



**Department of Exploration & Mineral Projects**

**Aviation Guideline**

---

Revision 7

REVISION STATUS							
TE: TYPE		A - PRELIMINARY	C - FOR KNOWLEDGE	E - CONSTRUCTION	G - AS BUILT		
EMISSION		B - FOR APPROVAL	D - FOR QUOTATION	F - AS PURCHASED	H - CANCELLED		
Rev	TE	Description	By	Check	Appr	Auth	Date
00	A	Draft version – circulated for comment.	NR	ASN	FM	-	02/05/2016
01	B	Aviation Guideline for Aviation Corporative approval.	NR	-	RH	LD	29/08/2016
02	B	Update - page 6 - Operational Risk – FRAT. Update - page 12 - Operational Audits. Update - page 19 - Aircraft Selection.	NR	-	-	LD	17/08/2017
03	B	Added – Helicopter Crash Rescue Locker – Specifications and Contents List (Annex-2 – Page 78) Update – page 62 – Subsection 22.1.1	NR	-	-	LD	16/05/2018
04	B	Update - Page 48 - Figure 2: Dimensions of Standard HLS Approach and Departure Paths (Visual Operations)	NR	ASN	-	LD	19/06/2019
		Update - page 31 - Removed reference to 14 days – 90hrs max hours duty time limitation. Duty time defined within country specific aviation safety legislation.					
		Update – page 19 – Rotor Downwash - selecting long-lines of increased length.					
		Update – page 27 - 10.7 Refresher Training training to be conducted for pilots who have not been flying for a period of 30 days ( <i>Increased to 45 days</i> ) to take into account operations which operate on a 4 week on 4 weeks off pilot roster. <i>(Existing Regulatory requirement requires pilots to undertake refresher training after 3 month = 90 days)</i>					
		Update – page 27 - 10.6 Proficiency Training					
05	C	Update – Section 21.2.3, Page 59 - Use of Opened Drums – Storage of empty fuel drums and number of times drums may be refilled. Update - Flight and Duty Time Limitations - Maximum Hours allowed increased from 11 – 12hrs a day in accordance with Indonesian civil aviation guidelines.	NR	-	-	BE	07/01/2020
06	B	Incorporate Section 25 – Aviation Audit Requirements into Section 8 Operational audits.	ASN	NR	NR	BE	25/09/2020
		Section 8 - Define Vale Exploration as standard to audit to for procurement and recurrent audits					
		Incorporation of Section 26 – Incident, Accident and Hazard Reporting into Section 10 – Safety Management Requirements for Air Service Providers					

		Addition Section 10 – Safety Management requirements for Air Service Providers					
		Addition Section 11 - Quality Management requirements for Air Service Providers					
		Addition of Section 12 – Emergency Response Planning requirements for Air Service Providers					
		Section renumbering and formatting due to addition of new content and use of Vale Heading styles throughout document					
07	B	<p>Complete reissue of Aviation Guideline with Sections reordered to improve logical flow of document. Changes to details within include:</p> <ul style="list-style-type: none"> <li>• New expanded Table of Contents (TOC)</li> <li>• Strengthening and expansion of Quality Management criteria</li> <li>• Strengthening and expansion of Airworthiness criteria</li> <li>• Strengthening and expansion of Maintenance Operations criteria</li> <li>• Redefining of Safety Compliance Audit Scope to match the criteria as detailed within the Aviation Guideline</li> <li>• Audit criteria for recurrent audits now aligned with Safety Compliance Audit Scope</li> <li>• Minor changes to wording throughout document to provide clarity and reduce ambiguity</li> <li>• Removal of Index/ replaced by new TOC.</li> <li>• New expanded Statement of Compliance</li> </ul>	ASN	YF	BE		24/06/2022

ASN: Adam Price - Air Safety Navigators (Aviation Safety Consultants)

FM: Fabio Masotti

LD: Liane Dilda

NR: Nigel Rogers

RH: Rafael Herculano - Corporate Aviation

BE: Bede Evans

YF: Yan Fuadi

## Table of Contents

<b>1</b>	<b>Overview .....</b>	<b>9</b>
<b>2</b>	<b>Scope .....</b>	<b>10</b>
<b>3</b>	<b>Planning .....</b>	<b>10</b>
<b>4</b>	<b>Reference Sources .....</b>	<b>11</b>
<b>5</b>	<b>Procurement Process.....</b>	<b>11</b>
5.1	Engaging Service Providers .....	13
<b>6</b>	<b>Air Service Provider Selection.....</b>	<b>14</b>
6.1	Criteria for Recommendation.....	14
6.2	Aircraft Operators .....	14
6.3	Maintenance Service Providers .....	16
6.4	Insurance .....	16
<b>7</b>	<b>Operational Audits and Compliance Standards for Air Service Providers .....</b>	<b>17</b>
7.1	Audit for Procurement Purposes .....	17
7.2	Safety Compliance Audit Scope .....	17
7.3	Validity of Operator Approval.....	20
7.4	Special Assessments .....	21
7.5	Payment of audit related costs.....	22
7.6	Accepted Industry Auditing Standards – (IOSA, IS-BAO & BARS) .....	22
7.7	Annual Audit Plan.....	23
7.8	Audit Program Management.....	23
7.9	Recurrent Safety Compliance Audit Requirements.....	24
7.10	Remote Audits .....	24
<b>8</b>	<b>Aircraft Selection .....</b>	<b>25</b>
8.1	Definitions of Criteria for Aircraft Selection .....	25
8.2	Selection Criteria for Helicopters.....	26
8.3	Selection Criteria for Fixed Wing Aircraft.....	27
8.4	Single Turbine Engine Fixed Wing Aircraft Requirements.....	27
8.5	Aircraft Types Not Approved for Vale Operations.....	27
8.6	All Aircraft – Required Equipment.....	29
<b>9</b>	<b>Operational Risk .....</b>	<b>30</b>

---

9.1	Flight Risk Assessment .....	30
9.2	Specialist Tasks .....	31
9.3	Environmental Management .....	32
<b>10</b>	<b><i>Quality Management System</i></b> .....	<b>33</b>
10.1	Internal Audit Plan/Schedule .....	33
10.2	Audit Scope .....	33
10.3	Auditor Qualifications.....	33
10.4	Audit Reports.....	34
10.5	Quality System Management.....	34
10.6	Quality Performance Indicators.....	34
10.7	Feedback to the Accountable Manager .....	34
10.8	External Audit Program.....	34
<b>11</b>	<b><i>Safety Management Requirements</i></b> .....	<b>35</b>
11.1	SMS Internal Assurance Processes .....	36
11.2	SMS Training Processes .....	37
11.3	Accident and Incident Reporting Requirements.....	37
11.4	Mandatory Reporting Responsibilities and Protocols.....	38
11.5	Identification & Reporting of Unsafe Conditions.....	38
11.6	Human Factors.....	39
11.7	Drug and Alcohol Policy requirements for Air Service Providers.....	39
<b>12</b>	<b><i>Emergency Response Planning</i></b> .....	<b>40</b>
12.1	Air Service ProviderERP.....	40
12.2	Interface Management.....	41
<b>13</b>	<b><i>Pilot Experience Requirements</i></b> .....	<b>42</b>
13.1	AeroplaneOperations .....	42
13.2	Helicopter Operations.....	44
13.3	Required Pilot’s Licenses .....	44
13.4	Additional Licences, Qualifications and Training.....	45
13.5	Operational Pilots on Multiple Types of Aircraft.....	45
<b>14</b>	<b><i>Aircrew Training and Checking Requirement</i></b> .....	<b>46</b>
14.1	Minimum Annual Training.....	46
14.2	Proficiency Evaluations .....	46

---

14.3	Refresher Training .....	46
14.4	Additional Requirements.....	46
<b>15</b>	<b><i>Aircrew Composition</i></b> .....	<b>47</b>
15.1	Single Pilot Operations.....	47
15.2	Additional Considerations .....	47
<b>16</b>	<b><i>Cabin Crew Requirements</i></b> .....	<b>48</b>
<b>17</b>	<b><i>Ground Crew / Loadmaster / HLO Requirements</i></b> .....	<b>49</b>
17.1	Training Requirements.....	49
17.2	Personal Protective Equipment (PPE).....	50
<b>18</b>	<b><i>Flight and Duty Time Limitations</i></b> .....	<b>51</b>
18.1	Standard Requirements.....	51
18.2	Geophysical Survey & Low-Level Operations.....	51
18.3	Helicopter External Load Operations.....	52
<b>19</b>	<b><i>Helicopter Operations</i></b> .....	<b>53</b>
19.1	Documented Procedures .....	53
19.2	Pilot Experience.....	53
19.3	Structure of Flight Crew .....	54
19.4	External Load Operations .....	54
19.5	Operational Requirements .....	59
<b>20</b>	<b><i>Establishment of On-Shore Helicopter Landing Sites (Ref: ICAO Annex 14 v2)</i></b> .....	<b>62</b>
20.1	Factors to Consider Prior to Using a Helicopter Landing Site.....	62
20.2	Attributes of a Helicopter Landing Site.....	63
20.3	Criteria for Helicopter Landing Sites.....	65
<b>21</b>	<b><i>Fixed Wing Operations</i></b> .....	<b>71</b>
21.1	Pilot Experience .....	71
21.2	Aircraft Fit Out.....	71
21.3	Operational Requirements .....	71
<b>22</b>	<b><i>Passenger and Baggage Requirements</i></b> .....	<b>72</b>
22.1	Passenger Operations .....	72
22.2	Baggage & Cargo Requirements .....	74
22.3	Authority of Crew.....	75

---

22.4	Dangerous Goods.....	75
<b>23</b>	<b><i>Geophysical Survey Operations.....</i></b>	<b>77</b>
23.1	Pilot Experience .....	77
23.2	Towed Bird or Array Operations .....	77
23.3	Aircraft Fit Out.....	78
23.4	Operational Requirements .....	79
<b>24</b>	<b><i>Aerial Photography Operations .....</i></b>	<b>81</b>
<b>25</b>	<b><i>Non-Standard Flight Operations.....</i></b>	<b>82</b>
25.1	Private FlyingOperations .....	82
25.2	Flights Not Sanctioned by Vale Exploration .....	82
25.3	Emergency Flight.....	82
<b>26</b>	<b><i>Airworthiness Standards.....</i></b>	<b>83</b>
26.1	The Maintenance Program .....	83
26.2	Maintenance Data.....	85
26.3	Records.....	85
26.4	Maintenance Planning .....	85
26.5	Minimum Equipment List (MEL) .....	85
<b>27</b>	<b><i>Maintenance Operations .....</i></b>	<b>87</b>
27.1	Standards.....	87
27.2	Maintenance Organisation Procedures.....	87
27.3	Maintenance Records .....	87
27.4	Production Planning .....	88
27.5	Critical Maintenance Tasks .....	88
27.6	Independent Inspections.....	88
27.7	Tool Control.....	89
27.8	Stores and Spare Parts.....	89
27.9	Facilities .....	90
27.10	Licensed Aircraft Mechanical Engineer (LAME) .....	90
<b>28</b>	<b><i>Fuel Facility Requirements .....</i></b>	<b>91</b>
28.1	Drum Storage.....	91
28.2	Quality Control.....	92
28.3	Procedures and Training.....	93

---

28.4	Requirements for Refuelling in Remote Areas .....	94
<b>29</b>	<b><i>Aerodromes and Helipads</i></b> .....	<b>95</b>
29.1	General Requirement.....	95
29.2	Emergency.....	95
29.3	Helipad or Landing Site .....	95
29.4	Inspections .....	96
29.5	Smoking.....	96
<b>30</b>	<b><i>Emergency Management for Vale Facilities</i></b> .....	<b>97</b>
30.1	Air Service Providers Emergency Response Plan .....	97
<b>31</b>	<b><i>Volcanic Ash Clouds</i></b> .....	<b>98</b>
<b>32</b>	<b><i>Service Provider Statement of Compliance</i></b> .....	<b>100</b>
<b>33</b>	<b><i>ANNEXES</i></b> .....	<b>109</b>
33.1	Annexe 1 - ACRONYMS.....	109
33.2	Annexe 2 – Helicopter Crash Rescue Locker – Specifications and Contents List.....	112

---

## 1 Overview

This aviation guideline was developed to provide Vales Department of Exploration & Mineral Projects (Here after referred to as Vale Exploration) management and staff engaged in all Department's areas with a source of reference relating to aviation and more specifically air transport services used to support mineral exploration activities.

The contents of this guideline define the operational requirements, duties and responsibilities related to Aviation Service Providers and Vale Exploration leaders accountable for aviation related contracts. This guideline should be used as a source of reference to assist with both the identification and management of hazards associated with aviation activities. This includes operations directly and indirectly controlled by Vale Exploration as well as associated air operations that potentially expose Vale Exploration employees and contractors to aviation risk.

Vale Exploration is committed to minimising risks associated with its aviation related activities and will wherever possible engage Aviation Service Providers which comply with the standards and expectations defined within this Guideline. Where air service providers are non-compliant with any aspect of this Guideline, risk mitigation measures will be implemented.

Aviation advisors are available on call for aviation technical and safety related matters regarding flight operations. Where there is doubt as to whether an operation or aircraft meets corporate compliance requirements, Vale's Corporate Aviation Area should be contacted and informed of the situation.

Where relevant the content of this document has been aligned to aviation Legislation, Regulations and standards established by the:

- Australian Civil Aviation Safety Authority (CASA)
- Transport Canada Civil Aviation (TCCA)
- Brazilian National Civil Aviation Authorities (ANAC)
- International Civil Aviation Organization (ICAO)

Where current aviation related Legislation, Regulations & Standards are not clearly defined, Vale's Corporate Aviation Area, or an approved Aviation Safety Consultant shall provide clarification.

---

## 2 Scope

The scope of this document extends to the:

- Procurement of Aviation Service Providers
- Use of contracted or chartered aircraft for the transport of passengers and cargo
- Use of contracted or chartered aircraft in specialised aviation operation
- Use of commercial airlines both domestically and internationally
- Aviation ground support services and infrastructure which are owned, operated or controlled by Vale Exploration.

