EXHIBIT/P-00239

JOINT OPERATOR SUBMISSION

Submitted to

OFFSHORE HELICOPTER SAFETY INQUIRY

By

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Hibernia SUNCOR ENERGY Husky Energy

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LIST OF ABBREVIATIONS

Aerosafe	Aerosafe Risk Management
Accord Acts	Federal and Provincial Atlantic Accord Implementation Acts for Newfoundland and Labrador
AD	Airworthiness Directive
ASB	Alert Service Bulletin
CAPP	Canadian Association of Petroleum Producers
CAPP Training Standard	CAPP Standard Practice for the Training and Qualifications of Personnel
CAR	*Canadian Aviation Regulations*
CGSB	Canadian General Standards Board
C-NLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board
C-NSOPB	Canada-Nova Scotia Offshore Petroleum Board
CORD	CORD Group Limited
Cougar	Cougar Helicopters Inc.
DND	Department of National Defence
EASA	European Aviation Safety Agency
FAA	Federal Aviation Authority
FAR	United States *Federal Aviation Regulations*
First Response SAR	First response search and rescue
FLIR	Forward-looking infrared
FORRI	Frontier and Offshore Regulatory Renewal Initiative
FRC	Fast Rescue Craft
Government SAR	Department of National Defence search and rescue resources

HLO	Helicopter Landing Officer
HMDC	Hibernia Management and Development Company Ltd.
HOTF	Helicopter Operations Task Force
HUEBA	Helicopter underwater emergency breathing apparatus
HUET	Helicopter underwater egress training
HUMS	Health and Usage Monitoring Systems
Husky	Husky Oil Operations Limited
The Inquiry	Offshore Helicopter Safety Inquiry
MOC	Management of Change
MOU	Memorandum of Understanding
NRC	National Research Council
Offshore Area	Newfoundland and Labrador offshore area
OHS	Occupational health and safety
OIM	Offshore Installation Manager
OSSC	Offshore Safety and Survival Centre (Marine Institute)
The Operators	HMDC, Suncor and Husky
PPE	Personal Protective Equipment
PLB	Personal locator beacon
SAR	Search and rescue
Sikorsky	Sikorsky Aircraft Corporation
Suncor	Suncor Energy Inc.
Survival Systems	Survival Systems Training Ltd.
TSB	Transportation Safety Board

FOREWORD

The tragic events of March 12, 2009 have forever changed all those who were involved. We are committed to learning from these events to ensure the safety of workers travelling offshore. This loss reinforces the need to be ever vigilant in our pursuit of continuous safety improvement.

We have comprehensive management systems which describe how safety is integrated into all aspects of our operations. We strive for a mature or "generative" safety culture and live by the statement that health and safety is "how we do business around here."[1] We are proud of the efforts of our workforce that make that statement true.

Our Response to March 12th

"The true test of the culture however is in the aftermath of a major incident or accident."[2]

We responded to the loss of Flight 491 by voluntarily suspending helicopter travel and establishing a Helicopter Operations Task Force to "[l]ead efforts by members of the offshore petroleum industry to safely resume personnel transportation by helicopter to the Grand Banks."[3]

No restrictions were placed on the work of the Task Force, including its lines of inquiry, resources or expertise needed, timetable or conclusions. Indeed, it was expected that "[a]ll aspects related to flight safety should be evaluated."[4]

The Task Force looked at all aspects of helicopter operations; consulted with technical, safety, and aviation experts; and solicited questions from the workforce. In addition to recommending readiness to return to flight operations, the Task Force made 18 recommendations. Some of those recommendations touch directly on issues identified by the Commissioner.

Our Commitment to Safety

We are committed to safe helicopter transportation. This commitment is demonstrated through the implementation and continuous improvement of our safety management systems, within the context of a robust regulatory regime.

We will describe initiatives we have taken to improve communication and engagement with our workforce. We will also provide recommendations for further initiatives to improve communication between regulators, industry associations, occupational health and safety committees and the workforce.

We have already begun implementing safety improvements to sizing and fitting of survival suits, first response search and rescue, offshore safety training programs and facilities, and a revised helicopter transportation suit system standard. We will describe these improvements in detail. We will also describe the helicopter operational safeguards put in place to ensure safe helicopter transportation.

The Work of the Inquiry

"Achieving and sustaining a positive HSE [health, safety and environment] culture is not a discreet event, but a journey."[5]

An important part of our journey has been our participation in the work of the Offshore Helicopter Safety Inquiry. We are committed to ensuring the safety of our workforce. It is our number one priority. Accordingly, we support the work of the Commissioner and appreciate the opportunity to participate in the process.

We express our sincere and profound thanks to the families of the deceased, Robert Decker, our workforce, the Commissioner, Inquiry staff and everyone who participated in the Inquiry.

We hope that our response to this tragedy and the improvements that will result from the work of the Inquiry will honour those lost and those whose lives have been profoundly affected.

INTRODUCTION

Background

Pursuant to the Federal and Provincial Atlantic Accord Acts[6] (the Accord Acts), the Canada-Newfoundland and Labrador Offshore Petroleum Board (the C-NLOPB) established a Commission of Inquiry (the Inquiry) on matters respecting worker safety associated with helicopter transportation in the Newfoundland and Labrador offshore area (Offshore Area), which for the purposes of this Submission refers to the Jeanne D'Arc Basin. The Honourable Robert Wells was appointed the Commissioner of the Inquiry whose purpose is to determine and recommend improvements to ensure the risks of helicopter transportation to offshore workers in the Offshore Area are as low as reasonably practicable.

The Inquiry was established following the tragic events of March 12, 2009 offshore Newfoundland and Labrador when 17 people lost their lives on Cougar Helicopters Inc. (Cougar) Flight 491. The one survivor was seriously injured. At the time, Flight 491 was en route to installations in the White Rose and Hibernia oil fields. The Transportation Safety Board (TSB) is currently conducting an investigation into the cause of the accident.

Helicopter services are essential to the operation of the oil and gas industry in the Offshore Area, which is currently comprised of three world class producing oil fields: Hibernia, Terra Nova and White Rose. These projects are operated by the Hibernia Management and Development Company Ltd. (HMDC), Suncor Energy Inc. (Suncor) and Husky Oil Operations Limited (Husky) respectively (Operator or the Operators). Each Operator has contracted with Cougar for the provision of helicopter services through a pooling arrangement, which facilitates helicopter sharing and shared emergency response capability.

The Operators are committed to operating a safe offshore workplace. This is embedded into every aspect of their operations. The Operators acknowledge that there are risks involved with helicopter travel to and from the Offshore Area and are committed to managing those risks to ensure they are as low as reasonably practicable. Accordingly, this Joint Operator Submission is being made to assist the Inquiry in its consideration of the issues identified in Phase 1(a), and its determination of recommendations to ensure the safe and reliable transportation of workers to and from the Offshore Area.

Issues

Issues for Consideration

Following Phase 1(a) of the Inquiry, the Commissioner identified the following "Issues for Consideration":

1. Should there be a degree of separation within the C-NLOPB between offshore helicopter regulation and other offshore industry regulation?

2. Are the risk management systems of oil operators and helicopter operator sufficient and adequate to ensure the risks of helicopter transport are as low as reasonably practicable in the Newfoundland and Labrador offshore?

3. What is the role of organizational safety culture in offshore helicopter transport?

4. What are the most appropriate practices, standards and forms of interaction between the C-NLOPB and the following:

   (a) industry (including suppliers and providers);
   (b) industry associations;
   (c) regulators of associated services;
   (d) other domestic and foreign oil and gas regulators; and
   (e) worker representatives;

   and are these interactions sufficient to ensure requirements that are understood, timely, achievable and enforceable?

5. Does the C-NLOPB use best practices in relation to its regulatory role in helicopter transport safety?

6. What is the appropriate standard of first response search and rescue that the C-NLOPB should require of all operators in the Newfoundland and Labrador offshore?

7. Are there circumstances, other than declared emergencies, when a rescue helicopter should be dispatched to assist a transport helicopter?

8. Should there be a more formal protocol regarding the roles of the Department of National Defence and the helicopter operator regarding first response?

9. Are operational limitations on helicopter transport, in addition to those dictated by Transport Canada, required to ensure the standard of first response search and rescue is able to be maintained at all times? (*Note: For example, operational sea states, night flight and low visibility.)*

10. Should the C-NLOPB impose additional operational requirements on operators to ensure that the risk from helicopter travel in the Newfoundland and Labrador offshore is as low as is reasonably practicable? *(Note: For example, safety systems, auxiliary fuel tanks, location of and restrictions on seating, safety screening, etc.)*

11. Can helicopter transport safety be affected by the capacity of the helicopter transport fleet and, if so, what role should the C-NLOPB play in the determination of fleet capacity?

12. What are the appropriate standards of offshore helicopter safety training to ensure that the risk to passengers is as low as is reasonably practicable, both during training and helicopter transport?

13. What personal protective equipment and clothing is necessary for helicopter passengers and pilots; what are the standards, and should the C-NLOPB require guidelines to ensure such equipment and clothing is properly fitted?

14. Are changes needed to maximize worker and pilot participation in the development, implementation and monitoring of helicopter safety initiatives and activities?

15. Should offshore workers have a level of personal accountability for their own safety in helicopter transport? *(Note: For example, clothing to be worn under the suit, fitness training and reporting.)*

16. Does the C-NLOPB exercise sufficient oversight of the oil operators, aviation contractors and subcontractors to ensure that the risk to workers from helicopter transport is as low as reasonably practicable?

17. Should the C-NLOPB and oil operators' safety aviation audits include reviews of past responses to declared emergencies and emergency preparedness exercises?

18. What information from the helicopter operator about flight operations should the C-NLOPB require the oil operators to provide to offshore workers? *(Note: For example, alert service bulletins, airworthiness directions, incident reports, information regarding departures from normal flight times, routines and the reasons.)*

19. Does the C-NLOPB have sufficient resources and expertise, including access to independent aviation expertise, to evaluate whether a proposal or plan for helicopter transport from industry ensures that the risks of helicopter transport are as low as reasonably practicable?

20. Should the C-NLOPB more directly involve itself in studies and research in Newfoundland and Labrador, and in other jurisdictions, to improve safety where offshore oil industry uses helicopter transport? *(Note: For example, North Sea studies on preventing inversion of ditched helicopters and enhancement of passengers' ability to escape.)*

21. Should there be safety conferences for all parties involved in offshore helicopter transport, and if so, how often should they be held?

22. How often should the C-NLOPB review its regulations, guidelines and standards with respect to offshore helicopter transport?

Issues to be Discussed by the Operators

The Operators are making submissions on Issues 1-3, 4 (a), (b) and (e), 6-7, 9-15, 17-18 and 21 only. For clarity, the Operators will not be commenting on Issues 4 (c) and (d), 5, 8, 16, 19-20 and 22.

INQUIRY ISSUE #1

Should there be a degree of separation within the C-NLOPB between offshore helicopter regulation and other offshore industry regulation?

Summary

It is difficult to see how a separation within the C-NLOPB between offshore helicopter regulation and other regulation would have any meaningful effect on the C-NLOPB's regulation of helicopter safety. Each regulator should oversee that which is within its jurisdiction. Therefore, aviation regulation should remain the responsibility of Transport Canada, and matters related to offshore regulation should be managed by the C-NLOPB. Communication between the parties can, however, be enhanced.

Recommendation

The Operators recommend that consideration be given to a Memorandum of Understanding (MOU) between the C-NLOPB and Transport Canada similar to those used by corresponding entities in Australia, the United Kingdom (UK) and the United States (US). Such an agreement should provide clarity of roles and responsibilities, which could improve communication between respective regulators.

Analysis

The Regulatory Environment

In Phase 1(a) of the Inquiry, the Operators testified that the Offshore Area is one of the most highly regulated regions anywhere in the world[7], and helicopter transportation is no exception. The Operators desire clarity in this regulatory environment which is determined by both Transport Canada and the C-NLOPB, whose jurisdictions over helicopter operations are summarized in the attached **Appendix A.**

The challenge for both regulators is avoiding duplication and differentiating between aviation safety regulation (Transport Canada) and occupational health and safety (OHS) regulation for the Offshore Area (the C-NLOPB). It is further complicated by the fact that Cougar is outside the direct jurisdiction of the C-NLOPB and under the authority of Transport Canada, while the Operators are primarily under the jurisdiction of the C-NLOPB.

Coordination of Regulatory Roles

The coordination of regulatory roles with respect to helicopter operations between the C-NLOPB and Transport Canada should improve with the execution of a MOU, an approach pursued in other jurisdictions. In particular, Aerospace Risk Management (Aerosafe) reported

that the UK Civil Aviation Authority and Health and Safety Executive have executed a MOU specific to the coordination of the regulation of helicopter offshore travel.[8] The Australian Civil Aviation Safety Authority and the National Offshore Petroleum Safety Authority have also used a MOU process to ensure a consistent and comprehensive regime for the protection of health and safety of those working at offshore facilities.[9]

Regulatory Reform

The Inquiry is already aware of two regulatory changes that are pending. These are the Frontier and Offshore Regulatory Renewal Initiative (FORRI) and the OHS amendments to the Accord Acts, both of which should be considered by the Commissioner prior to making any recommendations.

FORRI Initiative

The National Energy Board, the C-NLOPB and the Canada-Nova Scotia Offshore Petroleum Board (the C-NSOPB) are currently working with the federal and relevant provincial governments on the FORRI Initiative. This initiative is intended to transform the current primarily prescriptive regulations to those that are goal-oriented in nature. In so doing, it will encourage the Operators to apply the best standards whether they are of national, regional, international or industry origin.

OHS Amendments to the Accord Acts

The Governments of Canada, Newfoundland and Labrador, and Nova Scotia have proposed amendments relating to OHS to the Accord Acts applicable to Newfoundland and Labrador and Nova Scotia[10].

The amendments expressly propose to govern passengers in transit. In particular, they would apply to workers as well as "other passengers immediately before and while they are being transported from the last point of embarkation on shore and a workplace in the offshore area or on the return voyage, as well as between workplaces" in the Offshore Area.[11] The application of these amendments may create overlapping authority between the C-NLOPB and Transport Canada, thereby rendering the need for regulatory clarity more compelling.

