

Offshore Helicopter Safety Inquiry

Joint Panel Presentation by the Operators of
Hibernia, Terra Nova and White Rose

11 January 2010

Presentation Outline

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Introduction

Newfoundland & Labrador Offshore Joint Ventures

- The companies participating in a Joint Venture (JV) are often referred to as co-venturers.
- Each co-venturer's respective ownership interest in the JV is based on the percentage of the assets and liabilities each co-venturer holds in the particular project.
- The rights and obligations of the co-venturers are usually governed by a joint operating agreement (JOA).
- Hibernia, Terra Nova and White Rose all have JOAs, the terms of which are specific to each project.

Operators - by Project

- Hibernia is operated by Hibernia Management and Development Company Ltd. (HMDC), a separately incorporated company, the shares of which are owned by the Hibernia co-venturers.
- Terra Nova is operated by one of the project's co-venturers, Suncor.
- White Rose is operated by one of the project's co-venturers, Husky Energy.

Overview of Offshore Petroleum Industry

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Unique Operating Environment

The Grand Banks – A Challenging Work Environment

Season	Wind Speed (knots)		Wave height (meters)		Air Temperature (degrees C)		Sea Temperature (degrees C)	
	<i>mean</i>	<i>max</i>	<i>mean</i>	<i>max</i>	<i>mean</i>	<i>min</i>	<i>mean</i>	<i>min</i>
Winter	30	103	3.7	24.0	-1.0	-17.0	-0.6	-2.4
Spring	21	68	2.3	9.0	4.3	-5.6	2.6	-1.0
Summer	20	76	1.9	9.7	12.3	0.9	13.3	8.5
Fall	27	91	3.3	12.8	3.5	-13.5	3.2	0.0

Ice Environment of the Grand Banks

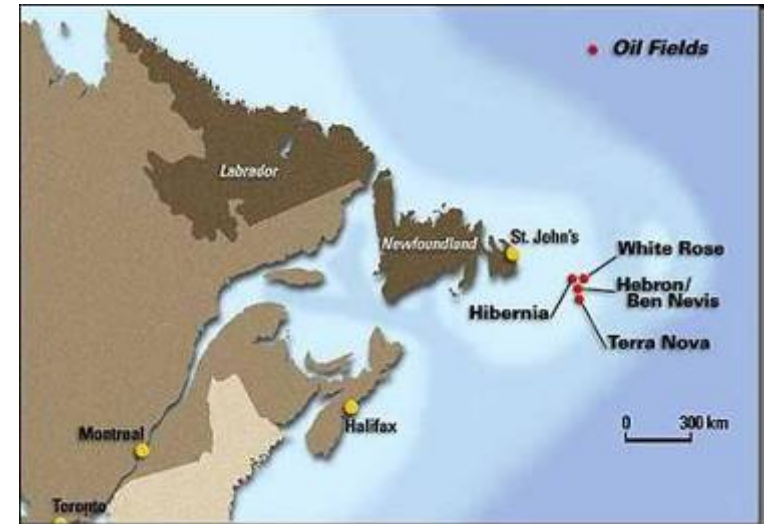
Ice is a significant factor for offshore Operators

- Jeanne D'Arc Basin is located on southern edge of the marginal ice zone.
- Sea ice and icebergs are prevalent between March and May.
- Ice and icebergs are considered in design and operating strategies.
- All Operators have ice management procedures in place and logistical support
 - Surveillance
 - Towing (ice nets, ropes)
 - Deflection (water cannons, prop. wash)



Offshore Petroleum Industry – A Newfoundland Success Story

- Three world class producing oil fields offshore Newfoundland and Labrador
 - Hibernia
 - Terra Nova
 - White Rose
- Hebron oil field in early design phase
- Collectively employ over 3400 people onshore and offshore.
- Approximately 700 people are based on five separate offshore facilities on any given day.

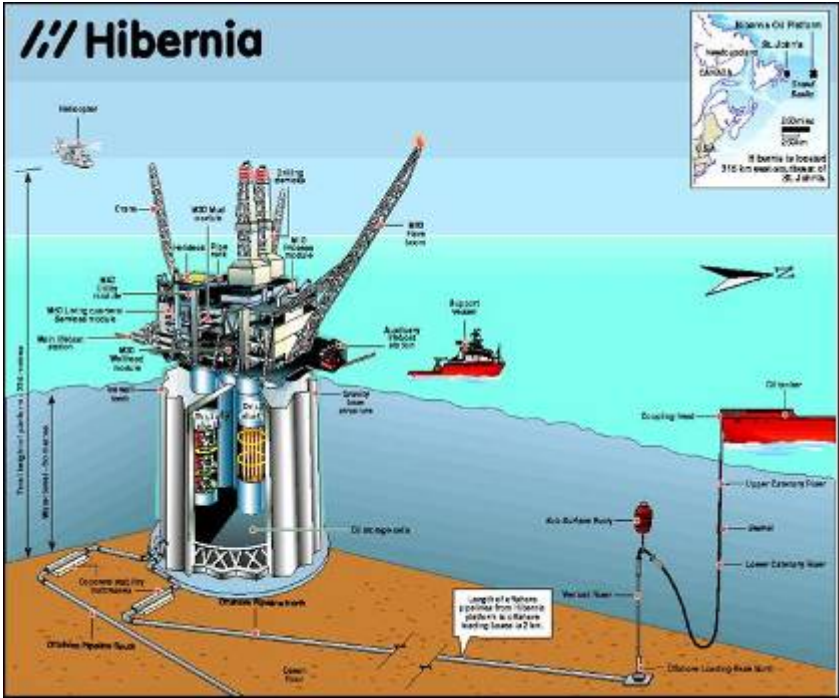


Hibernia

Operator:
Hibernia Management and
Development Company Ltd. (HMDC)

- Co-Venturers:**
- ExxonMobil 33.125%
 - Chevron 26.875%
 - Suncor 20.0%
 - Canada Hibernia
Holding Corporation 8.5%
 - Murphy Oil 6.5%
 - Statoil 5.0%

Location: 315 km offshore NL
Water Depth: 80 metres
Discovered: 1979
First Oil: November 1997



Hibernia Platform

Hibernia Platform

- Height - 224m
- Weight – 1.2 million tons
- 3 main components
 - Topsides
 - Gravity Base Structure
 - Offshore Loading System

Topsides

- 2 drilling rigs
- Production and utility equipment
- Living accommodations up to 280 people
- Normal rotation: 21 days on, 21 days off

Concrete Gravity Based Structure (GBS)

- 85m high
- 1.3 million barrels of oil storage capacity
- Designed to withstand impact of sea ice and icebergs

Offshore Loading System (OLS)

- Transfers oil from storage to tankers



Terra Nova

Operator:

Suncor

Co-Venturers:

- Suncor 34.0%
- ExxonMobil 22.0%
- Statoil 15.0%
- Husky Energy 12.5%
- Murphy Oil 12.0%
- Mosbacher 3.5%
- Chevron 1.0%

Location: 350 km offshore NL

Water Depth: 90-110 metres

Discovered: 1984

First Oil: January 2002



Terra Nova FPSO

Terra Nova FPSO (ship-shaped)

- Length - 292m
- Beam – 45m
- 3 main components
 - Topsides
 - Hull
 - Turret

Topsides

- Oil, water, gas, utilities
- Power generation

Hull

- Accommodations: 120 persons
- Oil storage capacity: 960,000 barrels
- Stern offloading discharge system
- Ice strengthened

Turret

- Disconnectable
 - Wells are drilled by a MODU and connected via subsea flowlines
 - Normal rotation: 21 days on, 21 days off



White Rose

Operator:

Husky Energy

Co-Venturers (core field):

- Husky Energy 72.5%
- Suncor 27.5%

Co-Venturers (North Amethyst and growth lands):

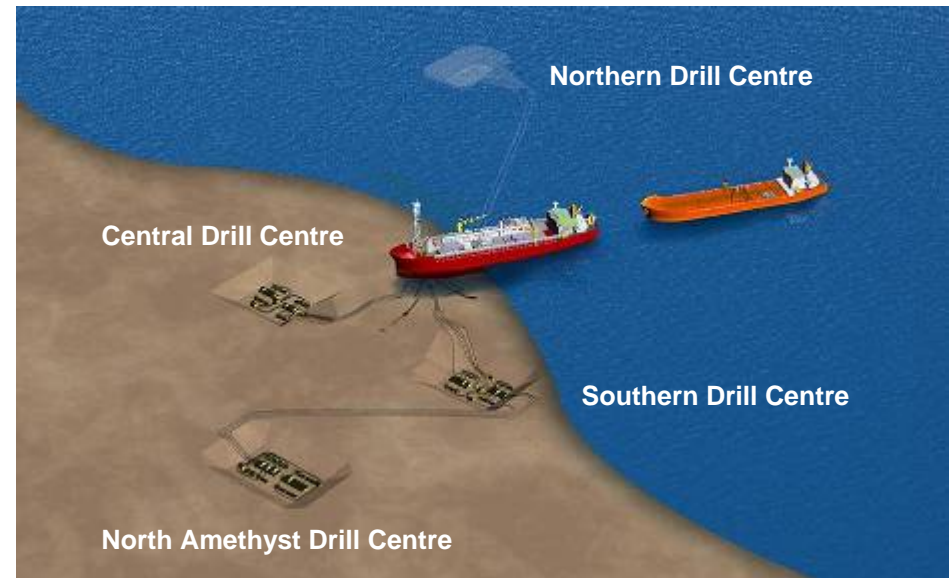
- Husky Energy 68.875%
- Suncor 26.125%
- Nalcor Energy 5.0%

Location: 350km offshore NL

Water Depth: 120 metres

Discovered: 1984

First Oil: November 2005



SeaRose FPSO

SeaRose FPSO (ship-shaped)

- Length - 271m
- Beam – 46m
- 3 main components
 - Topsides
 - Hull
 - Turret

Topsides

- Oil, water, gas, utilities
- Power generation

Hull

- Accommodations: 90 persons
- Oil storage capacity approximately 940,000 barrels
- Tandem stern offloading system
- Ice strengthened

Turret

- Disconnectable
- Wells are drilled by a MODU and connected via subsea flowlines
- Normal rotation: 21 days on, 21 days off



Drilling Activity

- The Hibernia platform is equipped with its own drilling rigs (two derricks).
- To support drilling activities within the Terra Nova and White Rose fields, a variety of drilling rigs have/are being used.
- Exploration drilling also continues to be conducted by the petroleum industry.



Logistics Operations

- All offshore production and drilling facilities are supported by logistical assets on a daily basis.

	HMDC	Suncor	Husky
Helicopters	S-92 (MCH)	S-92 (SCH)	S-92 (QCH)
Support Vessels	Maersk Nascopie Maersk Norseman Maersk Placentia	Atlantic Eagle Burin Sea	Atlantic Osprey Atlantic Hawk Atlantic Kingfisher Maersk Chancellor Maersk Chignecto Maersk Gabarus
Tankers	Kometik Mattea Vinland		Jasmine Knutsen Heather Knutsen

Regulatory Environment

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Offshore Project Operators

The Operator of each offshore project is:

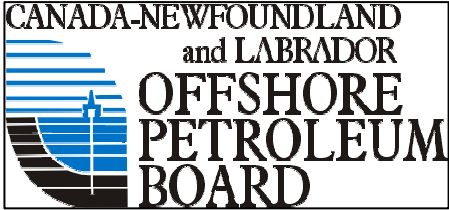
- Either one of the co-venturers or a separately incorporated company.
- Appointed by the co-venturers to conduct the project operations within the scope of authority conferred by the joint operating agreement (JOA).
- Provided with oversight and direction by a management committee.
- Responsible for health and safety of personnel.
- Responsible for legislative and regulatory compliance on behalf of the co-venturers.

Regulatory Regime for Petroleum Operations and Helicopter Operations

Petroleum Operators

C-NLOPB has jurisdiction over the petroleum operations in the Newfoundland and Labrador offshore area

Canada - Newfoundland Atlantic Accord Implementation Act



Operators

Helicopter Operators

Transport Canada (Aviation) has jurisdiction over aviation operations within Canada and the offshore

Aeronautics Act



Cougar Helicopters Ltd.

Canada-Newfoundland Offshore Petroleum Board - Authorization of Petroleum Operations

- Petroleum operations in the Newfoundland and Labrador offshore area are under the jurisdiction of the C-NLOPB.

Canada Newfoundland Atlantic Accord Implementation Act

No one can carry on any work or activity related to the exploration or drilling for or the production, conservation, processing or transportation of any petroleum in the offshore area unless (s. 137):

- they hold an operating license issued by the C-NLOPB.
 - they hold a work authorization issued by the C-NLOPB.
- C-NLOPB shall, before issuing an authorization for work or activity, consider the safety of the work or activity (s. 138.2).
 - C-NLOPB may suspend or revoke an operating license or work authorization for non-compliance (s. 138(4)). Noncompliance is an offence (s. 194).