## 3 Planning

When planning to engage an Aviation Service Provider/s the following key points must be considered:

- Aviation operations must be planned with enough lead time to allow appropriate levels of safety management and operational oversight to be implemented
  - Areas intending to utilise aircraft must conduct an initial risk analysis related to the scope, scale and location where the activities are to take place
  - Aviation risk analysis should be undertaken in accordance with the Risk Analysis Guidelines issued by the International Business Aviation Council (IBAC). If necessary, the Corporate Aviation area will be available to support the contracting area to complete the risk analysis process
  - It is important to note that the Risk Analysis Guidelines issued by the International Business Aviation Council (IBAC) deal primarily with passenger operations and not external load or airborne geophysical operations, as such alternate risk analysis methodologies may need to be used
  - Based on the initial risk analysis, the contracting area in conjunction with Vale's Corporate Aviation area should identify suitable aircraft types, required performance and mandatory equipment
  - Aviation Service Providers utilised on a regular or contracted basis are required to undertake and pass an annual aviation safety audit
  - Aviation Service Providers are required to be approved by Vale's Executive Manager Exploration (Americas, Africa & Australasia)
-

## 4 Reference Sources

- IAGSA - International Airborne Geophysics Safety Association
- IOGP 590 – International Association of Oil and Gas Producers Aviation Management Guidelines
- IATA - International Air Transport Association
- IBAC - International Business Aviation Council
- CASA - Civil Aviation Safety Authority
- ICAO - International Civil Aviation Organisation
- Regulations 92, 92A and 93 of the Civil Aviation Regulations 1988 (CAR)
- Part 139 and proposed Part 133 of the Civil Aviation Safety Regulations 1998 (CASR)
- Aeronautical Information Publication (AIP–AD)
- Annex 14, Volume II – Heliports, to the Chicago Convention
- ICAO Heliport Manual (Doc 9261)
- CASA Policy Notice CEO PN025-2005
- VALE – (PGS-002981) – Aviation Safety Critical Controls.

## 5 Procurement Process

The following procurement process has been developed to ensure that all relevant stakeholders understand and comply with Vale Explorations procurement process.

Step 1. Exploration managers should determine the type of aviation services / aircraft that will be required to support the project and other operational requirements. This step should also include a preliminary risk assessment to ensure that risks associated with the proposed scope of work are identified.

Step 2. After determining that aviation support will be required for the project. Vale's list of approved aviation service providers should be consulted to determine whether any local aviation service providers have been 'pre-approved' as being suitable service providers by Vales Corporate Aviation Area.

Step 3. If a local Aviation Service provider has previously been approved by Vales Corporate Aviation Area, the procurement process can commence. If the service provider has not been previously approved by the Corporate Aviation Area, the approval process should be conducted by the contracting area with the support of the Corporate Aviation Area.

In both cases, the validity of the approval, as well as the annual audit plan should be defined in consultation with Vales Corporate Aviation Area to ensure that the companies are approved during the agreement term.

---

Vale's Corporate Aviation Area will revalidate the approval of the aviation service provider if required, however if revalidation of a service provider is not scheduled to occur within the required period, the contracting area should request support for the revalidation process from the Corporate Aviation Area at least three months in advance.

Step 4. Potential service providers are contacted, and the pre-qualification process undertaken to form a shortlist of company's capable of providing services to Vale Exploration.

Step 5. Tenders are circulated to prospective service providers.

Step 6. Completed tender documentation and supporting material such as technical proposals submitted by prospective Aviation Service Providers will be evaluated by Vales Corporate Aviation Area. The evaluation will determine the standard of compliance with established technical requirements.

Aviation technical assessments utilise IS-BAO/BARS/IOSA safety audit report, air operator documents, contract bidding specifications and FSF' BARS standards as technical references.

It is important to note that aviation technical assessments do not cover Health & Safety or other Vale requirements. It will be necessary to engage the services of an Aviation Safety consultant to ensure that potential aviation service providers comply with industry and Vale standards.

In some instances, 'especially when dealing with smaller service providers', expenses associated with compliance auditing may need to be covered by Vale.

Aviation Service Providers are required to submit the following documents for evaluation:

- Activities generic description
  - Audit Report (IOSA / IS-BAO or BARS)
  - Hazard identification and Risk analysis
  - Hazard Register for the scope of the company's activities
  - Fatigue prevention plan
  - Emergency response plan
  - Air Operator Operational Specifications
  - SMS approval by the Civil Aviation Authority
  - Air Operator Certificate
  - Aircraft Registration and Airworthiness certificates
  - Insurance policy / certificates of currency
  - Pilots and mechanics certificates of technical qualifications and experience profile
  - Pilots and mechanics training for the previous 12-month period
-

## 5.1 Engaging Service Providers

The engagement of Aviation Service Providers must be undertaken in accordance with current Vale protocols.

Prior to the commencement of aviation activities, the following documents must be provided by the Aviation Service Provider:

- Operational Risk Analysis, covering operations, ground support, maintenance, logistics, installations, environment protection, suppliers, and security
- Verification of the effectiveness of controls implemented to mitigate risk
- Aviation Emergency Response Plan, for flight following, search and rescue, family assistance & communications with Vale Explorations contract manager
- Documents proving the qualifications and levels of experience of pilots
- Certificates of Currency for existing insurance policies
- Air Operators Certificate issued by a recognised civil aviation regulatory authority
- Safety Management System Manual.

Provisions must be incorporated into each contract regarding the provision of the documentation.

---

## 6 Air Service Provider Selection

The selection of Aviation Service Providers will be determined according to the:

- The specific needs of Vale Exploration
- Capability of the operator to provide a consistently safe and high-quality service
- Air service providers relevant experience and operating history
- Air service providers accident and incident history
- Type and suitability of aircraft
- Availability of backup aircraft.

### 6.1 Criteria for Recommendation

Vales Corporate Aviation Areas operational standards are aligned to those required for IATA Operational Safety Audit (IOSA), International Standard for Business Aircraft Operations (IS-BAO) and Basic Aviation Risk Standard (BARS) as audit parameters. IOSA, IS-BAO, IOGP 590 and BARS certifications are recognised by Vales Corporate Aviation Area as valid for recommending operators as Aviation Service Providers to Vale.

Additional operators without alignment to the above standards may be considered as Aviation Service Providers to Vale. Qualification for consideration will be dependent on a review of the operator by the Vale aviation consultant and with the express knowledge and approval of Vale's Executive Manager Exploration (Americas, Africa & Australasia).

### 6.2 Aircraft Operators

Aviation Service Providers must be approved by Vales Corporate Aviation area, which requires that the service provider:

- Pass an aviation safety compliance audit within the previous 6 months. Audits must be conducted by an approved aviation safety advisor(s)
  - Hold all required government approvals / certification / licenses to operate in the region of operation
  - Hold current insurance policies as specified in Vale Exploration aviation contracts or service agreements
  - Supply where possible aircraft which has been owned, or rented for a period in excess of 12 months, by the service provider
  - Maintain full control over air operations, aircraft maintenance programs and pilots and mechanics training programs
  - Not outsource aircraft, pilots or mechanics, without the contract manager's formal permission and Corporate Aviation technical validation
-

In addition, Aviation Service Providers will have the following documentation / systems in place:

- An effective, functioning Safety Management System, inclusive of a hazard register applicable to the scope of the company's operations
- An effective, functioning Quality Management System
- Emergency Response Plan which includes Vale Exploration, 24-hour contact details
- Operations manuals covering the full scope of the proposed operations
- Procedures for the Carriage of Dangerous Good
- Drug and Alcohol Management Plan
- Satellite Tracking / Flight Following System - Every air operation must be monitored and followed by the operator
- A satisfactory induction process for personnel involved in both conventional and specialised operations

Aviation Service Providers will operate at all times in accordance with legislative & regulatory requirements and in the case of flight operations in accordance with the manufacturers approved flight manual.

All serious occurrences/incidents and accidents involving Aviation Service Providers must be reported to Vale Explorations management representative immediately.

Aviation Service Providers shall provide a statement of compliance with regard to this document prior to contracted operations commencing.

---

### 6.3 Maintenance Service Providers

In the case where aircraft maintenance services are provided by a third party the Aircraft Operator must be able to demonstrate how they maintain quality assurance of the maintenance process and arrange formal access to the third party organisation to enable their services to be audited to this standard.

### 6.4 Insurance

Aviation Service Providers must possess and maintain insurance coverage as specified in the Contract Service Agreement or applicable service contract which includes Vale Exploration as an additional insured with respect to the liability incurred as a result of the negligent acts or omissions of the Supplier and include as a minimum:

- Third party insurance coverage of a minimum of Twenty Million Australian Dollars for any one accident and a minimum of US\$500,000 for each single passenger seat
- Workers compensation insurance including unlimited common law liability for personnel.

## 7 Operational Audits and Compliance Standards for Air Service Providers

### 7.1 Audit for Procurement Purposes

In addition to the examination of Flight and Maintenance procedures, Companies providing aviation services to Vale Exploration are required to have the standard of their Quality Assurance and Safety Management Systems verified by an approved Aviation Safety Consultant, prior to being approved as a service provider to Vale Exploration.

Additionally, specialist aviation service providers who are engaged by Vale to undertake airborne geophysical surveys are required to be current members of the International Airborne Geophysics Safety Association (IAGSA).

### 7.2 Safety Compliance Audit Scope

The scope of the Safety Compliance Audit is to assess service provider's documents, procedures, aircraft and facilities for compliance to the standards as published in the Vale Exploration Aviation Guideline. Approved safety auditors shall review each service provider's documentation and manuals, personnel and training records, and aircraft technical information prior to engagement for compliance in the following areas:

- Aircraft Selection (refer Section 8)
    - Selection Criteria for Helicopters
    - Selection Criteria for Fixed Wing Aircraft
    - All Aircraft – Required Equipment
  - Operational Risk – (refer Section 9)
    - Operational Risk Assessments
    - Individual Flight Risk Assessments
    - Specialist Task Risk Assessments
    - Environmental Management
  - Quality Management Systems (refer Section 10)
    - Internal Audit Plan
    - Audit Scope
    - Auditor Qualifications
    - Audit reports
    - Quality System Management
    - Quality Performance Indicators
    - Feedback to Accountable Manager
    - External Audit Program
-

- Safety Management Requirements (refer Section 11)
    - SMS internal Assurance Processes
    - SMS Training Processes
    - Accident and Incident Reporting Processes
    - Mandatory Reporting Responsibilities
    - Identification and Reporting of Unsafe Conditions
    - Human Factors
    - Drug and Alcohol Policy Requirements
  - Emergency Response Planning (refer Section 12)
    - Air Service Provider ERP
    - Interface Management
  - Pilot Experience Requirements (refer Section 13)
    - Aeroplane Operations
    - Helicopter Operations
    - Required Pilots Licences
    - Additional Licences, Qualifications and Training
    - Operational Pilots on Multiple Types of Aircraft
  - Aircrew Training and Checking Requirements (refer Section 14)
    - Minimum Annual Training
    - Proficiency Evaluations
    - Refresher Training
    - Additional Requirements
  - Aircrew Composition (refer Section 15)
    - Single Pilot Operations
    - Additional Considerations
  - Cabin Crew Requirements (refer Section 16)
  - Ground Crew/Loadmaster/HLO Requirements (refer Section 17)
    - Training Requirements
    - Personal Protective Equipment
  - Flight and Duty Time Restrictions (refer Section 18)
    - Standard Requirements
    - Geophysical Survey and Low Level Operations
    - Helicopter External Load Operations
-

- Helicopter Operations (refer Section 19)
    - Documented Procedures
    - Pilot Experience
    - Structure of Flight Crew
    - External Load Operations
    - Operational Requirements
  - Establishment of Onshore Helicopter Landing Sites (refer Section 20)
  - Fixed Wing Operations (refer Section 21)
    - Pilot Experience
    - Aircraft Fit Out
    - Operational Requirements
  - Passenger and Baggage Requirements (refer Section 22)
    - Passenger Operations
    - Baggage and Cargo Requirements
    - Authority of Aircrew
    - Dangerous Goods
  - Geophysical Survey Operations (refer Section 23)
    - Pilot Experience Requirements
    - Towed Bird or Array Operations
    - Aircraft Fit Out
    - Operational Requirements
  - Aerial Photography (refer Section 24)
  - Non Standard Flight Operations (refer Section 25)
  - Airworthiness Standards (refer Section 26)
    - Maintenance Program
    - Maintenance Data
    - Records
    - Maintenance Planning
    - Minimum Equipment List
-

- Maintenance Operations (refer Section 27)
  - Standards
  - Maintenance Organisation Procedures
  - Production Planning
  - Critical Maintenance Tasks
  - Independent Inspections
  - Tool Control
  - Stores and Spare Parts
  - Facilities
  - Licensed Aircraft Maintenance Engineers
- Fuel Facility Requirements (refer Section 28)
  - Drum Storage
  - Quality Control
  - Procedures and Training
  - Requirements for Refuelling in Remote Areas
- Aerodromes and Helipads (refer Section 29)
  - General Requirements
  - Emergency
  - Helipad or Landing Site
  - Inspections
  - Smoking
- Emergency Management for Vale Facilities (refer Section 30)
  - Air Service Providers ERP
- Volcanic Ash Clouds (refer Section 31)

### 7.3 Validity of Operator Approval

Aviation Service Providers who successfully pass the initial compliance audit shall be registered as authorised suppliers of aviation services to Vale for the term of the contract or two years (whichever is less). It is important to note that at any time during the two-year period a company may be struck from the list of approved service providers if poor compliance standards are identified during scheduled six-monthly safety compliance audits.

Company's which have Opportunities for Improvement (OFI's) recorded in their audits shall submit proof that the OFI's were corrected within agreed time frames.

