



# 9th Diesel Engine Emissions Reduction Conference

Newport Marriott  
Newport,  
Rhode Island

August 24-28, 2003



Organized by

**U.S. Department of Energy**

**Energy Efficiency and Renewable Energy**

*Bringing you a prosperous future where energy is clean, abundant, reliable and affordable*



August 24, 2003

**Dear DEER 2003 Conference Participants:**

On behalf of the U.S. Department of Energy's Freedom Car and Vehicle Technologies, welcome to the 9th Diesel Engine Emissions Reduction (DEER) 2003 Conference in Newport, Rhode Island! This year promises to be very rewarding for you as an attendee. Through the course of the week, you will hear about "cutting edge" research results on both in-cylinder and exhaust aftertreatment emission reduction technologies, diesel combustion analysis, health effects, fuels and lubricants, and waste heat utilization -- all designed to help move the Department's emissions reduction effort forward. You will also have a chance to ride in and drive SUVs and autos equipped with clean diesel engines that comply with Tier 2, 2007 emission standards but require additional work to achieve the required 120,000 miles durability.

I am pretty sure that each of you will want to visit some of the local attractions. You will find information pertaining to area attractions in your conference bag or you may visit the Newport Conventions and Visitors Bureau located next door to the Marriott.

A special thank you goes out to our corporate sponsors for ensuring that the DEER 2003 Conference is a success. Corporate sponsors are as follows:

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Your participation in DEER 2003 is very much appreciated. This year's conference is shaping up to be the most informative and successful yet!

Regards,

John Fairbanks, Chair  
Diesel Engine Emissions Reduction Conference

# Acronyms

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ADVISOR™ .....ADvanced VehIcle SimulatOR