INQUIRY ISSUE #2

> ***Are the risk management systems of oil operators and helicopter operator sufficient and adequate to ensure the risks of helicopter transport are as low as reasonably practicable in the Newfoundland and Labrador offshore?***

Summary

The Operators have comprehensive, dynamic and effective integrated safety management systems for the management of risk, including that associated with helicopter transport. Effective risk management requires the persistent application and enhancement of safety management system processes to reduce risk to as low as reasonably practicable. The Operators' systems are applied to all of their operations worldwide and represent best industry practice. They are structured to identify, assess, and control risks, and manage change. The Operators' consistent and effective application of these systems ensures that the risk of helicopter transport is as low as reasonably practicable.

Analysis

Integrated Safety Management

As explained by Aerosafe in Phase 1(a) of the Inquiry, an effective safety management system must be systematic, comprehensive and integrated into all aspects of an operation.[12] Safety management is embedded within the Operators' management systems. The integrated approach is also required by the C-NLOPB pursuant to the *Newfoundland Offshore Petroleum Drilling and Production Regulations*, which require, as a part of the work authorization process, that the Operators develop an effective management system that integrates operations and technical systems with the management of financial and human resources.[13]

The management system must include:

- the policies on which the system is based;
- the processes for setting goals for the improvement of safety;
- the processes for identifying hazards and for evaluating and managing associated risks;
- the processes for ensuring that personnel are trained and competent to perform their duties;
- the processes for ensuring and maintaining the integrity of all facilities, structures, installations, support craft and equipment necessary to ensure safety;

- the processes for internal reporting and analysis of hazards, minor injuries, incidents and near-misses and for taking corrective actions to prevent their recurrence;
- the documents describing all management system processes and the processes for making personnel aware of their roles and responsibilities with respect to them;
- the processes for ensuring that all documents associated with the system are current, valid and have been approved by the appropriate level of authority;
- the processes for conducting periodic reviews or audits of the system and for taking corrective actions if reviews or audits identify areas of non-conformance with the system and opportunities for improvement;
- the arrangements for coordinating the management and operations of the proposed work or activity among the owner of the installation, the contractors, the operator and others; and
- the name and position of the person accountable for the establishment and maintenance of the system and of the person responsible for implementing it.

Each Operator's management system complies with these requirements.

Safety Management Systems

As stated, safety management is fully integrated into the overall operations of each Operator within their management systems. As such, each system includes all of the components necessary to build an effective safety management system. Risk management processes are embedded within each element of the management system. While the Operators' systems are not identical, or called by the same name, they have the following common key elements:

- Management Leadership, Commitment and Accountability
- Risk Assessment and Management
- Facility Design and Construction
- Documentation and Regulatory Compliance
- Personnel, Training and Competency
- Operations and Maintenance
- Management of Change
- Third Party Services (Contractor)
- Incident Investigation and Analysis
- Emergency Preparedness
- Management System Assessment and Improvement

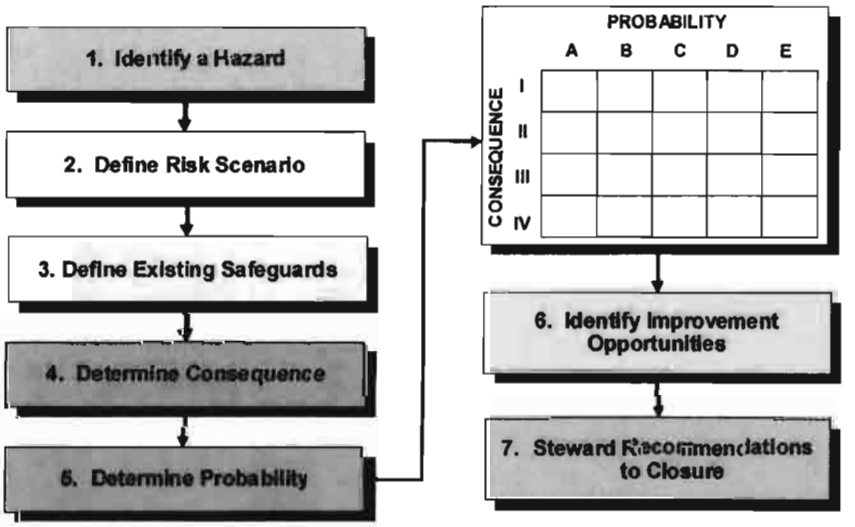
Practically, each element flows from policies, procedures and practices into work instructions, checklists, forms and drawings. While each plays a role in effective safety and risk management, it is the integration of all elements that ensures risks are reduced to as low as reasonably practicable. The application of each element to helicopter operations is described below.

Management Leadership, Commitment and Accountability

Each Operator's management team establishes policy, provides perspective, sets expectations, and supplies resources for successful operations, including those relating to helicopter transport. This management leadership and commitment is fully transparent and demands accountability at all levels, which is essential in the assurance of operations integrity.

Risk Assessment and Management

Comprehensive risk assessments can reduce health, safety and environmental risks and mitigate the consequences of incidents by providing essential information for decision-making. The goal is to facilitate the identification, evaluation, and control of hazards such that they are managed in a structured and disciplined manner, thereby preventing or mitigating the undesirable consequences of potential incidents. The following diagram illustrates this approach:



Each Operator utilizes a matrix as part of its risk management process.[14] The risk matrix is used to systematically evaluate a potential risk scenario considering the health and safety of workers, the public and the environment. The value lies not in establishing a specific risk level, but in continuously evaluating, mitigating and communicating relative risks, and identifying risk reduction measures. For example, helicopter transportation risks are reviewed at all phases of any project from conceptual design to current operations. In particular, the concept safety analysis is completed during the design phase, the original safety plan is developed and updated as necessary, pre-startup readiness reviews are conducted, and aviation risk assessments are also periodically conducted as dictated by each Operator's management system.

Facility Design and Construction

The use of standards and procedures for facility design, construction and start-up activities can effectively improve their safety and security and minimize risks to the health and safety of individuals and the environment. This includes design practices and standards, quality assurance and project execution. In terms of helicopter transportation, helidecks are designed in accordance with all applicable regulatory standards.[15]

Documentation and Regulatory Compliance

Accurate information respecting the configuration and capabilities of processes and facilities, the nature of products and materials handled, the potential operation hazards, and regulatory requirements is essential in the assessment and management of risk. Each Operator has systems in place for record retention as well as mechanisms to ensure that appropriate parties have the most up-to-date information. For example, updates to the emergency response plan are distributed systematically to the relevant parties. The management systems also ensure compliance with all regulatory requirements such as concept safety analyses and safety plans, each of which directly address helicopter transport.

Personnel, Training and Competency

To ensure safe operations and properly manage risk, the Operators establish appropriate selection, placement, assessment and training protocols for offshore workers. For instance, all offshore workers are required to undergo offshore safety training, including helicopter underwater egress training (HUET) and helicopter underwater emergency breathing apparatus (HUEBA) training. Further, helicopter landing officers (HLO) receive training to coordinate offshore helicopter operations.

Operations and Maintenance

The operation of facilities within established parameters and regulatory requirements is crucial. Such operation necessitates effective procedures, structured inspection and maintenance programs, reliable operation of equipment, and qualified personnel who consistently execute these procedures and practices. For example, each Operator has a Helicopter Operations Manual[16] which contains detailed procedures respecting helicopter operations, including passenger transport. As well, the helidecks on each installation are inspected annually.

Management of Change

The Operators must constantly be sensitive to necessary changes in operations, procedures, standards, facilities and personnel. These changes must be evaluated and managed to ensure that any risks arising from such changes remain at an acceptable level. As will be described in Issue #13, the transition to the HTS-1 helicopter passenger transportation suit in 2010 was managed using a management of change (MOC) process.

Third Party Services (Contractor)

Third parties working on the Operators' behalf impact operations and, as such, it is essential that they perform in a manner that is consistent and compatible with the Operators' policies and procedures, and that their operations are in alignment with the Operators' safety management systems. Therefore, appropriate procedures for third party evaluation, selection, and monitoring, and contractor interface management are required. For example, the selection of Cougar as the helicopter service provider was based on a competitive bid selection process. The process involved rigorous analysis of each formal bid package in order to identify the preferred contractor. This analysis included a safety and environmental assessment and technical and economic analysis. Cougar was the successful contractor and their performance is continuously monitored and assessed against the Operators' management system requirements and any identified deficiencies are corrected.

Incident Investigation and Analysis

Effective incident investigation, reporting and follow-up are necessary to ensure safe operations. It provides the opportunity to learn from incidents and take corrective action to prevent recurrence. Immediately after the loss of Flight 491, the Operators voluntarily suspended all helicopter operations and developed a rigorous process to be completed prior to any resumption of helicopter operations. The objective of this process was to ensure that all aviation risks were assessed prior to a decision being made to resume flight operations. The process called for the establishment of a Helicopter Operations Task Force (HOTF), which reviewed passenger and aviation safety issues and conducted extensive consultation with the workforce - responding to over 350 questions submitted by workers. In its report, the HOTF recommended immediate actions prior to a return to service as well as go-forward actions for consideration. The Operators implemented continuous communication mechanisms to ensure updates and continuous learning from the tragic event.

Emergency Preparedness

Emergency planning and preparedness are essential to ensure that in the event of an incident all necessary actions are taken for the protection of workers, the public and the environment. As such, each Operator has emergency response plans for all of its operations that outline procedures and the roles and responsibilities at all levels of the organization. In particular, the plan covers areas relating to planning, training and exercises. The emergency preparedness of helideck operations, for instance, is included. The plan also outlines the roles in an emergency event of the support vessel, the standby helicopter based in St. John's, and the Department of National Defence (DND) search and rescue resources. The Operators also provide for training of the helideck crew, under the command of the HLO, in firefighting and rescue techniques and participation in regular simulation exercises of a helicopter emergency scenario.

Management System Assessment and Improvement

An assessment of the degree to which established expectations are met is essential to improve operations integrity and maintain accountability. This ensures that all aspects of the safety

management systems, including training and procedures relating to helicopter transport, are working effectively and it also provides an avenue for continuous improvement.

Safety Plan

Pursuant to the *Newfoundland Offshore Petroleum Drilling and Production Regulations*, each Operator must submit a safety plan to the C-NLOPB for approval prior to project sanction.[17] The integrated approach to safety management is reflected in this requirement to the extent that the plan sets out all procedures, practices, resources, sequence of key safety-related activities, and monitoring measures necessary to ensure the safety of any proposed work or activity.[18] For example, the plan includes:

- a summary of the management system and its application to the proposed work or activity and how the duties set out in the *Newfoundland Offshore Petroleum Drilling and Production Regulations* will be met;
- a summary of the studies undertaken to identify hazards and evaluate safety risks related to the proposed work or activity;
- a description of the hazards identified and the results of risk evaluation; and
- a summary of the measures to avoid, prevent, reduce and manage safety risk.[19]

The management systems and processes for safe operations in the Offshore Area, including helicopter operations, are specifically outlined in each Operator's safety plan. These plans must be resubmitted and approved by the C-NLOPB at least every three years and, as such, evolve as an integral component of a continuously improving safety management system framework.

Risk Management in Helicopter Transportation of Passengers

Risk is inherent in all human endeavours. While it is not possible to eliminate all risk, it must be assessed and reduced to a level as low as reasonably practicable. Accordingly, helicopter transportation risks are reviewed at all phases of a project from conceptual design to current operations.

In Phase 1(a), Aerosafe and the Operators described the "swiss cheese model" of risk. Preventative safeguards may be viewed as barriers in that model which reduce the probability of a given hazard scenario from occurring. There are numerous preventative safeguards put in place relating to helicopter operations. Some examples include the use of health and usage monitoring systems (HUMS) on the helicopter, the development of weather monitoring and adverse weather flying procedures, and the provision of simulator training for pilots (including flight training for normal and emergency conditions).

The Operators also put in place mitigating safeguards to reduce the consequences of an incident should one occur. Such safeguards include the requirement to wear helicopter passenger transportation suits and to complete offshore safety training, and the use of a four-point quick release harness system on helicopter seats.

The various elements of the Operators' management systems ensure risk associated with helicopter operations is managed such that they effectively act as barriers to the realization of any potential risks. In the event risks materialize, the range of mitigating safeguards used by the Operators acts as a secondary barrier to reduce any negative consequences.

The safety management systems ensure the timely identification of hazards; implement preventative and mitigating safeguards; provide clear guidance on roles and responsibilities, accountabilities, policies and procedures; and establish clear measurement tools for continuous improvement. The full integration of each of these elements in helicopter operations ensures the risk to passengers is as low as reasonably practicable.

INQUIRY ISSUE #3

What is the role of organizational safety culture in offshore helicopter transport?

Summary

The Operators' safety management systems contain procedures, practices and tools that establish and promote a mature or "generative" culture of safety. These systems instill the attitudes, values and beliefs that permeate all levels and all aspects of each Operator's operations. A clear test of the Operators' safety culture was their actions following the loss of Flight 491. As previously stated, all helicopter transport was voluntarily and immediately curtailed to the offshore facilities and the HOTF was established. Those actions illustrate the role of a mature safety culture in offshore helicopter transportation and how it continually improves safety.

Analysis

Safety culture refers to those attitudes, values and beliefs about safety that underpin the way an organization conducts its operations as a whole. As described in Issue #2, the Operators each have their own systematic, structured and disciplined management system. Safety management is fully integrated into all aspects of operations within these systems. While safety management and safety culture cannot properly be viewed in isolation of the overall system, each Operator's safety culture has an important role in offshore helicopter transportation.

As stated by Aerosafe in its report entitled "Overview of best practice in Organizational & Safety Culture", "[w]hen an organization adopts a formal approach to safety oversight through the implementation of a safety management system, an environment is created that influences behaviour which then eventually shapes the beliefs and attitudes of those in the organization."[20] Accordingly, the Operators' safety management systems are the foundation of the offshore safety culture.

The International Association of Oil & Gas Producers defines five levels of safety culture as follows:

- Pathological: "Who cares as long as we're not caught"
- Reactive: "Safety is important – we do a lot every time we have an accident"
- Calculative: "We have systems in place to manage all hazards"
- Proactive: "Safety leadership and values drive continuous improvement"
- Generative: "HSE is how we do business around here"[21]

These five levels were also adopted by Aerosafe as "a model for measuring the maturity of an organizations [sic] safety culture."[22] The Operators strive to maintain a generative safety culture.