---

### 7.3.1 Suspension of Operator

In the event of an accident Aviation Service Providers shall be suspended from providing services to Vale Exploration. After a detailed accident investigation has been completed and contributing factors have been analysed, Vales Corporate Aviation Area in conjunction with Vale Explorations management will determine whether the service provider can recommence providing aviation services or not. Approval to recommence operations must be provided by the Executive Manager Exploration (Americas, Africa & Australasia).

Aviation Service Providers will also be suspended in the event that the service providers company should be added to the list of companies prohibited from flying within the European Community territory.

## 7.4 Special Assessments

### 7.4.1 Aviation Service Providers which do not meet the requirements

In cases where an exploration area requests air transport services and available Aviation Service Providers do not meet Vale's requirements, an operational risk analysis should be carried out by an approved Aviation Safety Specialist or Vales Corporate Aviation Area. An action plan should be developed and implemented to address any Opportunities for Improvement (OFI) identified.

### 7.4.2 Desktop Compliance Evaluations

In cases where insufficient time has been allocated to carry out a full compliance audit of Aviation Service Providers, a 'desktop' audit of the Aviation Service Provider's management systems and staff may be undertaken by an approved Aviation Safety Specialist or Vales Corporate Aviation Area at the discretion of Vale Exploration's director.

The 'desk-top' audit will focus on the service providers:

- Operating approvals and insurance
  - Safety Management System
  - Flight Operations Processes and Procedures
  - Maintenance Management System
  - Pilot experience and certification
  - Aircraft mechanics experience, certification and compliance with Vale standards.
-

If the desk-top audit reveals the service providers systems are of a suitable standard the Aviation Service Provider will be required to develop an action plan to address any OFI's identified during the audit. A desktop audit is valid for only a single flight operation.

#### 7.4.3 Corporate Aviation Safety Assessment

Vales Corporate Aviation Operational Safety Manager will perform a safety assessment of Aviation Service Providers when the aviation operation involves sensitive risks which fall outside the scope of standard aviation related activities.

#### 7.4.4 Operations with Executive Directors

Aviation operations involving one or more Executive Directors must be evaluated by Vale's Corporate Aviation Area for the risks related to the aircraft, crew and operational environment.

#### 7.4.5 Operations with VIP guests

Aviation operations involving one or more VIP guests should be evaluated by Vale's Corporate Aviation Area for the risks related to the aircraft, crew and operational environment.

### 7.5 Payment of audit related costs

Aviation Service Providers wishing to provide services to Vale Exploration are expected to contract certified auditors to conduct either IOSA, IS-BAO or BARS audits. Costs associated with the auditing process and associated annual re-certification fees will be covered by the service provider.

### 7.6 Accepted Industry Auditing Standards – (IOSA, IS-BAO & BARS)

Aviation Service Providers which have been audited and certified using the IOSA, IS-BAO and BARS audit systems / standards, whilst acknowledged in the procurement process, will only be approved to provide services to Vale Exploration subject to an evaluation of the Safety Compliance Audit report by Vales Corporate Aviation Area:

- IOSA - The IATA Operational Safety Audit (IOSA) program is an internationally recognised and accepted evaluation system designed to assess the operational management and control systems of an airline.
  - IS-BAO - The International Standard for Business Aircraft Operations (IS-BAO), developed by the International Business Aviation Council (IBAC) and its member associations, is a recommended code of best practices designed to help flight departments worldwide achieve high levels of safety and professionalism.
  - IS-BAO is an industry standard that provides standards based on the ICAO Standards and Recommended Practices (SARPS). Both the FAA and CAA in Canada recognise IS-BAO as meeting the ICAO standard. The European Committee for Standardization (CEN) also recognises IS-BAO as an industry standard for business aircraft operations.
  - IS-BAO was amended in 2012 to facilitate implementation by helicopter operators. This was a joint effort between IBAC, the helicopter associations HAI, BHA and EHA
-

- BARS – (Basic Aviation Risk Standards) is a risk-based model framed against the actual threats posed to aviation operations, particularly those that occur within challenging and remote environments. It directly links these threats to associated controls, recovery and mitigation measures.

## 7.7 Annual Audit Plan

Vales Corporate Aviation Area will establish an annual compliance audit plan. Audit plans will be forwarded to the relevant contract manager within four weeks of an aviation service contact being implemented.

## 7.8 Audit Program Management

### 7.8.1 Coordination

Vale's Corporate Aviation Area is responsible for managing the audit program for Aviation Service Providers engaged to provide services to exploration projects located in International Areas.

Vale's Corporate Aviation Area will be called upon for technical support as required.

### 7.8.2 Audit Frequency

Should an aviation service provider be engaged for extended periods, safety compliance audits will be required every six months.

### 7.8.3 Auditors

Companies contracted by Vale Exploration, will be selected through a bidding process among companies certified for IOSA, IS-BAO and/or BARS audits. The inclusion of companies previously utilised by Vale Exploration for conducting safety compliance audits will also be considered (see Note). Vale Exploration will manage the procurement process to select an aviation safety auditing company.

Auditors should be aware of:

- ICAO air transport standards
- Responsibilities of air transport companies
- Vale's internal rules for air transportation.
- Auditors must have successfully completed and certified as an auditor for one of the following: Standards: ISO, RABSQ, ICAO, IS-BAO, BARS.

Note: Vale's Corporate Aviation area may provide authorisation for suitably experienced technical staff who have completed a recognised aviation safety and security training program to conduct aviation safety compliance audits. Auditors that have previously completed audits and demonstrated sound judgement on behalf of Vale Exploration will be considered as suitably experienced.

---

## 7.9 Recurrent Safety Compliance Audit Requirements

Aviation Service Providers and maintenance service providers utilised by Vale Exploration are required to participate in and provide all requested documentation during scheduled 6 monthly safety compliance audits.

The audit process will assess compliance to this guideline utilising the scope detailed in Section 7.2. Additionally recurrent audits will be risk based considering results from previous audits, testing the effectiveness of corrective actions taken, and investigating areas from which hazard and occurrence reports have been generated in the preceding 6 months.

### 7.10 Remote Audits

Vale recognises that the use of Remote Audit techniques may need to be employed due to local social, environmental or community health restrictions. The use of remote audits should not negate the need for onsite auditing. Wherever possible onsite audits should be conducted.

## 8 Aircraft Selection

### 8.1 Definitions of Criteria for Aircraft Selection

#### 8.1.1 Hostile Environment

Means an environment in which:

- A safe forced landing cannot be accomplished because the surface is inadequate
- The helicopter occupants cannot be adequately protected from the elements
- Search and rescue response/capability is not provided consistent with anticipated exposure
- There is an unacceptable risk of endangering persons or property on the ground. The following areas shall also be considered hostile:
  - For overwater operations, the open sea areas north of 45N and South of 45S designated by the authority of the State concerned
  - Any overwater flight more than 25nm from land
  - Those parts of a congested area without adequate safe forced landing areas. (EASA Definition).

#### 8.1.2 Poor Weather Conditions

Poor weather would be similar to or is Instrument Meteorological Conditions (No Visual Conditions).

#### 8.1.3 Instrument Meteorological Conditions (IMC)

Is an aviation flight category that describes weather conditions that require pilots to fly primarily by reference to instruments, and therefore under instrument flight rules (IFR), rather than by outside visual references under Visual Flight Rules (VFR). Typically, this means flying in cloud or bad weather.

It is important not to confuse IMC with IFR (instrument flight rules) – IMC describes the actual weather conditions, while IFR describes the rules under which the aircraft is flying. Aircraft can (and often do) fly IFR in clear weather, for operational reasons or when flying in airspace where flight under VFR is not permitted. Commercial flights are generally operated solely under IFR.

#### 8.1.4 International Operations

Operations from one country to another.

#### 8.1.5 Inadequate Landing Site

Landing site considered inadequate during the mission planning. The risk analysis should define exposure to specific types of aircraft emergencies and the suitability of potential landing sites in the region.

---

#### 8.1.6 Inadequate Search & Rescue

Search and Rescue is considered inadequate if search and rescue response/capability is not provided consistent with potential exposures considered in the risk assessment.

#### 8.1.7 Inadequate Flight Following

Flight following is considered inadequate if the operator is not able to inform about the aircraft departures, landings and locations during the flight.

#### 8.1.8 Inadequate Crashworthiness

Crashworthiness is considered as inadequate if the aircraft is not designed to protect the passengers and crew in case of crash.

### 8.2 Selection Criteria for Helicopters

Single engine helicopters are considered suitable to support exploration related activities in regions where suitable alternate landing sites are either limited or unsuitable and / or in hostile environments.

If single engine helicopters are to be used, consideration should be given to selecting helicopters which are designed with a higher level of system redundancy, to reduce the likelihood of a mechanical or electrical failure compromising the safety of the aircraft. Vales Corporate Aviation area has indicated that Airbus AS350-B3 or H125 should be used where possible as these helicopters are equipped with triple FADEC and optional dual hydraulic systems.

Should it be determined that a multi-engine helicopter is required, it is important to recognise that in some cases larger multi-engine helicopters such as the BK117-850D2 while potentially offering an increased level of system redundancy, may not be suitable due to the increased rotor downwash<sup>1</sup> and the physical dimensions of the aircraft, this is especially relevant when supporting projects which are in heavily forested areas.

In such circumstances, consideration should be given to using a 'light' multi-engine helicopter such as the Airbus H135 or Eurocopter EC135P3 / T3 which produce less downwash than larger multi-engine helicopters.

Additional information is available in Section 19.4.9.

<sup>1</sup> When transporting external loads hazards associated with increased downwash may be countered by selecting long-lines of increased length.

---

### 8.3 Selection Criteria for Fixed Wing Aircraft

The following order of preference shall be considered when selecting fixed wing aircraft for charter flight transportation of passengers:

- Multi-engine, jet powered
- Multi-engine, turbine powered
- Multi-engine, piston powered
- Single-engine, turbine powered
- Preference shall be given to airlines or charter companies with a proven safety commitment and historical record.

### 8.4 Single Turbine Engine Fixed Wing Aircraft Requirements

Single Engine Turbine Fixed Wing Aircraft shall only be used for passenger transportation when:

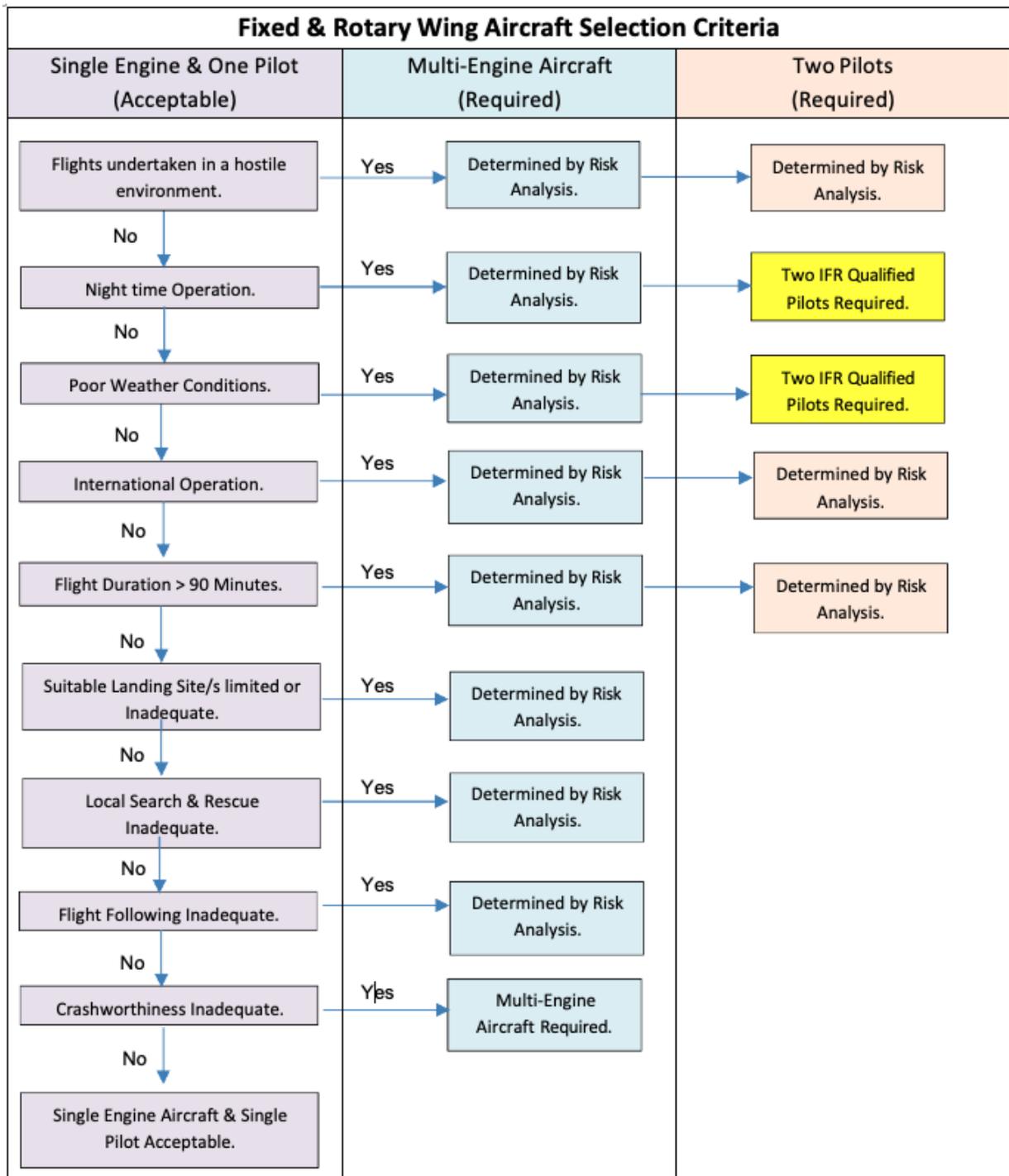
- A suitable twin-engine aircraft is not available
- Single Engine Turbine Aircraft are required to have an Engine Condition Trend Monitoring (ECTM) system in place
- Aircraft are equipped with a fully functional satellite tracking system or a flight following system is in place including scheduled position reports, logged with an approved ground facility with redundant communication equipment
- The Flight is subject to a flight plan, lodged with the local air traffic control authority
- The operator is required to submit a Job Safety Analysis for the proposed operation
- The aircraft is fitted with upper torso restraint for all crew and passengers
- The aircraft carries the fit out as described in All Aircraft
- The aircraft is equipped with a functional Weather Radar
- The aircraft is equipped with an approved serviceable IFR GPS
- The flight is to be planned, such that in the case of an engine failure a forced landing can be reasonably assured
- Search and Rescue capability is established in the area of operations during daylight and conducted VMC.

