+44 20 8123 2220
info@marketpublishers.com

Marine Applications of Nuclear Power

https://marketpublishers.com/r/M03211931A1EN.html
Date: June 2011
Pages: 585
Price: US$ 400.00 (Single User License)
ID: M03211931A1EN

Abstracts

The advent of modern civilization has powered the ever expanding human footprint on earth which is now present all across land, air and sea. In a historical perspective of the world, some of society’s earliest expansion objectives were met through the sea itself. Thereby, the role played by the oceans and human activity across them has been vital politically as well as in commerce. Today, the modern society also does a sizeable chunk of commerce and holds active political interests in the oceans. It has become an established fact that major industrial commerce takes place by the sea route itself as compared to the air route. In defense terms, the major nations of the world have actively developed their naval strengths as defenders, force projectors, front openers as well as defense backbones. Thus, the role of an exceptional naval fleet in any nation’s defense and commerce policy is undeniably critical to the country’s geo political success. Today, there are naval forces which are as huge as entire cities on water as they are purpose built for global power presence. Undoubtedly, this entire activity has equally huge energy consumption needs.

In land and air based systems energy needs can be met by transport for land as well as base support or mid air support for air needs, the jigsaw comes to fore at sea wherein energy may actually decide the outcome. The operational dynamics of providing energy support at sea are challenging as vessels may not even dock for long periods at go and the support provider itself cannot afford to be marooned in the middle of nowhere. Initially, some nations answered this challenge by powering their naval assets on fossil fuel systems. These worked fine for some time but a growing realization soon dawned upon them that constant replenishment, maintenance, limitation of storage and safety were dampening factors.

The scientific community of developed nations took up the challenge by identifying the two basic needs of energy support at sea. Firstly, the resource had to be long lasting and provide enough energy to meet a multitude of operational requirements in action as

well as at peace. Secondly, the resource should have longer replenishment cycles thereby allowing longer range, independence of operation and more uptime to the naval asset at sea. The only resource which has succeeded in meeting all such conditions as also displayed ease of scaling up from built up capabilities is the nuclear energy option.

The adaptation of nuclear energy to power global naval assets has revolutionized the thought process behind this crucial industry. Aruvian's R'search's report on Marine Applications of Nuclear Power focuses on this crucial industry which is a sterling example of technology pushing the physical boundaries of business and defense. The report develops a comprehensive understanding of this subject as under:

a) A clear and comprehensive understanding of nuclear marine propulsion, particularly in terms of military and civilian use; including the various types of marine-type nuclear reactors.

b) The various applications of a nuclear navy. This includes an in-depth analysis of nuclear-powered aircraft carriers, nuclear-powered submarines, and other nuclear-powered vessels.

c) An analysis of the benefits and challenges facing the development of marine applications of nuclear power.

d) Development over the years of the many types of naval nuclear reactors. These include the analysis of the S1W pressurized water reactor design, the large ship reactors, SIR/ S1G intermediate flux beryllium sodium cooled reactor, and many others.

e) An analysis of the naval reactors in the United States, including the designation system for reactors, and the various naval reactors and power plants. Nuclear reactors analyzed include the A1B reactor, A1W rector, C1W reactor, and many others. The analysis also includes an analysis of various types of nuclear-powered submarines owned by the United States.

f) Economic viability of a nuclear navy for the United States

g) A complete analysis of commercial nuclear ships and their reactor designs.

h) Analysis of the nuclear navies around the world.

i) The emerging technologies of All-Electric Propulsion and the various stealth technologies in use are also analyzed. This includes an analysis of anti-submarine warfare as well as the use of free electron laser and the electromagnetic rail gun.

j) An in-depth analysis of nuclear-powered ships used for both civil and naval purposes.

k) A section is dedicated to the analysis of the nuclear-powered surface ships in the United States, including a comparison between conventional and nuclear power usage for ships. The US Navy's Nuclear Propulsion Program is also analyzed, along with an analysis of the current Navy nuclear-powered ships. Cost factor impacting the development of these types of ships are also analyzed.