The key elements of the Operators' safety management systems contributing to their mature safety culture include:

- integrated systems and processes for the identification and reduction of risk;
- endorsement and commitment to safety at all levels;
- a philosophy that safety practices extend through every aspect of the business;
- extensive tools and processes including new worker orientations, pre-job meetings, hazard identification cards and incident investigation and reporting;
- audits and inspections to ensure compliance, verification and continual learning and improvement; and
- root cause analysis of incidents and hazards in a just culture.

The strong offshore safety culture was acknowledged throughout Phase 1(a) of the Inquiry. Both the Operators and worker representatives acknowledged that hazard awareness and reporting expectations permeate all aspects of operations.[23] These reporting systems have been, and continue to be, used by the offshore workforce to identify and respond to any potential transportation hazards. Investigations focus on isolating root causes rather than blaming individuals, and effective communications and continuous learning from incidents are key features of each system.

As stated by Jake Molloy in "The Elusive Culture of Safety", "[b]uilding a safety culture commences with effective leadership from the top but ultimately must encompass all persons who come within the orbit of the organisation and, moreover, must engage each person as a full player in his or her own right."[24] As such, one of the key measures of safety culture is the overall level of workforce engagement. This occurs at a variety of levels within each Operator's operations and is illustrated by their participation in the following: OHS Committees, workplace inspections and investigations, hazard and event identification and reporting, health and safety education and promotion initiatives, development of safety alerts, review of hazard reporting trends, analysis of injury trends, and contractor safety forums.

In the context of helicopter operations in particular, an example of the offshore safety culture is found in the Operators' response to the loss of Flight 491, which has already been described in Issue #2. As noted in Aerosafe's report prepared for the Inquiry, "[t]he true test of the culture however is in the aftermath of a major incident or accident... The temptation to withdraw behind barriers and blame directly involved employees may perhaps be too overwhelming."[25] The Operators' actions have clearly demonstrated the role a generative safety culture plays in offshore helicopter transportation and how it continually strives to improve safety.

INQUIRY ISSUE #4

What are the most appropriate practices, standards and forms of interaction between the C-NLOPB and the following:

(a) industry (including suppliers and providers);
(b) industry associations;
(c) regulators of associated services;
(d) other domestic and foreign oil and gas regulators; and
(e) worker representatives;

and are these interactions sufficient to ensure requirements that are understood, timely, achievable and enforceable?

Summary

The C-NLOPB has broad and enforceable regulatory authority over the oil and gas industry in the Offshore Area. Through the Operators, it also ensures that contractors have appropriate safety processes in place. The C-NLOPB also verifies that these processes are followed through its audits and inspections.

The C-NLOPB has no regulatory authority over industry associations. The C-NLOPB has worked with the Canadian Association of Petroleum Producers (CAPP) to ensure key health and safety issues affecting the industry are considered and addressed.

With respect to the offshore workforce, there already exists significant and effective interaction with the C-NLOPB through the OHS Committee representatives.

The Operators believe that improvements can be made to the interaction between the C-NLOPB, CAPP, workers and the Operators to ensure issues are dealt with in an efficient and effective manner.

Recommendation

The Operators recommend the following:

1. Improvements to the C-NLOPB's annual OHS meeting, including:

   (a) the establishment of formal terms of reference setting out the goals and expectations of the meeting;

   (b) a survey of the workforce to determine topics of interest; and

(c) the expansion of the subject matter of the meeting to include safety learnings and new initiatives from other oil and gas jurisdictions.

2. The C-NLOPB should develop enhanced training specific to the offshore oil and gas industry for OHS Committee representatives.

3. Enhanced engagement between CAPP, the C-NLOPB and other stakeholders, such as the offshore workforce, training institutes and service providers should occur during the administration of complex projects, including:

(a) more frequent and formal reporting by CAPP to the C-NLOPB at regular intervals to provide status updates on initiatives and activities of CAPP Committees;

(b) the provision by CAPP of updates on safety-related initiatives and activities at the C-NLOPB's annual OHS meeting;

(c) the inclusion of a stakeholder engagement plan in the project scoping process to outline the extent to which stakeholders will be informed and engaged in CAPP projects; and

(d) the development of communication materials and feedback forms.

Analysis

Industry (including suppliers and providers)

The C-NLOPB's authority over the Operators in the industry is broad and enforceable and, through them, to the industry as a whole. As holders of the relevant authorizations, the Operators have ultimate accountability to the C-NLOPB to ensure that all companies and persons working under a work authorization comply with all relevant regulatory requirements.

The Accord Acts provide jurisdiction to the C-NLOPB over petroleum operations in the Offshore Area. Section 138.2 of the Federal Act provides that before issuing an authorization for a work or activity, the C-NLOPB must consider the safety of that work or activity by reviewing the system as a whole and its components, including its structures, facilities, equipment, operating procedures, and personnel. The Operators are also subject to a range of active regulations and guidelines issued by the C-NLOPB.

In terms of safety specifically, the C-NLOPB is responsible to ensure that the Operators have appropriate safety plans in place. These plans are verified through annual audits and quarterly inspections conducted by the C-NLOPB to ensure the Operators are in compliance with applicable regulatory requirements. *Ad hoc* meetings and incident investigations are also held. The C-NLOPB ensures that any deviations identified from approved safety plans and regulatory requirements are properly corrected.[26]

The C-NLOPB has a range of powers available for compliance and enforcement, including safety audits, warnings and orders to cease or comply, suspension or revocation of a work

authorization, cancellation of an interest, as well as prosecution and establishment of an inquiry.[27]

The reporting requirements imposed on the Operators by the C-NLOPB are also quite extensive. These include the provision of daily reports, minutes of OHS Committee meetings, monthly statistics reports, as well as incident reports.[28]

The Operators believe the level of audit and inspection activity conducted by the C-NLOPB is significant in comparison to that of other offshore petroleum regulatory regimes. While there is no direct relationship between the C-NLOPB and the Operators' contractors, the C-NLOPB may also conduct an inspection of contractor facilities as part of an Operator's audit.

Industry Associations

CAPP is an industry association representing member companies in the upstream oil and gas industry throughout Canada. It has proven to be a useful vehicle for industry engagement and alignment on important issues affecting oil and gas operations. Specifically, individual companies may participate in CAPP's Committees to:

- facilitate discussion on issues relating to the development of regulations, safety and environmental protection initiatives, and other topics of joint industry concern;
- coordinate the engagement of other stakeholders on industry issues, including government, other oil and gas jurisdictions and service providers;
- facilitate issue identification, analysis and information collection on new and emerging issues; and
- facilitate the development of industry guidelines and standards.

The C-NLOPB participates in certain CAPP Sub-Committees in order to facilitate the development of industry guidelines and standards, which are then used by the regulator for audit and compliance purposes. Such regulatory participation has provided effective and thorough consideration of key health and safety issues. Some examples are the development and continuous update of the CAPP Standard Practice for the Training and Qualifications of Personnel (CAPP Training Standard) and the Safe Lifting Practice.

Despite CAPP's effective consideration and advancement of several issues, the Operators and CAPP have acknowledged that the consideration and implementation of HUEBA took too long. As such, CAPP recently undertook a lessons learned exercise to identify continuous improvement opportunities regarding the process by which issues of joint industry concern can be worked through CAPP in an effective and efficient manner.[29] The results of that exercise form the basis of the recommendations identified at the beginning of this Issue, which CAPP has already begun implementing.

Worker Representatives

The offshore workforce currently has substantial interaction with the C-NLOPB through their OHS Committee representatives who:

- attend opening and closing audit and inspection meetings;
- are copied on the C-NLOPB's offshore audit and inspection reports;
- meet with the C-NLOPB's safety officers during quarterly offshore visits;
- attend the annual C-NLOPB OHS meetings; and
- are engaged by the C-NLOPB in the investigation and resolution of rights to refuse.

Apart from worker representatives, all workers have direct access to the C-NLOPB if they have a complaint. The C-NLOPB's safety officers also review the minutes of OHS Committee meetings on a regular basis.

INQUIRY ISSUE #6

> ***What is the appropriate standard of first response search and rescue that the C-NLOPB should require of all operators in the Newfoundland and Labrador offshore?***

Summary

The standard of first response search and rescue (First Response SAR) required by the C-NLOPB pursuant to the interim recommendations of the Commissioner is appropriate. The Operators will continue to work with Cougar to meet this standard and to identify and implement additional improvements.

Analysis

First Response SAR and Government SAR

In this jurisdiction, the Operators provide First Response SAR for their installations in the Offshore Area. The C-NLOPB's Safety Plan Guidelines require the Operators to provide for a First Response SAR standby helicopter in their respective safety plans.[30] Such a helicopter would provide the initial SAR response in the event of an incident in the Offshore Area.

These SAR requirements are consistent with the approach taken by regulatory agencies in other jurisdictions where oil and gas operators must demonstrate they have adequate SAR infrastructure to complement that provided by government. As outlined in Aerosafe's report respecting SAR capabilities in other jurisdictions, in Australia, Norway and the UK, the initial response to an emergency is provided by industry.[31] However, the national governments in those jurisdictions also play a critical role in providing and coordinating SAR.

DND (Government SAR) is mandated to provide SAR in Canada and surrounding areas, including the Offshore Area, and has sole authority over all SAR operations. DND's SAR helicopters closest to the Offshore Area are stationed in Gander, which is approximately 45 minutes transit time to St. John's where Cougar's operations are based. In most situations, Cougar will be the first on the scene to provide SAR support to any offshore-related incident. The respective response time, or wheels-up time as it is referred to in the industry, of DND and Cougar also enables Cougar to be the first responder in most instances. Specifically, DND maintains a standard of 30-minute wheels-up time on weekdays (0800 – 1600) and two-hour wheels-up time after hours, on weekends and statutory holidays.[32] Cougar currently responds with a wheels-up time of 30 minutes during hours of flight operations and 60 minutes at all other times.

Upon notification of an incident, Cougar will immediately mobilize the First Response SAR helicopter and alert DND's Joint Rescue Coordination Centre. As stated, DND is vested with

the authority for control over all SAR operations.[33] The assets of both Cougar and DND must therefore be considered in the assessment of the appropriate standard of First Response SAR.

The C-NLOPB's First Response SAR Directive

In response to interim recommendations made by the Commissioner in February 2010, the C-NLOPB issued a directive requiring the Operators to enhance their existing First Response SAR. The directive required a fully equipped SAR helicopter on standby in St. John's with an effective wheels-up time of 15-20 minutes when transporting workers by helicopter, and 45 minutes otherwise. It also required that the First Response SAR helicopter be equipped with auto-hover and forward-looking infrared (FLIR) capabilities as soon as practicable.

The Operators began the implementation process of the enhanced First Response SAR requirements by immediately sourcing equipment and contracting for an additional S-92A helicopter. The Operators have already significantly improved wheels-up time to 30 minutes during flight operations and 60 minutes otherwise. Cougar has advised that these response times can be further improved by its construction of a new hangar facility to support the dedicated First Response SAR helicopter and crew. The Operators are working with Cougar to support this initiative.

The Operators anticipate that the newly chartered S-92A helicopter as the primary First Response SAR helicopter will be equipped with auto-hover (pending regulatory approval), FLIR and Night Sun capabilities by the Fall 2010. The C-NLOPB and the workforce have been fully informed of the implementation plan and they are regularly provided with progress updates.

Training and Dispatch Initiatives

In addition to addressing the C-NLOPB's directive noted above, the Operators are also actively supporting further First Response SAR training initiatives and dispatch protocols. In terms of training in particular, pursuant to Cougar's request, the Operators have committed to increased flight hours for competency training, including night operations to complement crew readiness. The Operators fully support this enhanced training initiative. As indicated in Cougar's evidence in Phase 1(a), this initiative is another example of the continuous improvement opportunities that have characterized the entire relationship between the parties.[34]

INQUIRY ISSUE #7

Are there circumstances, other than declared emergencies, when a rescue helicopter should be dispatched to assist a transport helicopter?

Summary

The Operators fully support the pro-active dispatch of a First Response SAR helicopter by Cougar in relation to incidents which have the potential to escalate to an emergency where Cougar deems such a response to be reasonable and prudent.

Analysis

The decision to dispatch a helicopter for such an incident can only reside with Cougar personnel. The Operators do not require any prior consultation, but should be notified immediately following dispatch.

The conditions for dispatch should not be prescriptive in nature as it is impractical to systematically catalogue each and every potential condition, or combination of conditions, that would dictate the dispatch of a helicopter. As such, the decision must ultimately be left to the experience and discretion of those persons assigned this responsibility.

INQUIRY ISSUES #9 AND #10

> ***Are operational limitations on helicopter transport, in addition to those dictated by Transport Canada, required to ensure the standard of first response search and rescue is able to be maintained at all times? (Note: For example, operational sea states, night flight and low visibility.)***
>
> ***Should the C-NLOPB impose additional operational requirements on operators to ensure that the risk from helicopter travel in the Newfoundland and Labrador offshore is as low as is reasonably practicable? (Note: For example, safety systems, auxiliary fuel tanks, location of and restrictions on seating, safety screening, etc.)***

Summary

The primary goal of the Operators is to do all that is reasonably practicable to prevent helicopter incidents. As such, there are numerous preventative safeguards, including operational limitations, in place to ensure that the potential risk of an incident is as low as reasonably practicable. The Operators fully support continuous improvement opportunities respecting safety in design, equipment, operations, training, and procedures to reduce or eliminate risks. The Operators are undertaking initiatives, among others, to have Cougar and Sikorsky Aircraft Corporation (Sikorsky) review the design and use of the auxiliary fuel tank and implement auto-hover and FLIR capabilities on helicopters.

Analysis

Prevention of Helicopter Incidents

Robert Decker stated in his testimony in Phase 1(a) of the Inquiry:

> *"Training to escape from a crashed helicopter is important. Having good survival suits is important, and having search and rescue capacity nearby is important. But all those things are what you need after there's been a crash into the ocean. If we really want to make offshore helicopter travel safe, what we have to do is to make sure that every helicopter does not crash. The best way to keep every offshore worker safe is to keep every helicopter in the air where it belongs. Safety starts with the helicopter and I think everything else is secondary."*[35]

The Operators in conjunction with Cougar have put in place numerous preventative safeguards, including the use of the latest engineering technology, training and safety management systems.