### 8.5 Aircraft Types Not Approved for Vale Operations

The following aircraft are not approved for passenger use for Vale Exploration:

- Military registered aircraft
  - Single engine piston helicopters – In the case of there being no viable alternative, the use of single engine piston helicopters requires the approval of Vale’s Executive Manager Exploration (Americas, Africa & Australasia)
-

- Eastern Bloc aircraft. The use of Mil 8 Helicopters requires the approval of Vales Corporate Aviation Area & Vale’s Executive Manager Exploration (Americas, Africa & Australasia).



## 8.6 All Aircraft – Required Equipment

Must be equipped with:

- In the case of Helicopters and Fixed Wing aircraft with less than 10 passenger seats a GPS Satellite Tracking device capable of 1-minute reporting intervals, which can be monitored through web based software by the service provider as well as Vale Exploration. In the case of Fixed Wing aircraft with more than ten (10) passenger seats a Flight Following Procedure approved by the contracted aviation safety advisor
  - Contracted aircraft must wherever possible, be equipped with a navigation system that has a moving map display
  - An Airframe mounted Emergency Locator Transmitter (ELT) meeting Technical Standing Order TSO-C126a standard (406 MHz) or higher
  - For helicopters, the ELT must have a six way 'G' switch
  - A fully functional aviation approved IFR GPS (with moving map display) in addition to any required navigation aids
  - Weather Radar for IFR operations
  - Aircraft with a takeoff mass greater than 5700kg shall be fitted with TAWS/EGPWS, CVR, FDR and TCAS
  - A fully functional primary and backup communication system capable of always contacting the operational base and field parties where required by the scope of work
  - Passenger Briefing Cards specific to that type of aircraft with clear instructions and diagrams in English and the common local language if it differs
  - A First Aid Kit appropriate for the number of persons on board
  - Survival kit appropriate for the regional conditions and enough for the number of persons on board, for a minimum of two days
  - Approved aviation life jackets and raft for overwater flights enough for the number of persons on board plus two
  - Aircraft above 5700kg must meet balanced field length requirements
  - The aircraft must be equipped with forward or backward facing seats only
  - Multi engine turbine aircraft must be equipped with a fully functioning automated fire suppression system
  - Pressurised aircraft should be fitted with an aural cabin altitude alarm.
  - All modifications to the aircraft must have been certified by the aviation regulatory authority in which the aircraft is registered and must include a flight manual supplement specific to the operational criteria
-

## 9 Operational Risk

Aviation Service Providers on contract to Vale Exploration will be expected to submit an operational risk assessment for the proposed flight operations prior to flight operations commencing. The risk assessment shall include but not be limited to:

- Flight Routing and Planning
- Fuel Dispensing, and Quality Requirements
- Aerodrome Requirements including security, serviceability and animal hazards
- Meteorological Conditions including Volcanos (Volcanic Ash Clouds)
- Dangerous Goods
- Passenger Handling
- Aircraft operating and reserve fuel requirements
- Aircraft Performance
- Ground Operations
- Emergency Response
- Aircraft Traffic Management
- Maintenance Operations
- Community Concerns
- Political Concerns.

Aviation Service Providers will be expected to detail the control measures which will be implemented to mitigate the risks identified in the risk assessment to a level as low as is reasonably practicable (ALARP). Audits and inspections conducted by aviation safety advisors engaged by Vale Exploration shall include checking the control measures adopted by the Aviation Service Provider to mitigate identified risks are both appropriate and functional.

The risk analysis shall be validated by Vales Corporate Aviation Area and the control measures should be monitored by Vale's contract manager.

### 9.1 Flight Risk Assessment

Flight Risk Assessments are required to be completed by pilot's prior commencing flight operations on a daily basis and/or prior to non-routine flights. Flight risk assessments will be undertaken using Vales Flight Risk Assessment Tool (FRAT). Copies of completed assessments shall be forwarded to Vales representative prior to flight commencing.

---

## 9.2 Specialist Tasks

Aviation Service Providers conducting specialised tasks such as but not limited to helicopter external load operations or geophysical surveys will be required to submit a detailed operational risk assessment prior to the commencement of operations. Geophysical surveys shall be undertaken in accordance with International Airborne Geophysics Safety Associations (IAGSA) guidelines and standards.

Risk assessments must include all specialist aviation related tasks and operational requirements specific to the project and scope of work being undertaken and must include but not be limited to the following:

### 9.2.1 Environmental

- Density and operating altitude
- Operating environment
- Local meteorological conditions.

### 9.2.2 Facilities

- Search and Rescue response and availability
- Suitable accommodation
- Medical facilities
- Communications.

### 9.2.3 Technical

- Performance margins with regard to topography
- Restricted size helicopter landing areas
- Minimum safe heights
- Applicability and suitability of aircraft for the proposed task
- Design of towed array or bird systems
- Aircraft operating and reserve fuel requirements
- Safe towing speed for external load or bird operations
- Operations in helicopter airspeed/height 'avoid areas'
- Lifting Equipment.

### 9.2.4 Political

- Indigenous and local communities
  - Military presence
  - Government stability.
-

### 9.2.5 Operational

- Fuel supply and storage facilities
- Ground personnel handling external loads
- Airspeed drupe monitoring plan for geophysical survey operations
- Remote aerodrome operations.

### 9.2.6 Human Factors

- Fatigue management
- Community partner expectations and concerns
- Operations outside of this guideline
- Duration of project.

## 9.3 Environmental Management

Vale Exploration requires Aviation Service Providers to implement an environmental protection management system which as a minimum must incorporate the following key points:

- Control of emissions into the atmosphere
- Reduction of aircraft noise
- Solid & liquid waste management
- Conservation of energy and water
- Control of discharges onto the ground
- Environment emergency response.

It should be noted that Environmental Management requirements will not be audited during recurrent aviation compliance audits however, any breaches observed during the process will be notified to Vales Corporate Aviation Area.

---

## 10 Quality Management System

The air service provider will have in place an effective quality assurance program, the scope of which at minimum includes the following.

### 10.1 Internal Audit Plan/Schedule

The Air Service Provider shall provide evidence of an internal audit plan appropriate to the size and scale of the operation. The audit plan or schedule should cover all departments including Flight Operations and Training, Airworthiness and Maintenance Control, Engineering Practices, Procedures and Training, Ground Operations, specialised operations such as External Loads and Aerial or Geophysical Survey, and Safety and Quality Management.

### 10.2 Audit Scope

Audits shall focus on appropriate processes, procedures, documentation, training and records. Audits scope will additionally be determined using the results of previous audits and the effectiveness and implementation of corrective actions.

#### 10.2.1 Facilities Audits

The audit schedule will include physical audits of remote bases, engineering facilities and engineering stores.

#### 10.2.2 Aircraft Audits

Aircraft audits shall be included in the audit schedule. These audits, often referred to as Ramp Checks may be completed by aircrew and are used to ensure the aircraft is carrying the correct documentation and safety equipment. Additionally, a review of the current Maintenance Release, Minimum Equipment List and Deferred Defects Log should be completed.

#### 10.2.3 Sample Aircraft Airworthiness Audit

At minimum an airworthiness review on a sample aircraft shall be performed annually to ensure the correct application of Airworthiness Directives, Service Bulletins and other Instructions for Continuing Airworthiness. Additionally, sampled entries from workpacks should be crosschecked with logbook entries.

#### 10.2.4 Regular review of compliance to Vale Aviation Guideline

The Air Service Provider shall be able to show a regular review process that examines compliance with the Vale Aviation Guideline and contractual expectations.

### 10.3 Auditor Qualifications

The Air Service Provider shall have acting in the capacity of Quality Manager a person holding at minimum Lead Auditor Qualifications or equivalent.

Auditors assisting the quality manager will preferably hold auditing qualifications or at minimum appropriate industry experience.

---

Competency of those personnel conducting audits shall be assessed, at minimum, every two years. Competency evaluations may be conducted through a peer review process.

#### 10.4 Audit Reports

An Audit Report shall be produced for every audit conducted. The report will summarise the areas examined and note deficiencies discovered. Deficiencies should refer to the regulation or internal document to which the non-compliance relates. Audit reports should be distributed to the relevant manager for assessment and corrective action. The Quality Manager should be informed of the Corrective Action planned.

Each finding or deficiency noted should be rated for risk. Those with a higher risk rating should be investigated for root cause. Appropriate time for rectification shall be assigned to each finding proportional to the rating of the associated risk.

#### 10.5 Quality System Management

Quality Assurance processes shall be managed through a dedicated Quality Manual or through an appropriately detailed section of the Air Service Provider's Safety Management System or Flight Operations manual.

#### 10.6 Quality Performance Indicators

The Air Service Provider shall track the performance of the Quality Management System through the measurement of, amongst others, the following parameters:

- The completion of scheduled audits on time
- Closure of findings through appropriate corrective actions within the defined time scale.

#### 10.7 Feedback to the Accountable Manager

The audit process shall include an effective system of feedback to the Accountable Manager to ensure they have effective oversight of audit results, findings and timely corrective actions.

#### 10.8 External Audit Program

Air Service Providers shall also be able to provide evidence of an external audit program that satisfactorily examines the providers of external services and products to their organisation. In the case of Flight Operations, this shall include:

- Fuel suppliers
- Ground handling service providers

In relation to Engineering operations this shall include:

- Suppliers of Aviation Parts
- Suppliers of Engineering services

Audits may take the form of a vendor approval process. Caution should be displayed to ensure an approval granted by the Air Service provider does not exceed the validity dates on any regulatory approvals the vendor may hold.

---

## 11 Safety Management Requirements

The Safety Management System (SMS) is a key function of an air service providers management system and provides a structured and integrated approach to the identification and control of hazards and risk across the scope of the organisation and its operations.

The air service provider must have a functional and effective SMS in place. This will be reviewed in detail during audit.

The SMS should be able to demonstrate conformity with the requirements and guidelines of CASA and ICAO (International Civil Aviation Organisation) and at minimum will include policy and procedures for the following:

- Safety Policy, Planning and Objectives
- Safety Risk management
- Safety Assurance
- Safety Training and Promotion

The air service provider should be able to demonstrate how each of the functions of the SMS are integrated within company processes.

The SMS will at a minimum have the following policy and processes in place, from which the Company's Senior management provide a commitment to safety and its continual improvement:

- A Safety Policy signed by the Accountable Manager
- A Quality Policy signed by the Accountable Manager
- A Fair and Just Culture signed by the Accountable Manager (where applicable)

Policies shall be reviewed on a regular basis. The air service provider shall be able to demonstrate from the statements or directions made within its policies how each is practiced.

The SMS must be able to formally demonstrate a current and comprehensive understanding of the hazards the company faces and the associated risks.

A system of Hazard/Risk registers is to be in place from which the Hazard/Risk Management (HRM) system should be able to demonstrate:

- The identification of known hazards to the organisation
  - The identification of existing and new controls that can be referenced back to specific company policy and procedures
  - That controls are audited on a regular basis to ensure their continued functionality
  - Newly established controls are reviewed within a reasonable time to ensure their functionality
  - Responsibilities of key personnel include formal review and acceptance of risk mitigation strategies relevant to the accountability of the position
-

- An established and formal management review of company HRM processes is maintained on a regular basis

The air service provider should be able to demonstrate how risk is eliminated or minimised to ALARP.

The air service provider shall be able to demonstrate an established and formal schedule of management reviews that provides an adequate level of oversight of the safety reporting system, hazard and risk management and quality assurance processes and outcomes. The management review process must include formal acceptance of the data presented.

The air service provider will have in place a formal operational risk assessment process that accounts:

- For the establishment of new or proposed air service operations.
- One off or ad hoc operations where an additional level of risk may reasonably be expected such as such as medevac flights at night.

The process should provide the operator with a current and comprehensive understanding of its hazards and risks from an operational perspective.

The process will include the listed control measures in a form that allows for their auditing of appropriateness and functionality. The scope of the assessment process should be commensurate with the complexity of operations and specialist tasks expected of aircrew.

### 11.1 SMS Internal Assurance Processes

The Safety Management System will have in place:

- A system of Key Performance Indicators by which the SMS can be regularly measured
  - Processes by which safety performance of the Company is recorded and monitored
  - Regular evaluations of the safety management processes and practices by key management personnel including the Accountable Manager
  - An effective Management of Change process that can be demonstrated to be in use on a regular basis
-

## 11.2 SMS Training Processes

Dependent on the size and complexity of the organisation, the company's SMS training needs are to be identified. The air service provider at a minimum should have in place the following training requirements for its SMS:

- Initial training at induction covering off on the relevant aspects of the SMS commensurate with the position being inducted to
- Recurrent SMS training for all personnel at defined intervals
- Management positions across the scope of company operations will be provided with a higher level of training in all aspects of the SMS to ensure that an adequate level of knowledge and awareness of their role and responsibilities with regard to the functionality of the SMS is attained
- Personnel tasked with maintaining the SMS and monitoring its functionality are to receive additional training with regard to the functions and processes of the SMS and their role in assuring its effectiveness.

## 11.3 Accident and Incident Reporting Requirements

The SMS shall have in place a formal occurrence reporting process that at a minimum differentiates between occurrences, accidents, near misses and incidents (See Definitions Section). The terms incident & accident are taken to be those defined in ICAO Annex 13).