AFDC.....Alternative Fuels Data Center

AFR .....Air-to-fuel ratio

ANL .....Argonne National Laboratory

APFB-DEC.....Advanced petroleum-based  
fuels - diesel engine control

APRF .....Advanced Powertrain Research  
Facility

APS.....Advanced Photon Source

ASME .....American Society of  
Mechanical Engineers

ATOF-MS.....Aerosol time-of-flight mass  
spectrometer

AVTA .....Advanced Vehicle Testing  
Activity

BMEP .....Brake mean effective pressure

BS .....Brake specific

BSFC.....Brake-specific fuel consumption

CAMS .....Center for Accelerated Mass  
Spectrometry

CARB .....California Air Resources Board

CBD cycle .....Central Business District cycle

CDPF.....Catalyzed diesel particulate  
filter

CDPF.....Continuously regenerating  
diesel particulate filter

CEC.....California Energy Commission

CFA .....Consortium for Fuels  
Assessment

CFD .....Computational fluid dynamics

CIDI.....Compression ignition direct  
injection

CMB .....Chemical mass balance

CNG .....Compressed natural gas

CPSI.....Cells per square inch

CRADA .....Cooperative research and  
development agreement

CRF .....Combustion Research Facility

CRT .....Continuously regenerating  
technology

CSHV cycle .....City-suburban heavy vehicle  
cycle

DCSF .....Diesel Combustion Simulation  
Facility

DECSE.....Diesel emissions control sulfur  
effects

DOC.....Diesel oxidation catalyst

DOE .....U.S. Department of Energy

DPF .....Diesel particulate filter

DPNR.....Diesel particulate and NOx  
reduction

EC .....Elemental carbon

ECU .....Emissions/electronic/engine  
control unit

EEPS™ .....Engine exhaust particle sizer  
spectrometer

EERE .....Energy Efficiency and  
Renewable Energy

EGR .....Exhaust gas recirculation

ELPI.....Electric low-pressure  
instrument

EMSL.....Environmental Molecular  
Science Laboratory

EPA .....U.S. Environmental Protection  
Agency

ETC cycle.....European Transit Cycle

EV.....Electric vehicle

FBC .....Fuel-borne catalyst

FE .....Fuel efficiency

F-T .....Fischer-Tropsch

FTIR.....Fourier transform infrared



GC-MS.....	Gas chromatograph - mass spectroscopy	LNG .....	Liquified natural gas
GDI.....	Gasoline direct injection	LNT.....	Lean NOx trap
GHG .....	Greenhouse gases	LTC .....	Low-temperature combustion
GTL .....	Gas to liquids	MARAD .....	U.S. Maritime Administration
GTRI.....	Georgia Tech Research Institute	MDPV .....	Medium-duty passenger vehicle
HC.....	Hydrocarbon	MEL .....	Mobile emissions laboratory
HCCI .....	Homogeneous charge compression ignition	MEMS .....	Mobile emissions measurement system
HEV.....	Hybrid electric vehicle	MI .....	Main injection
HLDT.....	Heavy light-duty vehicle	MK .....	Modulated kinetics
HPLC.....	High-performance liquid chromatograph	MOUDI .....	Micro-orifice uniform deposit impacter
HT .....	Hydrothermally aged	NAC .....	NOx adsorber catalyst
HTCD .....	Heavy truck clean diesel	NASA .....	National Aeronautics and Space Administration
HTM .....	High thermal mass	NFC .....	Near-frictionless carbon
HTML.....	High-Temperature Materials Laboratory	NIOSH.....	National Institute for Occupational Safety and Health
ICE .....	Internal combustion engine	NIST.....	National Institute of Standards and Technology
INEEL.....	Idaho National Engineering and Environmental Laboratory	NLTC .....	Novel low-temperature combustion
IQT™ .....	Ignition quality tester	NMHC .....	Non-methane hydrocarbon
LANL .....	Los Alamos National Laboratory	NMVOC.....	Non-methane volatile organic compounds
LED .....	Low-emitting diesel	NPBF .....	Non-petroleum based fuels
LEP .....	Low-Emissions Partnership	NREL.....	National Renewable Energy Laboratory
LIBS .....	Laser-induced breakdown spectroscopy	NTE .....	Not to exceed
LIDELS .....	Laser-induced desorption with elastic light scattering	NTP .....	Non-thermal plasma
LIF .....	Laser-induced fluorescence	NTPAC.....	Non-thermal plasma-assisted catalysis
LII.....	Laser-induced incandescence	NTRC.....	National Transportation Research Center
LLNL.....	Lawrence Livermore National Laboratory	NYB cycle.....	New York City bus cycle
LNC.....	Lean NOx catalyst	NYC cycle.....	New York City cycle



NYSERDA.....	New York State Energy Research and Development Authority	SCR .....	Selective catalytic reduction
OBD .....	On-board diagnostics	SI.....	Spark ignition
OC.....	Organic carbon	SMPS.....	Scanning mobility particle sizer
OEM .....	Original equipment manufacturer	SNL.....	Sandia National Laboratories
OFCVT .....	Office of FreedomCAR and Vehicle Technologies	Spaci-MS .....	Spatially resolved, capillary-inlet mass spectrometer
ORNL .....	Oak Ridge National Laboratory	SPLAT-MS .....	Single-particle laser ablation time-of-flight mass spectroscopy
PAH.....	Polycyclic aromatic hydrocarbon	SULEV .....	Super-ultra low emissions vehicle
PCCI.....	Premixed charge compression ignition	SV.....	Space velocity
PFC .....	Plasma-assisted catalysis	SVOC.....	Semi-volatile organic compounds
PI .....	Pilot injection	TAC .....	Toxic air contaminant
PM.....	Particulate matter	TDI.....	Turbocharged direct injection
PNGV .....	Partnership for a New Generation of Vehicles	TEG .....	Thermoelectric generator
PNNL.....	Pacific Northwest National Laboratory	TEM .....	Transmission electron microscope
PSAT .....	Powertrain systems analysis toolkit	TG .....	Thermogravimetric
RAC.....	Reformer-assisted catalysis	THC .....	Total hydrocarbons
RAS.....	Resonance absorption spectroscopy	TPM .....	Total particulate matter
ReFUEL.....	Renewable fuels and lubricants	UC test .....	Unified Cycle test
RSV .....	Respiratory syncytial virus	ULPD.....	Ultra low pressure drop
RTC .....	Residence time chamber	ULSD.....	Ultra low sulfur diesel
SAD.....	Selected area diffraction	USC .....	University of Southern California
SAE .....	Society of Automotive Engineers	USCAR .....	U.S. Council for Automotive Research
SCAAP .....	Supercomputer Automotive Applications Partnership	UT.....	University of Tennessee
SCAQMD.....	South Coast Air Quality Management District	VMT .....	Vehicle-miles traveled
SCCI.....	Stratified charge compression ignition	VOC .....	Volatile organic compounds
		WIS .....	Water-injection system
		ZEV.....	Zero emissions vehicle



## Platinum

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**Aaqius & Aaqius**    <http://www.aaqius.com>

The activity of Aaqius and Aaqius is entirely dedicated to Business Development, to the enhancement of innovative projects and to the implementation of technological progress.