The S-92A helicopter is certified to the latest regulations of the Federal Aviation Authority (FAA) in the US, the European Aviation Safety Agency (EASA) and Transport Canada. It was developed with a new fuselage design, which incorporated many lessons learned from offshore operations. The advanced features of the S-92A are outlined in the attached **Appendix B.**

The S-92A airframe is also equipped with the most advanced version of a HUMS which monitors more than 125 drive train components. A flight data monitoring program is a supplement to the HUMS and provides mechanisms to monitor the aircraft status and application of flight procedures for every flight with any unusual flight activity or procedural violation.

The effective and integrated safety management systems of the Operators, which were discussed in detail in Issue #2, as well as that of Cougar, provide further support for the prevention of helicopter incidents.

Conducting Safe and Effective Flight Operations

Cougar uses a satellite-based flight following system which automatically provides an updated aircraft position every three minutes when operating below 2,000 feet above ground level, and every five minutes when operating above 2,000 feet. In the event of an in-flight emergency, reports are generated every 15 seconds.

Cougar is also the first helicopter service provider in North America to operate a formal Type "B" Dispatch System. The primary component of this system is a 24/7 Operational Control Centre located in St. John's. There is a requirement that the pilot-in-command and dispatcher agree that all conditions are acceptable in order for flight operations to proceed.

In addition, one of Cougar's safety initiatives was the development of a pre-flight risk assessment matrix to assist in the identification of relative risk factors that helicopter crews should be aware of prior to each offshore flight. These factors include crew experience level, environment, time of day, fatigue and complexity. Pilots are required to advise the chief pilot or director of flight operations of any pre-flight risk assessment which indicates an elevated level of risk that may influence the safety of a flight, and manage those risks prior to dispatch.

The Operators are committed to the safe and reliable transportation of the workforce to the Offshore Area. Accordingly, an important aspect of the pre-flight risk assessment process is the designation of the authority with responsibility for determining the go-ahead for flight operations. As noted above, the ultimate responsibility for making the final decision to execute a flight rests with the pilot-in-command and dispatcher. The offshore installation manager (OIM) also has authority to cancel or prevent a flight from landing on their installation. Generally, the OIM will be concerned with the safety of helideck operations in support of helicopter operations, and whether any changes in operational or facility status may impact any inbound flight.

An equally important aspect of safe helicopter transport is the establishment of environmental criteria to ensure the safety of helicopter operations. The existing limits in the Offshore Area are described in more detail below.

Operating Limits

The Operators in conjunction with Cougar have established the following criteria for flight operations which comply with regulatory, manufacturer, Cougar and Operator requirements: (1) heave, pitch and roll; (2) wind speed; (3) visibility; and (4) sea state (which can affect (1)). These four criteria may be generally applicable or installation-specific. The operational criteria for helicopter transport in the Offshore Area are consistent with those in other offshore jurisdictions.

Sea States

Offshore fixed platforms are not impacted by criteria such as heave, pitch and roll, whereas offshore floating facilities have established limitations for these parameters. Such limits are intended to ensure the safe landing of the helicopter with particular consideration given to the helideck design and configuration of the offshore facility. Each Operator maintains an operations manual which describes all operating criteria that ensure the safety of flight operations for their respective facilities and installations.[36] First Response SAR can be initiated when flights are operating in these conditions.

Visibility

With respect to low visibility flying, Cougar operates in accordance with Transport Canada regulations. Cougar has provided the Operators with the following information regarding flight operations:

- Due to the distance and variability of weather conditions between onshore and offshore facilities, Cougar's standard operating procedure is to conduct all offshore passenger flight operations according to Transport Canada Instrument Flight Rules. The helicopter is flown safely with no visual reference through the use of instrumentation.

- Cougar's flight planning process includes a series of considerations, including aircraft status, forecasted and reported conditions throughout the flight path, precipitation conditions, surface winds at the take-off and landing site and wind-aloft, freezing precipitation, installation motion, and alternate onshore landing site.

- Prior to any flight dispatch, the dispatcher and the pilot will determine if it is suitable to conduct an entire flight, including return to base.

- Cougar's dispatch operation ensures constant monitoring of all weather and flight-related conditions and adjusts flight operations accordingly.

Cougar uses a variety of certified aviation weather sources and compares forecasted data with actual data on a regular basis. It is only when Cougar is confident that conditions are suitable for flight that they will make the determination to fly.

With respect to the rescue of individuals from the sea surface during periods of low visibility, Cougar has advised the Operators of the following:

- At any time during passenger flight operations, a First Response SAR aircraft can be launched.

- With the use of various tracking and locator tools such as Emergency Locator Transmitters, real-time flight tracking system (Blue Sky), and Personal Locator Beacons (PLBs), both aircraft and passengers can be located with precision.

- As weather conditions are variable, an on-site assessment conducted by the flight crew is the only way to determine the most effective rescue methods.

- Once on scene, the flight crew will make a site assessment to determine if a mechanical hoist rescue can be performed. The assessment is subject to the pilot-in-command observing the required visual reference point. If that cannot be achieved, the First Response SAR aircraft would, with the assistance of PLBs, locate personnel and deploy survival kits as required.

Given the existing safeguards discussed above relating to low visibility flying, no additional limitations should be required by either Transport Canada or the C-NLOPB. Due to the variability of weather in the Offshore Area, the introduction of additional visibility limitations would exacerbate an already challenging operating environment and make flight operations virtually impossible to conduct with any consistency. Additional constraints in efforts to conduct personnel crew changes on schedule will likely lead to the introduction of other risk factors that would have to be managed, while not resulting in any verifiable reduction in flight risk.

Night Flights

Helicopter operations in the Offshore Area are generally conducted during daylight hours. As the area is subject to adverse weather conditions, such as precipitation (snow, rain and freezing rain), fog and high winds, delays to scheduled daytime flights result. The Operators must therefore balance the risk associated with conducting a flight at least in part during darkness with the risks associated with failing to effect a timely crew change.

During the summer months, the recovery from these flight delays can generally be accomplished during daylight hours. Also, if delays continue during the week for a significant period, flights can be scheduled over the weekend.

During the winter, the limited number of daylight hours in the Offshore Area presents a significant challenge to the recovery from delayed flights due to adverse weather. When compounded by the restrictions on night flights, notwithstanding the fact flying conditions may

be otherwise ideal at that time, this presents a significant challenge for completing flight operations in a reasonable timeframe.

There are many jurisdictions where offshore operations are routinely carried out at night. For example, in the northern regions of the North Sea, the hours of darkness can extend to 17 or even 18 hours daily, resulting in crew change helicopter activity taking place in darkness. By comparison, the hours of darkness in the Offshore Area can extend to 16 hours during the winter.

Rescue and Recovery

In-Transit Rescue

An in-transit rescue refers to rescue required during transit where air SAR resources would likely be the primary mode of rescue, given that the support vessels would require a longer transit time. As such, First Response SAR helicopter resources would be used.

Limiting conditions such as wind, significant wave height, and visibility to execute a SAR mission by helicopter for rescue from the sea or a life raft, both en route and near installations, is assessed at the rescue site by the pilot-in-command. In terms of recovery rates by helicopter, it is understood that increases in wind speed and wave height make helicopter rescue more difficult. However, there is no defined limit in wind speed and wave height for successful rescues of personnel either in the sea or in a life raft, other than the limits described earlier for flight operations.

Installation Rescue

If a helicopter incident should occur in the vicinity of the offshore facilities, it will be responded to immediately by the support vessels on location, which are equipped with a Fast Rescue Craft (FRC) and Dacon Scoop to assist with rescue depending on wave conditions. In addition to the primary support vessel which will initiate rescue, additional vessels from nearby installations as well as First Response SAR and Government SAR resources would be mobilized to the site.

The support vessels used by the Operators have sufficient survivor capacity, are highly manoeuvrable, are well equipped and have well trained crews. During helicopter operations, the vessels are positioned strategically in preparation of a response to an incident. The wave height limit for the use of the FRC and Dacon Scoop in an emergency situation is up to 5.5 metres and 7 metres respectively.[37]

S-92 Flotation System Enhancements

FAA regulations stipulate that helicopters operating over water will be equipped with emergency flotation equipment. The S-92A is currently fitted with the standard three-float Emergency Flotation System which is certified to sea state 4[38].

The report of the HOTF included a recommendation to consider the adoption of enhanced emergency flotation equipment. Accordingly, the Operators have requested that Cougar upgrade flotation to the Enhanced Flotation System available from Sikorsky, which has demonstrated sea state 5, and limited sea state 6, capability in simulation (wave tank). This upgrade is currently ongoing and exceeds all FAA and Joint Aviation Authorities stability requirements.

Although sea state is one important factor to consider in the likelihood of a helicopter remaining upright under various wave and wind conditions, other factors affect whether the helicopter might invert.

Auxiliary Fuel Tank

Auxiliary fuel tanks are necessary for helicopter travel in the Offshore Area due to the long distances to installations from Cougar's base in St. John's. They have been used in all types of aircraft flown in the Offshore Area, including the AS332L Super Puma, Sikorsky S-61 and S-92A helicopters. The auxiliary fuel tanks provide for fuel plus adequate reserves to reach alternate landing sites.

The amount of fuel required for a flight is determined on an individual flight basis and is dependent on factors such as wind, routing, alternate landing sites and altitudes. If the fuel requirements for a particular flight exceed the capacity of the primary tank, an auxiliary fuel tank is required. Without the auxiliary fuel tank, flights to many of the offshore installations could simply not occur.

Type Approval

The auxiliary fuel system design was tested in accordance with *Federal Aviation Regulations* (*FAR*) 29 and subsequently approved for use under independent Supplementary Type Certificates issued by the FAA and Transport Canada. The auxiliary fuel tank has also received approval for use under the requirements of the EASA.

The Supplementary Type Certificate process allows for modifications or additions to the approved original design of the aircraft. Cougar's auxiliary fuel tank meets all of the requirements of the Supplementary Type Certificate, which specify the installation, maintenance and operational requirements for the tank. The auxiliary fuel tank also meets the following specific requirements for:

- *Crashworthiness*: It meets or exceeds *FAR* 29 crashworthiness regulations; the TSB also found that the tank on Flight 491 was structurally intact.

- *Safe Carriage of Fuel*: It satisfies the *Canadian Aviation Regulations* (*CAR*) 529 and *FAR* 29 requirements for the carriage of flammable liquids.

- *Impact on Flotation and Buoyancy*: Transport Canada and the FAA have approved Supplementary Type Certificates for the S-92A auxiliary fuel tank such that it

does not affect buoyancy or flotation except as a factor in the calculation of the flight weight and balance. The position of the tank or the weight of the tank, full or empty, is within the weight and balance limits of the aircraft.

Egress and Seating Requirements

Regulatory requirements stipulate that there must be emergency exits in the passenger cabin and cockpit. The S-92A, equipped with the auxiliary fuel tank, meets or exceeds both the *FAR* and *CAR* egress requirements. Specifically, the S-92A has:

- cockpit windows which can be jettisoned,
- four cabin emergency exits which can be jettisoned,
- an air stair door with upper section that can be opened, and
- push out cabin windows at each seat.

It is also a *FAR* requirement that the aircraft manufacturer demonstrate that there are adequate paths to the emergency exits. The auxiliary fuel tank must not intrude into the center aisle or into the areas in front of the exits, and must not impede egress.

During the design of the auxiliary fuel tank, egress was an important consideration. The design incorporated additional features not required by *FAR* 29, including:

- two smaller 150 US gallon tanks rather than a single larger tank,
- additional floor strengthening,
- no protruding tank attachment fittings in the floor or in the walls that may impede egress,
- no protruding into aisles or seat rows and impeding of access to emergency exits,
- no protrusions or snag hazards, and
- location below the window sill.

Under *FAR*, the auxiliary fuel tank may not have any protrusions that interfere with egress from the aircraft. As such, the tank is designed as a smooth surfaced rectangular shape with no protrusions or snag hazards to inhibit emergency egress. In the spirit of continuous improvement, the Operators have engaged Cougar to review the design, use and impact of the auxiliary fuel tank on the safety of helicopter operations.

In addition, the S-92A cabin windows are larger than other helicopters and the window glass is designed to pop-out. This requirement exceeds *FAR* 29 and allows the windows to be used in emergencies or in the event of hazards blocking access to the emergency exits.

Further, with the introduction of HUEBA, passengers are provided sufficient oxygen to compensate for any delay in egress caused by sitting in an aisle seat if the helicopter is

submerged. Alternatively, a passenger in an aisle seat can also exit through the push out window on the right side (starboard) of the helicopter.

Limiting the use of certain seats on the S-92A helicopter would necessitate increasing the number of flights, which will correspondingly increase the overall risk. Therefore, limiting the use of certain seats would not improve helicopter safety.

The C-NLOPB's Response to Rights to Refuse

In 2009, the C-NLOPB investigated a refusal to work by an offshore employee based on their belief that the current configuration of the auxiliary fuel tank on the starboard side of the cabin creates an unacceptable increased risk to egress from the helicopter during an emergency situation.[39] The C-NLOPB recognized that there are inherent risks associated with travel by helicopter. However, they determined that the inclusion of an auxiliary fuel tank does not result in an unacceptable increase in risk.

The investigation of the work refusal included consultation with the FAA as well as Transport Canada. Both confirmed that their process for review and approval of the design, installation and use of the auxiliary fuel tank included consideration of the impact on passenger safety, and it was determined to meet all of the regulatory requirements. The C-NLOPB was therefore satisfied that the presence of the auxiliary fuel tank in the helicopter does not result in an unacceptable increase in risk.

In their decision, the C-NLOPB recognized that the current HUET simulator training does not include the auxiliary fuel tank during egress exercises. However, they did note that the training does provide the basic skills necessary for escape from an upright and inverted helicopter.

INQUIRY ISSUE #11

> ***Can helicopter transport safety be affected by the capacity of the helicopter transport fleet and, if so, what role should the C-NLOPB play in the determination of fleet capacity?***

Summary

While fleet capacity is a function of safety and operational considerations, safety is the primary consideration. The Operators believe capacity is most appropriately determined by Cougar and the Operators. There is ample capacity within the existing pool to manage both the offshore transportation requirements of the Operators and ensure that any associated risks are as low as reasonably practicable.

Analysis

The Operators evaluate helicopter fleet requirements in consultation with Cougar on the basis of a range of considerations. Such considerations include the number of operating facilities and associated personnel requirements, season (i.e. summer vs. winter), geographic location of the facilities, the Transport Canada approved airframe capacity, and maintenance and pilot training schedules.