l) Moving on to an analysis of nuclear-powered icebreakers. The section analyzes the Russian expertise in this industry along with the many rector types that are used in the icebreaks. An analysis of some nuclear-powered icebreakers such as the Lenin Nuclear Icebreaker, the Sevmorput, NS 50 Let Pobedy, etc., completed the section. Use of the nuclear-powered icebreakers for tourism purposes is also touched upon.

m) Nuclear submarines are perhaps the most important application of nuclear power in the marine industry. We analyze the technical features in a nuclear-powered submarine, along with the submarine force of various countries, including China, India, France, Russia, the UK, and the US. Submarines under development are also analyzed, including any new technical developments. The upcoming developments in Argentina, Brazil, and South Korea are also analyzed.

n) An analysis of the nuclear submarines worldwide sums up the in-depth analysis of nuclear-powered submarines.

o) Any report on nuclear-powered marine applications is incomplete without an analysis of Russia's nuclear-powered naval fleet. We carry out a comprehensive coverage of Russia's nuclear-powered naval fleet starting with the military and civilian vessel classes and generations. The section is divided into an analysis of the civilian marine nuclear reactors in Russia and the military marine nuclear reactors in Russia. A well-covered industry forecast concludes this section.

p) The emergence of China and India as forces to reckon with in terms of their Nuclear Navy is looked upon in this report in an analysis of China's Submarine Force and India's Nuclear Navy.

Overall, the research report Marine Applications of Nuclear Power from Aruvian's R'search builds a complete understanding of both civilian and military uses of nuclear power in the marine industry.

+44 20 8123 2220
info@marketpublishers.com

Contents

A. EXECUTIVE SUMMARY

SECTION 1: UNDERSTANDING NUCLEAR POWER

B. BASICS OF THE NUCLEAR INDUSTRY

B.1 History of Nuclear Power
B.2 Types of Nuclear Reactors
B.2.1 Fission Reactor
B.2.2 Radioisotope Thermoelectric Generator
B.3 New & Upcoming Nuclear Technologies
B.4 Components & Parts of a Nuclear Power Plant
B.5 Analyzing the Fuel Cycle
B.6 Managing the Radioactive Waste

C. PROFILING THE GLOBAL NUCLEAR POWER INDUSTRY

C.1 Industry Overview
C.2 Uranium Market
C.3 Market Features
C.4 Price Trends
C.5 Managing the Risk in Nuclear Power
C.6 Industry Trends
C.7 Economic Trends
C.8 Nuclear Hedging
C.9 Future Outlook

SECTION 2: MARINE APPLICATIONS OF NUCLEAR POWER

A. INTRODUCTION TO NUCLEAR MARINE PROPULSION

A.1 Overview
A.2 History of Nuclear Power in Marine Applications
A.2.1 Military Use
A.2.2 Civilian Use
A.3 Marine-type Nuclear Reactors
A.4 Nuclear-powered Naval Vessels

B. ANALYSIS OF NAVAL NUCLEAR APPLICATIONS

B.1 Overview
B.2 Nuclear-powered Aircraft Carriers
B.3 Nuclear-powered Submarines
B.4 Other Nuclear-powered Vessels

C. BENEFITS OF NUCLEAR MARINE PROPULSION

C.1 Flexibility
C.2 High Power Density of Nuclear Power
C.3 Real-Time Response Time
C.4 End of Energy Dependency
C.5 Increasing the Capabilities of the Naval Forces
C.6 Environmentally Clean Source of Energy