Aaqius allows its clients to carry out their innovations by proposing overall development plans and by seeking industrial and financial partners within a logic of mutual trust based on risk sharing. Aaqius speeds up the development of projects and their entry into the market through the implementation of appropriate tools.

The wide competencies of the Aaqius team are available in the fields of operational and relational strategic marketing, innovations project management, business intelligence and communication.

Thanks to the Aaqius Network, Aaqius is operational on the international market (Europe, American continent and Asia) and plays a part in such varied industries as automotive, specialty chemicals, defence and High Tech.

# BOSCH

**Robert Bosch Corporation**    <http://www.bosch.com>

As the world's leading supplier of diesel fuel injection systems, Bosch established the *Automotive Diesel Technology Center* (ADTC) in North America to develop, engineer and produce high-precision diesel technology. The ADTC offers dependable diesel system expertise and a wide range of diesel capabilities - Engineering, Manufacturing, Technology, Lifecycle Management and Aftermarket Service - for Light, Medium and Heavy-Duty diesel applications.

Robert Bosch GmbH, headquartered in Stuttgart, Germany, is the second largest automotive supplier in the world with automotive technology group sales in 2002 of \$22 billion. The Robert Bosch Corporation, a wholly owned subsidiary, is responsible for North American operations and is headquartered in Farmington Hills, Michigan.



## Platinum

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**Cummins Inc.**    <http://www.cummins.com>

Cummins Inc. is a leading supplier of diesel- and alternate-fueled engines for heavy-duty trucks, medium-duty trucks, buses, motorhomes, and specialty on-highway vehicles, and the exclusive supplier of diesel engines for the Dodge Ram pickup truck. Cummins is also a leading global supplier of diesel engines for the agriculture, construction, government, marine, mining, rail, and oil and gas markets. Cummins is a global supplier of diesel- and natural gas-powered generator sets and generator set components from 3kW to multi-megawatt installations. Cummins supplies advanced integrated filtration systems for heavy-duty equipment, both on- and off-highway, and is a leading North American supplier of filtration and silencing systems for gas turbine, industrial, small engine, and passenger car applications. Holset, is a global provider and leading technologist of turbochargers for a wide range of applications. Cummins has a retail distribution network for Cummins' products and provides related services and broader solutions that enhance the end users' overall experience.



**Diesel Technology Forum**    <http://www.dieselforum.org>

The Diesel Technology Forum is the nation's leading information resource and promoter of clean diesel technology, its value, economic importance, environmental progress and promise for the future. The Forum promotes clean diesel solutions for existing diesel engines (on/off road), conducts technology demonstrations and works with stakeholders to modernize and upgrade existing diesel engines. Members include leaders in diesel engine, vehicle, component manufacturing, fuel refining and emissions treatment systems. *Offices in Washington DC, Frederick MD and San Carlos, CA.*

## Gold

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**Caterpillar Inc.** <http://www.cat.com>

For more than 75 years, Caterpillar Inc. has been building the world's infrastructure and, in partnership with its worldwide dealer network, is driving positive and sustainable change in every continent. With 2002 sales and revenues of \$20.15 billion, Caterpillar is a technology leader and the world's leading manufacturer of construction and mining equipment, diesel and natural gas engines and industrial gas turbines. More information is available at <http://www.cat.com>.



**Delphi Automotive Systems** <http://www.delphi.com>

Delphi Automotive Systems is a world leader in transportation and mobile electronics components and systems technology. Delphi's three business sectors-Dynamics & Propulsion; Safety, Thermal & Electrical Architecture; and Electronics & Mobile Communication-provide comprehensive product solutions to complex customer needs. The company is headquartered in Troy, Michigan, U.S.A., with regional headquarters in Paris, France; Tokyo, Japan; and São Paulo, Brazil. Delphi maintains a global presence consisting of wholly owned manufacturing sites, joint ventures, customer centers, sales offices, and technical centers. Delphi can be found on the Internet at [www.delphiauto.com](http://www.delphiauto.com).