Cougar provides helicopter services through a pooling arrangement with the Operators in the Offshore Area. Each Operator contributes equal capacity to the pool of helicopters.[40] Given the capacity of the current S-92A airframe, equal capacity essentially translates into one helicopter per project (in addition to the First Response SAR helicopter).

When additional short-term offshore operations arise, the Operators in conjunction with Cougar assess whether the existing helicopter pool can manage the work. In addition to the fleet capacity considerations noted above, the assessment is also based on the normal and maximum personnel on the installation, type of operation, and location of that facility. If it is determined that the existing pool cannot support the additional short-term requirements, the Operator will contract for another airframe to support its needs.

It is significant to note that the average utilization rate of the existing helicopter pool is currently less than 90% for regularly scheduled flights and approximately 60% for *ad hoc* flights.[41] There is therefore sufficient capacity within the existing pool to manage both the offshore transportation requirements of the Operators and ensure that any associated risks are as low as reasonably practicable.

INQUIRY ISSUE #12

> ***What are the appropriate standards of offshore helicopter safety training to ensure that the risk to passengers is as low as is reasonably practicable, both during training and helicopter transport?***

Summary

The Operators endorse the continued utilization of CAPP's Training and Qualifications Committee and CAPP Training Standard for the development and continual review of the appropriate standards of offshore safety training. The goal is to balance training requirements with any associated medical and safety risks. As new training methods and equipment are introduced, they are assessed to determine whether implementation will further that objective.

The Operators are reviewing training standards, upgrading training equipment and facilities, and exploring survival training enhancements.

Analysis

CAPP Training Standard

The offshore training standards for the Operators are coordinated through CAPP and are binding on the Operators as a condition of their C-NLOPB authorizations.

As stated in the Joint Operator Panel in Phase 1(a), "[i]ndustry, regulators and the training institutions continually review training requirements for offshore workers through the CAPP Training and Qualifications Committee."[42] This Committee is comprised of representatives from the C-NLOPB, C-NSOPB, Canadian Association of Oilwell Drilling Contractors and CAPP. By invitation, the Offshore Safety and Survival Centre (OSSC) at the Marine Institute in St. John's and Survival Systems Training Ltd. (Survival Systems) in Dartmouth, Nova Scotia also participate.[43]

The CAPP Training Standard was first issued in March 2001 and is updated regularly. A 2010 revision is expected later this year. These revisions are reviewed with the Operators' OHS Committees. The CAPP Training Standard provides guidance on the appropriate level of training required for the offshore workforce and required qualifications, including that associated with offshore helicopter travel.[44]

The three main offshore helicopter safety training certifications established by the CAPP Committee, along with a brief description of course content, are as follows:

- *Basic Survival Training (BST)*: Provides personnel with a basic understanding of the hazards associated with working in an offshore environment, the knowledge and skills necessary to react effectively to offshore emergencies, and the ability to

care for themselves and others in a survival situation. This is a five-day course with a three-year renewal period.

- *Basic Survival Training- Recurrent (BST-R)*: BST refresher that provides personnel with continued proficiency in the use of safety, survival and rescue equipment and techniques, and updates individuals with respect to advancements in equipment technology and procedures since their previous training. This is a two-day course with a three- year renewal period.

- *Offshore Survival Introduction (OSI)*: Provides participants with an awareness of the hazards associated with the marine environment, an understanding of their responsibilities during an offshore emergency, and the ability to care for themselves and others in a survival situation. This is a one-day course that permits holders to go offshore for six days during a twelve-month-period. It is effective for three years.

In addition to the requirements set out above, all workers travelling by helicopter view a recorded helicopter safety briefing at the heliport prior to departure onshore and offshore.

Medical assessments are also required of all offshore workers prior to taking the BST, BST-R and OSI to ensure that they are medically fit to travel and work. CAPP's East Coast Medical Assessment for Fitness to Work Offshore outlines this mandatory requirement. The level of fitness prescribed by the standard is uniform, but the frequency for medical certification increases with age.[45]

Offshore Helicopter Safety Training

The offshore training requirements for workers employed in the Offshore Area are rigorous. The Operators do however recognize that training itself can involve risk. As such, the benefit achieved by training workers in offshore survival must be balanced with the training risk.

In her 2006 report prepared for the UK's Offshore Petroleum Industry Training Organization, Susan Coleshaw reviewed stress levels on offshore training following the introduction of emergency escape exits in safety training courses. Increasing the frequency of egress training in the HUET resulted in elevated levels of stress. She concluded that while some level of stress can be beneficial in reacting to a real or perceived emergency, excessive stress can have negative effects.[46] As such, the Operators state that such effects must be considered in the implementation of any new training requirement.

As of October 1, 2009, all workers travelling by helicopter to the Offshore Area are required to wear a HUEBA and be trained in its operation.[47] The training requirements associated with this device were developed by CAPP in consultation with medical experts.

In addition, offshore safety training includes HUET, consisting of a simulation exercise of a controlled helicopter landing on water. It also includes a simulation of the inversion of a helicopter and sinking, which is conducted in a purpose-built device. It should be noted that emergency helicopter egress training is designed to assist with escape from a helicopter which

has made a controlled ditching on water. The training and equipment is not designed for training in high impact or uncontrolled helicopter accidents.

The offshore safety training takes place mainly at the OSSC. Survival Systems is also a training provider for BST, BST-R and OSI. The Operators recognize the importance of effective survival training and that training standards and equipment evolve as new techniques and technologies emerge. The Operators have therefore committed to reviewing current training standards, upgrading training equipment and facilities, and exploring survival training enhancements. These initiatives are being carried out through industry association committees, individual operator equipment procurement processes, and industry joint research projects.

Negotiations are underway with the OSSC to procure a newly designed HUET, which can be configured to represent multiple airframe types, including the S-92A. The HUET will be fitted with four-point harnesses, high back stroking seats and an auxiliary fuel tank. The Operators are also negotiating with OSSC to procure new facilities equipment to simulate wind and wave conditions to create a more realistic training environment. Despite this commitment, it is significant to note that not all experts believe that training with high fidelity is necessary.[48]

Furthermore, the Operators agree with Michael Taber's testimony in Phase 1(b) of the Inquiry that repetition reinforces survival skills acquired during BST and BST-R training. This increased proficiency however involves training risk. The Operators caution that an increase in the number and complexity of egress exercises from an inverted HUET, including the use of HUEBA in the device, should not be recommended without consideration of any increased risks associated with the training simulation.

Survival Course Review Project

Industry, through CAPP, initiated the Survival Course Review Project in March 2010 to review the offshore survival courses. The purpose of the Project is to define performance standards and identify core competencies for offshore survival training, as well as to achieve a consistent training standard for survival courses being taught in Atlantic Canada. In their review, the Project's team will consider reviews of the BST and BST-R and solicit regulatory, industry and worker input. The review is expected to be completed by the end of 2010.

INQUIRY ISSUE #13

> ***What personal protective equipment and clothing is necessary for helicopter passengers and pilots; what are the standards, and should the C-NLOPB require guidelines to ensure such equipment and clothing is properly fitted?***

Summary

The current structure in which the C-NLOPB requires the Operators to have helicopter passenger transportation suits approved by the Canadian General Standards Board (CGSB) is appropriate. The role of the C-NLOPB is to audit the Operators' safety management systems and processes to ensure that passengers are equipped with the most appropriate personal protective equipment (PPE) and that MOC processes are used when changes in PPE are made.

With respect to suit fitting standards in particular, no further action is required. The Operators believe the protocols developed by Helly Hansen in conjunction with the Operators are best industry practice.

The Operators continue to look for continuous improvement opportunities with respect to helicopter passenger PPE, with the current focus being enhanced goggles and PLBs.

Recommendation

The Operators recommend the following:

1. Any further consideration of the appropriate standards for PPE and clothing necessary for helicopter passengers be done in consultation with the CGSB Working Group.

2. The C-NLOPB should audit the Operators' safety management systems and processes to ensure that:

   (a) passengers are equipped with the most appropriate PPE; and

   (b) MOC processes are used to ensure equipment integrity, including appropriate fit, when changes are made in PPE.

Analysis

Role of CGSB and the C-NLOPB

With respect to helicopter passenger transportation suits, the *Newfoundland Offshore Area Petroleum Geophysical Operations Regulations*[49], the Draft Petroleum Occupational Safety and Health Regulations – Newfoundland[50] and the Guidelines Respecting Drilling Programs[51]

specify that passengers must wear a suit system certified to the CGSB standard.[52] The C-NLOPB should continue to audit the Operators' safety management systems to ensure compliance with this requirement.

In 2008, the CGSB began consideration of its standard with respect to helicopter transportation suits. The National Review Committee members include representatives from government, regulators (i.e. the C-NLOPB and C-NSOPB), suit manufacturers, scientific groups, trade unions (i.e. CEP, Local 2121), industry and other interest groups. In November 2009, the first meeting to begin the review of the standard was held with tasks assigned to Committee members, including the development of recommendations for the revised standard and the improvement of its format and functionality.

The CGSB, through a working group of stakeholders, is currently reviewing the standard, which consists of a review of all aspects of the suit standard including water egress standards, undergarment requirements and glove design requirements.

The National Research Council (NRC) recently reported there is a knowledge gap between the calm water testing conditions used to determine a human's thermal responses in immersion suits and a real world scenario.[53] The NRC also stressed the importance of more realistic testing in conditions where PPE will be used.[54] Accordingly, this knowledge gap is currently being addressed in the CGSB review process of the suit standard.

Research is being carried out by the CORD Group Limited (CORD), the NRC Institute for Ocean Technology and Mustang Survival Corporation. Research requirements have been identified to review the many elements of the suit standard and are outlined in the attached **Appendix C**.

The results from these studies will assist the CGSB Working Group in their recommendations to update the CGSB standard and improve testing methodologies. The Operators view this work as vital for the continuous improvement in the helicopter transportation suit system.

Suit Fitting Protocols

As noted by Susan Coleshaw in her report to the Inquiry, "it is important that helicopter suits are well fitted to the individual, limiting the air that can be trapped. Measures to check that the correct size of suit was being worn by each passenger would also be beneficial."[55]

In early 2009, Helly Hansen and the Operators began to address this issue. They formalized a suit fitting assessment process that was ultimately implemented in May 2009 for all personnel travelling offshore in conjunction with the return to helicopter operations. The suit fitting protocol adopted by the Operators has been recognized by the TSB who recommended that Transport Canada inform others about the importance of confirming appropriate suit sizing.[56]

This suit fitting assessment process was the first of its kind and is now a standard component of any suit system MOC process used by the Operators. As a result, in 2010 when the Operators

converted from the Helly Hansen E-452 suit to the HTS-1 suit, all offshore workers were required to be fitted for the new suit.

Water Ingress Testing Protocols

In June 2009, the Operators contracted CORD to perform water ingress testing on the Helly Hansen E-452 helicopter transportation suit. The Operators considered the testing protocols associated with the existing CGSB standard[57] and worked with CORD to develop more rigorous and realistic testing. New testing protocols were evaluated in trials that included simulated ditching, helicopter evacuation and surface swim conducted in wind, wave and continuous waves. The trials provided a significantly more rigorous testing protocol than that contained within the existing standard.

In July 2009, offshore OHS Committee representatives were invited to witness naïve subject testing of the E-452 suit using the more rigorous testing protocol. That testing concluded that the E-452 suit met or exceeded thermal requirements of the CGSB standard. The testing methodology developed through this initiative is being evaluated in the CGSB water ingress research.

Transition to HTS-1 Suit

In 2008, Helly Hansen had begun work to improve some areas of functionality in the E-452 suit. That work included enhancements in the E-452 suit hood, zipper, glove and suspenders. The prototype suit (HTS-1) combined the body of the existing E-452 suit with these enhanced features. The HTS-1 suit was evaluated by Helly Hansen and determined to provide an appropriate solution for the majority of those who had not been able to achieve an appropriate fit in the E-452 suit.

The Operators then commenced a series of MOC initiatives including the following:

- CORD was contracted to perform water ingress testing in accordance with the new and more rigorous protocol developed in the Summer 2009. This testing was successfully completed in November 2009.
- HUET egress testing was conducted to ensure identification of any suit performance issues.
- OHS Committee members participated in the testing process.
- Feedback was solicited in a survey of HTS-1 suit users.

Based on these activities, the Operators introduced the HTS-1 suit for offshore personnel in the first quarter of 2010. The introduction of the HTS-1 suit included individual fit testing and group orientation to the suit's features. If an individual cannot obtain a fit, then a custom suit will be provided.

Transport Canada approval of the HTS-1 suit was received in November 2009 and the suits were put into circulation for those individuals who were unable to fly in the E-452 suit. The HTS-1 suit is now the primary suit for the Operators.

Thermal Undergarment Requirements

Current regulations and CGSB standards do not specify what clothing should be worn under a helicopter transportation suit. However, further study in this area is being conducted as a component of the CGSB review process. As such, any recommendations should await the results of this work.

Additional Helicopter PPE Initiatives

The Operators continue to monitor additional improvement in other areas of PPE, including goggles and PLBs. The Operators will also review the anticipated UK Emergency Breathing System technical standard, noted in Susan Coleshaw's report to the Inquiry[58], for any continuous improvement opportunities that may be applied in Canada.

INQUIRY ISSUE #14

> ***Are changes needed to maximize worker and pilot participation in the development, implementation and monitoring of helicopter safety initiatives and activities?***

Summary

In addition to the initiatives already undertaken since March 12, 2009 and described in Issues #2, 4 and 18, the Operators propose to establish a forum to be held twice a year to facilitate worker engagement in the identification, development, implementation and monitoring of helicopter safety initiatives.

Recommendation

The Operators recommend that a Helicopter Operations Safety Forum be established and held twice a year to facilitate worker engagement in helicopter safety initiatives, which would be attended by representatives from key stakeholders including the offshore workforce.

Analysis

It is critical to maintain open communication and engagement with the offshore workforce. As such, the Operators communicate regularly with their workers in relation to safety and continually strive to identify opportunities to enhance communication.

Return to Service

As mentioned in Issue #2, the Operators implemented enhanced communication mechanisms with workers following the HOTF report. In particular, during the return to helicopter service process, all the Operators provided regular updates to workers as well as more comprehensive and frequent updates to the offshore OHS Committees. The OHS Committees and the offshore workforce were also engaged in the resumption of helicopter operations through their submission of over 350 questions to the Operators for consideration and response.

