Radiation Safety & Control Services, Inc.

N. S. Savannah

History and Decommissioning Status

Presented to the North Carolina Chapter of the Health Physics Society

James P. Tarzia, M.S., CHP

March 13, 2009
N.S. Savannah
The Worlds First Nuclear Merchant Ship
# The World's Nuclear Cargo Ships

<table>
<thead>
<tr>
<th>Ship</th>
<th>Operating Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS Savannah, USA</td>
<td>1962 - 1972</td>
</tr>
<tr>
<td>NS Otto Hahn, Germany</td>
<td>1968 - 1979</td>
</tr>
<tr>
<td>NS Mutsu, Japan</td>
<td>1979 - 1992</td>
</tr>
<tr>
<td>NS Sevmorput, Russia</td>
<td>1988 - present</td>
</tr>
<tr>
<td></td>
<td>• Being converted to the world's first nuclear powered oil drilling vessel</td>
</tr>
</tbody>
</table>
Germany’s Otto Hahn
Japan’s Mitsu
Russia’s Sevmorput
N.S. Savannah Concept

• In 1955, President Eisenhower proposed that the US build the world’s first atomic-powered merchant vessel to demonstrate America’s peaceful use of the atom.

• In 1956, Congress approved the project.
Savannah’s was a Name-Sake

- In 1819, the Steamship Savannah was the first ship to use steam in an ocean voyage
- Sailed from Atlanta to Liverpool in 29 Days
The Joint Venture

- Atomic Energy Commission
- Maritime Administration (MARAD)
- Department of Commerce
N.S. Savannah Contributors

Designer: George C. Sharp, Inc.
Construction: NY Shipbuilding Corp
Nuclear Plant: Babcock and Wilcox Co.
Interiors: Jack Heaney and Assoc.
Maintenance: Todd Shipyards Corp.
Operator: American Export Isbrandtsen Lines
N.S. Savannah Construction

- Keel Laid at Camden, NJ on National Maritime day, 1959
- Ship Launched on July 21, 1959
- Reactor Fueled 1961
- Began operating in August 1962
N.S. Savannah Specifications

• Tonnage: 13599 Gross Registered Tonnage (GRT)
• Displacement: 9900 long tons deadweight
• Length: 596 ft (181.66 m)
• Beam: 78 ft (23.77 m)
N.S. Savannah Specifications

- Propulsion: 20,300 hp to a single propeller
- Service Speed: 38.89 km/h
- Maximum Speed: 44.45 km/h
- Range: 300,000 nautical miles at 20 knots on one single load of 32 fuel elements
- Capacity: 60 passengers
- Cargo Capacity: 14,040 ton
- Crew: 124
N.S. Savannah Power Plant

- 74 MW Babcock & Wilcox nuclear reactor
- Two De Laval steam turbines
N.S. Savannah Power Plant
N.S. Savannah
Cargo Ship or Cruise Ship?
N.S. Savannah
Cargo Ship or Cruise Ship?
The Main Lobby
The Veranda and Pool
The Lounge and Movie Theater
The Dining Room
Guest Quarters
N.S. Savannah History

• Savannah launched on March 23, 1962
• Maiden Voyage in August 1962
• 1962 – 1964 Series of Domestic and International Visits
• 1965-1971 NS Savannah in revenue cargo service
• 1972 Decommissioned in an effort to reduce spending by the Maritime Administration
• 1981 Stored near Patriot's Point Naval Museum, South Carolina
• 1994 Moved to James River Merchant Marine Reserve Fleet near Newport News, Virginia
RSCS, Inc. and the N.S. Savannah

- Contract Award: June 2007
  - Savannah Emergency Response Assistance Team (SERAT)
  - General Health Physics Support Services
Savannah Emergency Radiological Assistance Team (SERAT)

- 2 to 4 Senior Health Physics Technicians
- Trained on N.S. Savannah Procedures
- Able to Respond to the Ship Within 2 Hours
- Provide Radiological Support and Advice to Emergency Teams
General Health Physics Support

- Radiation Safety Officer Support
- HP Supervisor and Technicians
- Personnel and Environmental Monitoring Support
- Instrumentation
- Shipboard and Environmental Sampling
- Radiological Supplies
Radiation Safety Officer Support

- Procedure Development
- Radiological Technical Support
- Annual Program Assessment
- Decommissioning Planning
General Supervisory and Technical Health Physics Support

- Routine Surveys
- Job Coverage for RCA
- Dosimetry
- Pre-Work Planning
- Shipboard Tank Sampling
- Environmental Monitoring
Personnel and Environmental Monitoring Support

- Provide TLDs for Personnel Monitoring
- Provide TLDS for Environmental Monitoring
- Provide Dose Records to the RSO and Personnel
Instrumentation

- Provide Calibrated Survey and Count Room Instruments
- Provide Air Sampling Equipment
- Provide Calibration Services for Savannah Emergency Kit Instruments
Shipboard and Environmental Sampling Support

- Provide Radiological Environmental Sampling of Water and Sediment at Berthing Sites
- Provide Radiological Sampling of Water and Sludge in Tanks and Void Spaces
Radiological Supplies

• Provide All Consumable and Durable Radiological Supplies:
  • Signs and Postings
  • Protective Clothing
  • Step Off Pads
  • Barrier Material
  • Bags and Tape
  • Smears and Air Sample Media
Milestones to Date
BAE Systems, Norfolk
June – October 2007

- Complete Surveys of All Compartments
  - Reactor Containment Vessel
  - Adjacent Compartments
  - Travel Routes and Storage Areas
  - Weather Decks and Dockside Area
BAE Systems, Norfolk
October 2007-January 2008

- Preparation for Dry Docking
  - Procedure Development
  - Equipment and Supply acquisition
  - RWP Initiation
  - Shipyard Interface
  - Pre-Docking Environmental Samples
BAE Systems Norfolk
January - February 2008

• Dry Dock
  • Complete Hull Survey
  • Contamination Survey of Hull Penetrations
• Training for Shipyard Workers
• Environmental Samples of Former Pier Area
BAE Systems, Norfolk, VA
March - May 2008

- Post Dry Dock
  - Pre-Docking Environmental Sample of New Pier Area
- Post Dry Dock Environmental Sample of Dry Dock Area
May 2008

- Hull Preservation Complete
- Weather Tight Integrity Restored
- Towed to Baltimore, MD
Baltimore, MD
May Present

- Continuing Tank and Internal Surveys and Sampling
- Bureau of American Shipping Hull and Tank Inspection
- Development of Procedures to Support Decommissioning
Baltimore, MD
Savannah Preserved for Posterity

• Supporting the Naval Historical Ship Association to:
  • Document, Catalog and Preserve Ship’s Records, Plans and Drawings
  • Photograph Ship’s Interior, Exterior and Equipment
  • Produce a Virtual Tour of the Ship