## Gold

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**Detroit Diesel Corporation**    <http://www.detroitdiesel.com>

Detroit Diesel Corporation (DDC), headquartered in Detroit, Michigan, is engaged in the design, manufacture, sale and service of heavy-duty diesel and alternative fuel engines, automotive diesel engines and engine-related products. The company offers a complete line of engines from 22 to 13,000 horsepower for the on-highway, off-road and automotive markets and is a QS-9000 certified company. Detroit Diesel services these markets directly and through a worldwide network of more than 2,700 authorized distributor and dealer locations. Detroit Diesel is a subsidiary of DaimlerChrysler AG, the world's leading manufacturer of heavy-duty diesel truck engines. Within DaimlerChrysler AG, DDC is part of the Powersystems Business Unit.

## Silver

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**Argillon GmbH** <http://www.sinox.com>

SINOx® Emissions Control, the recognized leader in stationary and mobile emission applications is your trusted partner addressing customer needs with proven experience and expertise. When it comes to supplying catalyst or system components, we have the ability to offer a comprehensive solution for your diesel application. SINOx® allows an engine to be tuned for maximum fuel economy while reducing NOx and particulate emissions.



**Corning Incorporated** <http://www.corning.com>

### About Corning Incorporated

Established in 1851, Corning Incorporated ([www.corning.com](http://www.corning.com)) creates leading-edge technologies that offer growth opportunities in markets that fuel the world's economy. Corning manufactures optical fiber, cable, hardware and equipment in its Telecommunications segment. Corning's Technologies segment manufactures high-performance display glass, and products for the environmental, life sciences, and semiconductor markets. Corning's revenues for 2002 were \$3.2 billion.

## Silver

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**John Deere**    <http://www.johndeere.com>

Deere & Company, founded in 1837 by John Deere, is one of the oldest industrial companies in the United States. Growing from a one-man blacksmith shop into a worldwide corporation, the company also known by its founder's name does business in more than 160 countries and employs approximately 43,000 people.

In 1918, John Deere purchased the Waterloo Gasoline Engine Company and began manufacturing engines. The company has conducted engine emissions research since 1967. Today, in five countries, John Deere manufactures diesel engines that meet the stringent non-road emission standards of the European Union, U.S. Environmental Protection Agency, California Air Resources Board, and Japan.

Deere is committed to producing engines that meet or exceed future emission regulations while providing optimal performance and value to customers, and maximum cost efficiency to the company.



**Hilite International**    <http://www.hilite.com>

Hilite International is a multi-national Corporation with manufacturing facilities in the United States, Germany and France. As a supplier of engine products that require engineering/design, manufacture, assembly and testing to meet increasing global government requirements for improved fuel economy and higher environmental standards, our components and systems perform critical functions for engine control, 4-wheel torque transfer, and transmission systems. Hilite's expertise includes custom camphasing systems, stepped automatic and CVT control valves, automated manual transmission controls, high pressure gasoline and diesel pump systems and emission control modules for NOx reduction on diesel truck applications (urea dosing unit for SCR).

## Bronze

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**Marriott International, Inc.** <http://www.marriott.com>

Marriott International, Inc. is a leading worldwide hospitality company. Its heritage can be traced to a small root beer stand opened in Washington, D.C., in 1927 by J. Willard and Alice S. Marriott. Today, Marriott International has more than 2,600 lodging properties located in the United States and 63 other countries and territories.

**People first**—the foundation of Marriott's success for 75 years. Marriott's enduring belief is that our associates are our greatest assets. Marriott Culture is the experience we create for our customers which is demonstrated by the behavior of our associates. It is people serving people.

**Core Values & Culture**--Marriott's strong corporate culture and inspiring core values are keys to our continued growth and associate satisfaction.

**Diversity**--Marriott is truly international. Our company reflects the rich cultural array of our customers and associates.

**Community Involvement**--"Spirit to Serve Our Communities" reflects the genuine desire of our facilities and associates to give resources, time and energy to help make a difference in the lives of others and the communities we work and live in.