D. ANALYSIS OF NAVAL NUCLEAR REACTOR DEVELOPMENT

D.1 Introduction
D.2 S1W Pressurized Water Reactor Design (STR)
D.3 Large Ship Reactors, A1W-A, A1W-B
D.4 SIR OR S1G Intermediate Flux Beryllium Sodium Cooled Reactor
D.5 Experimental Beryllium Oxide Reactor
D.6 SC-WR Super Critical Water Reactor
D.7 Organic Moderated Reactor Experiment
D.8 Lead-Bismuth Cooled Fast Reactors
D.9 Natural Circulation S5G Prototype
D.10 Fail Safe Control and Load Following S7G Design
D.11 S9G High Energy Density Core
D.12 Expended Core Facility
D.13 Ongoing R&D in Naval Reactors

E. ANALYSIS OF US NAVAL REACTORS

E.1 Overview
E.2 Designation System for Reactors
E.3 History of Naval Reactor Industry in the US
E.4 Naval Reactors & Power Plants

E.5 Nuclear Reactors of the US Navy
E.5.1 A1B Reactor
E.5.1.1 Gerald R. Ford-Class Aircraft Carriers
E.5.2 A1W Reactor
E.5.3 A2W Reactor
E.5.3.1 USS Enterprise (CVN-65)
E.5.4 A3W Reactor
E.5.5 A4W Reactor
E.5.5.1 Nimitz-Class Aircraft Carriers
E.5.6 C1W Reactor
E.5.6.1 Long Beach Class Cruiser
E.5.6 D1G Reactor
E.5.7 D2G Reactor
E.5.7.1 Bainbridge Class Cruiser
E.5.7.2 Truxtun Class Cruiser
E.5.7.3 California Class Cruiser
E.5.7.4 Virginia Class Cruiser
E.5.8 NR-1 Reactor
E.5.9 S1C Reactor
E.5.10 S1G Reactor
E.5.11 S1W Reactor
E.5.12 S2C Reactor
E.5.12.1 USS Tullibee (SSN-597)
E.5.13 S2G Reactor
E.5.13.1 USS Seawolf (SSN-575)
E.5.14 S2W Reactor
E.5.14.1 USS Nautilus (SSN-571)
E.5.15 S2Wa Reactor
E.5.16 S3G Reactor
E.5.17 S3W Reactor
E.5.17.1 USS Skate (SSN-578)
E.5.17.2 USS Sargo (SSN-583)
E.5.17.3 USS Halibut (SSGN-587)
E.5.18 S4G Reactor
E.5.18.1 USS Triton (SSN-586)
E.5.19 S4W Reactor
E.5.19.1 USS Swordfish (SSN-579)
E.5.19.2 USS Seadragon (SSN-584)
E.5.20 S5G Reactor

E.5.21 S5W Reactor
E.5.21.1 Skipjack Class Submarine (SSN-585 class)
E.5.21.2 George Washington Class Submarine (SSBN-598 class)
E.5.21.3 Thresher/Permit Class Submarine (SSN-593/SSN-594 class)
E.5.21.4 Ethan Allen Class Submarine (SSBN-608 class)
E.5.21.5 Lafayette Class Submarine (SSBN-616 class)
E.5.21.6 James Madison Class Submarine (SSBN-627 class)
E.5.21.7 Benjamin Franklin Class Submarine (SSBN-640 class)
E.5.21.8 Sturgeon Class Submarine (SSN-637 class)
E.5.21.9 USS Parche (SSN-683)
E.5.21.10 USS Glenard P. Lipscomb (SSN-685)
E.5.22 S6G Reactor
E.5.23 S6W Reactor
E.5.24 S7G Reactor
E.5.25 S8G Reactor
E.5.26 S9G Reactor

F. ECONOMIC VIABILITY OF THE NUCLEAR NAVY FOR US

G. ANALYSIS OF COMMERCIAL NUCLEAR SHIPS

G.1 Overview
G.2 Reactor Designs

H. ANALYSIS OF NUCLEAR NAVIES

H.1 Overview
H.2 Navy Carrier Force
H.3 Nuclear Submarine Force
H.3.1 Russian Navy
H.3.2 Chinese Navy
H.4 Nuclear Surface Vessels
H.5 Nuclear Cruise Missile Submarines
H.6 Nuclear Ballistic Missile Submarines
H.7 Nuclear Attack Submarines

