
- Licensed Professional Engineer Exam for all sectors: Industrial, Information, Civil-Environmental.
- Laurea Thesis Research at the Lawrence Berkeley National Laboratory LBNL (year 1998/99).
- Fellowship of the International Atomic Energy Agency (year 2004 & 2005).
- Fellowship of the University of California Berkeley (year 1996/97).
- Military Service as an Officer in the Italian Navy in the Coast Guard Headquarters.

Coutry	Dates	Experience in International Projects
EU	2017 - 2023	Several contracts in fusion/ITER and fission/Lead Fast Reactors.
China	2016	China LEAd-based Reactor (CLEAR): Accelerator Driven System –Safety and Licensing Expert
EU	2015 -2016	European Bank for Reconstruction and Development (EBRD): Safety and Licensing Expert in the framework of a Program to Upgraded Nuclear Safety of Ukrainian NPP.
SLOVAK REPUBLIC	2008 –2015	Mochovce 3&4 NPP: CEQP/QAIP, Licensing Basis Document, Norms & rules, Design review, Systems requirements, Process Engineering
ITALY / EU	2008 - 2017	Engineering support in the field of decommissioning for Ispra-JRC and SOGIN (ANN clients)
RUSSIA	2005 - 2008	TACIS RF/TS/39; "Licensing procedures and safety requirements for LILR Waste management in Russian Federation, methodology and support for regulatory licensing activity of a real near surface disposal facility".
RUSSIA	2005 - 2008	TACIS RF/RA/06; "Institutional support to the Nuclear Safety Authorities of the Russian Federation to develop their regulatory capabilities on the basis of transferred Western European safety principles/practices"
UKRAINE	2005 - 2008	TACIS UK/RA/06; "Further development of SNRCU regulatory capabilities transferring western European regulatory methodology and practices".
UKRAINE	2005 - 2008	TACIS UK/TS/26; "Support to SNRCU in licensing activities related to TACIS/NSA financed decommissioning facilities at Chernobyl NPP site assistance projects/follow up of project UK/TS/20"
ARMENIA	2005 - 2008	TACIS AR/TS/04; "Enhancement of the safety capabilities of the Armenian Nuclear Regulatory Authority (ANRA) for licensing of Medzamor 2 safety improvements".
GEORGIA	2006 - 2008	TACIS GE/RA/01; "Transfer of Western Regulatory Methodology and Practices to the Nuclear Safety Authority of Georgia (NRSS)".
EU / USA	2009 - 2011	Tasks for determining specific design features for the European Passive Plant (AP1000 European version)
EU / USA	1998 –2003	Monte Carlo analysis for several international projects

ANNEXES

I. MAIN TEACHING ACTIVITIES (Attività di docenza principali presso la Pubblica Amministrazione a corsi universitari): Number: 5 in Italian

1	Dal 2021/2 al 2023 con n.2 contratti	Università degli Studi di Genova; Dipartimento di Ingegneria Meccanica, Energetica, Gestionale e dei Trasporti (DIME). Nell'ambito dell'insegnamento "Impianti Nucleari" (cod. 73245), ciclo di seminari dal titolo "I principi generali della sicurezza nucleare per i reattori a fusione ed a fissione applicati all'impianto a fusione ITER". (Prot. n. 13548 del 11/03/2021)
2	2013/6	Corso di "Tecnologie per la produzione di energia elettrica da fonte nucleare" del Modulo "Energia Elettrica" presso il Master in "Gestione delle Risorse Energetiche", organizzato da SAFE (Sostenibilità Ambientale Fonti Energetiche) in collaborazione con le principali Società operanti nel settore dell'Energia, con prestigiose Università Italiane e straniere e con le Istituzioni.
3	2010/6	Corso di "Nucleare e licensing in ITALIA/USA/Slovacchia" presso il Master in "Scienze e tecnologie degli impianti nucleari" dell'Università degli Studi di Genova in collaborazione con AnsaldoNucleare S.p.A. Lezioni su sistemi di Licencing in Italia, USA, Slovacchia con Principali leggi e decreti legge in materia di energia nucleare ed esempi di documenti autorizzativi, preparazione e correzione esami scritti.
4	Dal 2005/5 al 2014/7 con n.7 contratti	Università di Roma "Tor Vergata" – Roma; Professore a contratto a Tempo Determinato, nell'ambito del corso di "Gestione ed economia dell'energia" ed "Energetica ambientale" per Ingegneria Gestionale, Energetica e dell'Ambiente e Territorio; attività integrativa non di ruolo in accordo con contratti in essere presso ENEA, APAT, Ansaldo). Lezioni sulle fonti primarie di energia, su sistemi, materiali e cicli di combustibile di Impianti Nucleari a fissione di II, III, IV Generazione e su sistemi a Fusione, cenni di fisica nucleare, radioprotezione, sicurezza, esercitazione di confronto tra vari tipi di impianti per produzione di energia elettrica (Nucleare, Carbone, Olio Combustibile, Gas Naturale, Idroelettrico), preparazione e correzione esami scritti.
5	Dal 2009/1 al 2013/2 con n.5 contratti	Master Universitario in "Materiali per energia e ambiente" dell'Università degli Studi del Piemonte Orientale "A. Avogadro" – Novara (Incarico di docenza). Lezioni su sistemi, materiali e cicli di combustibile di Impianti Nucleari a fissione di II, III, IV Generazione e su sistemi a Fusione, cenni di fisica nucleare, radioprotezione, sicurezza, preparazione e correzione esami scritti.