## Crystal

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**Compact Membrane  
Systems, Inc.**



**Compact Membrane Systems, Inc.**    <http://www.compactmembrane.com>

Compact Membrane Systems, Inc. is a Wilmington, Delaware based small business involved in the development and application of a new family of membrane products. Two products nearing commercialization have environmental and automotive relevance. One product can recover volatile organic compounds such as gasoline vapors from vent streams at service stations and fuel storage facilities. Another membrane device is being field tested for enriching the air fed to diesel engines in nitrogen by removing 1 to 4% percent of the oxygen. The higher nitrogen level in the diesel cylinder charge results in a substantial reduction in NOx emissions.

The CMS membranes employ perfluoropolymers having unique transport properties and superior chemical resistance. Although not as selective, these membranes have fluxes that are one hundred times higher than industrial gas separation membranes. This makes them ideally suited for performing modest separations and enrichment at low pressure differentials and in compact devices.

## Crystal

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**Dekati Ltd**    <http://www.dekati.fi>

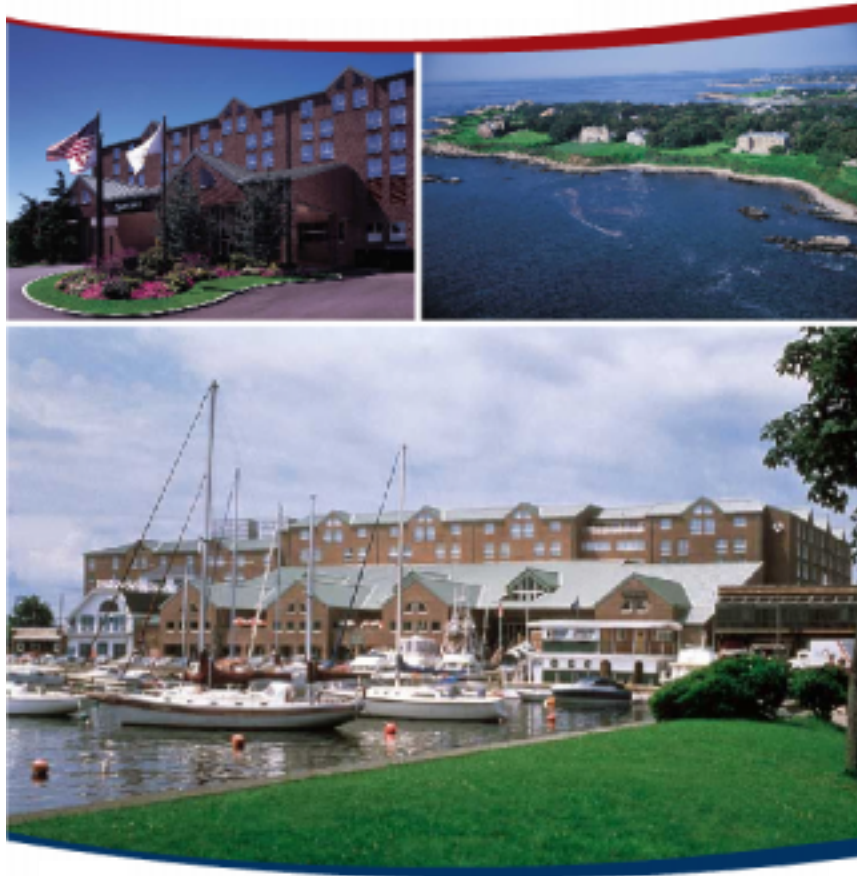
Dekati Ltd. manufactures a complete line of instrumentation for analysis of diesel exhaust particulate matter. Our products include:

- Sampling instruments for tailpipe, CVS, mini-dilution tunnel and other applications. Dekati samplers can be used to promote, control or eliminate nucleation, reduce concentration by a precise dilution ratio or cool the sample in a controlled manner for analysis.
- Conditioning instruments like a thermodenuder to remove volatile and semi-volatile compounds from the aerosol sample stream.
- Measuring instruments that can be used for everything from sophisticated real-time particle size or mass determination to basic gravimetric analysis.

Dekati's history is rooted in combustion measurement, it is our specialty. Please stop by our exhibit, visit our web site at [www.dekati.fi](http://www.dekati.fi), or contact our N. American distributor Particle Instruments LLC at either (612) 328-2772 or [particleinstruments @att.net](mailto:particleinstruments@att.net) to learn more about the complete line of Dekati products.