I. EMERGENCE OF THE ALL-ELECTRIC PROPULSION SYSTEM & STEALTH SHIPS

I.1 Industry Overview
I.2 Littoral Combat Ship
I.3 Anti-Submarine Warfare, ASW Continuous Trail Unmanned Vessel Program
I.4 Free Electron Lasers
I.5 Electromagnetic Rail Gun
I.6 High Powered Microwave Directed Beams
I.7 Multipurpose Floating Barges
I.8 Antisubmarine Warfare

J. ANALYSIS OF NUCLEAR-POWERED SHIPS

J.1 Industry Overview
J.2 Nuclear Naval Fleets
J.3 Nuclear Civil Vehicles
J.4 Nuclear Propulsion Systems
J.5 Floating Nuclear Power Plants
J.6 Future Perspective

K. NUCLEAR-POWERED SURFACE SHIPS IN THE US

K.1 Nuclear versus Conventional Power for Ships
K.2 US Navy Nuclear-powered Ships
K.2.1 Navy's Nuclear Propulsion Program
K.2.2 Current Navy Nuclear-Powered Ships
K.2.3 Historical Data for Navy Nuclear-powered Cruisers
K.3 Analysis of the Initial Fuel Core
K.4 Role of the Defense Authorization Act (P.L. 110-181)
K.5 Looking at the CG(X) Cruiser Program
K.6 Analysis of the Construction Shipyards
K.6.1 Shipyards Building Nuclear-powered Ships
K.6.2 Surface Combatant Shipyards
K.7 Issues Facing the Navy
K.7.1 Cost Factor
K.7.1.1 Designing and Development Cost
K.7.1.2 Cost for Procurement
K.7.1.3 Life Cycle Cost
K.7.2 Operational Issues
K.7.2.1 Operational Value
K.7.2.2 Other Operational Advantages

+44 20 8123 2220
info@marketpublishers.com

K.7.3 Issues with Ship Construction
K.7.3.1 Shipyard Challenges
K.7.3.2 Lack of Component Manufacturers
K.7.4 Environmental Impact

L. ANALYSIS OF NUCLEAR-POWERED ICEBREAKERS

L.1 Overview
L.2 Use of Nuclear-powered Icebreaker
L.3 Applications of Icebreakers
L.4 Russian Expertise in the Industry
L.5 Reactor Types
L.4 Analysis of Nuclear-powered Icebreakers
L.4.1 Lenin Nuclear Icebreaker
L.4.2 Arktika Icebreaker
L.4.3 Sevmorput
L.4.4 Taymyr Nuclear Icebreaker
L.4.5 Vaygach Nuclear Icebreaker
L.4.6 Yamal Icebreaker
L.4.7 NS 50 Let Pobedy
L.5 Planned Nuclear Icebreakers
L.6 Supporting Infrastructure
L.7 Use of Nuclear-powered Icebreakers in Tourism
L.8 Decommissioning and Defueling
L.9 Accidents with Icebreakers
L.9.1 USS Thresher, SSN-593 Accident
L.9.2 USS Scorpion, SSN-589 Accident
L.9.3 John S. Stennis, CVN-74 Loca Accident
L.9.4 San Francisco Underwater Collision
L.9.5 Nerpa, Akula Class Fire
L.9.6 USS Houston Coolant Leak
L.9.7 HMS Vanguard, Le Triomphant Collision
L.9.8 Hartford and New Orleans Accident