In addition, prior to the return to helicopter service, Town Hall briefings were held which were attended by the offshore workers and their families, the Operators' senior management teams, the HOTF, the C-NLOPB, Cougar, and other service providers. At these briefings, the Operators' management representatives provided updates and answered questions on helicopter safety-related issues. Management also conducted briefings with regulators and government with respect to the resumption of helicopter operations.

Helicopter Operations Safety Forum

The Operators propose to host a Helicopter Operations Safety Forum twice a year which would be attended by key stakeholder representatives, including OHS Committee representatives from the offshore and onshore workforce as well as Cougar.

The formation of such a forum will clearly enhance worker and pilot participation in the development, implementation and monitoring of helicopter safety initiatives and activities. The proposed agenda for the forum is attached in **Appendix D**.

Other Initiatives

In addition to the proposed forum relating to helicopter operations, the Operators have committed to other communication and stakeholder engagement initiatives which are described in Issues #4 and #18.

INQUIRY ISSUE #15

> ***Should offshore workers have a level of personal accountability for their own safety in helicopter transport? (Note: For example, clothing to be worn under the suit, fitness training and reporting.)***

Summary

Workers play a key role in ensuring that the health, safety and environmental objectives established by the Operators are achieved through their consistent application of policies, procedures and safe work practices in their day-to-day work activities. It is therefore a clear expectation of the Operators, as well as a legislative requirement, that workers be accountable for their own safety at the workplace, including during helicopter transport.

Analysis

The Operators are ultimately accountable for the health and safety of their workers. However, in the Offshore Area, as in all workplaces, safety is everyone's responsibility.

All workers are trained in, and responsible for the adherenece to, all safety procedures and practices established by the Operators, including those relating to helicopter transport.

Worker's accountability for their own personal safety is also reflected in the Operators' expectation that all safety concerns are reported to a supervisor or through their hazard reporting systems. For example, workers can complete hazard identification cards so that the Operators are aware of any potential safety risks and can manage them appropriately.

Workers are also expressly subject to legislative requirements respecting their own safety in the workplace. The Newfoundland and Labrador *Occupational Health and Safety Act* outlines various general and specific duties of workers respecting the protection of their own health and safety and that of other persons at or near the workplace.[59]

INQUIRY ISSUE #17

> ***Should the C-NLOPB and oil operators' safety aviation audits include reviews of past responses to declared emergencies and emergency preparedness exercises?***

Summary

A comprehensive audit process currently exists which includes reviews of declared emergencies and emergency preparedness exercises.

Analysis

The Operators have testified about their audits of Cougar. In particular, each Operator has outlined its specific protocols and requirements in this area respecting the assessment of the effectiveness of the emergency response processes of Cougar.

Cougar is engaged in Operator emergency response exercises and drills. Any learnings acquired through this process, and specifically those relating to helicopter emergency response, are immediately identified for follow-up.

INQUIRY ISSUE #18

> ***What information from the helicopter operator about flight operations should the C-NLOPB require the oil operators to provide to offshore workers? (Note: For example, alert service bulletins, airworthiness directions, incident reports, information regarding departures from normal flight times, routines and the reasons.)***

Summary

The Operators currently have various communication protocols in place that provide relevant helicopter information received from Cougar to the offshore workforce. Communications with respect to normal operational matters is not typically the subject of specific C-NLOPB requirements.

Recommendation

The Operators will work with Cougar to develop a DVD on routine helicopter maintenance and operations to disseminate to the workforce.

Analysis

Existing Communication

The Operators provide the workforce with information or updates concerning:

- HOTF recommendations
- TSB investigation
- Worker rights to refuse relating to helicopter transport
- First Response SAR
- Shutdown of aircraft due to mechanical issues when passengers have already boarded
- In-flight and in-taxi turnarounds
- Unplanned shutdown of aircraft offshore due to mechanical issues
- Significant maintenance and inspection activities (i.e. cracks in gearbox mounting feet)
- Manufacturer's continuous improvement activities

Alert Service Bulletins and Airworthiness Directives

Alert Service Bulletins (ASB) and Airworthiness Directives (AD) are written for airframe owners and helicopter service providers, such as Cougar, and contain significant technical information in relation to the required actions to be taken. Accordingly, they are not written for general release. ASBs in particular are not even authorized for dissemination without the express consent of the manufacturer at issue. While ADs are public documents published on Transport Canada's web site, their highly technical nature is evident from the example attached at **Appendix E**.

When the Operators are alerted to an ASB or AD considered relevant to the offshore workforce, the Operators commit to work with Cougar and the manufacturer to develop an information package to assist the workforce in understanding the ASB or AD. This approach was adopted by the Operators with respect to recent ASBs dealing with maintenance of filters and gearbox mounting feet inspection requirements.[60]

Cougar's Maintenance Activities

Ongoing aircraft maintenance activities are based on prescriptive maintenance regimes and are generally conducted after normal flying hours in order to minimize flight disruption. The Operators believe it would be beneficial to improve its workers' awareness and understanding of routine maintenance regimes and practices. Accordingly, the Operators propose that they work with Cougar to develop a DVD.

Routine Flight Information

On average only 66% of scheduled helicopter flights depart on time, with 70% of delays relating to weather.[61] As such, there are limitations respecting the amount of information that can be provided in relation to departures from normal flight times and the associated reasons. Apart from weather, delays may also be attributable to unplanned maintenance as well as late passengers or cargo requirements.

While general flight status updates are provided onshore and offshore as well as through the Cougar flight information line, more detailed updates would not be feasible or practical.

INQUIRY ISSUE #21

> ***Should there be safety conferences for all parties involved in offshore helicopter transport, and if so, how often should they be held?***

Summary

The Operators support the convening of a Helicopter Operations Safety Forum to be held twice a year, as is more particularly discussed in Issue #14.

Analysis

The Operators fully support the need for continuous improvement in communication and engagement relating to helicopter safety, and remain committed to identifying any additional opportunities that may support that goal.

The Operators recognize that relative to other operating areas, the East Coast does not have significant helicopter operations. As such, they endeavour to learn from other oil and gas jurisdictions, as illustrated by CAPP's participation in the UK Helicopter Task Group.

Further, the Operators support safety-related forums which focus on best practice and sharing learnings. In particular, the Operators support the establishment of a Helicopter Operations Safety Forum to be held twice a year, which is discussed in detail in Issue #14.

APPENDIX A:

Jurisdiction of the C-NLOPB and Transport Canada

Jurisdiction of the C-NLOPB and Transport Canada

The C-NLOPB

The C-NLOPB has the mandate to interpret and apply the provisions of the Accord Acts to all activities of the Operators in the Offshore Area. Specifically, it has jurisdiction over offshore petroleum operations on or within the vicinity of 500 metres of a facility as well as any emergency affecting operations. The C-NLOPB exercises this authority through the issuance of work authorizations. It also monitors compliance with statutory requirements.

Helicopter operations in particular are within the mandate of the C-NLOPB by virtue of its authority with respect to offshore worker safety. Various regulations and guidelines issued by the C-NLOPB outline specific requirements in regards to helicopter operations including:

- *Newfoundland Offshore Petroleum Installations Regulations*, SOR/95-104; 120/09; N.L.R. 20/97
- *Newfoundland Offshore Area Petroleum Geophysical Operations Regulations*, SOR/95-334; N.L.R. 16/97
- Draft Petroleum Occupational Safety and Health Regulations – Newfoundland
- *Newfoundland Offshore Drilling and Production Regulations*, SOR/2009-316; N.L.R. 120/09
- Safety Plan Guidelines
- Drilling and Production Guidelines
- Guidelines Respecting Drilling Programs

The Guidelines Respecting Drilling Programs, in particular, set out several requirements with respect to offshore helicopter transportation including the following:

- All helicopters must be certified by Transport Canada.
- All pilots must be licenced by Transport Canada.
- Helicopter crews, including first response technicians, should have experience with the aircraft being used and experience with offshore operations in similar environments.
- Adequate flight time must be provided for first response practice and drills.
- Aircraft should be of multiple-engine design and should be capable of landing on the water in at least moderate sea states.
- Aircraft must be capable of communication with the shore base, drilling installation, supply vessels and lifeboats.
- All aircraft must be equipped with externally mounted life rafts.
- Aircraft interiors should be configured to allow the emergency egress of passengers.

- Suitable upper torso passenger restraints should be used in the aircraft.
- All passengers must receive HUET training and be suitably briefed prior to transport. All passengers must also wear approved helicopter transportation suits.
- Passengers and freight should not normally be carried on the same aircraft.
- Operators must give proper consideration to weather and helicopter load limits when planning flights.
- Flying at night should be avoided to the extent possible.
- Operators must specify the amount of reserve helicopter fuel to be kept on board the offshore installation and provide the rationale used to arrive at this amount.
- Consideration should be given to providing goggles and appropriate breathing devices to assist in underwater escape.
- Maintenance systems and activities are expected to meet the highest possible standards. Proven automated usage and monitoring systems should be used where practicable.

The C-NLOPB has also recently issued additional requirements with respect to helicopter operations including:

- SAR capability in addition to that provided by DND
- Limitations on night flights
- Limitations on low visibility flying
- Limitations on flight pending enhancements to SAR capability

Transport Canada

Transport Canada has the primary responsibility for the oversight of helicopter operations. The Minister of Transport is responsible for the development of regulations and standards, licensing and certification and promotion and security of services relating to aeronautics, including aviation safety. The Minister also has the authority under the *Aeronautics Act*, R.S.C. 1985, c. A-2, to develop guidance and advisory materials pertaining to aviation. Helicopter service providers, such as Cougar, are within Transport Canada's authority. They are issued a Certificate of Airworthiness to conduct operations pursuant to the requirements set out in *CAR*.

It is also significant to note that Transport Canada established the Canadian Aviation Regulation Advisory Council (CARAC) as a joint undertaking between the federal government and the aviation community to streamline the approach to consultation and rulemaking and improve its regulatory regime. CARAC's prime objective is to assess and recommend potential regulatory changes through cooperative rulemaking activities. All recommendations for change to the aviation regulatory system must also be made with a view to maintaining or improving aviation safety in Canada.

APPENDIX B:

Features of the Sikorsky S-92A

Features of the Sikorsky S-92A

Overview

- Flaw/Damage Tolerant Design
  - The enhanced safety requirements of the FAA and Joint Aviation Authorities (JAA) require that the Sikorsky S-92A be designed to withstand damage from flawed, damaged, scratched, corroded or dented parts:
    - Critical parts are purposely scratched, corroded or dented, then tested to ensure that parts maintain their strength
    - Small flaws (0.005 inch) are qualified for 30,000 hour life with no cracks allowed to form
    - Larger damage and corrosion (0.040 inch) is qualified for at least 1250 flight hours with no cracks allowed to form
    - Composites are tested with built-in voids and hammer blows

- Rotor Ice Protection System
  - The Sikorsky S-92A offers the most modern ice protection system ever designed for a helicopter. Extensive testing in the offshore operations in the East Coast of Canada and in Alaska has proven the fully automatic system to be very effective in the prevention and removal of ice.

- State-of-the-Art Cockpit
  - The "clean-sheet" design of the Sikorsky S-92A permitted the design of a cockpit that rivals most modern jetliners. The Engine Indicating Caution Advisory System provides automatic alerting and system information for virtually every system installed in the helicopter.

- Enhanced Ground Proximity Warning System
  - Standard equipment on the Sikorsky S-92A includes an Enhanced Ground Proximity Warning System. Over the past several years, this equipment has saved a countless number of lives by providing timely warnings of approaching water or terrain.

- Enhanced Passenger Survivability - improved crashworthiness
  - The Sikorsky S-92A was designed with crashworthy seats and crashworthy landing gear. Both systems are designed to absorb crash energy during an accident, thereby reducing the severity of injuries to the occupants on board.

- Enhanced Emergency Egress
  - The Sikorsky S-92A is fitted with an emergency exit at ***every*** row of seats, on both sides of the helicopter fuselage. In the event of an offshore ditching, this safety feature offers an unprecedented availability of choice of emergency exits:
    - Four emergency exits FAA and JAA Type III or larger
    - Ten push out windows 42.7 x 50.8 cm (16.8" x 20.0")
    - Escape area is 530% larger than FAA and JAA requirement

- Enhanced Bird Strike Protection
  - Continued safe flight despite 2.2 pound (1 kg) bird strike at maximum speed of 165 knots

- Crash Resistant Fuel Systems
  - The Sikorsky S-92A offers a safer fuel system design due to the fact the main fuel tanks located in the sponsons are external to the passenger cabin and they are fitted with self-sealing break-away shut-off valves.

- Dynamic Seat Testing for Passenger and Crew Seats
  - Designed to absorb impact force up to 16 Gs - A 16 G seat is tested in a manner that simulates the loads that could be expected in an impact-survivable accident. Two separate dynamic tests are conducted to simulate two different accident scenarios: one in which the forces are predominantly in the vertical downward direction and one in which the forces are predominantly in the longitudinal forward direction.

- Engine Turbine Burst Protection
  - As turbines have high energy and can burst and destroy surrounding systems, the S-92A has detailed designs to deal with such bursts vastly reducing the hazard of such failures

- Enhanced Lightning Strike Protection

- High Intensity Radiated Field Protection
  - Critical electronic systems are protected from dangerous electromagnetic interference
    - Electromagnetic interference hardened equipment bays
    - Extensive electrical/electronic qualification
    - Over-braided electrical and avionics harnesses

- Improved Life Raft System
  - The Sikorsky S-92A is fitted with two life-rafts that can be deployed either electrically or mechanically. They are positioned in the forward section of each sponson. The two 14-person rafts can each hold up to 21 persons (50% overload capacity)

Passenger capacity and comfort

- Enhanced Passenger Comfort
  - The larger cross section of the Sikorsky S-92A offers passengers room and comfort more closely associated with a fixed wing commuter aircraft.

- Enhanced Environmental Control System
  - The Sikorsky S-92A offers an excellent heating and ventilation system for both the cockpit and main cabin. The optional air conditioning system enhances passenger comfort during summer-time operations.

- Active Vibration Control System
  - The system makes both cockpit and cabin environments smoother.

- Actuators
  - Actuators on the aircraft cancel structural vibration as measured by accelerometers.