Active Regulations (Example)

- Certificate of Fitness
- Petroleum Installations
- Petroleum Drilling
- Petroleum Production and Conservation
- Petroleum Diving
- Petroleum Occupational Health and Safety (draft)
 - Enforceable by virtue of the Operator's Authorization(s)
- Petroleum Geophysical Operations

Published Guidelines (Example)

- Safety Plan
- Drilling Program
- Reporting and Investigation of Safety Related Incidents
- Physical Environmental Programs
- Geophysical, Geological, Environmental and Geotechnical

Other Guidance

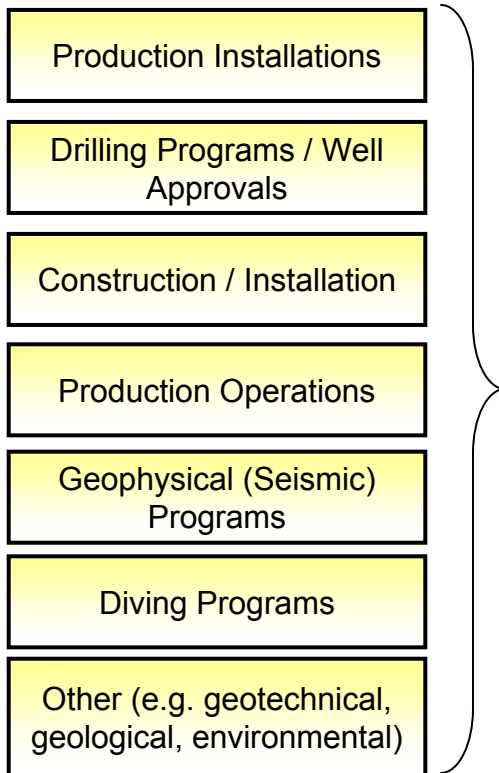
- CAN/CGSB-65.17, Helicopter Passenger Transportation Suit System
- Transport Canada TP 4414, *Guidelines Respecting Helicopter Facilities on Ships*
- UK CAA Offshore Helicopter Landing Areas – Guidance on Standards – CAP 437
- Atlantic Canada Offshore Petroleum Industry: Standard Practice for the Training and Qualifications of Personnel produced by CAPP

Authorization for Petroleum Operations

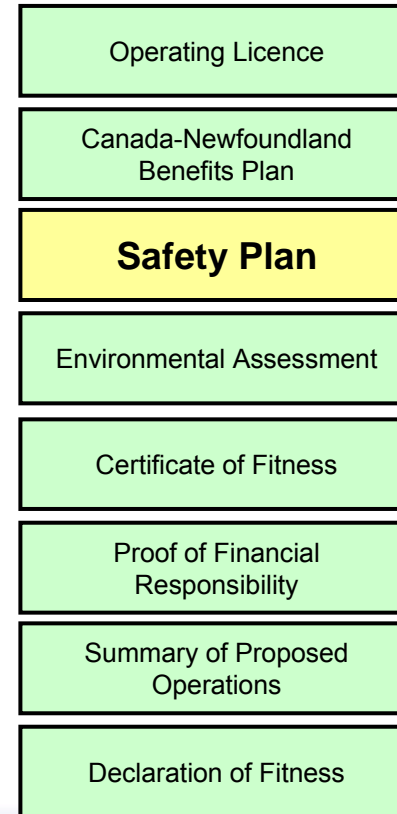
- Work Authorizations issued by the C-NLOPB specify:
 - Type of operation permitted
 - The vessels or installation authorized to conduct the work
 - The time period for the work to be completed
 - Conditions pertaining to the authorization
- The Production Operations Authorization (POA) and/or Operations Authorization (OA) and other required authorizations are issued by C-NLOPB to each Operator prior to commencement of operations and are renewed every three (3) years.

Authorization for Petroleum Operations

Work / Activities Requiring Authorization



Requirements associated with Authorization Application



C-NLOPB Authorization – Safety Plan

- The C-NLOPB's Chief Safety Officer shall approve the Safety Plan where adherence to the plan will ensure safety, health and training of persons on board the installation and preservation of the integrity of the installation. (Production and Conservation regulations (s. 51(4))).
- Authorization is only granted to the Operator if the Safety Plan is deemed acceptable by the C-NLOPB.
- The Operator must demonstrate to the C-NLOPB that the approved management system / safety plan effectively identifies, assesses, and controls risk posed to worker health and safety, including the safe transport to and from the offshore installation.
- The Safety Plan evolves as an integral component of a continuously improving safety management system framework.
- The Safety Plan is resubmitted and revalidated by the C-NLOPB at least every three years.

Safety Plan Guidelines

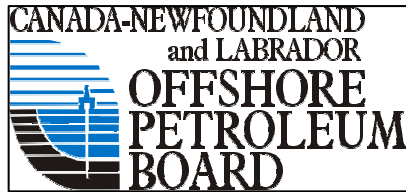
“The Safety Plan must clearly show how safety management fits within the overall system of management. It should define the roles of, and relationships between, the operator’s executive level management personnel and the various line and staff functions in achieving safety-related goals and objectives...”

Safety Plan Components

- The Safety Plan highlights the management systems and processes for safe operations in the offshore area including helicopter operations.

- Components of the Safety Plan include written policies, programs, and procedures in the following areas:
 - Safety Management
 - Basis of Safe Operations in Design
 - Organizational Structure (authorities/command)
 - Hazard/Risk Identification and Assessment
 - Facilities and Equipment
 - Operations and Maintenance
 - Training and Qualifications
 - Command Structure and Contingency Planning
 - Physical Environmental Monitoring

Regulatory References to Helicopter Operations



Under the requirements for work authorization the C-NLOPB have multiple references specific to helicopter operations. The following are examples of regulatory references applicable to Operators:

Safety Plan Guidelines	<ul style="list-style-type: none"> ■ Contingency Planning ■ Standby Helicopter ■ Flight Following & Vessel Watch ■ Mutual Aid Agreements
Petroleum Installation Regulations	<ul style="list-style-type: none"> ■ Immersion Suits ■ Helideck Design
Petroleum Geophysical Regulations	<ul style="list-style-type: none"> ■ Helideck Design ■ Helicopter Passenger Transportation Suit
Draft Petroleum OSH Regulations	<ul style="list-style-type: none"> ■ Helicopter Passenger Transportation Suit
Drilling Program Guidelines	<ul style="list-style-type: none"> ■ Helicopter Passenger Transportation Suit

Audits/Inspections

- The C-NLOPB conducts at least one (1) annual audit and three (3) quarterly inspections per year.
- The scope of the C-NLOPB audits and inspections is to monitor compliance with:
 - Regulations
 - Authorizations and Approvals
 - Conditions of Approval
 - Operator's Management System
 - Safety Plan and Environmental Plan
 - Incident Management
- Transport Canada surveys are delegated to the Certifying Authority (CA) under the Delegated Statutory Inspection Program (DSIP)
 - Transport Canada will periodically conduct monitoring surveys of the Certifying Authority.

Role of Certifying Authority

- Atlantic Accord acts require that each production, drilling, diving, and accommodation installation have a valid Certificate of Fitness issued by a recognized Certifying Authority before the C-NLOPB can authorize an activity in the offshore area.
- Each of the offshore installations has a Certifying Authority involved in their respective businesses, namely;
 - Hibernia Lloyd's Register (LR)
 - Terra Nova Lloyd's Register (LR)
 - White Rose Det Norske Veritas (DNV)



Each Certifying Authority certifies, audits and inspects facilities

Role of Certifying Authority (CA)

- The role of the Certifying Authority is to provide certification of a unit in accordance with C-NLOPB regulations. The CA provides an independent third party evaluation of regulatory compliance and fitness for purpose.
- The intent of certification is to provide assurance that the installation, during the term of the certificate, is fit for purpose and remains in compliance with the regulations.
- Before issuing a Certificate of Fitness, the Certifying Authority must be satisfied that the installation:
 - Is designed and constructed in accordance with the regulations
 - Is fit for the intended purpose and can be safely operated without polluting the environment
 - Will remain fit when maintained in accordance with the approved inspection and monitoring, maintenance, and weight control programs

Delegated Statutory Inspection Program (DSIP)

- Transport Canada has signed formal agreements covering the delegation of statutory inspection and certification functions under the Canada Shipping Act to specific recognized organizations (ROs).
- For FPSOs both Lloyd's and DNV are identified as ROs and have been delegated by Transport Canada to perform surveys and issue certificates
 - Lloyd's Register of Shipping – December 4, 2000
 - DNV – April 22, 2002
- The CA is involved with ensuring that the helideck on each installation conforms to TP 4414.

Safety Management

Safety Management

- Safety at each offshore facility is the responsibility of the Operator.
- Industry continues to look for ways to improve safety in the areas of people, process and equipment.
- Challenges in the offshore industry have led to the development and use of the state-of-the art safety and risk management systems.
- Industry's best practices are being used in offshore Newfoundland and Labrador.

Safety Focus

Safety is about People

... your spouse, your children, your grandchildren, and your team members.

Safety is about behaviors

... injuries happen because someone takes action, or doesn't take an action that was needed.

Safety is about teamwork

... everyone must have commitment, be observant, listen, and care about their own and others' safety.

Safety is about continuous vigilance

... we can never be insulated, immune, or totally removed from at-risk behaviors and conditions.

Safety is about a promise

... to my family, to myself and to my team members.

Safety Management

Equipment

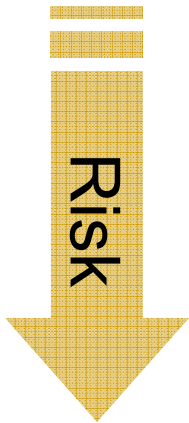
- Engineering Design
- Equipment Certification
- Operations/Maintenance
- Availability/Reliability
- Fit for Purpose

Process

- Hazard Identification
- Risk Management
- Policies and Procedures
- Integrity Management
- Audit and Verification

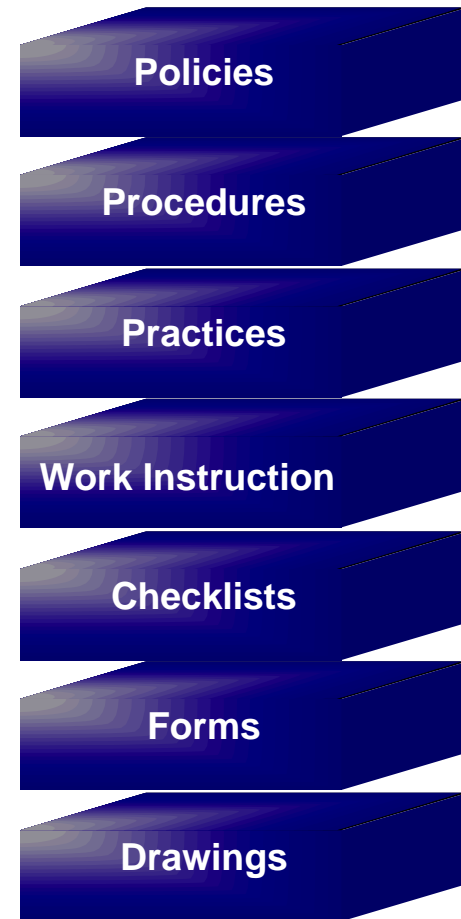
People

- Leadership
- Accountability
- Attitudes/ Behaviours
- Training/Competency



Safety Management System

- Effective health, safety and environmental management requires goal setting, planning, and performance measurement.
- Each Operator effects this by applying its own systematic, structured and disciplined safety management system.
- Each safety management system includes the necessary processes and methods to ensure that all work is conducted safely and in an environmentally responsible manner.
- To conduct work safely, hazards must be identified and the risk reduced to tolerable levels. This is known as risk management.
- The safety management system is a management process integrated in all work done by Operators.



Hazard Identification and Mitigation

- The development and application of effective hazard identification processes is one of the keys to successful risk management, and forms a part of each Operator's safety management system.
- Effective hazard identification and mitigation requires open communication and engagement by all of the workforce.



Risk Management

- Effective risk management requires the persistent application and enhancement of safety management processes to reduce risk to as low as reasonably practicable.
- **Philosophy**
 - Eliminate or prevent hazards by application of inherently safe design.
 - Control any hazardous conditions that may arise.
 - Mitigate against those hazards that cannot be fully controlled.
 - Provide means of recovery from any hazardous events.
- **Application**
 - Identify hazards
 - Evaluate risks
 - Identify credible risk reduction measures
 - Evaluate practicability
 - Implement measures

Risk Matrix (Typical)

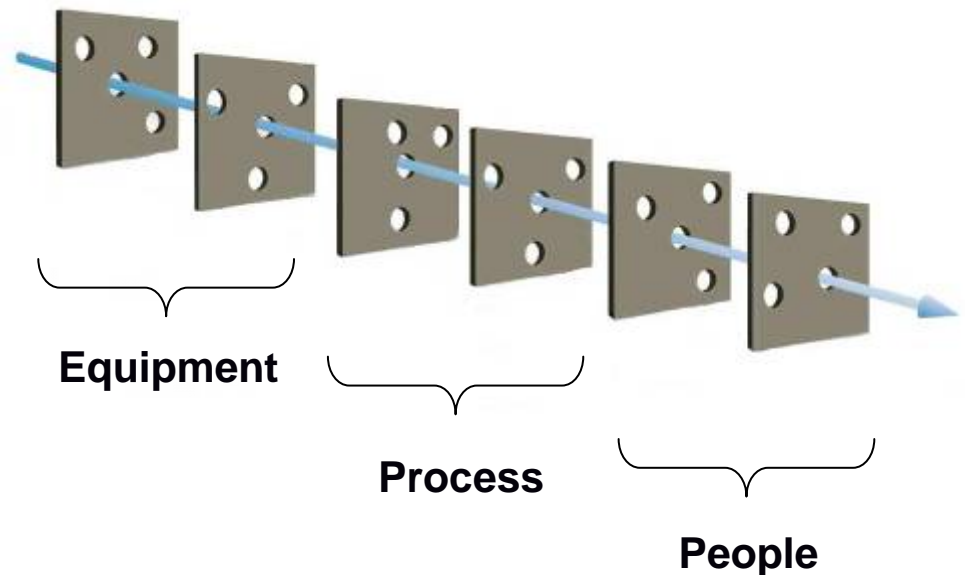
- Risk ranking matrices provide a tool which ensures a consistent approach for evaluating consequence and likelihood and overall risk.
- Once hazards or potential hazards are identified the severity of any consequence and likelihood of occurrence must be assessed.
- Actions are then taken, if required, to implement steps to reduce the overall risk.