### 11.3.1 Aviation Service Provider Responsibilities and Protocols for the Reporting of Incidents, Accidents and Hazards

The air service provider must have in place within its occurrence reporting protocol a process that escalates at minimum the following reported aviation related occurrences to Vale:

- Aircraft Accident
- An Incident relating to the clients contracted services
- Near Miss
- Mandatory Air Safety Reports (Airworthiness/ Flight Operations)
- Failure of safety critical equipment
- Any other events which create a non-conformance to this procedure.

In the event of an accident, incident or near miss event involving contracted aircraft, Vale's Exploration Manager shall be immediately notified by the Aviation Service Provider and, within 24 hours after the event, the service provider shall submit to Vale a draft copy of the preliminary investigation report which shall detail the 'known facts' relating to the incident.

The report must if possible, include reference to contributing factors, including and identifying any failure in the risk mitigation controls implemented.

Where possible recommendations and preventative actions, including 'action dates' identified

---

during the preliminary investigation shall be provided to Vale's exploration manager within 72 hours.

A complete action plan for the remedial measures identified during the investigation process shall be provided to Vale, by the service provider, within 48 hours of receiving the final report.

Where an accident or incident requires an investigation the Aviation Service Provider shall provide upon request, all requested documentation regarding the occurrence to the investigation team.

**Note:** Vale Exploration acknowledges that incident investigations, especially those involving aircraft typically take a significantly longer period than 24hrs to complete, however it is important that a preliminary investigation report be completed and submitted to Vales Exploration Manager within the prescribed time frame.

#### 11.4 Mandatory Reporting Responsibilities and Protocols

The SMS should have in place policy and processes to record and track its regulatory responsibilities for where the mandatory reporting of aviation related occurrences or maintenance defects is required.

The Aviation Service Provider shall notify the relevant civil aviation regulatory authorities at the earliest opportunity after an emergency occurs. The service provider shall also provide a written summary report to Vale's exploration manager, which must include but not limited to:

- Any accident involving damage to an aircraft, serious or significant incidents/accidents and near miss events involving the possible collision of aircraft with other aircraft or stationary objects.

**Note:** It is the responsibility of Vale's exploration manager/s to notify:

- Vales Corporate Control Centre of emergencies involving contracted aircraft and associated support infrastructure.
- Vales Corporate Aviation Area of emergencies involving contracted aircraft and associated support infrastructure within 24 hours of the event.

#### 11.5 Identification & Reporting of Unsafe Conditions

The contracted Aviation Service Provider must report to the exploration manager any unsafe condition that has the potential to impact upon the safety and/or health of employees, community, environment or the service provider's ability to undertake the contracted work in a safe and efficient manner.

---

## 11.6 Human Factors

Human factors/Non-technical skill training should be undertaken across all aspects of the Company's operation. The expectation is that all personnel including the Accountable Manager will be involved in this training process.

In addition to the Human Factors/Non-Technical Skills Training (HF/NTS) an air service providers SMS should be able to demonstrate an effective and structured investigation process including where necessary use of the Company's Fair and Just Culture policy.

## 11.7 Drug and Alcohol Policy requirements for Air Service Providers

Air service providers should have in place documented policy and procedures for the education and monitoring of drugs and alcohol in the workplace.

At a minimum, procedures must comply with the National Aviation Authority regulations and include pre-employment and random/periodic testing regimes.

---

## 12 Emergency Response Planning

### 12.1 Air Service Provider ERP

- The air service provider must have in place an Emergency Response Plan (ERP) that identifies the responsible persons and the actions that need to be taken in the event an aviation crisis scenario develops or could have the potential to
- The ERP will have in place established emergency protocols to deal with other emergencies requiring aviation services such as oil spills, medical flights and evacuations
- Where air service operations involve larger aircraft and substantial numbers of passengers, Vale Exploration and the air service provider should give consideration to contracting a specialist crisis management/recovery organisation

At a minimum the ERP will have the capability to respond to the following scenarios:

- Aircraft overdue/missing
  - Aircraft accident on in vicinity of a company owned airfield or helipad
  - Aircraft accident on in vicinity of a third party owned airfield or helipad
  - Aircraft accident enroute
  - Checklists, flow charts and event logs should form part of the ERP document to ensure all planned actions can be completed and documented
  - The air service provide should document the requirement to quarantine documents in the event of a serious incident or accident
  - A formal media policy or sample media statements should be included to guide personnel when dealing with the media
  - In addition, the ERP's should provide adequate direction for actioning non-aviation related scenarios that could have a direct or indirect bearing on Vale Exploration operations
  - Training commensurate with a person's position and responsibilities in relation to activating and or actioning the ERP must be provided both as an induction to the plan, and as recurrent training to ensure familiarity with the process is maintained
  - The Emergency Response Plan is to be practiced on a regular basis as a scenario-based exercise and at a minimum of once every twelve months
  - Vale Exploration should ensure that where a new project or operational base is established a joint exercise with the air service provider and other aviation related party's is conducted within 30 days of the project start date
-

- Where the service provider ERP has been activated or exercised, a formal review will be convened as soon as practical after the event to assess the effectiveness of the plan and whether any areas for improvement can be identified

## 12.2 Interface Management

- Both the air service provider and Vale Exploration need to establish an ERP interface framework applicable for aviation incidents involving both parties. The framework should describe incident control/command responsibilities, interfaces and communication protocols are established and tested on an agreed frequency
- To ensure both plans are aligned with attention made to:
  - Lines of communication
  - Master contact lists
  - Media policy and alignment of media statements issued
  - Notification protocol of external agencies
  - Liaison with investigators both from a regulatory and client perspective
  - Medevac processes

**Note:** The establishment of an Emergency Response Plan for Vale Exploration operated helipads or aerodromes is detailed in Section 29.

---

## 13 Pilot Experience Requirements

The following tables indicate the required levels of pilot experience required for Vale Exploration flight operations.

### 13.1 Aeroplane Operations

Aeroplane Operations **above 5700kg:**

<b>Captain – Aeroplane</b>	<b>Minimum Requirements</b>
Total Flight Time	3000 hours
Total Flight Time in Command	2500 hours
Total Time in Command, all Multi Engine Aircraft (If Applicable)	1500 hours
Total Time in Command, Turbine Engine Aircraft (If Applicable)	500 hours
Total Time in Command, Contract Type	100 hours
Time in Command in Role (low level surveys)	300 hours
Time in Command of Contract type (low level surveys)	50 hours

<b>Co Pilot – Aeroplane</b>	<b>Minimum Requirements</b>
Total Flight Time	1000 hours
Total Flight Time in Command	500 hours
Total Time in Multi Engine Aircraft (If Applicable)	200 hours
Total Time in Turbine Engine Aircraft (If Applicable)	100 hours
Total Time in Contract Type	50 hours

Aeroplane Operations **below 5700kg:**

<b>Captain – Aeroplane</b>	<b>Minimum Requirements</b>
Total Flight Time	2000 hours
Total Flight Time in Command	1500 hours
Total Time in Command, all Multi Engine Aircraft (If Applicable)	500 hours
Total Time in Command, Turbine Engine Aircraft (If Applicable)	300 hours
Total Time in Command, Contract Type	100 hours
Time in Command in Role (low level surveys)	300 hours
Time in Command of Contract type (low level surveys)	100 hours

<b>Co Pilot – Aeroplane</b>	<b>Minimum Requirements</b>
Total Flight Time	1000 hours
Total Flight Time in Command	500 hours
Total Time in Multi Engine Aircraft (If Applicable)	200 hours
Total Time in Turbine Engine Aircraft (If Applicable)	100 hours
Total Time in Contract Type	100 hours

### 13.2 Helicopter Operations

<b>Captain – Helicopter</b>	<b>Minimum Requirements</b>
Total Flight Time	2000 hours
Total Time in Command Helicopters	1500 hours
Total Time in Command Turbine Engine Helicopter (If Applicable)	500 hours
Total Time in Command on Helicopter Type	300 hours
Time in Command in Role (low level surveys)	300 hours
Time in Command in Role (External load operations)	300 hours
Time in Command of Contract type (low level surveys)	300 hours

<b>Co Pilot – Helicopter</b>	<b>Minimum Requirements</b>
Total Flight Time	1000 hours
Total Flight Time in Command	500 hours
Total Time in Multi Engine Aircraft (If Applicable)	200 hours
Total Time in Turbine Engine Aircraft (If Applicable)	100 hours
Total Time in Contract Type	100 hours

### 13.3 Required Pilot's Licenses

<b>Operational Specifics</b>	<b>License/Rating Type</b>
For all aircraft below 5,700 kg,	Commercial Pilot's License
For all aircraft above 5,700 kg,	Airline Transport Pilot's License
For all Jet aircraft,	Airline Transport Pilot's License
For all IFR operations, pilots must have a valid	Command Instrument Rating

### 13.4 Additional Licences, Qualifications and Training

- Must have a current license and medical certificate, rating for the category and type of aircraft contracted or utilised and meet all local regulatory requirements
- Helicopter underwater escape training (HUET) completed within the previous three years if regular flights over water flights are required or undertaken
- Current First Aid certification issued by a recognised organization if a cabin attendant is not carried
- CAO 20.11 or equivalent emergency training completed annually per type
- Dangerous Goods Awareness training completed every 2 years
- Crew Resource Management training completed every 2 years
- Human Factors training completed every two years

### 13.5 Operational Pilots on Multiple Types of Aircraft

Although pilots may be certified for more than one type of aircraft, pilots engaged to fly the aircraft contracted by Vale should not operate more than two types of different aircraft.

Should a pilot be required to operate more than two types of aircraft, Vale Exploration requires that a risk assessment be completed by the pilot and a copy of the assessment shall be forwarded to Vales Corporate Aviation Area for validation.

---

## 14 Aircrew Training and Checking Requirement

### 14.1 Minimum Annual Training

Pilots engaged to operate aircraft contracted by Vale Exploration under the Instrument Flight Rules are required to undertake annual instrument flight rules (IFR) training. The training should extend over a six-hour flight period.

In cases of special operations with helicopters, the Aviation Service Providers training program shall include two hours of flight, every six months, for reviewing specific operating procedures related to the contracted operations. Where the two hours of flight training is not practical the Aviation Service Provider shall submit to Vale a suitable competency based training (CBT) program that encompasses all aspects of the flight operations and documented procedures. The CBT must include an adequate flight component.

### 14.2 Proficiency Evaluations

Aviation Service Providers shall ensure each pilot flying for Vale Exploration undergoes a proficiency check for instrument flight rules (IFR) every six months. This is not required for contracts covering only visual flights.

Helicopter pilots conducting special operations for Vale Exploration must take proficiency checks every six months for the contracted operations. The checks must be conducted in accordance with the Company operations manual training and checking requirements.

### 14.3 Refresher Training

Aviation Service Provider's operator training programs shall include details of the training to be conducted for pilots who have not been flying for a period of 45 days or more on the type of aircraft contracted to Vale Exploration.

### 14.4 Additional Requirements

- Pilots must have participated in the Aviation Service Provider's (their employers) induction training program, which must include but not limited to operational procedures and processes. Pilots must be assessed as competent at the conclusion of the induction training
  - Pilots in command conducting flight under the IFR shall have a minimum of three Instrument Rating renewals
  - When available for the contracted aircraft type, simulators should be used for crew training once a year. This training should be conducted as Line-Oriented Flight Training (LOFT), which exercises should be developed by the operator and the simulator instructor
  - Pilots must have a minimum of 100 hours experience with the operator or 50 hours dual time with an experienced pilot who has been flying with the operator for more than six months, this requirement may be waived for co-pilots
  - Aviation Service Providers must ensure that any outsourced training is documented, and
-

the records indicate the training was completed. The documents shall be available for audit.

## 15 Aircrew Composition

All Vale Exploration passenger operations shall be crewed by two rated and licensed pilots:

- Where required under existing Regulations
- For multi-engine airplanes:
  - below 5700 kg Maximum Take-off Weight (MTOW) with a certified passenger seating capacity of 10 or more,
  - below 5700 kg (MTOW) with a certified passenger seating capacity between 6 to 9 conducting night take off or landings.
- For multi-engine helicopters conducting IFR operations
- When continuous flight time exceeds two hours
- When identified as being required during a risk assessment.

Cabin Crew shall be carried as part of the crew composition as regulatory required.

### 15.1 Single Pilot Operations

Single pilot operations for aerial photography, geophysical survey, helicopter operations or other specialist or on demand tasks require the approval of Vale's Exploration Manager. Vale's Aviation Safety Advisors and/or Vale Corporate Aviation Area may be called upon should specialist advice be required.

### 15.2 Additional Considerations

- The Aviation Service Providers Operations Manual shall prescribe the procedures to be adopted when a crew of two pilots is flying the aircraft type
  - The co-pilot shall meet the experience requirements of single and multi-engine operations co-pilot
  - All flights shall be conducted in accordance with the Operations Manual requirements for two pilot crew operations
  - Training as prescribed in the Aviation Service Providers Operations Manual shall be completed before pilots may act as a member of a crew of two pilots
  - Rostered pilots shall have successfully completed a CRM or Multi-Pilot Training course within the previous 12-month period
  - In the case of helicopter operators with external load operations, the CRM training should involve ground crew.
-

## 16 Cabin Crew Requirements

All Cabin Crew utilised on Vale Exploration flight operations shall:

- Be adequately trained, rated and licensed
  - Have current emergency procedures training
  - Current First Aid training conducted by a recognised organization
  - Dangerous Goods Awareness Training
  - Crew Resource Management Training within the previous two years.
-

## 17 Ground Crew / Loadmaster / HLO Requirements

Ground Crew, Loadmasters & Helicopter Loading Officers (HLO's) are often used to provide ground support for aviation operations. Aviation Service Providers or contracted companies are to comply with the following requirements.

### 17.1 Training Requirements

Only persons trained and approved by the operator and/or the regulatory authority where applicable can conduct or take part in aviation related operations on Vale Exploration projects. An outline of the recommended training is tabled below.

#### 17.1.1 General Procedures

- Aircraft type specific familiarity
- Marshalling and signalling
- Radio procedures (license required for aviation frequencies)
- Passenger control in the vicinity of aircraft
- Emergency procedures published by the aircraft operator
- Operational specific documented procedures regarding external loads or specialised operations.