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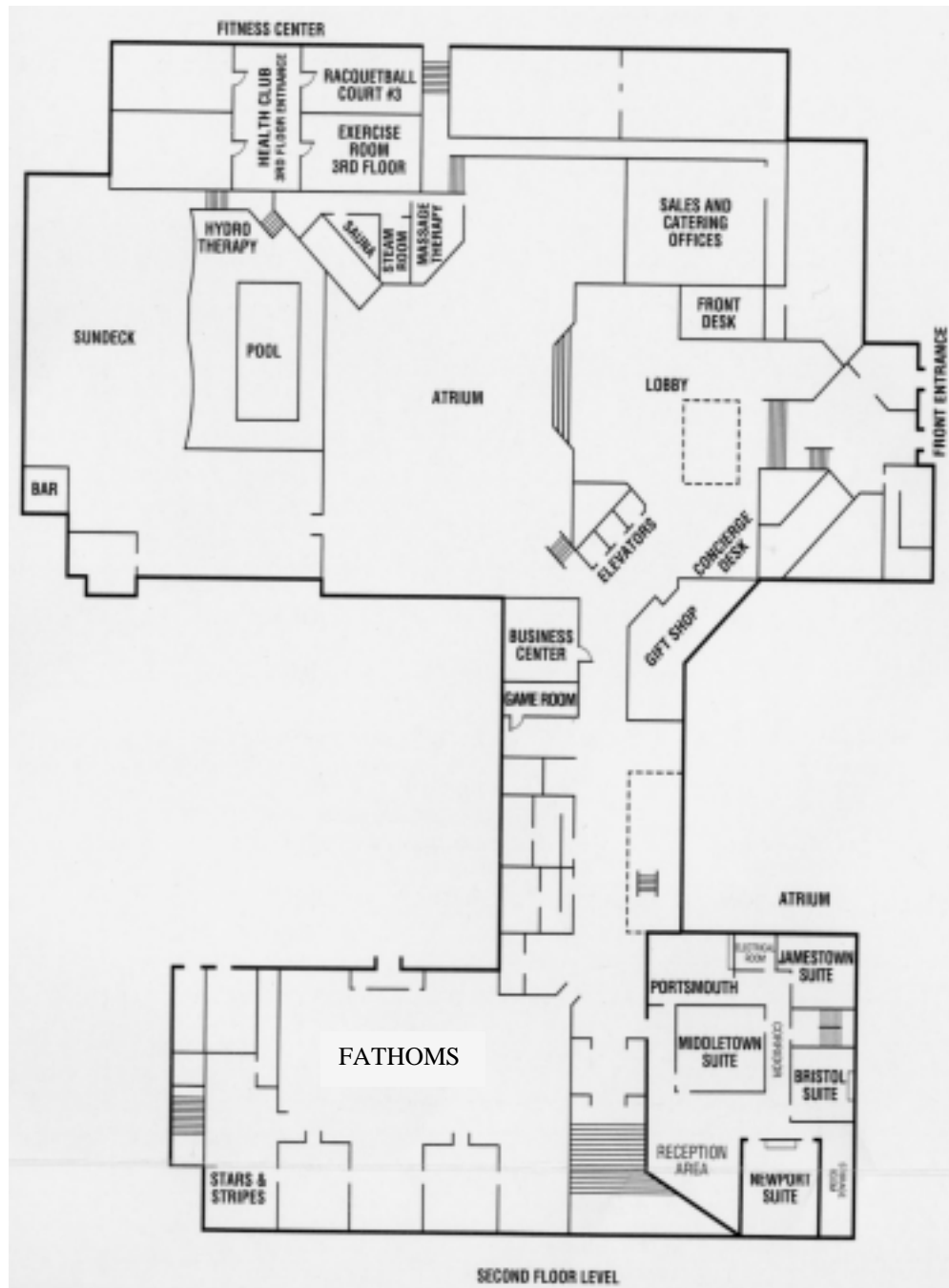


The Newport Marriott is conveniently located on the harborfront in the heart of downtown, historic Newport. Often referred to as “The City by the Sea,” Newport’s restored 18th century homes and buildings, quaint shops, and over 80 restaurants and lounges are all within walking distance of the Hotel.