Likelihood

		IMPROBABLE	REMOTE	OCCASIONAL	PROBABLE	FREQUENT
		A	B	C	D	E
Consequence Ranking	5					
	4					
	3					
	2					
	1					

Swiss Cheese Model

- Each slice of cheese is a layer of defence or opportunity to prevent an error. The more defences you have the better.
- If an error occurs and a problem does pass through a hole in one defensive layer (or a hole in the cheese) then it will be stopped at the next layer as the holes are not in alignment.
- For an incident to occur, the holes need to align for each step in the process allowing all defenses to be defeated.



Safety Participation

East Coast CAPP Participation

Industry participates at all CAPP levels on the East Coast:

- Executive Policy Group
- Safety Committee
- Environment Committee
- Various Sub-Committees

East Coast CAPP Committees are primary mechanism for:

- Development and input into regulations and regulatory reform (e.g. Drilling and Production Regulations)
- Development of offshore oil and gas standard practices (e.g. Training and Qualifications, Medical Fitness, Safe Lifting Practice)
- Development and input into guidelines (e.g. Evacuation, Escape and Rescue, Incident Reporting, Drilling and Production)

Communication About CAPP Initiatives

- CAPP Initiative Updates are provided to the workforce through the Joint Occupational Health and Safety (JOHS) committees. Examples of updates:
 - Changes in the Training and Qualification Standards
 - Evacuation Escape and Rescue Guide
 - Helicopter flight suit water ingress testing
 - Helicopter Underwater Emergency Breathing Apparatus (HUEBA)
- Updates are provided to the C-NLOPB at twice yearly meetings and at ad hoc meetings for specific topics/initiatives.

Other Occupational Health and Safety Regulations

- NL Occupational Health and Safety Act
- Canada Labour Code, Part II
- C-NLOPB
 - “Other Requirements Respecting Occupational Health and Safety”
 - Employer and employee duties
 - Right to refuse dangerous work
 - Health and safety program and policy
 - OHS committees (election, meetings, training etc.)

Offshore OHS Committees

- Offshore OHS Committees:
 - Are comprised of worker and management representatives.
 - Have meetings which are led by worker and management Co-Chairs.
 - Maintain representation from all departments, including Contractors.
 - Meet on a three week basis (once per rotation, exceeds mandated requirement).
 - Convene special meetings, when necessary.
 - Submit minutes to management and regulatory authorities.

- OHS Committee members receive training in the following:
 - Organization and functions for OHS Committees.
 - OHS Committee training (principles of health and safety programs).
 - Incident investigation techniques.

Employee Rights - OHS

Rights

- ❑ Right to **PARTICIPATE**
- ❑ Right to **KNOW**
- ❑ Right to **REFUSE**

Functions of the OHS Committee:

- Attend and participate in meetings
- Monitor and support the OSH program
- Participate in workplace investigations and inspections
- Receive complaints from workers
- Promote OHS education and training needs
- Promote a health and safety culture
- Investigate refusals to do unsafe work
- Make recommendations to the Operator

The OHS Committee is one of the formal mechanisms that fulfils the right of the employees to participate in the development and enhancement of safety and risk management processes

Communication

Communication among workers, supervisors and management occurs on an ongoing and regular basis.

- Orientations are considered essential for employees to become informed of:
 - The safety culture of the respective organizations.
 - The expectations regarding their health and safety.
 - Targeted workplace hazards.
- Examples of orientations include:
 - New employee, safety management
 - Helicopter Induction (Outbound/Inbound), Offshore Induction

Communication

Meetings are essential ongoing communications and are fundamental to successful and open communication among the workforce and with management. Examples of meetings that are held onshore and offshore are:

- ❑ Permit to Work and Toolbox Talk
- ❑ Departmental Safety Meetings
- ❑ Town Hall Meetings with Management
- ❑ Handovers (Shift and Rotation)

Contracted Services

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Operator - Contract Services

- Contractors are important to the success of our business and are very much a part of our safety culture.
 - All contractors have to adhere to the Operator's policies and procedures when offshore.
 - All contractor companies have to demonstrate alignment to the Operator's safety management system.
 - Contractor companies are subject to audit and inspection by the Operator.

Operator - Contract Services

- Each Operator hires its own contractors to provide many of the goods and services required for the operation of each project.
- Each Operator requires its contractors to comply with all applicable legislative requirements including those of the C-NLOPB and Transport Canada.

Operator - Contract Services

- Examples of goods and services contracted by each Operator include:
 - Shorebase services
 - Marine offshore service and support vessels
 - Drilling
 - Catering
 - Ice and weather observation and forecasting
 - Helicopter services

Shorebase Services

Each Operator has contracted with A. Harvey and Co. Limited to provide shorebase services in support of their offshore operations such as:

- ❑ Shorebase facilities/personnel/services
- ❑ Berthing of vessels
- ❑ Loading and unloading of cargo
- ❑ Cargo and vessel coordination
- ❑ Processing/documenting all material/equipment movements
- ❑ Provision of transport containers and material handling equipment
- ❑ Provision of local road transport
- ❑ Handling, processing and containing dangerous/hazardous materials and waste

Marine Support Services

- Each Operator has its own specific marine support requirements (standby vessel configuration, anchor handling/towing capability, sub-surface support capability) which makes formalized resource pooling impractical.
- Occasionally, one Operator may assist another by transporting personnel and materials offshore.

Standby Vessels

Standby vessels are certified by Transport Canada and may have:

- Emergency response capabilities including
 - Fast Rescue Craft
 - Personnel recovery equipment
 - Firefighting and medical support
 - Passenger carrying capability (varies by vessel)
- Ice strengthened hulls and dynamic positioning

Helicopter Operations

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Regulatory References



- The C-NLOPB Guidelines Respecting Drilling Programs contain specific expectations with regards to helicopter transportation offshore.
- To obtain a Work Authorization, it is the responsibility of the Operator to demonstrate that these regulatory expectations are met.
- Currently all offshore Operators comply with and meet these regulatory expectations.

Regulatory References



Under the requirements for work authorization the C-NLOPB has multiple references specific to helicopter operations. The following are references outlined in the Guidelines Respecting Drilling Programs

- Helicopters must be certified by Transport Canada
- Pilots must be licensed by Transport Canada
- Training and experience of crews and first response technicians
- Provision of flight time for first response practice and drills
- Aircraft should:
 - have multiple-engine design;
 - be capable of landing on the water in at least moderate sea states;
 - have upper torso passenger restraints;
 - be equipped with externally mounted life rafts;
 - be configured to allow the emergency egress of passengers; and,
 - communicate with shore base, drilling installation, supply vessels and lifeboats.

Regulatory References



Under the requirements for work authorization the C-NLOPB has multiple references specific to helicopter operations. The following are references outlined in the Guidelines Respecting Drilling Programs

- All passengers must receive Helicopter Underwater Escape Training (HUET)
- Passengers must be suitably briefed prior to transport and wear approved helicopter transportations suits
- Passengers and freight should not normally be carried on the same aircraft
- Consideration of weather and helicopter load limits when planning flights
- Flying at night should be avoided to the extent possible
- Reserve helicopter fuel to be kept on MODU including rationale
- Consideration given to providing goggles and appropriate breathing devices to assist in underwater escape
- Proven automated usage and monitoring systems should be used where practicable.

Helicopter Operations

- Each Operator has contracted with Cougar Helicopters Inc. for the provision of helicopter services including:
 - supply, operation and maintenance of helicopters
 - specialized personnel
 - terminal services
 - passenger/cargo administration
 - cargo transport
 - air ambulance (medivac)
 - standby helicopter for emergency response
 - other specialized services
- The Operators have adopted a pooling arrangement, administered by Cougar, to ensure continuation of service to all installations. This arrangement facilitates helicopter sharing and provides for a shared emergency response capability.
- Operators conduct independent formal audits of Cougar.

Selection of Cougar as Helicopter Services Provider

In 1995 Cougar Helicopters Inc. was awarded the Hibernia Helicopter Services contract by HMDC utilizing a competitive bid process. Cougar was one of three pre-qualified bidders for the Helicopter Services Contract.

Competitive bid process included:

- a detailed statement of requirement outlining the specific scope of work
- a formal bid proposal submitted by each of the pre-qualified service providers
- a detailed analysis conducted on each bid package by the bid evaluation team (including an aviation subject matter expert). Analysis consisted of a:
 - safety and environmental assessment
 - technical analysis
 - commercial/economic analysis
 - local benefits analysis

Contract award to Cougar Helicopters was reviewed and validated by the C-NLOPB.

Other Operator Selection of Cougar Helicopters

Petro-Canada

- In preparation for the start of the Terra Nova project, Petro-Canada also entered into a competitive bidding process for offshore helicopter services:
 - Basic requirements - helicopter with full de-icing capability and capable of personnel and cargo transport, emergency response and medivac services.
 - A technical evaluation was conducted by an aviation consultant on behalf of Petro-Canada as a part of the bid process.
- A contract was established between Petro-Canada and Cougar in 1998.

Husky

- In preparation for the start of the White Rose project, Husky also entered into a competitive bidding process for offshore helicopter services, similar to Petro-Canada (technical evaluation against known operating requirements)
- A contract was established between Husky and Cougar in 2003.

General

- For all Operators, the Cougar contract is re-visited on a periodic basis.

Selection of Sikorsky S-92A

- When Cougar was first selected as the helicopter service provider for HMDC it was using the Eurocopter Super Puma airframe.
- As its base of operations expanded, Cougar subsequently added the Sikorsky S61 to its fleet.
- In early 2000, Cougar began to consider new helicopter technologies to continue to enhance operational and safety performance:
 - The leading contenders considered by Cougar were the Sikorsky (S-92A) and the Eurocopter (EC225) in the new generation of helicopters suitable for offshore applications.
 - The AgustaWestland EH101 was not considered a suitable airframe for use as a passenger transport due to maintenance and weight considerations.

Selection of Sikorsky S-92A – Petro-Canada

- Cougar conducted a selection process which included a detailed comparison of the two leading contenders which included:
 - Monitoring the Sikorsky's Federal Aviation Authority certification process and production program for the S-92A
 - Extensive technical analysis of the EC225 and S-92A
 - Including analysis of respective size, fuel capacity, range and simulator availability for both airframe designs
- The process resulted in Cougar recommending the selection of S-92A to Petro-Canada.
- Petro-Canada briefed the C-NLOPB on selection of S-92A and the selection process and due diligence undertaken by Cougar
- Cougar put the first S-92A into service in April 2005
- HMDC and Husky also adopted the S-92A after independent internal reviews.

S-92A Considerations

- Safety
- Passenger capacity
- Passenger comfort
- Speed and range
- Cargo capability and flexibility
- Maintenance support
- Manufacturer track record
- Cougar endorsement

Transition to S-92A Fleet

- The first S-92A was delivered and put in service for Petro-Canada in April 2005.
- Cougar's fleet at that time consisted of an S-92A (Petro-Canada), an S-61 and Super Pumas (Husky/HMDC)
- By mid-2007 Cougar completed its transition to a full S-92A fleet when Husky and HMDC executed agreements with Cougar that also provided for use of the S-92A airframe.

Personal Protective Equipment for Helicopter Transportation (specific to passenger safety)

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Regulatory References to Helicopter Passenger Transportation Suits

The requirements for the use of a helicopter passenger transportation suit are outlined within the following C-NLOPB regulations and guidelines:

- Newfoundland Offshore Area, Petroleum Geophysical Regulations (s.15)
- Draft Newfoundland Petroleum OSH Regulations, Part XII, Helicopter Protection Suit (s.12.18)
- Newfoundland Offshore Petroleum Installation Regulations, Lifesaving Equipment for Installations (s.22)
- Guidelines Respecting Drilling Programs, Appendix E, Helicopter Operations

Helicopter Passenger Transportation Suit Selection

- The Operators used the Mustang Flight Commander MS2000 suit until the fall of 2007.
- As a continuous improvement initiative, in mid to late 2006, the Operators undertook a joint bidding exercise to replace existing Mustang suits.
- Basic scope of work was for the supply of Helicopter Passenger Transportation suits compliant with the latest Transport Canada standard CAN/CGSB 65.17-1999 (including life vests and Personal Locator Beacons (PLB's)) and all specified support services. Suits were also required to be HUEBA capable.
- Any replacement suit was required to meet both the Helicopter Passenger Transportation suit system as adopted by Transport Canada (Aviation) CAN/CGSB 65.17-1999 and the marine abandonment immersion suit systems standard CAN/CGSB 65.16-2005 as adopted by Transport Canada (Marine).