M. ANALYSIS OF NUCLEAR SUBMARINES

M.1 Overview
M.2 History of Nuclear Submarines
M.3 Technical Features

M.4 Operational Nuclear Submarines in China
M.4.1 Type 091 (Han) Attack Submarines
M.4.2 Type 092 (Xia) Ballistic Missile Submarines
M.4.3 Type 093 (Shang) Attack Submarines
M.4.4 Type 094 (Jin) Ballistic Missile Submarines
M.5 Nuclear Submarines under Development in China
M.5.1 Type 095 Attack Submarines
M.5.2 Type 096 (Tang) Ballistic Missile Submarines
M.6 Operational Nuclear Submarines in France
M.6.1 Rubis Class Attack Submarines
M.6.2 Triomphant Class Ballistic Missile Submarines
M.7 Nuclear Submarines under Development in France
M.7.1 Barracuda Class Attack Submarines
M.8 Operational Nuclear Submarines in India
M.8.1 INS Chakra
M.9 Nuclear Submarines under Development in India
M.9.1 Arihant Class Ballistic Missile Submarines
M.10 Operational Nuclear Submarines in Russia
M.10.1 Project 941 (Typhoon) Ballistic Missile Submarines
M.10.2 Project 945 (Sierra) Attack Submarines
M.10.3 Project 949 (Oscar) Cruise Missile Submarines
M.10.4 Project 667BDR, Kalmar (Delta III) Ballistic Missile Submarines
M.10.5 Project 667BDRM, Delfin (Delta IV) Ballistic Missile Submarines
M.10.6 Project 1910 (Uniform) Special Purpose Submarines
M.10.7 Project 971 (Akula) Attack Submarines
M.10.8 Project 671RTM Shchuka (Victor III) Attack Submarines
M.11 Nuclear Submarines under development in Russia
M.11.1 Project 885 (Graney) Attack Submarines
M.11.2 Project 935 (Borei) Ballistic Missile Submarines
M.12 Operational Nuclear Submarines in the UK
M.12.1 Trafalgar Class Attack Submarines
M.12.2 Vanguard Class Ballistic Missile Submarines
M.12.3 Astute Class Attack Submarines
M.13 Operational Nuclear Submarines in the US
M.13.1 SCB-303: Los Angeles Class Attack Submarines
M.13.2 SCB-304: Ohio Class Ballistic Missile Submarines
M.13.3 Seawolf Class Attack Submarines
M.13.4 Virginia Class Attack Submarines
M.14 Argentina’s Plans for Nuclear Submarines

+44 20 8123 2220
info@marketpublishers.com

M.15 Brazil's Plans for Nuclear Submarines
M.16 South Korea's Nuclear Submarines
M.17 Nuclear Submarine Accidents

N. ANALYSIS OF NUCLEAR SUBMARINES WORLDWIDE

N.1 USS Alabama, SSBN-731
N.2 USS Alaska, SSBN-732
N.3 USS Albany, SSN-753
N.4 USS Albuquerque, SSN-706
N.5 USS Alexandria, SSN-757
N.6 HMS Ambush, S120
N.7 S605 Am?thyste, SNA (SSN)
N.8 USS Annapolis, SSN-760
N.9 INS Arihant, (ATV-1), SSBN-S02
N.10 HMS Artful, S121
N.11 USS Asheville, SSN-758
N.12 Astute-class (SSN)
N.13 HMS Astute, S119
N.14 HMS Audacious, S122
N.15 USS Augusta, SSN-710
N.16 USS Boise, SSN-764
N.17 USS Bremerton, SSN-698
N.18 USS Buffalo, SSN-715
N.19 Borei Class Submarine
N.20 Russian Submarine K-117 Bryansk
N.21 S603 Casabianca (ex-Bourgogne), SNA (SSN)
N.22 USS Charlotte, SSN-766
N.23 USS Cheyenne, SSN-773
N.24 USS Chicago, SSN-721
N.25 Churchill-class (SSN)
N.26 HMS Churchill, S46
N.27 USS City of Corpus Christi, SSN-705
N.28 USS Columbia, SSN-771
N.29 USS Columbus, SSN-762
N.30 USS Connecticut, SSN-22
N.31 HMS Conqueror, S48
N.32 HMS Courageous, S50
N.33 USS Dallas, SSN-700