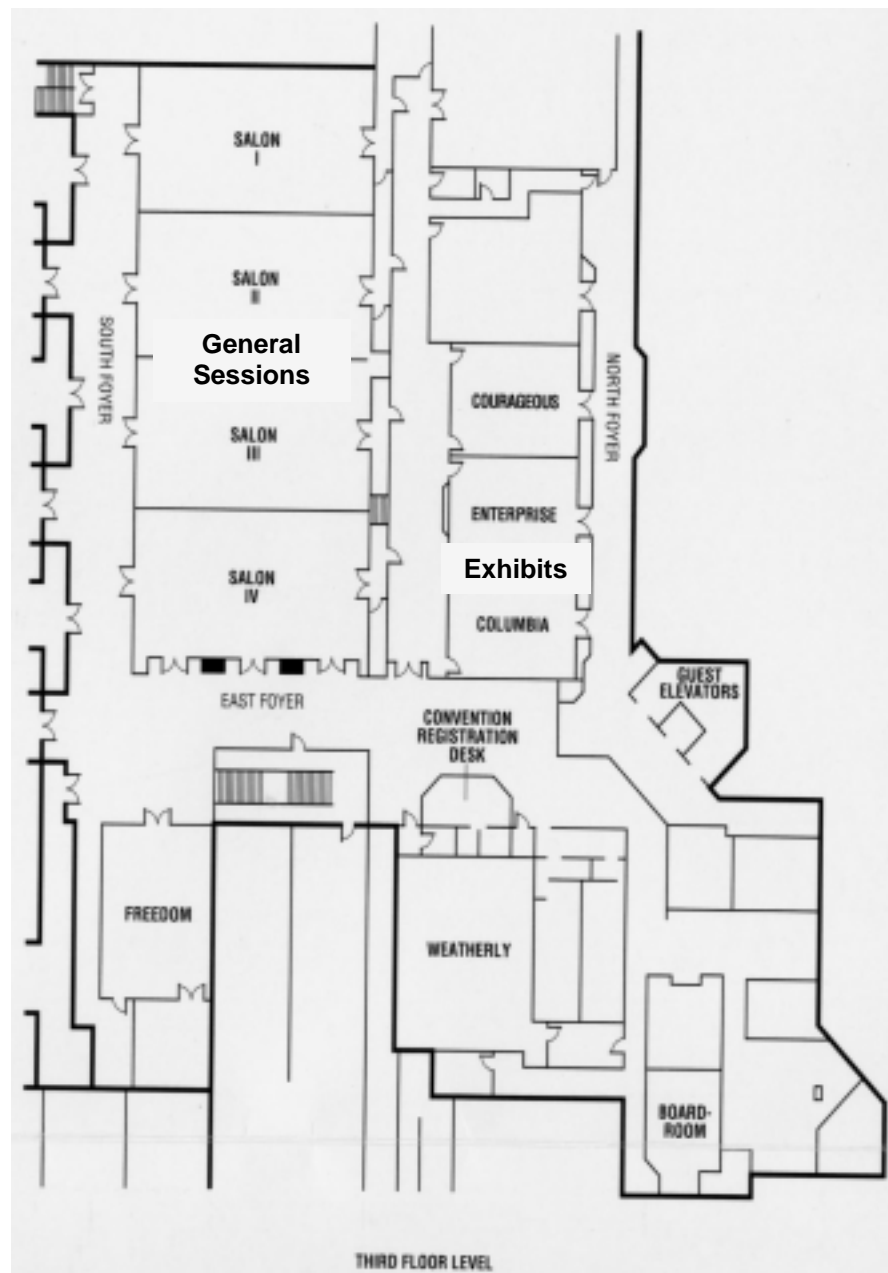
The Newport Marriott Hotel recently completed a \$13 million renovation that encompassed all sleeping rooms, function space, and public areas. The renovation also included a new “nautical” Atrium/Lobby area for all to enjoy, giving our guests the feeling of boarding one of Newport’s finest yachts.

- For safety or security concerns, dial "0" to get *At Your Service (AYS)*. They will direct all your calls to the appropriate location.

## Meeting Space



## Meeting Space



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