Flight Suit Dual Standard Requirement

- For operational flexibility the Operators also specified the suits to be compliant with the marine abandonment immersion suit standard CAN/CGSB 65.16-2005
- The marine abandonment suits were:
 - Certified for use during an offshore marine evacuation
 - Available for use during marine transfer offshore

Selection of New Suit

- An Expression of Interest (EOI) was issued in early 2006
- EOI evaluation included:
 - Transport Canada certification requirements ie. suit design (weight, life jacket location, durability, thermal protection etc.),
 - Manufacturer quality control processes
 - Turn around time for suit implementation
- Four potential suppliers bid
- Technical evaluation completed on each bidder
- Helly Hansen suit (E452) obtained the highest technical score and Helly Hansen was recommended as the preferred supplier

E452 Implementation

Contract Award and Implementation

- Helly Hansen was awarded the contract in May 2007
 - Helly Hansen would supply approximately 1400 suits to meet the needs of the existing Operators and ad hoc supply for short term programs.
- Transition plan developed as the new suits were manufactured
 - Helly Hansen worked with the Marine Institute east coast training programs (ie. Basic Survival Training (BST))
 - Transition strategy developed to introduce E452 to the offshore workforce
 - New suits introduced Nov 1, 2007.

E452 Overview



Personal Locator Beacons

- All E452 suits are fitted with a Personal Locator Beacon (PLB): Sea Marshall PLB
- The PLB automatically activates on contact with water.
- PLB signals facilitate rescue of personnel on the water surface.
- PLB's are not designed to operate at submerged water depths.
- Subsequent to the loss of Flight 491, Cougar confirmed that the PLBs functioned properly.



Helicopter Underwater Emergency Breathing Apparatus (HUEBA)

- HUEBA provides the user with an additional supply of breathable air.
- Process underway since 2000
- Implementation plan in final stages on March 12
- As of October 1, 2009, all personnel travelling to/from offshore installations, via helicopter, are:
 - required to have HUEBA training
 - wear a HUEBA device on their E452 suit



HUEBA Implementation

- Operators acknowledge that the decision to implement the HUEBA took a long period of time.
- The overall process of evaluating appropriate breathing devices and the eventual selection of HUEBA was a very complex process.
- Compressed air versus the re-breather device was considered.
- The compressed air unit was identified as the best available technology in 2006.
- Associated risks were reviewed against the following:
 - Operational Performance
 - Training requirements (under 1 meter / over 1 meter in water depth)
 - Medical Requirements (under 1 meter / over 1 meter in water depth)
 - Medical screening

Qualifications and Training for Work Offshore

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Context for Emergency Helicopter Egress Training and Equipment

- Emergency helicopter egress training and equipment is designed to enable escape from a helicopter which has made a controlled ditching on water.
- The training and equipment is not designed for a high impact/uncontrolled helicopter crash - training under such circumstances introduces an unacceptable risk.

C-NLOPB Requirements

- All Operators ensure that the training and qualifications of personnel in their operations comply with the requirements of:
 - CAPP Training and Qualifications Standard Practice, and,
 - Operator specific requirements for offshore work
- Industry, regulators and the training institutions continually review training requirements for offshore workers through the CAPP Training and Qualifications Committee.

Standard Practice for the Training and Qualifications of Personnel

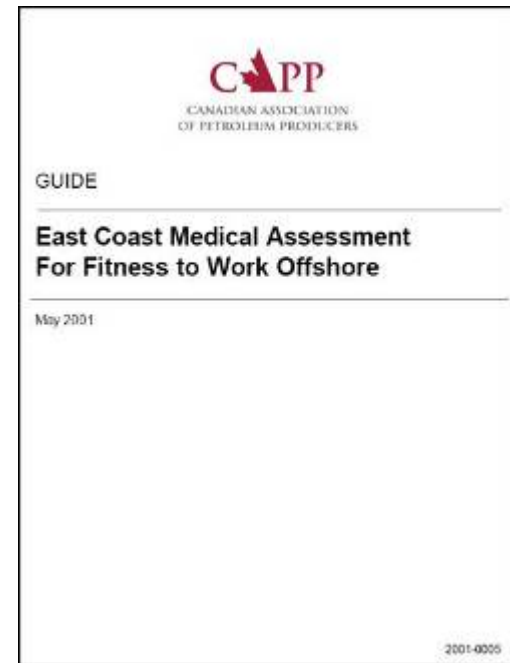
- Standard Practice for the Training and Qualifications of Personnel
 - Provides guidance on the appropriate level of training required for the offshore workforce
 - Is a joint committee effort by Operators, CAODC members, CAPP, regulatory bodies and training institutions
 - Outlines the required qualifications and certified safety training for east coast offshore workers including offshore travel
 - Outlines approved training institutions for course as deemed necessary by the Committee
 - Has been in effect since March 2001; revised 2008



Canadian Association of Oilwell Drilling Contractors (CAODC)

CAPP – Medical Fitness to Work Offshore

- The offshore work site in the Newfoundland and Labrador area exists in a remote and hostile environment. Adverse weather may cause delays in medical evacuation, and convert a minor medical problem into a major emergency.
- As such, medical assessments are conducted for all personnel prior to their travel to an offshore worksite.
- Objectives of the medical assessment are:
 - To ensure that offshore personnel are medically fit to work safely at an isolated location
 - To anticipate and, where possible, prevent the avoidable occurrence of ill health offshore
 - To provide occupational health surveillance
 - To meet any regulatory requirements for hazard monitoring



Mandatory Qualifications for Offshore Travel



Frequency

- Up to 39 years old - every 3 years
- 40 – 49 years old - every 2 years
- Age 50 and above - annually



Basic Survival Training (BST)

- 5 day course with a 3 year renewal period

Basic Survival Training Recurrent (BST-R)

- 2 day course with a 3 year renewal period
- Requires valid BST as a pre-requisite

Offshore Survival Introduction (OSI)

- 1 day course with 3 year renewal period
- Permits 6 days offshore during a 12 month period



Note: BST certificates issued for the successful completion of the OPITO and OLF approved courses will be considered valid for travel to offshore facilities on the east coast.

Additional Training Related to Helicopter Operations

- Additional training requirements relating to helicopter operations and safety:
 - Helicopter Safety Briefing (for all personnel)
 - Regulatory Awareness
 - Transportation of Dangerous Goods
 - Workplace Hazardous Materials Information Systems (WHMIS)
 - Helicopter Landing Officer
 - Helideck Teams
 - Offshore Fire Team

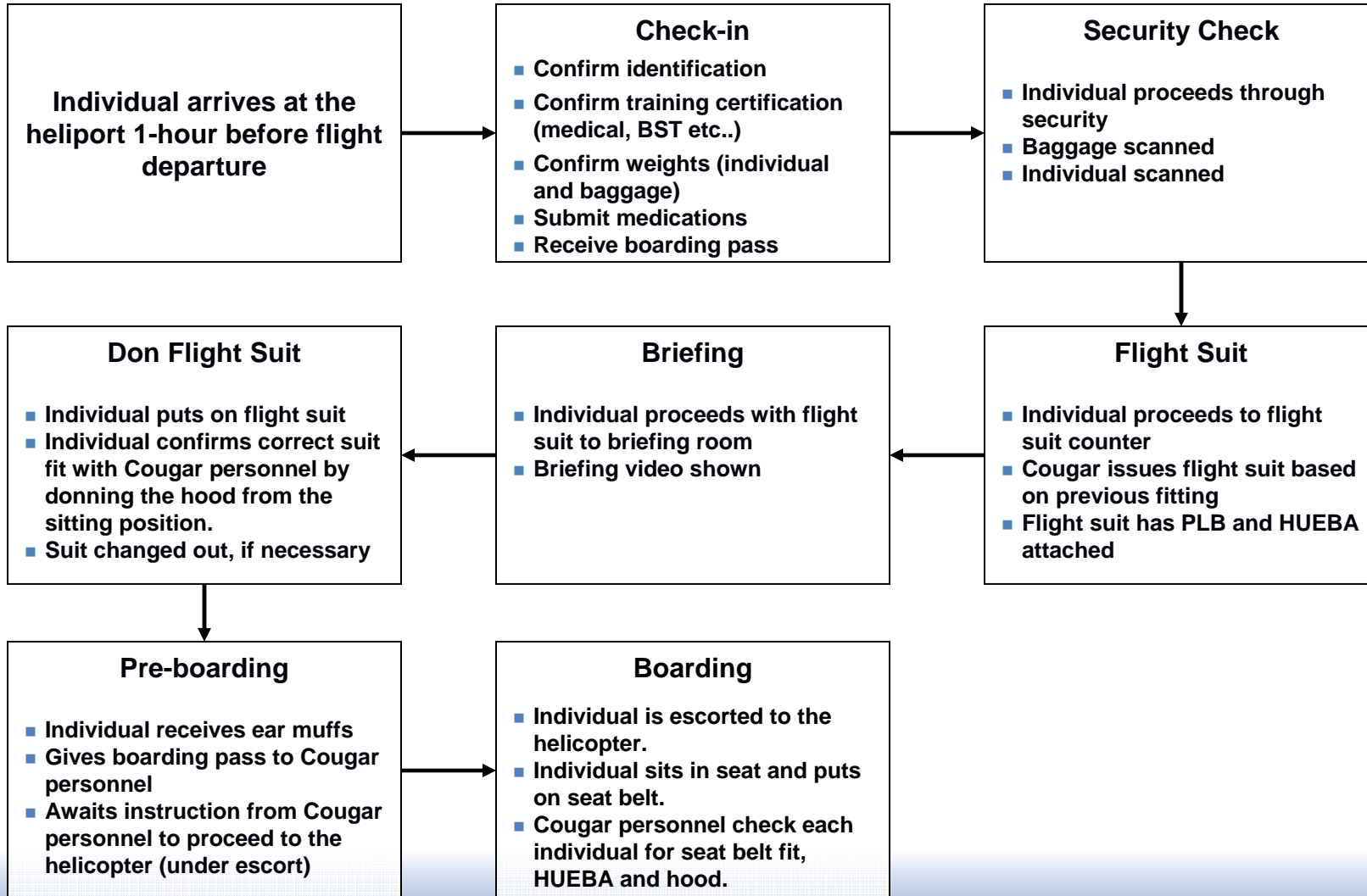
Training Certification Compliance

- Operators and their respective contractors are responsible for maintaining employee qualifications/certification records and compliance with the CAPP Training and Qualification Standard Practice
- C-NLOPB monitors Operator compliance
- As Cougar represents the final “gateway” to the offshore, Operators have worked with Cougar to implement electronic personnel tracking systems which maintain records of all mandatory training and medical certifications (and expiry dates) to ensure that all personnel travelling offshore are either eligible to travel or have the appropriate exemption.