II. MAIN ACTIVITIES FOR PUBLIC ADMINISTRATIONS: Number: 15 in English

1	TACIS GE/RA/01; Title: "Transfer of Western Regulatory Methodology and Practices to the Nuclear Safety Authority of Georgia (NRSS)".	APAT (24 months): Activities supported by European Commission under TACIS Programme
2	TACIS AR/TS/04; Title: "Enhancement of the safety capabilities of the Armenian Nuclear Regulatory Authority (ANRA) for licensing of Medzamor 2 safety improvements".	
3	TACIS UK/RA/06; Title: "Further development of SNRCU regulatory capabilities transferring western European regulatory methodology and practices".	

4	TACIS UK/TS/26; Title: "Support to SNRCU in licensing activities related to TACIS/NSA financed decommissioning facilities at Chernobyl NPP site assistance projects – follow up of project UK/TS/20".	
5	TACIS RF/TS/39; Title: "Licensing procedures and safety requirements for LLR Waste management in Russian Federation, methodology and support for regulatory licensing activity of a real near surface disposal facility (follow-up of the Project Taxis RF/TS/07)".	
6	TACIS RF/RA/06; Title: "Institutional support to the Nuclear Safety Authorities of the Russian Federation to develop their regulatory capabilities on the basis of transferred Western European safety principles and practices".	
7	Title: "Implementazione di un Centro di monitoraggio dell'Ambiente e di gestione dell'emergenza nell'area di PANCEVO"; (in Italian).	
8	Title: "Nuclear analysis of ITER Divertor Design" (see ENEA Report RT/FUS05/860 & EFDA Report FUS TN-DI-MC.R-003)	ENEA (27 months): Activities supported by EFDA (European Fusion Development Agreement) for ITER (International Thermonuclear Experimental Reactor)
9	Title: "Nuclear analysis of ITER Neutron Camera diagnostic systems" (see ENEA Report RT/FUS05/859 & EFDA Report FU06 CT 2003-00020; EFDA/02-1002)	
10	Title: "Nuclear analysis of ITER Vacuum Vessel" (see ENEA Report RT/FUS05/858 & EFDA Report FU06 CT 2003-00336; EFDA/03-1110)	
11	Title: "Nuclear analysis of ITER Port Plug" (see L. Petrizzi, E. Mainardi; Neutronic Analysis of Equatorial Port Plug, Second Meeting on the ITER Port Engineering Task; Culham - UK, March 11, 2005).	
12	Activity2003 at LBNL supported by U.S. DoE under Contract No. DE-AC03-76SF00098: Comparison of microdosimetric simulations using PENELOPE and PITS for a 25 keV electron microbeam in water (see report LBNL- 53806)	
13	Activity2002 at LBNL supported by U.S. DoE under Contract No. DE-AC03-76SF00098: Comparison of microdosimetric quantities using PENELOPE and PITS for 25 keV electrons (see report LBNL-51487)	
14	Activity2003 at LBNL supported by U.S. DoE under Contract No. DE-AC03-76SF00098: Comparison of microdosimetric simulations using PENELOPE and PITS for a 25 keV electron microbeam in water (see report LBNL- 53806)	
15	Activity1998/99 at LBNL supported by U.S. DoE: Comparison and physical interpretation of MCNP and TART neutron and gamma Monte Carlo shielding calculations for a heavy-ion ICF system (see reports LBNL-51155 e LBNL-46226)	