#### 17.1.2 Safety

- Aircraft safety zones
  - Dangerous goods
  - Noise
  - Dust and debris
  - Dynamic rollover (helicopters)
  - External load operations
  - In Indonesia personnel involved in external load operations are required to complete a certified 'Load Master' training course. Exploration Managers must ensure that training complies with country / region specific requirements.
  - Trip and entanglement hazards
  - Crush and protrusion hazards
  - Overhead hazards
  - Static discharge.
-

### 17.1.3 Cargo and Loading

- Load preparation
- Loading and unloading cargo or passengers
- Load area management
- Manifest control relating to load limits. External Loads specific (when applicable):
- Loading and unloading external loads
- Inspection and maintenance of lifting equipment.

### 17.1.4 Refuelling

Crew employed in the task of refuelling, require the following additional training:

- Refuelling equipment inspections
- Fuel sampling and inspection for contaminants
- Refuelling procedures (Hot & Cold)
- Emergency procedures
- Safety awareness
- Fire extinguisher operation.

## 17.2 Personal Protective Equipment (PPE)

The following safety PPE is to be used by ground crew:

- Ground crew including the loadmaster shall be easily identifiable by the pilot
  - High visibility vests or clothing
  - Steel cap boots
  - Gloves
  - Hearing protection
  - Eye protection (safety glasses or goggles)
  - Particle (dust) masks in dusty environments
  - Helmets with a chin strap for helicopter external load operations
  - Wherever practicable the ground crew/ loadmaster will have hands-free radio communications with the pilot, preferably an aviation type headset. For external load operations, the headset shall be integrated into the helmet.
-

## 18 Flight and Duty Time Limitations

Pilot Flight and Duty times shall be governed and audited against local national Civil Aviation Regulations relating to Flight and Duty Limitations.

### 18.1 Standard Requirements

Aviation Safety Advisors are required to review flight and duty time limitations prior to aviation operations commencing when:

- Specialised, non-standard or overseas operations are conducted
- Government Instruments or exceptions allow Aviation Service Providers to exceed standards
- Where an operator has a Fatigue Risk Management System (FRMS) in place.

#### 18.1.1 Flight Hours

Time Period	1 Day	7 Days	30 Days	1 Year
Maximum Flight Hours	8 hrs	30 hrs	100hrs	900hrs

#### 18.1.2 Duty Periods and Rest Times

Time Period	1 Day	7 Days
Maximum Hours allowed	12 hrs	A minimum of 36 hours free of duty in a 7-day period

### 18.2 Geophysical Survey & Low-Level Operations

Low level operations such as Airborne Geophysical Survey's, and other low-level operations conducted below 500' AGL (Above Ground Level) have additional fatigue management risks.

Flights conducted below 500' AGL will be limited to:

- 5 hours low level operations (not inclusive of ferry) per day for one pilot
- 8 hours low level operations (not inclusive of ferry) per day for two pilots.

Local aviation regulations will supersede these requirements where they are more restrictive.

### 18.3 Helicopter External Load Operations

Due to fatigue issues present within helicopter external load/lifting operations, the following flight and duty requirements apply for loads, more than three (3) per hour:

- Single pilot operation:
  - 3 hours maximum rotors running time followed by a 30-minute break
  - 6 hours maximum flight time in any one day.
- Two pilot operations:
  - 5 hours maximum rotors running time followed by a 60-minute break
  - 8 hours maximum flight time in any one day.

## 19 Helicopter Operations

Specialised operations may involve the use of helicopters for lifting, geophysical survey, passenger movements, helicopter supported drilling operations, and helicopter supported geo-chemical mapping, reconnaissance or aerial photography operations. In addition to all published requirements within this guideline, specialised types of helicopter operations must meet the following conditions. Helicopters used to support exploration programs are commonly required to operate at low altitudes. When flying at low altitudes, the risks associated with colliding with obstacles increases and there is a lower margin for error. Recognising the risks and hazards of low-level flying, requires pilots to receive special training and endorsements before they can legally and proficiently conduct low-level flying.

It is the responsibility of aviation service providers to conduct detailed assessment of the intended operational area to identify any terrain, wire, or other obstacles that need to be avoided while operating at low altitude. The assessment should include communicating with local power and telecommunication providers to gain access to local maps indicating the location and height of transmission wires and towers.

While conducting the assessment aviation service providers must keep in mind that not only do powerlines exist at low levels and in remote areas, they are also not easy to identify. Even against a clear blue sky, wires are difficult to spot. Wires can oxidise to a blue/grey tinge and may blend into the background, or the wire may be obscured by terrain. Single wires are difficult to detect from the air and can be encountered in the most unexpected places in rural areas.

### 19.1 Documented Procedures

Specialised operations must be included in the Aviation Service Providers Flight Operations Manual or relevant company exposition. Documentation must include:

- Procedures for pilots and other company personnel involved in the operation including normal and emergency procedures
- Training syllabus for pilots and other company personnel involved in the operation.

### 19.2 Pilot Experience

Pilots must have recent and relevant experience as described in Section 13 Pilot Experience Requirements of this guideline.

In addition to this, pilots must:

- Completed an approved external load course and be appropriately rated and endorsed by the country of registration in which the helicopter is registered
  - In the case of external load operations have a minimum of 300 hours external load experience. Specialist operations such as Indonesia may require pilots to have attained additional external load experience
  - Must meet the crew composition requirements as specified in Section 15 Aircrew Composition.
-

### 19.3 Structure of FlightCrew

Two pilots will be required for helicopter flights when engaged in the following:

- Instrument Flight Rules (IFR)
- Night operations
- Poor weather conditions exist
- Supporting firefighting operations
- Flying in areas where two pilots are required under local civil aviation regulations
- If determined as necessary as a result of risk assessment and hazard analysis.

### 19.4 External Load Operations

#### 19.4.1 Pre-Flight

In addition to the daily pre-flight and prior to commencing external load flights the pilot is responsible for checking:

- The condition, activation and safety of the cargo hook assembly, fixations and connections
- The signalling and jettisoning system of the external cargo
- The electric jettisoning as to its functionality
- The mechanical jettisoning as to its functionality and the manual release on the hook
- The status of nets, slings, baskets, clamps and swivels used in the operation should be checked, as well as cleaning of the area of loose / unrestrained objects
- The weight of the aircraft-cargo combination and the position of its centre of gravity are within the limits approved, record all the data in the appropriate manifest, leaving a copy in the aircraft and another with the HLO
- Whether the cargo is safe and fixed and that it does not interfere with the devices provided for their jettisoning in emergencies.

#### 19.4.2 Cargo Selection

Upon receipt of a manifest detailing the weight, volume and shape of the cargo, the helicopter pilot or if available the loadmaster will decide the type of sling and other lifting equipment to be used.

---

### 19.4.3 General Requirements

- It is forbidden to transport a person in the aircraft while engaged in external cargo operations, unless:
  - The person is one of the crew members of the aircraft
  - The person is crew member in training
  - The person performs an essential role related to the operation in course, or
  - The person is required to perform a job directly associated with the operation
- A daily briefing is required for all personnel to review the days planned operations
- It is mandatory for ground support staff to use PPE (Overalls or long-sleeved shirts and trousers, gloves, goggles, helmet and ear protection)
- It is mandatory for all personnel involved in the operation understand the aviation service providers standard signalling procedures
- All lifting equipment will be serviceable and suitable for the task and:
  - Be supplied and maintained by the service provider
  - Labelled with a unique ID number which will be permanently attached to the item and that will not become visually degraded with time
  - Maintained on a Lifting Equipment Register
  - Inspected annually by an authorised inspector
  - Inspected and documented daily by trained Ground Crew or the Pilot
  - Dragging of external loads is prohibited
  - Unloaded lines shall be suitably weighted empty to prevent rotor entanglement
  - Due care and consideration should be given to the flight characteristics of loads

### 19.4.4 Certification, Training & Retraining

- Aviation Service Provider:
    - In the specific case of helicopters, the Aviation Service Provider must be certified by the relevant aviation regulatory authority to perform external load operations and ensure that the pilots used in these operations have received adequate training before starting external load operations.
  - Pilots:
    - Vale Exploration requires that pilots qualified for external load operations be evaluated every six months by a qualified assessor
    - Pilots who have not participated in this type of operation for more than 3 months shall undergo refresher training before starting the activities with external load operations
-

- Helicopter Loading Officers (HLO's):
  - Personnel engaged to rig, connect and disconnect loads from a helicopter must have successfully completed an approved training course to undertake such tasks
  - HLO's are required to undertake refresher training once in every two-year period. HLO's may need to be licenced in accordance with local civil aviation safety legislation

#### 19.4.5 Lifting Equipment Inspection

Aviation service providers shall ensure that lifting equipment is inspected by a competent person before and after each use for any visible signs of damage or defects that could affect its safe use, as well as undergoing periodic inspections for suitability of ongoing use. The person checking the sling and accessories must have attained appropriate instruction, training and where applicable, certification prior to conducting this work. All inspections must be documented.

Inspections shall include but not limited to the following:

- Checking for excessive wear of the item for example, worn or stretched links and webbing, broken or worn stitching, cuts, nicks, tears and punctures
- Checking for obvious damage or defects for example, distorted, twisted, gouged, cracked, split, bent or broken links and components, heat damage or excessive corrosion
- Checking all rigging accessories for damage and compatibility including hooks, shackles, rings, swivels, lifting eyes and inserts
- Checking the lifting gear is tagged and all relevant information listed for example rated capacity, grade of chain, and any relevant Standards markings are legible
- Signs of overloading - deformation of components, checking the length of reach of each leg against reach shown on tag. If reach is greater than that shown on tag, there is a possibility that the sling has been subject to overloading or excessive wear
- lifting hooks are provided with operable safety latches

All lifting equipment will be inspected and where required tested to the manufacturer's specification. Records of inspections and testing shall be made readily available.

#### 19.4.6 Inspection Records and Lifting Equipment Register

Aviation service providers shall ensure that a record of inspection is kept of each lifting device and/or accessory. Results of each inspection shall be documented on the Lifting Equipment Register and retained for the extent of the sling/accessory's service life. Individual equipment must be easily identified against the record, and in specific circumstances this might warrant further non-destructive markings be placed on the item, to distinguish it from other identical items.

---

Aviation service providers where lifting equipment is used are required to develop and maintain a Lifting Equipment Register. Registers must contain the following information:

- Item description
- Identification number including distinguishing markings
- Item location
- Inspection schedule and results
- Serial number details including Working Load Limit
- Disposal record

#### 19.4.7 Repair and Disposal

Longlines, slings and accessories showing any signs of damage, defects or any uncertainty as to the integrity of the item must be withdrawn from service and tagged with an “Out of Service Tag”. The equipment must be referred to a competent person who will undertake assessment of the lifting device and authorise repairs or disposal of the damage/defective equipment.

#### 19.4.8 Disposal

All defective or damaged longlines, slings and/or accessories must be rendered inoperable before disposal. Slings are to be cut up where practicable or clearly marked as being unfit for load-bearing service and disposed of immediately. The Lifting Equipment Register is to be adjusted accordingly.

#### 19.4.9 Aircraft Fit Out

In addition to the requirements in Section 8 Aircraft Selection, helicopters must be equipped with:

- Fuel low-level warning light or audible alarm
  - Dedicated radio communications link with the ground crew
  - All modifications to the aircraft must have been certified by the aviation regulatory authority in which the aircraft is registered and must include a flight manual supplement specific to the operation criteria
  - GPS flight following system capable of 1-minute reporting intervals
  - A satellite telephone
  - A portable 406 EPIRB
-

Helicopters used for external loads must be equipped with the following additional equipment:

- Protective assemblies between the Skid and Fuselage to prevent cable interference (anti snag device)
- External load viewing mirror useable from the pilot's seating position
- Electric cockpit hook release, a manual cockpit release and an external release on the hook
- Appropriate measures to ensure inadvertent release of the load does not occur, such as switch guarding, isolating and cockpit commonality between the Aviation Service Providers aircraft

In addition, the following serviceable equipment is preferred:

- Remote torque indicating gauge
- Remote fire warning and caution lights for long line operations where possible
- Incorporation of a load meter with remote indicator where possible.
- Crash resistant fuel tanks.

Helicopters which are equipped with Health & Usage Monitoring Systems (HUMS) should be given preference over those that are not.

#### 19.4.10 Additional Safety Equipment

It is recommended that helicopter pilots engaged in low level flights (below 500 feet AGL) and external load operations wear flight helmets. If due to prevailing environmental or working conditions a pilot deems that wearing a flight helmet introduces additional hazards, the Aviation Service Provider in conjunction with the pilot/s shall conduct a risk assessment & hazard analysis to validate their decision to not wear flight helmets.

Once the Aviation Service Provider is satisfied that it is not necessary for its aircrew to wear flight helmets, Vale Exploration shall be formally notified of the decision and a copy of the risk assessment & hazard analysis shall be provided.

Vale Exploration ultimately reserves the right to determine the safety standards being applied to aviation operations on its projects.

Cotton or flame-resistant clothing such as Nomex is preferred for personnel working around aircraft. Chemical reactions from fuel and other aircraft associated chemicals or fire can cause synthetics to melt to skin.

---

## 19.5 Operational Requirements

### 19.5.1 Fuel Reserves

Turbine helicopters must carry a minimum fixed fuel reserve of 30 minutes at the normal cruise consumption rate plus a variable reserve of 10% of calculated trip fuel in addition to any holding or alternate destination fuel requirements when passengers are on board.

### 19.5.2 Hot Refuelling

Hot refuelling means the refuelling of a helicopter with its engine or engines running.