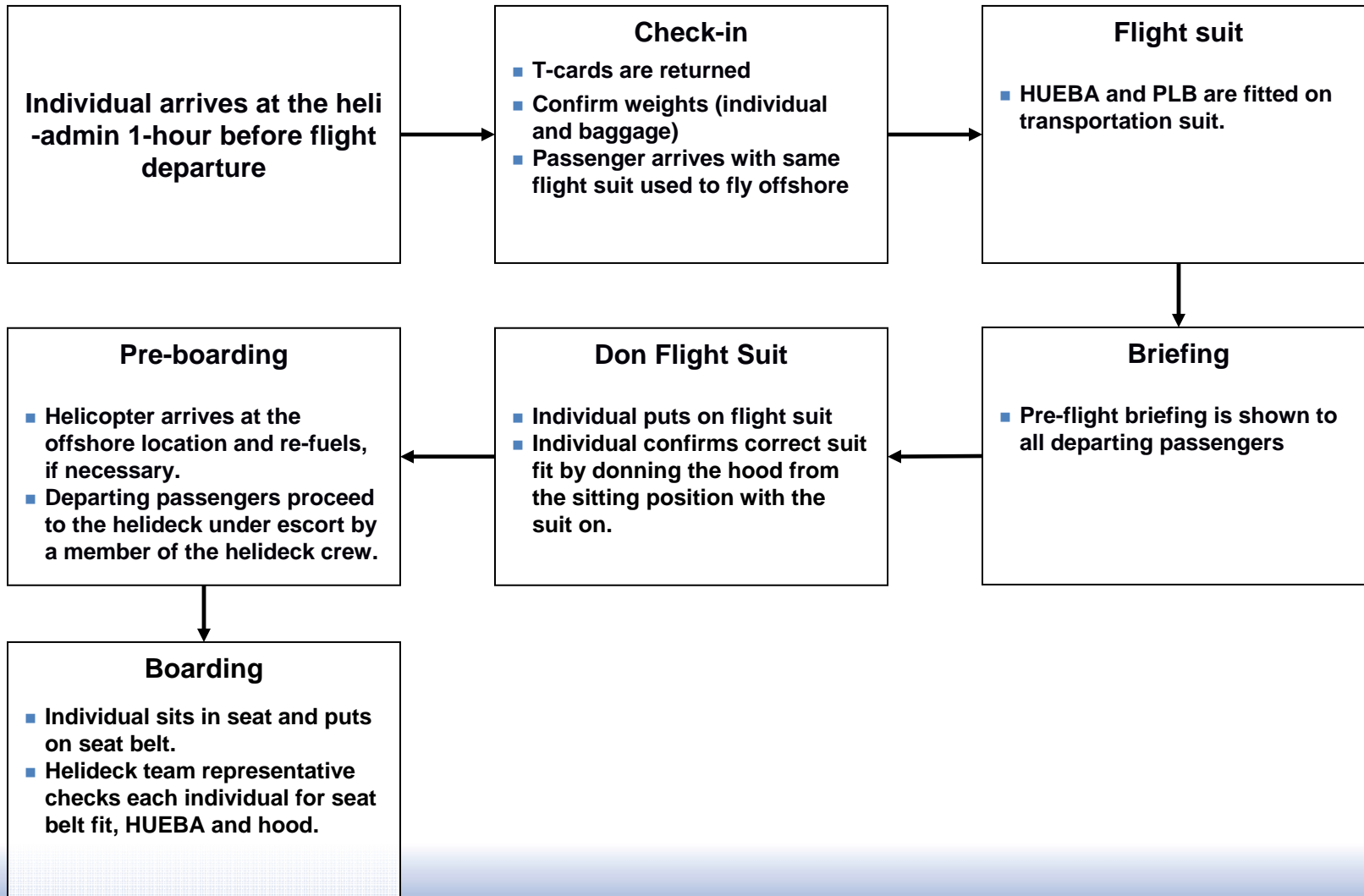
CAPP Exemption Procedures

- Chapter 7, “Exemption Procedures” of the Standard Practice for the Training and Qualifications of Personnel notes:
 - Because of the intermittent nature of employment, course scheduling and other factors, it may not always be possible for an individual to fulfill all the qualification and training requirements set out in this document prior to traveling offshore.
- Exemptions may be granted on a case-by-case basis with the approval of the Operator’s senior onshore representative and the Offshore Installation Manager (OIM).
- The C-NLOPB monitors all exemptions and will notify the Operator of any questions or concerns and reserves the right to deny any exemption or to issue an order to an Operator relating to exemptions if the process is abused.

Cougar Check-in Process



Offshore Check-in Process (Typical)



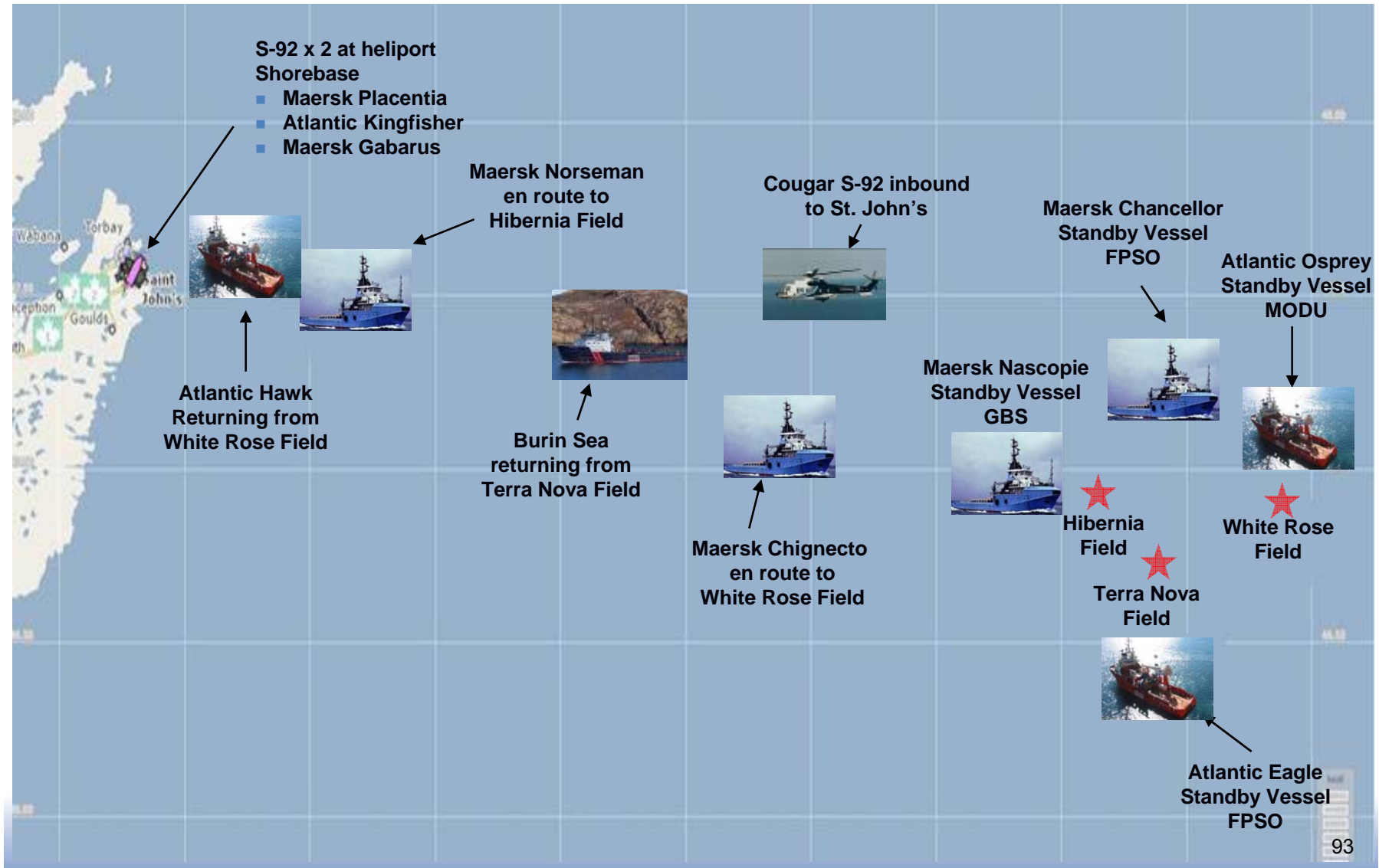
Operator Emergency Preparedness

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Emergency Preparedness - Operators

- Operators recognize the great importance of emergency preparedness and strive to identify all necessary actions to be taken to protect people, the environment and property in the event of an emergency or security threat.
- Each Operator has effected a comprehensive Emergency Response Plan
- The Emergency Response Plans:
 - Detail the emergency response organizational structure and details procedures to be followed for all reasonably anticipated events. They encompass planning, training and exercises;
 - Have evolved with the projects and are continually updated; and
 - Can also be applied to any emergency, offshore or onshore, in support of the Operator's commitment to Mutual Aid.

Logistics – Offshore Perspective



Operator Emergency Response – Regulatory Requirements

Operators require Cougar, as their contracted helicopter services provider, to maintain a standby helicopter in accordance with the Safety Plan Guidelines.

Safety Plan Guidelines

7.1.2 Standby Helicopter

“It is expected that a helicopter will be maintained on standby and dedicated to search and rescue on a 24 hour per day basis. This helicopter should be equipped with a hoist; equipment for retrieving single and multiple persons from the water; life-raft systems designed for air deployment and associated equipment. Trained personnel should be available to accompany the helicopter crew and assist with search and rescue duties. Provision should be made for helicopter training time sufficient to ensure that the helicopter and rescue crews can develop the necessary co-ordination to operate effectively”.

Emergency Response – Cougar Resources

- 24 hour 7 days a week standby
- One hour wheels up (maximum)
- S-92A emergency response equipment
- Trained pilots
- Trained rescue specialists
- Allocated monthly training time
- S-92A's are fitted with emergency locator transmitters (ELTs)
- Blue Sky flight following and vessel tracking (AIS)



DND SAR Interaction with Operator Response

- In Canada SAR is provided by the federal government. DND controls and directs all SAR response including the Cougar standby helicopter.
- DND has the authority to command any vessel or aircraft of opportunity to support their search and rescue missions.
- As DND Cormorants are located in Gander, the Cougar stand-by helicopter will likely always be the first responder to an offshore emergency and provide the first on-site aid.
- DND's SAR assets are single purpose. Personnel and equipment are used on a full time basis only for SAR training and SAR response.

DND SAR Interaction with Operator Response

- DND has acquired an unparalleled level of training and experience for search and rescue with specialized equipment that is fit for SAR purposes.
- In the event of an escalating emergency DND can provide a cascade of backup resources (federal or other) necessary to mount and execute a full emergency response.

DND SAR Interaction with Operator Response

- DND has established Joint Rescue Co-ordination Centres (JRCC) in various regions in Canada which are responsible for co-ordination of all aeronautical and maritime SAR operations within their regions.
- JRCC will be immediately notified of any mobilization of the standby helicopter or any urgent or emergency requirement. JRCC will assume command of any SAR response directing the standby helicopter and deploying Department of National Defense (DND) aircraft, including Cormorants based in Gander, Canadian Coast Guard (CCG) vessels and other assets, as may be required.

DND Search and Rescue

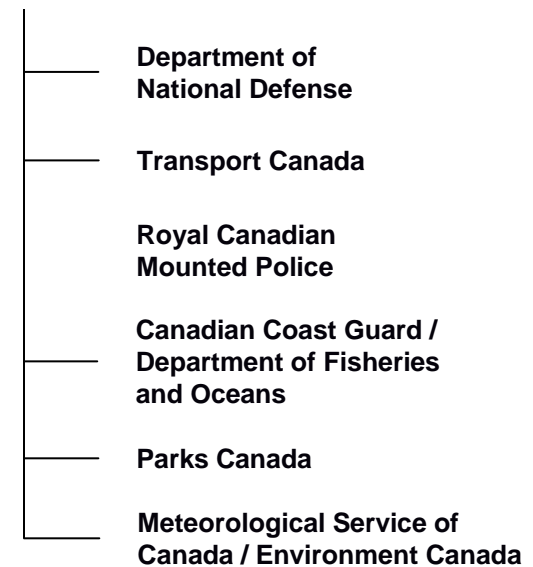
99

DND – Search and Rescue

- By international agreement Canada is obliged to provide aeronautical and maritime search and rescue (SAR) response to a vast area, which includes the Newfoundland Offshore Area.
- The National Search and Rescue Program coordinates search and rescue operations in Canada.

Minister of National Defense

National Search and Rescue Secretariat



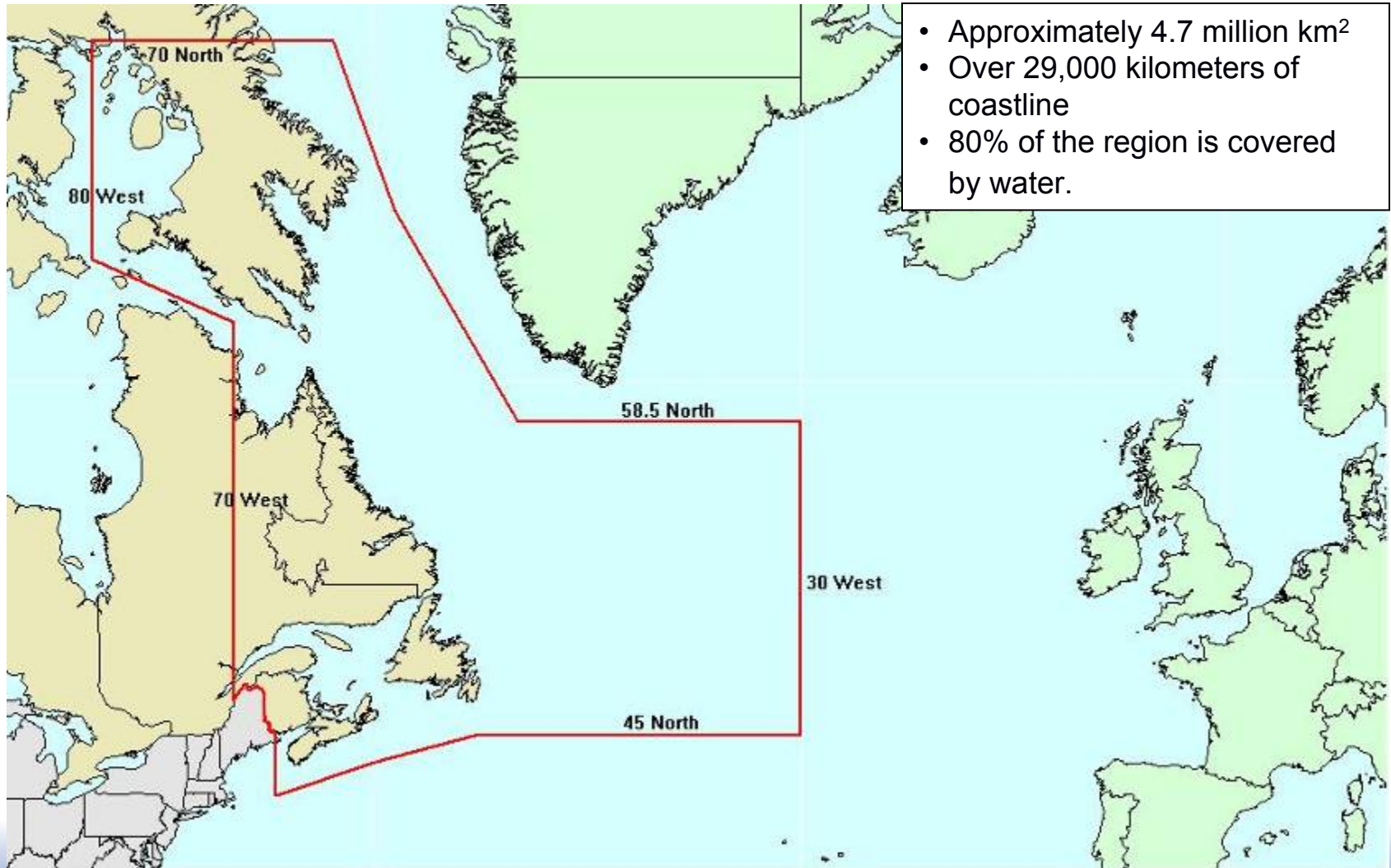
DND – Search and Rescue

- Marine and aeronautical SAR is carried out principally by DND and CCG.
- DND has overall responsibility for the co-ordination and operation of aeronautical and maritime SAR.
- Some regions also have Marine Rescue Sub-Centers (MRSC) manned by CCG.