Speed and range

- Reduced Number of Flights
  - Considering the fact that the passenger carrying capacity of the Sikorsky S-92A is almost double that of the Super Puma (16-19 passengers versus 8-10), the number of flights to the offshore installations has been notably reduced, which translates into reduced risk.

- Reduced Number of Helideck Landings
  - The reduced number of overall flights has also reduced the number of landings at the offshore facilities, which translates into reduced risk to everyone involved with helideck operations.

Cargo capability and flexibility

- Enhanced baggage capacity - large external cargo/baggage area, which is easily loaded with the full-width overhead door and a hydraulically lowered ramp
- 140 cubic feet of cargo space
- Removable bulkhead, shelf, netting
- Total capacity of 100 pounds: 300 pounds (shelf) and 700 pounds (ramp)
- Loading/unloading through overhead door and/or by lowering ramp
- High capacity actuators (200 psf floor)
- Wide open standup accessibility to the baggage
- Main cabin door fork lift capability

Maintenance support

- Canadian-Based Field Service Representative
  - Full-time assigned representatives
  - On call 24 hours a day
  - Front line support for all matters operational, maintenance and logistics
  - Guidance, training and factory liaison for technical and material support

- Customer Support Manager
    - Responsible for delivery of all product support items and resolution of all customer issues

Enhanced S-92A Flotation Gear

- Enhanced Emergency Flotation System
    - The Sikorsky S-92A offers a standard three-float Emergency Flotation System which is certified to sea state 4. The Enhanced Flotation System available from Sikorsky has demonstrated sea state 5, and limited sea state 6, capability in simulation. The flotation system is designed to allow time and stability to evacuate the helicopter in the event of a water landing:
        - Exceeds all FAA and JAA stability requirements
        - Deploys automatically or manually
        - Safeguarded against spontaneous/ inadvertent deployment

APPENDIX C:

CGSB Survival Suit Research Topics

CGSB Survival Suit Research Topics

In its review of the current CGSB standard with respect to helicopter passenger transportation suits, the National Review Committee has identified the following research topics:

- Water Ingress
  - Develop a testing protocol which more realistically contemplates helicopter egress
  - Consider leakage modelling to determine whether leakage rates are linear

- Escape Buoyancy
  - Develop the appropriate buoyancy level using dynamic scenarios

- Thermal Protection
  - Determine performance of existing standards in a simulated dynamic environment (including air temperature, wave, wind and water ingress)
  - Test the relationship between mannequin versus human measurements under simulated sea conditions

- Hand Protection
  - Conduct cold water hand dexterity testing to determine the time needed to perform key survival tasks
  - Determine optimal thermal requirements for gloves that could be worn to provide the hand dexterity required while performing key survival tasks

- Spray Shield
  - Review existing test methodology for improvement opportunities

- Floating Stability
  - Determine impacts of wave frequency on stable floating position

- Vertical Positioning
  - Determine impacts of wave frequency on vertical positioning

- Colour
  - Determine if ISO colour standards should be adopted

APPENDIX D:

Agenda for the Helicopter Operations Safety Forum

Agenda for the Helicopter Operations Safety Forum

Morning Session I: Operations Overview

Objective: Cougar will present an overview on various operations and maintenance-related subjects for the purpose of providing OHS Committee members with a comprehensive update on matters that are believed to be of interest in regards to the safety of offshore travel by helicopter. This session may include:

1. Helicopter Base Tour
2. Flight Operations Update
   - Flight planning/scheduling including flight interruption issues
   - In-flight procedures
3. Equipment and Maintenance
   - Safety aspects of flight operations (aircraft, SAR)
   - Overview of maintenance program
   - Overview of the management of ASB and AD process
   - Discussion on any significant maintenance challenges
   - Equipment and technology updates and improvements
4. Hazard/Incident Update (Regional/Global)
   - Update on any operational or equipment related incidents
   - Safety performance update on key performance indicators
5. Question and Answer

Afternoon Session II: Helicopter Safety Update

Objective: Various presenters will provide an update on regulatory matters, research and development initiatives, safety performance and industry trends for the purpose of providing OHS Committee members with a comprehensive update on topics related to the safety of offshore travel by helicopter. This session may include:

1. Regulatory Update from the C-NLOPB and Transport Canada
2. CAPP Update
   - Standards, guidelines, research and initiatives
3. Guest Speakers
4. Operator Update
   - Safety Performance
   - Operations Update
5. Question and Answer

APPENDIX E:

Sample Airworthiness Directive

[Federal Register: December 4, 2009 (Volume 74, Number 232)]
[Rules and Regulations]
[Page 63563-63565]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr04de09-6]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2009-1130; Directorate Identifier 2009-SW-40-AD; Amendment 39-16130; AD 2009-25-10]

RIN 2120-AA64

Airworthiness Directives; Sikorsky Aircraft Corporation (Sikorsky) Model S-92A Helicopters

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule; request for comments.

SUMMARY: This amendment adopts a new airworthiness directive (AD) for the Sikorsky Model S-92A helicopters. This action requires a one-time visual inspection of the main gearbox (MGB) lube system filter assembly for oil filter damage. This action also requires if either the primary or secondary oil filter is damaged, replacing both filters, all packings, and the studs before further flight. This AD also requires replacing the oil filter bowl within 30 days after replacing a damaged filter and a daily leak inspection for an oil leak (no oil leaks allowed) during that 30-day interim period. This amendment is prompted by three reports of damaged oil filters or packings resulting from installing the filter assembly with an oversized packing possibly because of incorrect part numbers in the maintenance manual. Based on a previous accident investigation, failure of the oil filter bowl or mounting studs can result in sudden and complete loss of oil from the MGB. The actions specified in this AD are intended to prevent complete loss of oil from the MGB, failure of the MGB, and subsequent loss of control of the helicopter.

DATES: Effective December 21, 2009.

The incorporation by reference of certain publications listed in the regulations is approved by the Director of the Federal Register as of December 21, 2009.

Comments for inclusion in the Rules Docket must be received on or before February 2, 2010.

ADDRESSES: Use one of the following addresses to submit comments on this AD:

- Federal eRulemaking Portal: Go to http://www.regulations.gov. Follow the instructions for submitting comments.
- Fax: 202-493-2251.
- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE., Washington, DC 20590.

- Hand Delivery: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE., Washington, DC 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

You may get the service information identified in this AD from Sikorsky Aircraft Corporation, Attn: Manager, Commercial Technical Support, mailstop s581a, 6900 Main Street, Stratford, CT, telephone (203) 383-4866, e-mail address tsslibrary@sikorsky.com, or at http://www.sikorsky.com.

Examining the Docket: You may examine the docket that contains the AD, any comments, and other information on the Internet at http://www.regulations.gov, or in person at the Docket Operations office between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The Docket Operations office (telephone (800) 647-5527) is located in Room W12-140 on the ground floor of the West Building at the street address stated in the ADDRESSES section. Comments will be available in the AD docket shortly after receipt.

FOR FURTHER INFORMATION CONTACT: Kirk Gustafson, Aviation Safety Engineer, Boston Aircraft Certification Office, Engine and Propeller Directorate, FAA, 12 New England Executive Park, Burlington, MA 01803, telephone (781) 238-7190, fax (781) 238-7170.

SUPPLEMENTARY INFORMATION: This amendment adopts a new AD for the Sikorsky Model S-92A helicopters. This action requires a one-time visual inspection of the MGB lube system filter assembly for oil filter damage. This action also requires if either the primary or secondary oil filter is damaged, replacing both filters, all packings, and the studs before further flight. This action also requires replacing the oil filter bowl within 30 days after replacing a damaged filter and a daily inspection for an oil leak (no oil leaks allowed) during that 30-day interim period. This amendment is prompted by three reports of damaged oil filters or packings resulting from operating with an oversized packing possibly because of incorrect part numbers in the maintenance manual. Sikorsky has issued a temporary revision, T-Rev 63-19, to the maintenance manual to correct any errors. Installing the filter assembly with an oversized packing (also known as an O-ring) in the oil filter double bypass valve can produce excessive assembly and fatigue loads in the oil filter bowl or the mounting studs that secure the oil filter bowl to the MGB. Based on rig testing, these conditions can result in reduced fatigue life in the studs and the oil filter bowl. Based on information from a previous accident investigation, failure of the oil filter bowl or mounting studs can result in sudden and complete loss of oil from the MGB. This condition, if not corrected, could result in complete loss of oil from the MGB, failure of the MGB, and subsequent loss of control of the helicopter.

We have reviewed Sikorsky Alert Service Bulletin (ASB) No. 92-63-018, dated July 1, 2009, and No. 92-63-019, dated July 14, 2009. ASB No. 92-63-018 specifies a one-time visual inspection for a damaged oil filter element. ASB No. 92-63-019 specifies replacing the MGB filter bowl on those helicopters that have previously been found to have a damaged MGB oil filter. ASB No. 92-63-019 also requires a daily visual inspection of the MGB lube system filter assembly for oil leaks (no leaks allowed) until the oil filter bowl is replaced.

This unsafe condition is likely to exist or develop on other helicopters of the same type design. Therefore, this AD is being issued to prevent complete loss of oil from the MGB, failure of the MGB, and subsequent loss of control of the helicopter. This AD requires visually inspecting the oil filter for damage and replacing any filter, packings, and mounting studs before further flight if the filter is damaged. The AD also requires replacing the oil filter bowl within 30 days after a damaged filter has been replaced. Do the actions by following specified portions of the service bulletin described previously.

The short compliance time involved is required because the previously described critical unsafe condition can adversely affect the controllability or structural integrity of the helicopter. Therefore, a one-time visual inspection of the oil filter within 7 days is required. If the visual inspection finds a damaged filter, replacing the damaged filter, packings, and filter bowl mounting studs before further flight are also required. Also, a one-time replacement of the oil filter bowl is required within 30 days

after replacing a damaged oil filter. All of these are very short compliance times. Therefore, this AD must be issued immediately.

Since a situation exists that requires the immediate adoption of this regulation, it is found that notice and opportunity for prior public comment hereon are impracticable, and that good cause exists for making this amendment effective in less than 30 days.

We estimate that this AD will affect 44 helicopters. Assuming a one-time inspection shows no damage to 39 of the helicopters, it will take about 1.5 work hours to remove, inspect, and reinstall each oil filter assembly and packing for 39 helicopters. Assuming oil filter damage is discovered in 5 helicopters, the additional required actions will take about:

- 1.5 work hours to remove, inspect, and reinstall each filter assembly and packing, and
- 3 work hours to replace the mounting studs.

Assuming the bowl replacement is deferred on all 5 helicopters for 30 days, it will take about:

- 15 work hours for 30 daily (.5 work hour each) inspections for leakage, and
- 1 work hour to replace the oil filter bowl.

The average labor rate is $80 per work hour. Required parts will cost about $817 for the oil filter assembly, $81 for the filter bowl mounting studs, and $4,568 for the filter bowl per helicopter. Based on these figures, we estimate the total cost impact of the AD on U.S. operators to be $40,210.

Comments Invited

This AD is a final rule that involves requirements that affect flight safety and was not preceded by notice and an opportunity for public comment; however, we invite you to submit any written data, views, or arguments regarding this AD. Send your comments to an address listed under ADDRESSES. Include "Docket No. FAA-2009-1130; Directorate Identifier 2009-SW-40-AD" at the beginning of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of the AD. We will consider all comments received by the closing date and may amend the AD in light of those comments.

We will post all comments we receive, without change, to http://www.regulations.gov, including any personal information you provide. We will also post a report summarizing each substantive verbal contact with FAA personnel concerning this AD. Using the search function of our docket Web site, you can find and read the comments to any of our dockets, including the name of the individual who sent the comment. You may review the DOT's complete Privacy Act Statement in the Federal Register published on April 11, 2000 (65 FR 19477-78).

Regulatory Findings

We have determined that this AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that the regulation:

1. Is not a "significant regulatory action" under Executive Order 12866;

2. Is not a "significant rule" under the DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and

3. Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

We prepared an economic evaluation of the estimated costs to comply with this AD. See the AD docket to examine the economic evaluation.

Authority for This Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

Adoption of the Amendment

Accordingly, pursuant to the authority delegated to me by the Administrator, the Federal Aviation Administration amends part 39 of the Federal Aviation Regulations (14 CFR part 39) as follows:

PART 39–AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. Section 39.13 is amended by adding a new airworthiness directive to read as follows:

FAA
Aircraft Certification Service

AIRWORTHINESS DIRECTIVE

www.faa.gov/aircraft/safety/alerts/
www.gpoaccess.gov/fr/advanced.html

2009-25-10 Sikorsky Aircraft Corp.: Amendment 39-16130. Docket No. FAA-2009-1130; Directorate Identifier 2009-SW-40-AD.

Applicability: Model S-92A helicopters, serial numbers 920006 through 920109, certificated in any category.

Compliance: Required as indicated, unless done previously.

To prevent complete loss of oil from the main gearbox (MGB), failure of the MGB, and subsequent loss of control of the helicopter, do the following:

(a) Within 7 days, inspect the MGB lube system filter assembly for damage to the primary and secondary oil filters by following the Accomplishment Instructions, paragraphs 3.A.(4) and through 3.A.(6) of Sikorsky Alert Service Bulletin (ASB) No. 92-63-018, dated July 1, 2009 (ASB No. 92-63-018). For purposes of this AD, ''damage" is the presence of those conditions described in paragraphs 3.A.(5) and 3.A.(8) of the Accomplishment Instructions of ASB No. 92-63-018.

(b) If you find damage in the primary oil filter element (part number (P/N) 70351-38801-102) as follows: ''wavy pleats" as depicted in Figure 1, internal buckling or a crack as depicted in Figure 2, or indented dimples as depicted in Figure 3 of ASB No. 92-63-018 or damage in the secondary oil filter element (P/N 70351-38801-103) as follows: ''wavy pleats" as depicted in Figure 4 or an elongated cup as depicted in Figure 5 of ASB No. 92-63-018, replace both the primary and secondary filters, packings, and filter bowl mounting studs, service the transmission and perform a functional test before further flight by following the Accomplishment Instructions, paragraphs 3.C.(1) through 3.C.(23), of ASB No. 92-63-018, except this AD does not require you to return removed studs to HSI nor does it require you to contact the manufacturer. If you find damage in the tapped holes or in the MGB housing lockring counterbore, contact the Boston Aircraft Certification Office for an approved repair.