#### □ Aviation Service Providers Responsibilities

- Hot refuelling of a helicopter must not be carried out unless authorised by the Aviation Service Provider and Vale's Exploration Manager.
- Before authorising the hot refuelling of a helicopter, the Aviation Service Provider must conduct a detailed risk assessment and hazard analysis and be satisfied that the refuelling can be carried out safely and must have regard to:
  - (a) The configuration of the helicopter and its engine or engines and
  - (b) The location of the components of the helicopter's fuel system and
  - (c) The refuelling system or systems to be used and its or their components and
  - (d) The helicopter's flight manual.
- The Aviation Service Provider must set out the matters referred to in the previous paragraph separately in relation to each type of helicopter to which the operations manual applies.

#### □ Responsibilities of Pilot in Command

- Before allowing the hot refuelling of a helicopter to commence, the pilot in command must ensure that the refuelling can be carried out safely in accordance with this section and the procedures included in the operations manual.
- The pilot in command must ensure that passengers are not on board during hot refuelling, except in the case of a passenger who cannot, in the opinion of the pilot or on medical advice, be safely disembarked.
- A pilot with a licence that is valid for the helicopter must, always be at the controls of the helicopter while refuelling is carried out.
- While a pilot is at the controls of a helicopter, communication between the pilot and the person on the ground in charge of the refuelling system must be maintained by means of an electronic intercommunication system or by visual contact and an agreed system of signals.

#### □ Procedures & Equipment

- All persons engaged in hot refuelling must be trained in, and familiar with, the procedures to be followed during hot refuelling or any emergency that may occur in relation to the refuelling.
-

- The hot refuelling procedure must form part of the Aviation Service Providers Operations Manual or equivalent.
- Suitable and properly maintained firefighting equipment must be readily available for use if an emergency occurs during the refuel.
- Personnel involved in refuelling the helicopter must be trained to use the firefighting equipment.
- **Fuel Loading**
  - The quantity of fuel to be loaded must be decided before hot refuelling is commenced.
  - A closed or open refuelling system may be used for hot refuelling.
  - If an open system of refuelling is used, there must be a means of quickly cutting off the fuel supply at the point of entry into the fuel tank of the helicopter.
  - Before the helicopter’s fuel filler cap is removed, the refuelling equipment and the helicopter must be earthed and connected to ensure they are of the same electrical potential.
- **Radio Transmissions**
  - While hot refuelling is taking place, HF transmitters and/or radar equipment on the helicopter must not be operated.
- **Inspection & Testing of Fuel System**
  - The operator of a helicopter that has been hot refuelled may forgo the need to inspect and test the helicopter’s fuel system for the presence of water only if the following criteria are met:
    - (a) The helicopters fuel system has been inspected and tested for the presence of water prior to the first flight of the continuous flight operations sequence **AND**
    - (b) The helicopter has, for a continuous period of not more than 5 hours’ time in service, been engaged in operations during which hot refuelling has taken place **AND**
    - (c) The fuel used by the helicopter is supplied by a person:
      - (i) Who has a fuel quality audit program **AND**
      - (ii) Whose regular audit reports are checked by the operator **OR**
      - (iii) In a case where the fuel used by the helicopter is supplied by a person who does not have a fuel quality audit program, the Aviation Service Provider has a system for monitoring the quality of the fuel used by the helicopter.

### 19.5.3 Ground Crew / Loadmasters

Only persons trained and approved by the operator and/or the regulatory authority where applicable can conduct or take part in operations and must meet the requirements as detailed in Section 17 Ground Crew and Loadmaster Requirements.

---

#### 19.5.4 Flight over Water

A flight over water is defined as any flight passing over the water for a distance from the land that exceeds 10 minutes of flight (calculated at normal cruising speed).

For short flight periods over water, excluding offshore operations, the Aviation Service Provider shall ensure that the following items are provided or incorporated in the helicopter design prior to the flight taking place:

- The helicopter shall be equipped with an approved emergency flotation kit and operated in accordance with the Emergency Flotation Kit Flight Manual Supplement
  - When travelling over water, the helicopter shall be operated at an altitude that will provide adequate time for full inflation of the flotation devices prior to water contact
  - A life raft shall be installed and maintained in a serviceable condition in cases of forced landing of the helicopter in water
  - All emergency exits, including crew exits, must be clearly indicated to guide the occupants in daylight or night-time situations. These indications are designed to be visible if the helicopter rolls over and the cabin is submerged
  - All doors, windows or other openings in the passenger compartment intended for the exit under water must be equipped in a way that they can be operated in an emergency. A person using a lifejacket not yet inflated, should be able to leave through an emergency exit or “push-out” window
  - Personal life preservers (jackets) shall be carried and stowed so that they are within reach of each person carried when seated with his or her seat belt fastened
  - Aircraft must be equipped with an underwater location transmitter and/or an Automatically Deployable Emergency Locator Transmitter (ADELT)
  - The Aviation Service Providers Operations Manual shall include passenger briefing ditching procedures and a requirement for the pilot to file a flight plan or flight itinerary.
-

## 20 Establishment of On-Shore Helicopter Landing Sites (Ref: ICAO Annex 14 v2)

A helicopter being used to support Vale Exploration activities shall not land at, or take-off from, any place unless the place is assessed as being suitable for the purposes of the landing and taking-off of the helicopter being used and, having regard to all the circumstances of the proposed landing or take-off (including the prevailing weather conditions), the helicopter can land at, or take-off from, the place in safety. It is important to note that all helipads should be subject to daily inspections and that such inspections should be documented.

### 20.1 Factors to Consider Prior to Using a Helicopter Landing Site

The pilot of a helicopter operating to, from or at a helicopter landing site must ensure that:

- The helicopter landing site is clear of all:
  - Personnel – other than people who are trained and been found competent in helicopter operational safety procedures and who are essential to the helicopter operation
  - Objects and animals likely to be a hazard to manoeuvring the helicopter – other than objects essential to the helicopter operation.
- No person is to be located within 30 meters of an operating helicopter, other than a person who is essential to the safe conduct of the operation and who is trained and been found competent in helicopter operational safety procedures.

**Note:** Despite having stated this, unless the specific nature of the task requires, it is recommended that, for normal helicopter operations, the Final Approach & Take-Off Area and the Touch-Down & Lift-Off Area are free of personnel and obstacles while the helicopter is operating. Pilots must ensure that neither the helicopter nor its rotor downwash constitute a hazard to other aircraft, persons or objects.

- Appropriate permission from both Vale and the relevant authorities has been obtained
  - Where the performance requirements of an Aircraft Flight Manual (AFM) detail greater or additional requirements for defined areas or the approach and departure paths (than those set out in these guidelines), then the greater and/or additional requirements are met
-

A helicopter must not land at, or take-off from a helicopter landing site unless:

- For a flight under the Visual Flight Rules, the applicable helicopter visual meteorological conditions exist
- For any flight, the relevant instructions in the Aeronautical Information Publication (AIP) are followed and
- For a helicopter landing site that is located within controlled airspace:
  - Two-way VHF radio communications with the relevant Air Traffic Service unit is established
  - The appropriate Air Traffic Control clearances have been received.

If a proposed helicopter landing site is to be located near a city, town, village or populous area (or any other area where noise or other environmental considerations make helicopter operations undesirable), it may be subject to the provisions of local Environmental Protection Legislation.

There may be other local legislation that also applies to the location of helicopter landing sites within Vale's scope of operation. It is the responsibility of the Exploration Manager to ensure that all landing sites associated with exploration project/s for which he/she is responsible comply with local legislative requirements.

With respect to operations in multi-engine helicopters at a helicopter landing site, located within cities, towns, villages or populous areas, the pilot-in-command should assess the potential risk of danger to persons or property on the ground which would result from failure of an engine and plan the flight to minimise that risk.

## 20.2 Attributes of a Helicopter Landing Site

The helicopter is an extremely versatile aircraft and can (if required under special circumstances) operate to and from a space little larger than its overall length. The smaller the site, and the less known about hazards presented by obstacles and surface conditions, the greater the risk associated with its use.

The risk presented by such hazards can be reduced when:

- The size of the defined areas of the helicopter landing site are greater than the minimum required size
  - The pilot-in-command has access to accurate, up-to-date information about the site, which is presented in a suitable and easily interpretable form
  - Visual information cues and positional markings are present for the defined areas at the site.
-

### 20.2.1 Defined Areas

Defined areas are the basic building blocks of a helicopter landing site and have a set of attributes that persist even when co-located or coincidental with another defined area (In these cases the defined area with the more limiting standard would apply.)

Defined areas in relation to typical exploration projects are in one of two main categories:

- **FATO** – the area over which the final approach is completed, and the take-off conducted
- **TLOF** – the surface over which the touchdown and lift-off is conducted

A defined area on a helicopter landing site may have one or more of three basic attributes:

- **Containment** – An attribute which affords protection to the helicopter and/or its undercarriage and permits clearance from obstacles to be established. Containment is of two types: undercarriage containment and helicopter containment.
  - Where a defined area provides only undercarriage containment, it should be situated within, or co-located with, another defined area (a FATO) to ensure that helicopter containment is attained.
- **Surface Loading** – This ensures adequate surface strength to permit a helicopter to touchdown without damage to the surface of the helicopter landing site or helicopter.

Surface loading is either:

- **Static** – where only the mass (one G) of the helicopter is considered, or
- **Dynamic** – where the apparent weight (a force comprised of multiples of G) of the helicopter is used. Two types of dynamic loading need to be considered:
  - Dynamic loading due to normal operations and
  - Dynamic loading due to a heavy / emergency landing, determined by an ‘ultimate limit state’ test (touchdown at a rate of descent of 3.6m/s or 12 ft/sec for helicopter landing areas). The design load in this case should be taken as 1.66 times the maximum take-off mass of the heaviest helicopter. (surface level landing areas)

In addition to surface loading, durability and structural integrity are also necessary considerations. For this reason, likely traffic must be taken into consideration to ensure that the surface loading and the condition of the landing area remains in good condition for the period that the helicopter landing site is to be used.

### 20.2.2 An Additional Safety / Protection Area:

**For a Final Approach & Take Off area** – a safety buffer surrounds the FATO and compensates for errors in manoeuvring, hovering and touchdown. With this in mind, the following section includes guidance for individuals required to design and construct Helicopter Landing Sites for Vale Exploration.

---

## 20.3 Criteria for Helicopter Landing Sites

### 20.3.1 Basic Helicopter Landing Site

Because basic helicopter landing sites used to service exploration activities in the field are often constructed from basic/raw materials which are available in the immediate vicinity, it is necessary for helicopter operators and Vale Exploration staff to carry out thorough risk and hazard assessments for the proposed operation and apply appropriate controls to any hazards identified during this process.

Any passengers, crew and operational personnel carried into such locations should be briefed on the hazards of the site and any safety procedures needed to ensure safe loading and unloading at the landing site.

A Basic Helicopter Landing Site should:

- Be determined, by way of the helicopter operators risk assessment to be large enough to accommodate the helicopter, and have additional operator-defined safety areas (or buffers) to allow it and the crew to conduct the proposed exploration support operation at the location safely
- Have a Touch-Down & Lift-Off area with suitable surface characteristic for safe operations and strong enough to withstand the dynamic loads imposed by the helicopter
- Have sufficient obstacle free approach and departure gradients to provide for safe helicopter operations into and out of the site under all expected operational conditions
- Have approach and departure paths that minimise the exposure of the helicopter to meteorological phenomena which may endanger the aircraft and provide escape flight paths, if a non-normal situation arises, which maximise the potential for using suitable forced landing areas
- Only be used for day operations under helicopter Visual Meteorological Conditions (VMC).

**Note 1:** Requiring dynamic load bearing capability assumes all static load limits imposed by the helicopter will be met. Aviation Service Providers should ensure this is the case prior to using the site.

**Note 2:**

- (a) Contracted Aviation Service Providers should be included in the design and location of HLS. This is because of the temporary nature of helicopter landing areas used to support field-based exploration activities, the 'basic' design of them and the often-hostile environment in which helicopter landing areas are constructed.
  - (b) Aviation service providers are required to conduct a thorough risk and hazard assessment of such locations for the proposed operation and apply appropriate controls to any hazards identified during this process. &
  - (c) Aviation service providers will maintain a register of all helipads operated to.
-

### 20.3.2 Remote Area Helicopter Landing Site

Helicopters, supporting exploration operations in remote areas shall comply with the following criteria:

- **Landing area on the ground level**

Square with sides of a minimum equal to 1.5 of the largest dimensions of the helicopter is required. The surface should be smooth, stable and solid, when wet or dry, with a maximum inclination that does not exceed 3° at horizontal line.

- **Elevated landing area**

This is an alternative to the landing area on the ground level and is the most suitable for clearings with uneven floor. To facilitate the access, it is recommended that:

- The landing area does not exceed 1 meter above ground level,
- The pad dimensions are larger than the Helicopters skids,
- A clear area at least 1.5 times larger than the diameter of the main rotors.

In the specific case of helicopters, the tops of hills, ridges or mountain chains are typically good areas for landing sites, if they are next to the operation area, since the free area is greatly reduced and the winds are taken into consideration.

Loose branches and any material that may be displaced due to rotor downwash must be removed from the landing area.

The landing area should be free of all items during take-offs and landings. Therefore, a proper place for shipping, luggage storage, should be separated / built outside the landing area, and no item waiting loading or unloading must be above the level of the landing area.