DND – Search and Rescue

- JRCC has direct tasking authority over all primary SAR resources such as DND aircraft (fixed wing and helicopters) and CCG vessels. Secondary federal resources, such as navy vessels, can also be deployed.
- Under the *Canada Shipping Act*, JRCC and CCG have the authority to direct other (civilian) vessels and aircraft to render assistance to a nearby vessel or aircraft in distress.
- Additionally, both JRCC and CCG can task voluntary aviation and maritime civilian resources to assist with a SAR operation such as the CCG Auxiliary.

JRCC Halifax – Search and Rescue Region



DND Aviation Search and Rescue (SAR) for the Grand Banks



Response Time (wheels up)

JRCC (wk days 8am to 4pm)	30 minutes
JRCC (after hours) hrs	2
Cougar Support	1 hr

Resources Based in Halifax and Gander

Gander 103 Squadron:	3 Cormorant Helicopters
Greenwood 413 Squadron:	4 Cormorant Helicopters
	1 CC-130 Hercules Aircraft

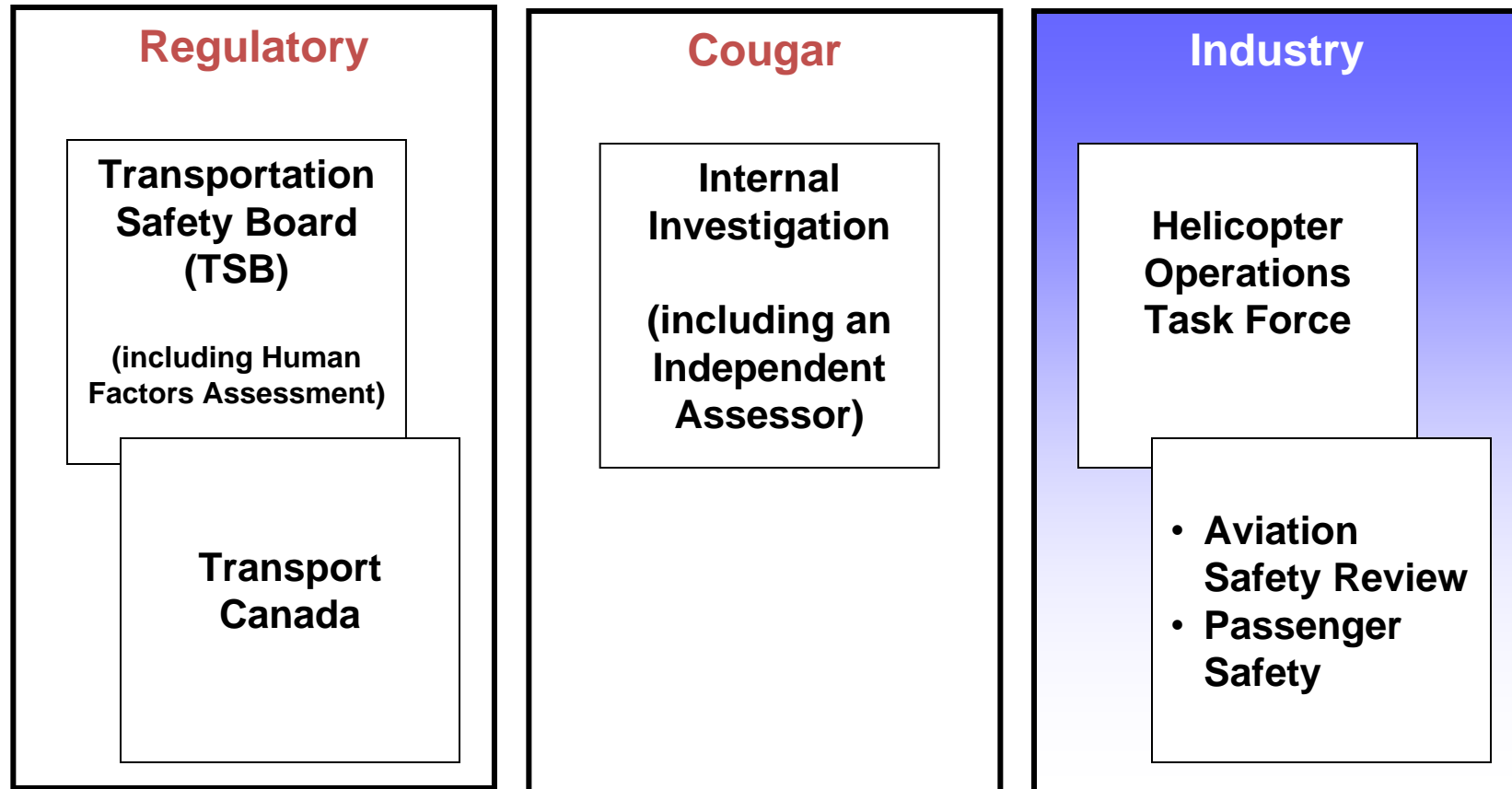
March 12, 2009

- On March 12, 2009 Cougar Flight 491 departed from St. John's for the SeaRose FPSO and the Hibernia Platform with 16 passengers and two pilots on board.
- The helicopter crashed into the water with considerable force due to the loss of the main gearbox oil pressure.
- All Operators immediately mobilized their respective emergency response teams.
- Post March 12 emergency response, all offshore S-92A helicopter flights were suspended pending further investigation.
- Operator specific response to incident will be covered in individual panels.

Helicopter Operations Task Force

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Levels of Investigation/Assessment



HOTF Charter

Purpose

Lead industry efforts to safely resume personnel transportation by helicopter to the Grand Banks (helicopter operations).

Scope and Objectives

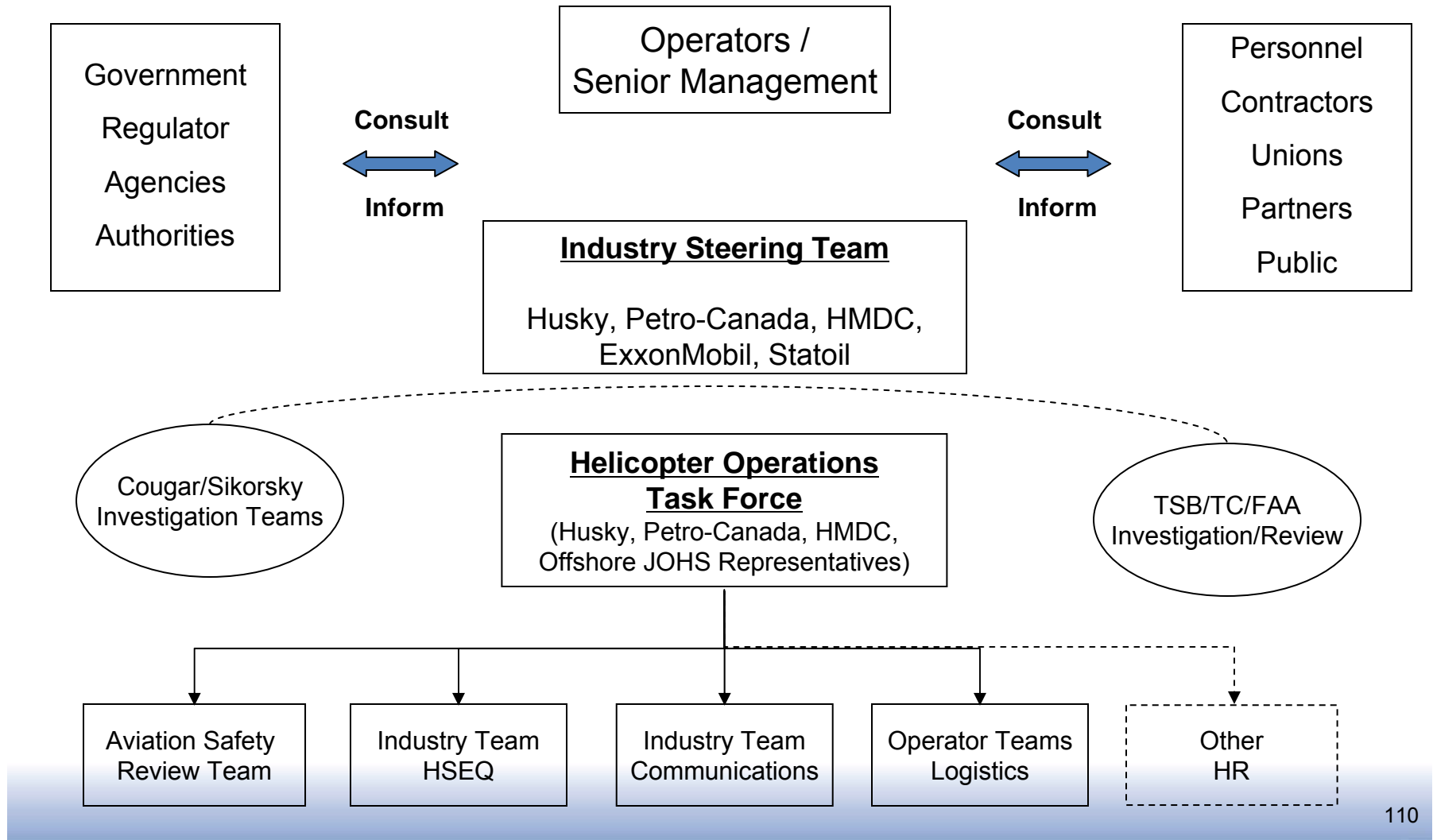
- Define the issues to be addressed prior to the resumption of helicopter operations and coordinate their resolution.
- Develop and execute a road map for the resumption of helicopter operations.
- Develop and rollout a stakeholder communication plan for industry.
- Monitor the findings emerging from the TSB and Cougar incident investigations and ensure they are addressed promptly.
- Monitor Cougar's return to operations activities.
- Coordinate an independent assessment of Cougar's St. John's operations to be issued to each operator for their review and consideration.