(c) If you find no damage in the primary or secondary oil filter element, before further flight, replace the packings, service the transmission, and perform a functional test by following the Accomplishment Instructions, paragraphs 3.B.(1) through 3.B.(4) of ASB No. 92-63-018.

(d) For those helicopters on which the primary or secondary oil filter element and filter bowl mounting studs were replaced as required by paragraph (b) of this AD:

(1) Before the first flight of each day until the oil filter bowl, P/N AAC367-16D2A, is replaced, inspect the MGB lube system filter assembly for any oil leak.

(2) Before further flight after any oil leak is detected as required by paragraph (d)(1) of this AD or within 30 days, whichever is earlier, replace the oil filter bowl.

Note: Sikorsky ASB No. 92-63-019, dated July 1, 2009, pertains to the subject of this AD.

(e) To request a different method of compliance or a different compliance time for this AD, follow the procedures in 14 CFR 39.19. Contact the Manager, Boston Aircraft Certification Office, FAA, ATTN: Kirk Gustafson, Aviation Safety Engineer, Engine and Propeller Directorate, FAA, 12 New England Executive Park, Burlington, MA 01803, telephone (781) 238-7190, fax (781) 238-7170, for information about previously approved alternative methods of compliance.

(f) The Joint Aircraft System/Component (JASC) Code is 6300: Main Rotor System.

(g) Inspecting and replacing the main gearbox lube system assembly parts shall be done by following the specified portions of Sikorsky Alert Service Bulletin (ASB) No. 92-63-018, dated July 1, 2009. The Director of the Federal Register approved this incorporation by reference under 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from Sikorsky Aircraft Corporation, Attn: Manager, Commercial Technical Support, mailstop s581a, 6900 Main Street, Stratford, CT, telephone (203) 383-4866, e-mail address tsslibrary@sikorsky.com, or at http://www.sikorsky.com. Copies may be inspected at the FAA, Office of the Regional Counsel, Southwest Region, 2601 Meacham Blvd., Room 663, Fort Worth, Texas or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

(h) This amendment becomes effective on December 21, 2009.

Issued in Fort Worth, Texas, on November 25, 2009.
Lance T. Gant,
Acting Manager, Rotorcraft Directorate, Aircraft Certification Service.
[FR Doc. E9-28863 Filed 12-3-09; 8:45 am]

[1] International Association of Oil & Gas Producers, "A Guide to selecting appropriate tools to improve HSE Culture" (Report No. 435, March 2010), online: <http://www.ogp.org.uk/pubs/435.pdf> [OGP, "Guide"] at p.1.
[2] Aerosafe Risk Management, "Overview of best practice in Organizational & Safety Culture" (Report prepared for the Inquiry, May 2010) [Aerosafe, "Safety Culture"] at p. 14.
[3] Helicopter Operations Task Force, "S-92A Return to Service Assessment: Final Report" (May 5, 2009) at Appendix 1: Helicopter Operations Task Force Charter (Exhibit P-00117-100).
[4] *Ibid.*
[5] OGP, "Guide", *supra* note 1 at p. ii.
[6] *Canada-Newfoundland Atlantic Accord Implementation Act*, S.C. 1987, c. 3; *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act*, R.S.N.L.1990 c. C-2.
[7] Testimony of Paul Sacuta, Joint Operator Panel (January 11, 2010) at p. 59.
[8] Aerospace Risk Management, "Review of Selected Offshore Petroleum Regulatory Regimes" (Report prepared for the Inquiry, May 2010) [Aerosafe, "Regulatory Regimes"] at p. 13.
[9] *Ibid.* at p. 36.
[10] *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act*, S.N.S. 1987, c. 3; *Canada-Nova Offshore Petroleum Resources Accord Implementation Act*, S.C. 1988, c.28.
[11] Governments of Canada, Newfoundland & Labrador and Nova Scotia, "Proposed Amendments to the Accord Acts to Incorporate an Offshore Occupational Health and Safety Regime" (April 2010) at p. 4.
[12] Aerosafe Risk Management, OHSI Presentation on Risk Profile (Exhibit P-00058) at slides 54-57.
[13] *Newfoundland Offshore Drilling and Production Regulations*, SOR/2009-316 [Federal *Drilling and Production Regulations*], s. 5; *Offshore Petroleum Drilling and Production Newfoundland and Labrador Regulations, 2009*, N.L.R. 120/09 [NL *Drilling and Production Regulations*], s. 6.
[14] Joint Operator Panel Presentation (Exhibit P-00116) at slide 42.
[15] *Canadian Aviation Regulations Standard* 325-*Heliports and the Heliport and Helideck Standards and Recommended Practices* (TP 2586E); American Petroleum Institute, *API-RP-2L Recommended Practice for Planning, Designing and Constructing Heliports for Fixed Offshore Platforms*.
[16] Helicopter Operations Manual (Exhibit C-00141) (Suncor); (Exhibit C-00133) (HMDC); (Exhibit C-00149) (Husky).
[17] Federal *Drilling and Production Regulations*, s. 6(c) and NL *Drilling and Production Regulations*, s. 7(c), *supra* note 13.
[18] See Joint Operator Panel Presentation (Exhibit P-00116) at slide 29. 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

[19] Federal *Drilling and Production Regulations*, s. 8 and NL *Drilling and Production Regulations*, s. 9, *supra* note 13.
[20] Aerosafe, "Safety Culture", *supra* note 2 at p. 1.
[21] OGP, "Guide", *supra* note 1at p.1.
[22] Aerosafe, "Safety Culture", *supra* note 2 at p. 10.
[23] Testimony of Paul Sacuta, HMDC (January 18, 2010) at p. 5-7, 36-37; Testimony of John Fraser, HMDC (January 18, 2010) at p. 123-24; Testimony of Gary Vokey, Suncor (January 20, 2010) at p. 18; Testimony of Michele Farrell, Suncor (January 20, 2010) at p. 58-59; Testimony of Brian Stacey, Suncor (January 20, 2010) at p. 83-87; Testimony of Trevor Pritchard, Husky (January 25, 2010) at p. 9, 24-25; Testimony of Don Williams, Husky (January 25, 2010) at p. 124-25; Testimony of Ken Dyer, Husky (Januar y 25, 2010) at p. 167-68;

Testimony of Brian Murphy, CEP (February 9, 2010) at p. 11-12; Testimony of Sheldon Peddle, CEP (February 9, 2010) at p. 104; Testimony of Stan Hussey (February 9, 2010) at p. 229.

[24] Jake Molloy, "The Elusive Culture of Safety" (Paper presented to the Conference on HSE Risk Management & Process Safety for Oil & Gas, Aberdeen, UK, February, 2008), online: <http://www.oilc.org/download/OILC_ProcessSafety.pdf > at p.1.

[25] Aerosafe, "Safety Culture", *supra* note 2 at p. 14.

[26] Presentation of John P. Andrews, C-NLOPB (Exhibit P-00029) at slide 8.

[27] Presentation of Howard Pike, C-NLOPB (Exhibit P-00030) at slides 22, 25-26; Testimony of Howard Pike, C-NLOPB (February 17, 2010) at p. 257-266.

[28] Presentation of Howard Pike, *ibid.* at slides 22, 25-27.

[29] Testimony of Paul Sacuta, Joint Operator Panel (January 11, 2010) at p. 218; Testimony of Paul Barnes, CAPP (November 17, 2009) at p. 73; Testimony of Michele Farrell, Suncor (January 21, 2010) at p. 93.

[30] C-NLOPB, Safety Plan Guidelines, s. 7.1.2.

[31] Aerosafe, "Regulatory Regimes", *supra* note 8.

[32] Testimony of Colonel Paul Drover, DND (January 27, 2010) at p. 153.

[33] Testimony of Colonel Paul Drover, DND (January 28, 2010) at p. 46-50, 78-79.

[34] Testimony of Rick Burt, Cougar (February 3, 2010) at p. 226.

[35] Testimony of Robert Decker (November 5, 2009) at p. 86.

[36] See each Operator's Helicopter Operations Manual, *supra* note 16.

[37] Kelley Consultancy, "Survival After Helicopter Ditching" (December 2000), online: <http://www.docstoc.com/docs/26241455/SURVIVAL-AFTER-HELICOPTER-DITCHING/ > at p. 31. See also Wisense Ltd.'s "Assessment of the Dacon Scoop Rescue System Report" and associated presentation which discussed trials involving the use of the Dacon Scoop in the North Sea. The trials showed that the Dacon Scoop was very effective at picking up personnel from the sea. For example, the results from trials in the Central North Sea were as follows:

- 6 mannequins picked up in 23 minutes at 7.5 metre sea wave height / 38 knots winds
- 5 mannequins picked up in 3 minutes at 5 metre sea wave height / 30 knot winds
- 6 mannequins picked up in 9 minutes at 5 metre sea wave height / 33 knot winds

An analysis of this data suggests that under current sea state standards, passengers in the water after a ditching have a high probability of recovery within a conservative survival period.

[38] For the purpose of the discussion on flotation system, it is understood that the sea state criteria pertaining to the flotation system is defined by the World Meteorological Organization. It states that a Sea State 5 condition involves a wave height of 2.5 to 4 metres and is characterized as "rough". A Sea State 6 condition involves a significant wave height in the range of 4 to 6 metres and is characterized as "very rough seas".

[39] Testimony of Howard Pike, C-NLOPB (February 17, 2010) at p. 178-86.

[40] Testimony of Gary Vokey, Trevor Pritchard and Paul Sacuta, Joint Operator Panel (January 11, 2010) at p. 181-186.

[41] Based on internal data provided by Cougar to the Operators for the 12-month period of July 2009 to June 2010.

[42] Testimony of Paul Sacuta, Joint Operator Panel (January 11, 2010) at p. 225.

[43] Presentation of Robert J. Rutherford, OSSC (Exhibit P-00011) at slide 20.

[44] Joint Operator Panel Presentation (Exhibit P-00116) at slide 83.

[45] *Ibid.* at slide 85.

[46] Susan Coleshaw, "Stress Levels Associated with HUET: The Implications of Higher FidelityTraining Using Exits" (Paper prepared for OPITO, December 2006), online: <http://www.opito.com/uk/library/documentlibrary/huet_stress_report.pdf>. At p. 13, she stated that "[w]hen considering the health impact of stress, the main concern for most people, and the concern with the greatest potential impact is the risk of coronary heart disease."

[47] Joint Operator Panel Presentation (Exhibit P-00116) at slide 78.

[48] See Susan Coleshaw, "Report for the Offshore Helicopter Safety Inquiry" (Report No. SC176, May 2010) (Exhibit P-00213) [Coleshaw, "Report for Inquiry"]. In her report, Ms. Coleshaw provides a tempered view of the requirement for training fidelity. At p. 34, she states:

> *There is much debate regarding the fidelity of training. This may be applied to the similarity of the environmental conditions, the similarity of equipment, and the similarity of tasks undertaken. For example, disorientation is known to be one of the most difficult factors that individuals must learn to cope with in an inverted helicopter. By experiencing disorientation in a controlled environment its impact in a real event can be diminished. However, in a real emergency it might be dark, there could be oil floating on the water, and there may well de damage to the helicopter structure in all but controlled landing on the water. It would therefore not be sensible or practical to recreate all aspects of this environment in training.*

And at p. 35, she notes the view expressed by Michael Taber in relation to HUET fidelity is not universally accepted:

> *That said, it has been argued that exact physical fidelity is not needed. Summers (1996), in a study of procedural skill decay and optimal retraining periods in helicopter underwater escape training, considered that physical fidelity was not necessarily required for effective transfer of training from the simulator to the real environment. She considered that task analysis was more important when identifying the information needed for learning i.e. it was more important to physically go through the actions required to locate an exit and operate the exit mechanism than for the exit door to look like a real exit door. Summers stated that the most important factors in simulator training were operational realism and functional similarity.*

Further, as noted by the Presentation of OSSC (Exhibit P-00011) at slide 44, the purpose of helicopter escape training is to provide offshore workers with exposure to the disorientation that can result from inversion and sinking of a helicopter, and the basic skills to respond to such an event.

[49] *Newfoundland Offshore Area Petroleum Geophysical Operations Regulations*, SOR/95-334, s. 15; *Offshore Area Petroleum Geophysical Operations Newfoundland and Labrador Regulations*, N.L.R. 16/97, s. 15.
[50] Draft Petroleum Occupational Safety and Health Regulations – Newfoundland, s. 12.18.
[51] C-NLOPB, Guidelines Respecting Drilling Programs at p. 20-21.
[52] Canadian General Standards Board (1999), Helicopter Passenger Transportation Suit Systems, CAN/CGSB65.17-99.
[53] Jonathan Power and António Simões Ré, National Research Council of Canada, "Human Performance in Immersion Suits" (May 2010) (Exhibit P-00220) at p. 2.
[54] *Ibid.* at p. 7, 12.
[55] Coleshaw, "Report for Inquiry", *supra* note 48 at p. 7.
[56] Letter from TSB to Transport Canada (9 December 2009) (Exhibit P-00119).
[57] See summary in Michael Taber, "Offshore Helicopter Safety Report" (2010) (Exhibit P-00216) at p. 40.
[58] Coleshaw, "Report for Inquiry", *supra* note 48 at p. 16-17.
[59] *Occupational Health and Safety Act*, R.S.N.L. 1990, c. O-3, ss. 6-7:

> *6. A worker, while at work, shall take reasonable care to protect his or her own health and safety and that of workers and other persons at or near the workplace.*
>
> *7. A worker*
> *(a) shall co-operate with his or her employer and with other workers in the workplace to protect*
> *(i) his or her own health and safety,*
> *(ii) the health and safety of other workers engaged in the work of the employer,*
> *(iii) the health and safety of other workers or persons not engaged in the work of the employer but present at or near the workplace;*
> *(a.1) shall use devices and equipment provided for his or her protection in accordance with the instructions for use and training provided with respect to the devices and equipment;*
> *(b) shall consult and co-operate with the occupational health and safety committee, the worker health and safety representative or the workplace health and safety designate at the workplace; and*

(c) shall co-operate with a person exercising a duty imposed by this Act or regulations.

[60] ASB 92-63-018 (July 2009) – maintenance parts numbering for MGB filter servicing and ASB 92-63-020 (September 2009) – gearbox mounting feet inspection requirements.
[61] Based on internal data provided by Cougar to the Operators for 2009.