N.34 RFS Dmitriy Donskoy, TK-208 (SSBN)
N.35 Delta Class Submarine
N.36 Russian submarine K-414 Daniil Moskovsky
N.37 HMS Dreadnought, S101
N.38 S604 ?meraude, SNA (SSN)
N.39 USS Florida, SSGN-728
N.40 USS Georgia, SSGN-729
N.41 USS Greeneville, SSN-772
N.42 USS Hampton, SSN-767
N.43 USS Hartford, SSN-768
N.44 USS Hawaii, SSN-776
N.45 USS Helena, SSN-725
N.46 USS Henry M. Jackson, SSBN-730
N.47 USS Honolulu, SSN-718
N.48 USS Houston, SSN-713
N.49 USS Hyman G. Rickover, SSN-709
N.50 S615 L'Inflexible, SNLE (SSBN)
N.51 USS Jacksonville, SSN-699
N.52 USS Jefferson City, SSN-759
N.53 USS Jimmy Carter, SSN-23
N.54 USS Kentucky, SSBN-737
N.55 USS Key West, SSN-722
N.56 Russian Submarine B-276 Kostroma
N.57 USS La Jolla, SSN-701
N.58 USS Los Angeles, SSN-688
N.59 USS Louisiana, SSBN-743
N.60 USS Louisville, SSN-724
N.61 USS Maine, SSBN-741
N.62 USS Maryland, SSBN-738
N.63 USS Memphis, SSN-691
N.64 USS Miami, SSN-755
N.65 USS Michigan, SSGN-727
N.66 USS Minneapolis-Saint Paul, SSN-708
N.67 USS Montpelier, SSN-765
N.68 USS Nautilus SSN-571
N.69 USS Nebraska, SSBN-739
N.70 USS Nevada, SSBN-733
N.71 USS New Hampshire, SSN-778
N.72 USS Newport News, SSN-750

+44 20 8123 2220
info@marketpublishers.com

N.73 USS Norfolk, SSN-714
N.74 USS North Carolina, SSN-777
N.75 Russian Submarine K-407 Novomoskovsk
N.76 Russian Submarine K-152 Nerpa
N.77 USS Ohio, SSGN-726
N.78 USS Oklahoma City, SSN-723
N.79 USS Olympia, SSN-717
N.80 Oscar Class Submarine
N.81 USS Pasadena, SSN-752
N.82 USS Pennsylvania, SSBN-735
N.83 S606 Perle, SNA (SSN)
N.84 USS Philadelphia, SSN-690
N.85 USS Pittsburgh, SSN-720
N.86 USS Portsmouth, SSN-707
N.87 USS Providence, SSN-719
N.88 Russian Submarine K-336 Pskov
N.89 Russian Submarine K-211 Petropavlovsk-Kamchatskiy
N.90 Russian Submarine BS-64 Podmoskovye
N.91 S611 Redoutable, SNLE (SSBN)
N.92 Resolution-class (SSBN)
N.93 HMS Resolution, S22
N.94 HMS Repulse, S23
N.95 HMS Renown, S26
N.96 HMS Revenge, S27
N.97 USS Rhode Island, SSBN-740
N.98 S601 Rubis (ex-Provence), SNA (SSN)
N.99 USS Salt Lake City, SSN-716
N.100 USS San Francisco, SSN-711
N.101 USS San Juan, SSN-751
N.102 USS Santa Fe, SSN-763
N.102 S601 Saphir (ex-Bretagne), SNA (SSN)
N.103 HMS Sceptre, S104
N.104 USS Scranton, SSN-756
N.105 USS Seahorse, SSN-669
N.106 USS Seawolf, SSN-21
N.107 Sierra Class Submarine
N.108 HMS Sovereign, S108
N.109 HMS Spartan, S105
N.110 HMS Splendid, S106