HOTF Charter

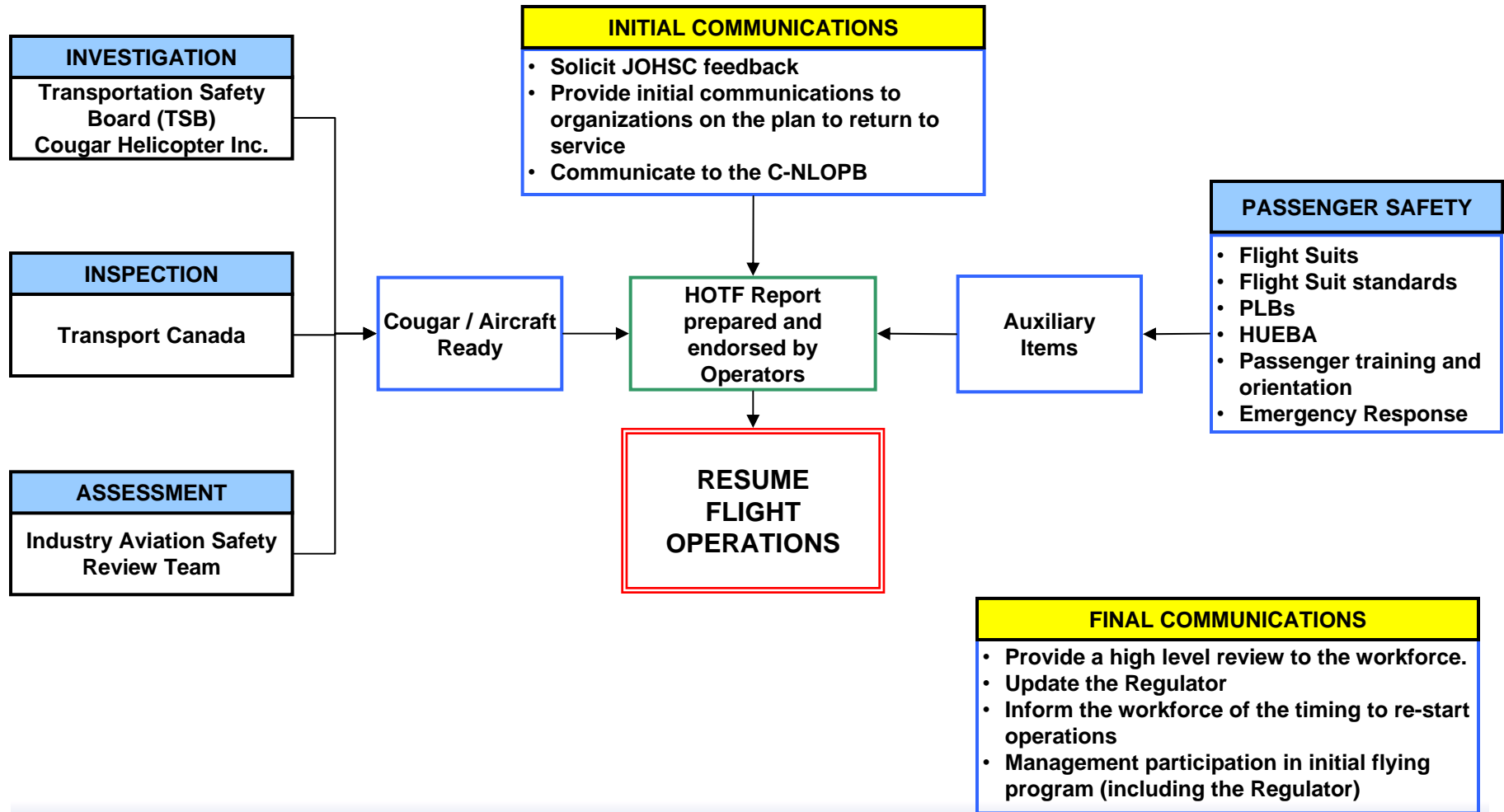
Expectations

- Task force to begin immediately and to continue until the resumption of helicopter operations.
- Task force members are to be full-time dedicated resources.
- Task force is to provide twice weekly update to Steering Team.
- Cougar Helicopters is responsible for integrity of its operations and addressing industry concerns related to resuming normal helicopter operations.
- All aspects related to flight safety should be evaluated by the task force.

Roles, Reporting and Communications



Road Map - Resumption of Helicopter Operations



Passenger Safety Review

PURPOSE

- The Health, Safety, Environment and Quality (HSEQ) team was established to assist the HOTF with issues related to passenger safety.
- Some of the key areas reviewed included:
 - ❑ Flight Suits
 - ❑ Flight Suit standards (CGSB)
 - ❑ Personal Locator Beacons (PLBs)
 - ❑ Helicopter Underwater Emergency Breathing Apparatus (HUEBA)
 - ❑ Passenger Training and Orientation
 - ❑ Emergency Response

Aviation Safety Review (ASR) Team

PURPOSE

To provide the HOTF with an independent recommendation regarding the readiness of Cougar Helicopters to resume providing S-92A helicopter transportation services to offshore facilities.

- Maintenance Department
- Aircraft Condition and Compliance
- Quality Assurance
- Safety Management System
- Validity of Regulatory documents
- Staffing levels
- Operations Department
- Spares and Inventory Control
- Dispatch Function
- Personnel training
- Document Control
- Standard Operating Procedures

Aviation Safety Review Team

- The Aviation Safety Review Team was comprised of four individuals with a combined experience of over 160 years in the aviation field.
- Expertise in the following areas:
 - ❑ Safety and quality
 - ❑ Technical, engineering
 - ❑ Training
 - ❑ Helicopter pilots
 - ❑ International helicopter operations

ASR Team Findings

- The ASR Team issued a report to the HOTF stating:
 - Cougar's maintenance of the S-92A meets the manufacturers recommendations, regulatory requirements and industry norms
 - Cougar's maintenance engineers are well trained and well qualified
 - Cougar's pilots are well trained and well qualified
 - Cougar's Standard Operating Procedures and Emergency Response Plan Manual exceed regulatory requirements and industry norms

The HOTF Report

The HOTF prepared a report that was issued to the Industry Steering Team. It concluded it was safe to return to service. The Table of Contents of the Report is shown below.

1. Introduction
2. Purpose
3. Scope
4. Roles and Responsibilities
5. S-92A Return to Service Assessment
 1. Roadmap for Return to Service
 2. Incident Investigation (Findings and Actions)
 3. Sikorsky S-92A Helicopter Readiness
 4. Cougar Flight Operations Readiness (People and Processes)
 5. Passenger Safety (Non helicopter safety equipment)
 6. Stakeholder Engagement
6. Recommendations
7. Conclusions

Return to Flight Process

- **Prior to returning to service with the S-92A, Operators:**
 - Responded to over 350 questions from offshore and onshore JOHS committees.
 - Conducted regular briefings with JOHS committees.
 - Conducted Town Halls onshore with Cougar leadership for offshift offshore workers and their families.
 - Conducted Town Halls offshore with Operator leadership; included C-NLOPB Chair, Cougar Helicopters officials.

- **Town Halls included:**
 - Description of Return to Flight process.
 - Overview of HOTF Report.
 - Overview of Alert Service Bulletin (ASB)
 - Changes to Cougar operations post March 12.

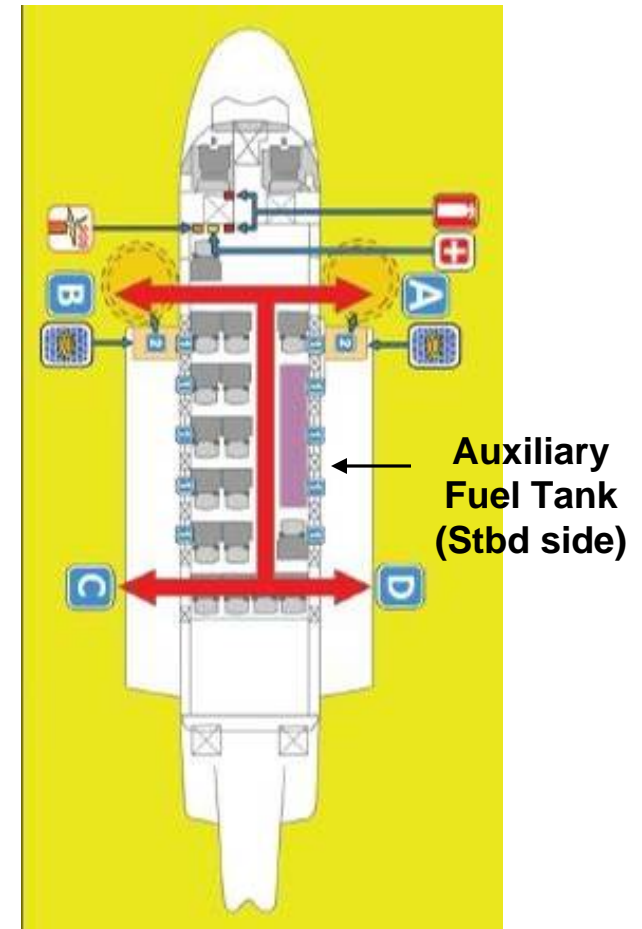
Return to Flight Changes – Cougar

- Changes to Cougar operations post March 12
 - Titanium stud replacements
 - Updated emergency procedures and checklists
 - Revised descent profile for emergencies and flying at a lower altitude
 - Pilots were trained in changes to the procedures and descent profile
 - Change to the location of the helicopter auxiliary fuel tank



Auxiliary Fuel Tank

- Originally located on the port side of the aircraft; now on starboard side
- Concerns were raised through the JOHS with regards to the:
 - Safety design of the auxiliary fuel tank inside the helicopter
 - Ability to egress the helicopter through a window over the auxiliary fuel tank based on individual size.
- Fuel tank design, installation, maintenance and operation approved by both FAA and Transport Canada
- Auxiliary fuel tank is empty approximately 20 minutes into flight



Current S-92 configuration with the Auxiliary Fuel Tank installed

Operator Return to Service

- Prior to returning to service, the C-NLOPB required Operators to submit a declaration which states, from the Operator's perspective:
 - the equipment is fit for purpose for which it is being used;
 - the operating procedures relating to helicopter operations and maintenance are appropriate for use; and,
 - the personnel who are to be employed in connection with the operations and maintenance of helicopters are qualified and competent.

Operator Return to Service

- HOTF report was sent to the C-NLOPB (Chief Safety Officer) on May 5, 2009.
- Letter received from the C-NLOPB on May 15, 2009 stating:
 - their acceptance of the report and declaration as a demonstration of the requirements for support craft under Section 55 of the ***Newfoundland Offshore Petroleum Production and Conservation Regulations***
 - their acceptance of the HOTF as an interim report as required by Part 15 of the ***Newfoundland Offshore Petroleum Occupational Health and Safety Regulations***
 - *“We will accept the final report of the TSB as meeting this requirement but will require GBO [Grand Banks Operators] to review all findings that arise from the TSB final report and provide a satisfactory report on this review once it is completed.” (Letter from C-NLOPB dated May 15, 2009)*

Operator Return to Service

- Based on the HOTF report the Operators concluded they were ready to safely resume passenger service using the S-92A helicopter.
- Regular helicopter operations commenced on May 18, 2009.
- A copy of the HOTF report was made available to each installation and made available to the work force for their review.

HOTF Report Recommendations

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HOTF Recommendations

- Further to the decision made by the Operators to resume safe flight operations with the S-92, the Helicopter Operations Task Force (HOTF) also identified recommendations for future consideration by each Operator (not required for return to service).
- Operators continue to meet regularly to progress resolution of these recommendations.
- Periodic updates are provided to the onshore and offshore work force and the C-NLOPB.

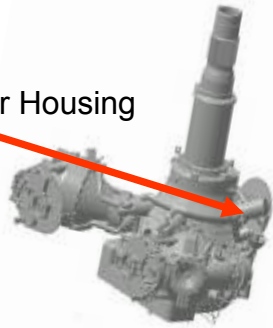
HOTF Recommendation # 1



Filter Housing



Stud



Main Gear Box

**Emergency Checklist
(Low and Zero Oil Pressure)**



- 1. Monitor TSB and Cougar internal investigations for further learnings and actions.**
 - Operators are monitoring both the TSB and Cougar investigations.
 - TSB has indicated the cause of the crash was loss of main gearbox oil due to failure of stud on filter bowl housing.
 - TSB also recommended changes to the S-92A emergency checklist which were implemented by Cougar with input from Sikorsky soon after the accident.

HOTF Recommendation # 2

2. **Support and monitor Cougar's rollout of its new Safety Management System (SMS) incorporating their management of change process.**
 - Cougar completed rollout of their SMS in the third quarter of 2009
 - Joint Operator assessment of new SMS was completed in October 2009
 - Final report submitted to Cougar in early November 2009.

HOTF Recommendation # 3

3. Consider revisiting the current sea state limitations imposed on flights to ensure helicopter risk is as low as reasonably practicable.

- There are three components of helicopter operations which may be impacted by sea states.
- **Flying to or from an Installation**
 - There are no sea state restrictions to fly to or from an offshore installation.
- **Landing at an Installation**
 - Hibernia is a gravity based structure and helicopter landing is not impacted by sea states.
 - Landing on a floating facility is impacted by heave, pitch, and roll conditions.
- **Recovery from Sea**
 - The ability to recover personnel from the sea is affected by sea state conditions. Recovery by the stand-by vessel can be accomplished through the use of a Fast Rescue Craft or through mechanical retrieval.
 - Operators are currently discussing a common sea state limitation.

HOTF Recommendation # 4

Current Floatation Equipment



2010 Addition



4. Consider, in consultation with Cougar Helicopters, the installation of additional floatation on the S-92A fleet to sea state 6 capability.

- Design sea state specification does not guarantee helicopter will remain upright in those conditions
- However, additional floats should provide more stability on the sea surface
- All floatation deploys automatically if armed or otherwise manually
- Ordered additional floatation for all three S-92As in May 2009
- Floatation available for installation mid-year 2010
- Installation estimated to take 10 days per aircraft

HOTF Recommendation # 5

- 5. Participate through CAPP on the Canadian General Standards Board (CGSB) evaluation of survival suit standards.**
- National review committee (40+ members) includes representation from variety of stakeholders including government departments, regulators (C-NLOPB and C-NSOPB), suit manufacturers, scientific groups and other interest groups.
 - Operators are represented through CAPP – working group includes Suncor, ExxonMobil, Chevron, Statoil, Husky Energy and Conoco Philips
 - Through CAPP, we submitted feedback on the current standard including issues relating to testing requirements, fit, comfort, thermal requirements, etc.
 - Review of standard commenced in November 2009. Process could take 18-24 months to complete.