III. THESIS AND BOOKS: Number: 4 (in Italian or in English)

4	E. Mainardi , "Impieghi dell'energia nucleare", Editoriale Delfino; Gennaio 2008. [ISBN 978-88-89518-54-0] (in Italian). (http://www.enricomainardi.it/book.html)
3	E. Mainardi , U.Spezia, "Orizzonti della Tecnologia Nucleare in Italia", Atti della Giornata di Studio AIN 2004; Roma, ITALY, 21° Secolo Editore; September, 2004 [ISBN.88-87731-26-8] (in Italian).
2	E. Mainardi , "Monte Carlo radiation transport for energetics - nuclear applications", Ph.D. Thesis in Energetics, University of Rome "La Sapienza", ITALY, December 2003 [Prof. A.Gandini advisor, M.Cumo chair] (in English).
1	E. Mainardi , "Calcoli Monte Carlo di Neutronica per i Magneti di Focalizzazione Ionica di un Dispositivo a Fusione Inerziale", Master Thesis in Nuclear Engineering, University of Bologna, ITALY, July 1999 [Prof. F. Premuda (Università di Bologna), Dr. E. Lee (LBNL) advisors] (in Italian).

IV. PAPERS IN REFEREED SELECTED INTERNATIONAL JOURNALS - Number: 9; (in English)

N.	ISSN	Title
9	2288-6559	Lomonaco, G.; Mainardi, E. ; Marková, T.; Mazzini, G.; Approaching Nuclear Safety Culture in Fission and Fusion Technology. <i>Appl. Sci.</i> 2021, 11, 4511 (May 2021).
8	2410-390X	Adlish, J.I.; Costa, D.; Mainardi, E. ; Neuhold, P.; Surrente, R.; Tagliapietra, L.J. Polyethylene Identification in Ocean Water Samples by Means of 50 keV Energy Electron Beam. <i>Instruments</i> 2020, Vol.4, N.32 (October 2020).
7	2424-9424	Adlish, J.I.; Mainardi, E. ; Neuhold, P.; Surrente, R.; Tagliapietra, L.J.; RNA Detection in Air by Means of Cosmic Rays Interactions. <i>Reports in Advances of Physical Sciences</i> 2020, Vol.4, N.2 (October 2020).
6	0920-3796	L. Petrizzi, R. Bamsley, L. Bertalot, B. Esposito, H. Haskell, E. Mainardi , D. Marocco, S. Podda, C. Walker, S. Villari; "Neutronic Design of the ITER Radial Neutron Camera", <i>Fusion Engineering and Design</i> , Vol 82 (<i>Elsevier</i> : 2007). pp 1308-1314.
5	0168-9002	E. Mainardi ; "The MAUS nuclear space reactor with ion propulsion system", <i>Nuclear Inst. and Methods in Physics Research A</i> , Vol 561 (<i>Elsevier</i> : 2006), pp 331-335.
4	0920-3796	G. Mazzone, F. Lucca, E. Mainardi , A. Marin, M. Merola, L. Petrizzi, A. Pizzuto, M. Roccella, G. Zanotelli; "Design modification of plasma facing component and cassette body for ITER divertor", <i>Fusion Engineering and Design</i> , (<i>Elsevier</i> : 2005).
3	0033-7587	E. Mainardi , R. J. Donahue, W. E. Wilson, E. A. Blakely; "Comparison of microdosimetric quantities using PENELOPE and PITS for 25 keV electrons microbeam in water", <i>Radiation Research</i> , Vol. 162 Issue 3, (September 2004), pp. 326-331.
2	0168-583X	E. Mainardi , F. Premuda, E. Lee; "Comparison and Physical Interpretation of MCNP and TART Neutron and Gamma Monte Carlo Shielding Calculations for a Heavy-Ion ICF System", <i>Nuclear Inst. and Methods in Physics Research B</i> , Vol. 213, (<i>Elsevier</i> , January 2004), pp. 182-185.
1	0168-9002	E. Mainardi , E. Lee, F. Premuda; "Neutronics Calculations for an Inertial Fusion Final Focus System", <i>Nuclear Inst. and Methods in Physics Research A</i> , Vol 464 (<i>Elsevier</i> : 2001), pp 410-415.