+44 20 8123 2220
info@marketpublishers.com

N.111 USS Springfield, SSN-761
N.112 HMS Superb, S109
N.113 Russian Submarine K-433 Svyatoy Georgiy Pobedonosets
N.114 Swiftsure-class (SSN)
N.115 HMS Swiftsure, S126

O. ANALYSIS OF RUSSIA'S NUCLEAR-POWERED NAVAL FLEET

O.1 Military Vessel Classes and Generations
O.2 Civilian Vessel Classes and Generations
O.3 Civilian Marine Reactors in Russia
O.3.1 Overview
O.3.2 OK-150 Plant
O.3.2.1 Overview
O.3.2.2 Reactor Analysis
O.3.2.3 Fuel Analysis
O.3.2.4 Reaction Control
O.3.2.5 Pressure Vessel & Safety Radiation Shield
O.3.2.6 Cooling Circuit
O.3.2.7 Thermal Features
O.3.3 OK-900 Plant
O.3.3.1 Overview
O.3.3.2 Reactor Analysis
O.3.3.3 Fuel Analysis
O.3.3.4 Reaction Control
O.3.3.5 Safety System
O.3.4 KLT-40 Plant
O.3.4.1 Overview
O.3.4.2 Reactor Analysis
O.3.4.3 Fuel Analysis
O.3.4.4 Reaction Control
O.3.4.5 Safety System
O.3.4.6 Cooling Circuit
O.3.4.7 Radioactivity Containment System
O.3.5 Floating Nuclear Power Stations
O.3.5.1 Overview
O.3.5.2 History
O.3.5.3 Technical Features
O.3.5.4 Fueling Features

+44 20 8123 2220
info@marketpublishers.com

O.3.5.5 Developers of the Stations
O.3.5.6 Advantage of Location
O.3.5.7 Safety Issues
O.4 Military Marine Reactors in Russia
O.4.1 Overview
O.4.2 VM-A Reactor System
O.4.2.1 Reactor Analysis
O.4.2.2 Fuel Analysis
O.4.2.3 Reactivity Control
O.4.3 VM-4/ VM-2 Reactor Systems
O.4.3.1 Overview
O.4.3.1 Reactor Analysis
O.4.3.2 Fuel Analysis
O.4.3.3 Reactivity Control
O.4.4 OK 650/ KN-3 Reactor Systems
O.4.4.1 Overview
O.4.4.2 Reactor Analysis
O.4.4.3 Fuel Analysis
O.4.4.4 Reactivity Control
O.4.5 RM-1 and VM- 40 A Reactor Systems
O.4.5.1 Overview
O.4.4.2 Reactor Analysis
O.4.4.3 Fuel Analysis
O.4.4.4 Reactivity Control
O.5 Future of Russian Marine Nuclear Systems
O.5.1 Industry Forecast
O.5.2 Civilian Reactors
O.5.3 Military Reactors

P. CASE STUDY: CHINA'S NUCLEAR SUBMARINE FORCE

Q. CASE STUDY: INDIA'S NUCLEAR NAVY

Q.1 Introduction
Q.2 Maritime Nuclear Development in India
Q.3 Sino-Indian Nuclear Dynamic

R. CASE STUDY: SAFETY OF US NUCLEAR POWERED WARSHIPS

R.1 Introduction
R.2 Design of Naval Reactor Plant
R.3 Operation of the Naval Reactor
R.4 Issue of Radiation Exposure
R.5 Disposal of Nuclear Waste
R.6 Environmental Impact
R.7 Preparations for Emergencies
R.8 Possible Radiation Leakage

S. APPENDIX

S.1 Analysis of the Shippingport Pressurized Water Reactor and Light Water Breeder Reactor
S.2 Figures & Tables

T. GLOSSARY OF TERMS

+44 20 8123 2220
info@marketpublishers.com

I would like to order

Product name: Marine Applications of Nuclear Power

Product link: https://marketpublishers.com/r/M03211931A1EN.html

Price: US$ 400.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

info@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page https://marketpublishers.com/r/M03211931A1EN.html