HOTF Recommendation # 6 & 7

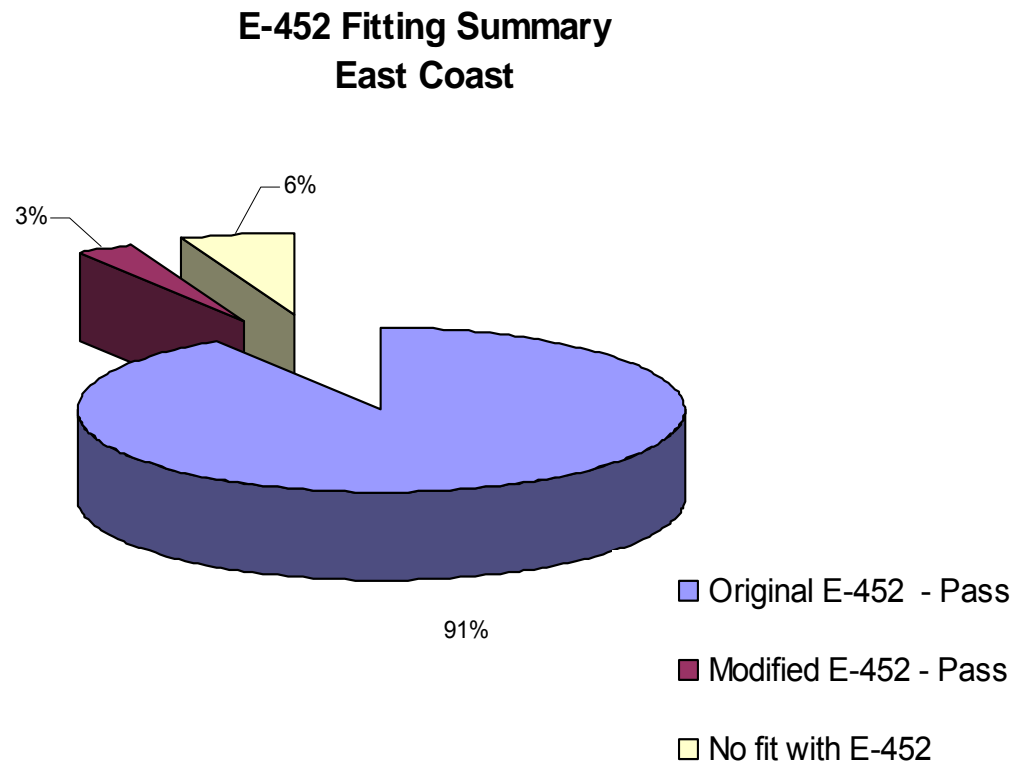
6. Consider adding additional standard immersion suit sizes, especially an **XXS size (modified suit and custom suit)**
7. Evaluate adoption of immersion suit zipper enhancements currently being tested by Helly Hansen.
 - During the review of these recommendations, a number of suit initiatives were identified which met the recommendations' intent.
 - Suit Assessment and Fitting
 - E452 Modified Suit
 - HTS1
 - Custom Suits
 - Water Ingress Testing

Suit Assessment and Fitting

- After March 12 it was recognized that improvements in the assessment and fitting of helicopter transportation suits were necessary.
- A formal process was instituted in May for all personnel traveling offshore to be assessed by Helly Hansen to determine the appropriate suit size.
- During the period from May to October approximately 10% of the total population of persons fitted were unable to obtain an acceptable fit.
- Until a properly fitted suit became available, those personnel were transported offshore by supply boat.

Helicopter Transportation Suits – Fit Test

- Fit testing for all regular workforce personnel was completed as we returned to service. The majority of personnel were able to use the original E452 suits.



Modified E452, HTS1 and Custom Suits

- Helly Hansen created a pool of modified suits which incorporated smaller components of the existing E452 suit (boots and hoods). This addressed some of the fitting concerns for personnel who did not achieve a good fit with a standard E452 suit.
- In order to address those personnel for whom a proper fit could not be obtained with an E452 or modified E452 suit, an additional solution was necessary.
- In 2008 ExxonMobil at the Sable project offshore Nova Scotia, contracted Helly Hansen to address E452 comfort issues; this resulted in Helly Hansen designing the HTS1 suit.
 - New neoprene hood with adjustment strap to improve comfort and fit
 - New, enhanced zipper and arm cuffs make donning and removal easier
 - Internal suspenders allows the fit in the legs to be adjusted
- Based on the work previously completed in the design of the HTS1 suit, Operators introduced the HTS1.
- HTS1 suit fittings commenced in September
- HTS1 received Transport Canada approval November 26, 2009
- Small number of custom suits may be required for those who have not been successfully fitted in any of the suits.

HTS1



Water Ingress Testing

- The Operators conducted an independent assessment of the performance of the E452 (July 2009) and HTS1 (November 2009) related to water ingress.
- The assessment included a review of a simulated helicopter egress scenario and a survival situation. The actual tests included escape from a helicopter, swim in moderately gusty winds (30 – 70 km/hr), waves (random and confused) and rain (continuous and heavy) followed by boarding a life raft. A second test involved a 30 minute swim in moderately gusty winds and waves.
- The results of the tests indicated water ingress for both suits was below the leakage amount allowed by the CGSB standard.
- The testing methodology used will be provided to the national review committee currently evaluating the CGSB standard (HOTF Recommendation #5).

HOTF Recommendation # 8

8. **Review current immersion suit gloves for ease of use and practicality. Consider having passengers wear a thin glove with adequate dexterity for seatbelt release, and thermal protection during initial immersion, until suit gloves can be donned.**
- This past summer Helly Hansen undertook a glove enhancement project
 - New glove is easier to put on
 - *New Velcro wrist strap with less stitching*
 - *New neoprene fabric with more stretch*
 - New glove has been approved by Transport Canada.
 - Glove replacement program commenced on Nov 16th. It will take about 4-5 months to complete the change-out program.



Original Glove



New Glove

HOTF Recommendation # 9

- 9. Develop an information database for Cougar and Helly Hansen that specifies the approved suit size for each passenger, so that it no longer is up to the passenger to select their preferred size.**
- ❑ Following accident, all personnel were fit tested, with sizes assigned based on the testing.
 - ❑ Cougar now has a database with suit sizes identified for all personnel who regularly travel offshore.
 - ❑ Personnel flying offshore now required to use suit size that has been specified for them.
 - ❑ Cougar personnel have also been trained in the suit fitting process to ensure future personnel traveling offshore will be properly assessed.

HOTF Recommendation # 10

10. **Develop guidelines for technical emergencies requiring use of the SAR helicopter. The standby crew currently responds and this affects availability of SAR/Medivac.**
 - As of May 2009, the Operators committed to no longer using the Cougar standby helicopter or crew for technical emergency flights.

HOTF Recommendation # 11

- 11. Re-evaluate the current SAR arrangement the Operators have with Cougar, recognizing that the last formal assessment was done in 1997. Consideration should be given to response time and night flights.**
- As of return to flight service in May 2009, the Operators required Cougar to maintain at least one airframe on the ground available for emergency response at all times. This changes the previous practice of allowing helicopters to leave St. John's once an inbound flight was within 30 minutes of the St. John's base.
 - Additional emergency response enhancements:
 - Increased number of Rescue Specialists in back of aircraft from 2 to 3
 - Pilot SAR training limited to a core group, increased training from 10 hrs per month to 40 hrs per month; required adding more pilots to pool
 - Plan and schedule night hoist training to offshore installations (pending)
 - Obtain auto hover certification and install on aircraft; 20 additional hrs of training per month for pilots (pending 2010)

HOTF Recommendation # 12

12. Develop criteria and approval process guidelines for scheduling night flights.

- With return to service, Operators communicated the commitment to continue the existing practice of minimizing night flights - balancing the requirement for night time flying with the need to adhere, to the greatest extent possible, to our offshore rotation schedule.
- Operators also looked at alternate opportunities to adjust the flying schedule to best utilize day time flying hours and therefore adjusted the flight schedule so that the flying program commenced earlier in the day.
- Where a night flight may be required, Operators consider the following:
 - Operational requirements
 - Opportunity/likelihood of next day flight
 - Location/availability of supply vessel transportation options (availability and weather)
 - Weather conditions
 - Location and availability of 103 SAR Squadron
- The OIM, in conjunction with onshore Logistics and the Operations/Drilling Manager (or alternate), will make the final decision

HOTF Recommendation # 13

- 13. Follow up with Cougar and offshore facilities to ensure the correct usage of passenger seatbelts is reinforced.**
- Safety notice prepared by Cougar and posted at the heliport and at offshore facilities.
 - Flight support personnel check passenger seatbelts for correct usage prior to take-off

HOTF Recommendation # 14

14. Implement training program and introduce the Helicopter Underwater Emergency Breathing Apparatus (HUEBA).

- HUEBA training program implemented using independent sessions and now is standard part of BST and BST-R courses.
- As of October 1, 2009 all personnel flying offshore are required to have completed HUEBA training.

Heliport HUEBA demonstrations occur by exception

- Cougar provides trained personnel to provide briefings based on those established by HUEBA training providers.

HOTF Recommendation # 15

- 15. Re-evaluate the current setup of the S-92A Emergency Locator Transmitter (ELT) and consider the procurement of an ADELTA (Automatic Deployable Emergency Locator Transmitter) which can detach from the aircraft.**
- Cougar utilizes the Blue Sky tracking system which provides instantaneous aircraft location.
 - The S-92A also has other locator beacons in the passenger cabins and in the life rafts.
 - A study by Husky Energy determined that the use of ADELTA does not provide any additional benefit to helicopter operations.
 - It concluded that the BlueSky system currently in use at Cougar Helicopters already provides the same last known position as an ADELTA, plus it also provides altitude, heading and groundspeed.

HOTF Recommendation # 16

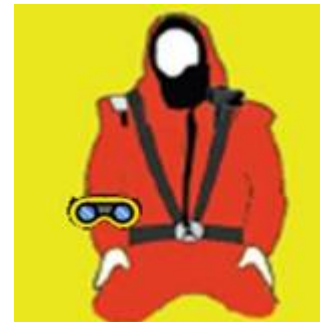
16. Work with Marine Institute to better align survival training equipment and programs with S-92A characteristics

- Industry is working through CAPP to progress near term and long term enhancements to survival training programs.
- CAPP recently completed an audit of the Basic Survival Training programs at the Marine Institute (MI) and Survival Systems in NS.
- Results are under review by CAPP sub-committee, MI and Survival Systems.
- Formally engaged MI and Survival Systems on improvement expectations

HOTF Recommendation # 17

17. Review use, type, and location of goggles in the helicopter as well as the potential effects the goggle strap may have on the suit hood air vent.

- Cougar has recently implemented a new practice for goggles
 - No longer stored under each seat
 - Goggles are located in a seat pocket, if available
 - Otherwise, goggles are secured by being looped through the seat belt
 - Cougar / Helicopter Landing Officer ensures goggles are secured



HOTF Recommendation # 18

18. Share the results of Cougar's Personal Locator Beacon (PLB) functionality assessment with each JOHS committee.

- The UK PLB and associated impact was discussed in the return to service briefings.
- All personnel traveling offshore NL are equipped with a PLB attached to their flight suit which automatically activates on contact with water.
 - PLB signals facilitate rescue of personnel on the water surface
- An assessment by Cougar concluded there was no interference from the PLBs and the helicopter S-92A ELT.

Closing Remarks

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Phase 1b

Proposed areas for further discussion:

- Emergency Response
- Communications
 - Workforce
 - Between regulators
 - Cougar and passengers
 - Between Operators and training institutions
- Passenger training
- Responsiveness of CAPP initiatives.

Closing Remarks

- There is nothing more important than the safety of our workforce
- Based on our experience NL has one of the highest safety standards for helicopter transportation in the world
- Systems for managing safety are effective and provide continuous improvements in our safety performance
- Operators are committed to continuous safety improvement opportunities
- We recognize the importance and are committed to communication with all stakeholders
- We are proud of the way we assessed our return to helicopter operations in 2009
- We are committed to working with the Inquiry in Phase 1b

Glossary

Common Industry Terms and Acronyms

- AIS – Automatic Identification System
- ASB – Alert Service Bulletin
- BST – Basic Survival Training
- CAPP – Canadian Association of Petroleum Producers
- CGSB – Canadian General Standards Board
- C-NLOPB – Canada-Newfoundland and Labrador Offshore Petroleum Board
- DNV – Det Norske Veritas
- E452 – Helicopter Passenger Transportation Suite used offshore NL
- FPSO – Floating Production Storage and Offloading Vessel
- GBS – Gravity Based Structure
- HOTF – Helicopter Operations Task Force
- HTS1 – Modified Helicopter Transport Suit approved for usage offshore NL
- HUEBA – Helicopter Underwater Emergency Breathing Apparatus
- JOA – Joint Operating Agreement
- JRCC – Joint Rescue Coordination Centre

Common Industry Terms and Acronyms

- MODU – Mobile Offshore Drilling Unit
- OA – Operations Authorization
- OHS Committee –Occupational Health and Safety Committee (also known as JOHS – “Joint Occupational Health and Safety Committee”)
- OIM – Offshore Installation Manager
- OLF - Oljeindustriens Landsforening (Norwegian Oil Industry Association)
- OPITO – Offshore Petroleum Industry Training Organization (UK)
- PLB – Personal Locator Beacon
- POA – Production Operations Authorization
- SAR – Search and Rescue
- Sikorsky S92-A – Helicopter used offshore NL
- Topsides – surface hardware installed on the deck of a vessel or platform; typically includes accommodations, production/processing equipment
- TSB – Transportation Safety Board
- TQG – Training and Qualifications Guideline