### 20.3.3 Standard Helicopter Landing Sites

Since a Standard Helicopter Landing Site is intended to be used for numerous types of operations, (i.e. both day and night under helicopter Visual Meteorological Conditions) it should satisfy the following guidelines:

- The final approach & take-off area should, at minimum, be capable of enclosing a circle with a diameter equal to one-and-a-half times the length of the helicopter, when the rotor(s) are turning ( $1.5 \times D$ ), and be free of obstacles likely to interfere with the manoeuvring of the helicopter:
    - The final approach & take-off area should provide ground effect if the associated Touchdown and Lift-Off area is located outside of its defined area, unless operations at the Helicopter Landing Site are to be limited to 'hover out of ground effect performance capability'.
    - It is recommended that a safety area extend of at least  $0.25 \times D$  or 3 metres around the final approach & take-off Area, or a larger distance if considered necessary for a HLS.
-

- The safety area surrounding final approach & take-off area need not be a solid surface. However, its attributes should provide that no fixed object should be permitted on or in the area defined as the safety area.
  - Objects which are capable of being broken or damaged but which because of their aviation safety function need to be in this area, are acceptable but Aviation Service Providers who use the Helicopter Landing Site should be made aware of their location. Objects in the safety area should not exceed a height of 25 cm.
  - The mean slope of a final approach & take-off area should not exceed 5% for 'Category A' operations or 7% for other operations or a lesser percentage if required by the design helicopter Aircraft Flight Manual. The slope of an associated solid Safety Area should not exceed 4% up away from the Final Approach & Take-Off area.
  - CATEGORY A – with respect to rotorcraft, means a multi-engine rotorcraft that is:
    - (a) Designed with engine and system isolation features specified for Category A requirements in Parts 27 and 29 of the FARs or EASA CS-27 and CS-29 and
    - (b) Capable of operations using take-off and landing data scheduled under a critical engine failure concept which assures adequate designated ground or water area and adequate performance capability for continued safe flight or safe rejected take-off in the event of engine failure.
  - Have at least one Touchdown & Lift-off Area – being a cleared and stable area capable of bearing the dynamic loads which may be imposed by the helicopter on the site by a heavy/ emergency landing. The final approach & take-off area, at minimum, should be an area equal to  $1 \times D$  and may or may not be located within the final approach & take-off area:
    - The touchdown and lift-off area should provide for adequate drainage to prevent accumulation of water on the surface, but the overall slope should not exceed the maximum slope landing capability of the helicopter. The recommended maximum slope for a touchdown and lift-off is 2% in any direction.
    - If the touchdown and lift-off is not within the final approach & take-off, it should be co-located with a stand. In this case the touchdown and lift-off is also protected by the safety area of the stand.
    - An air taxiing route with a width equal to twice the main rotor diameter (RD) of the design helicopter should be provided between the final approach & take-off and the touchdown and lift-off.
-

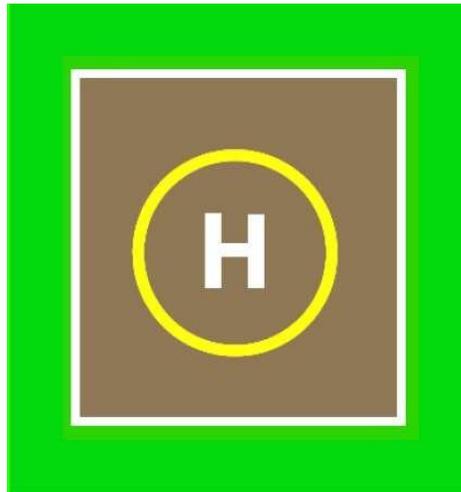


Figure 1: Standard HLS – A 1 x D TLOF within a 1.5 x D FATO and additional 0.25 x D Safety Area (Total area is 2 x D). Also showing 'H', FATO perimeter and TD/PM markings.

- A helicopter **Stand** should be of sufficient size to contain a circle with a diameter of at least 1.2 x D, plus a 0.4 x D protection area for the largest helicopter the stand is intended to serve.
- The **approach and departure paths** should extend outwards from the edge of the final approach & take-off as illustrated in Figure 3 and have an obstacle free gradient of approximately 7 degrees (1:8 vertical to horizontal), measured from the edge of the final approach & take-off to a height of 500 feet above the final approach & take-off level. The sides of the obstacle free sector should diverge at an angle of 10 degrees in the horizontal plane to a maximum of seven times the RD of the design helicopter for visual day operations and ten times the RD for visual night operations. This path may be curved left or right to avoid obstacles or to take advantage of a more advantageous approach or departure path.

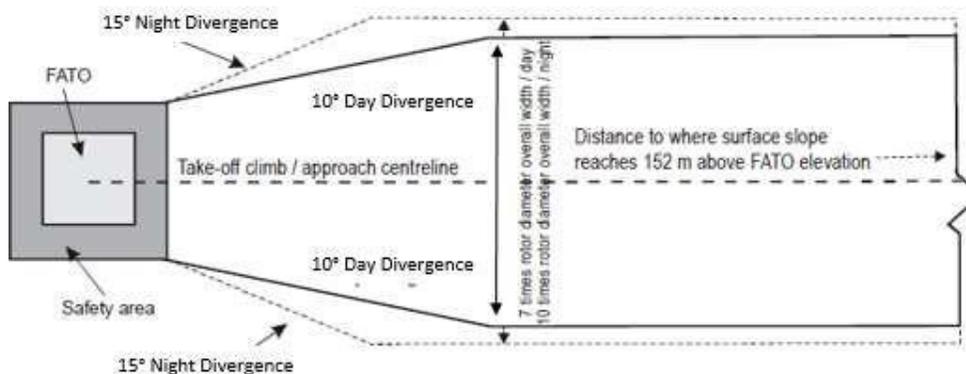


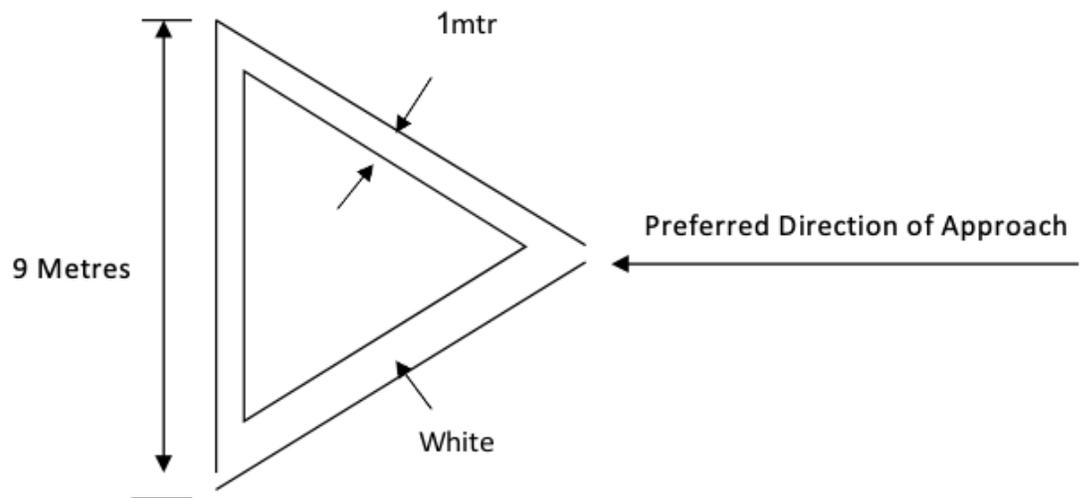
Figure 2: Dimensions of Standard HLS Approach and Departure Paths (Visual Operations)

- **Access** – the helicopter landing site should be sited with easily accessible and well-defined access routes for both exploration personnel and emergency services.

- **Fire Extinguishers** – the helicopter landing site should be equipped with at least two dry chemical powder or carbon dioxide fire extinguishers, each with a minimum capacity of 9kg.

#### 20.3.4 Markings & Indicators

- **Wind Indicator:**
    - A standard helicopter-landing site should be equipped with at least one wind indicator, which is visible to the pilot for take-off, approach and landing.
    - The wind indicator for night operations should be capable of being illuminated.
  - **Helicopter Landing Site Identification Marker:**
    - Where possible should be painted on the helicopter landing site final approach & take-off in the form of a large letter 'H'.
  - **Final Approach & Take-Off edge markers:**
    - Where possible the edge of the final approach & take-off should be marked with a 40 cm-wide white stripe, painted to clearly delimitate the final approach & take-off on the helicopter landing site and
    - If the helicopter-landing site is separate from the touchdown and lift-off, it should be marked so it is easily identifiable by the pilot when conducting operations. The use of aiming point markings may assist in this situation.
  - **Aiming Point Marker:**
    - An aiming point marker should be provided at the helicopter-landing site where it is necessary to make an approach to a point prior to moving to the touchdown and lift-off area.
    - The aiming-point marking should be located within the final approach & take-off.
    - The aiming-point marking should be an equilateral triangle with the bisector of one of the angles aligned with the preferred approach direction. The marking should consist of a continuous white line and the dimensions of the marking should conform to those shown in the following diagram:
-



- Touch Down/Positioning Marking (TD/PM):
  - A TD/PM circle should be provided where it is necessary for a helicopter to touch down or be accurately placed in a specific position
  - A TD/PM should be located so that when the pilot's seat is over the marking, the undercarriage will be inside the load-bearing area and all parts of the helicopter will be clear of any obstacle by a safe margin and
  - A TD/PM should be a yellow circle and have a line width of at least 0.5 m. The inner diameter of the circle should be 0.5 D of the largest helicopter the helicopter landing site touchdown and lift-off area is intended to serve.
- A Maximum Helicopter Tonnage Marking:
  - Should be painted as a whole number on the helicopter landing site within the final approach & take-off with the weight, expressed in kilograms, calculated by multiplying the indicator number by 1000 and these figures should be orientated to the preferred approach path and be able to be read on final approach to the helicopter landing site.

## 21 Fixed Wing Operations

### 21.1 Pilot Experience

Pilots must have recent and relevant experience as described in Section 13 Pilot Experience Requirements of this guideline. In addition to this, pilots must:

- Be appropriately rated and endorsed by the country of registration where the airplane is registered
- Must meet the crew composition requirements as specified in Section 15 Aircrew Composition
- Two pilot crew members must have completed formal documented Multi-Pilot Training or Crew Resource Management (CRM) training
- Use a two-pilot crew for multi-engine airplanes:
  - Below 5700 kg Maximum Take-off Weight (MTOW) with a certified passenger seating capacity of 10 or more
  - Below 5700 kg (MTOW) with a certified passenger seating capacity between 6 to 9 conducting night take off or landings.

### 21.2 Aircraft Fit Out

As per the requirements of Section 8 Aircraft Selection.

### 21.3 Operational Requirements

#### 21.3.1 Fuel Reserves

- IFR Flight Planning

Turbine aeroplanes must carry a minimum fixed fuel reserve of 30 minutes at the normal cruise consumption rate plus a variable reserve of 10% of calculated trip fuel in addition to any holding or alternate destination or IFR fuel requirements.

Piston engine aeroplanes must carry a fixed reserve of 45 minutes plus a variable reserve of 15% in addition to any holding or alternate destination or IFR fuel requirements.

- VFR Flight Planning

The fuel should be sufficient for the route proposed, plus 10% of contingency and another 30 minutes. The fuel for starting and taxi should also be considered.

#### 21.3.2 Refuelling

In addition to the requirements of Section 28 Fuel Facility Requirements:

- Hot refuelling must not be conducted for fixed wing aircraft.
-

### 21.3.3 Additional Safety Equipment

- Pilots and crew shall wear flight helmets for specialist flights conducted below 500 feet AGL
- Effective Radio communication is essential between the loadmaster and pilot
- Cotton or flame-resistant clothing such as Nomex is preferred for personnel working around aircraft. Chemical reactions from fuel and other aircraft associated chemicals or fire can cause synthetics to melt to skin.

### 21.3.4 Ground Crew

- Only persons trained and approved by the operator and/or the regulatory authority where applicable can conduct or take part in operations and must meet the requirements as detailed in Section 17 - Ground Crew and Loadmaster Requirements.

## 22 Passenger and Baggage Requirements

### 22.1 Passenger Operations

Site or operational specific risk based safe work procedures, training inductions, and passenger briefings will be established to ensure the safety of personnel whilst located in the vicinity of aircraft propellers, jet engines or rotor blades.

Personnel may only enter or exit a helicopter while the rotors are in motion if they have been appropriately instructed and endorsed to do so. Passengers shall not be permitted near aircraft or airside unless accompanied by the aircrew or an approved member of the facility's ground staff.

#### 22.1.1 Passengers

- Must be listed on a manifest or passenger list not carried on the aircraft that includes passenger and cargo/baggage weights
  - Must be employed or otherwise engaged by Vale. Any exception should be formally approved by the Exploration Manager
  - At least one passenger must carry a Personal Location Beacon (PLB) when non-scheduled, remote area or helicopter operations are conducted
  - Personnel travelling on Vale Exploration chartered or operated aircraft shall wear clothing appropriate for the local weather conditions and that offers protection against possible hazards
-

- Smoking is not permitted:
  - In any aircraft chartered or operated by Vale Exploration
  - Airside (including ramps, apron area, hangars or in the vicinity of aircraft)
  - Outside the designated smoking area at any aerodrome or helipad
  - Only personnel either employed directly by Vale or contractors engaged by Vale shall be permitted to travel in contracted aircraft unless an emergency exists.

#### 22.1.2 Passenger Safety Briefings

Passengers shall be briefed by a crew member before each flight. The briefing shall include but not be limited to:

- A description of the aircraft and the danger areas associated with the type of aircraft being utilised, with emphasis given to helicopter rotors and propellers
  - Items that cannot be carried on board
  - Location and use of emergency and survival equipment carried on board
  - Where a portable EPIRB/ELT is carried, the crew shall brief the passengers on its location and operation
  - Where a passenger is carried in a control seat, a specific briefing shall be given
  - Stowage of hand carried items
  - Location of the first aid kit
  - Safe access and egress procedures from the aircraft while the rotors are in motion (For safety reasons personnel are required to enter and leave helicopters while the rotors are in motion on remote / temporary Helipads)
  - No smoking requirements
  - Use of seat belt and or shoulder harnesses
  - Fasten seat belts / no smoking signs
  - Actions in the event of an emergency
  - Use and location of life jackets
  - Location and use of life raft
  - Location and operation of emergency exits
  - Location and presentation of emergency briefing cards
  - Activities prohibited during flight
  - Use of mobile phones and other electronic equipment whilst onboard the aircraft
  - Flight details
-

- Air sickness protocol
- Emergency radio operation (in small aircraft)
- Location and use of oxygen masks if applicable to the aircraft type and operation
- In the case of specialised operations, a brief covering program specific information
- Personnel to remain seated with seat belt fastened until instructed to leave the aircraft by the pilot.

Passenger briefing cards shall be provided for each passenger in addition to the passenger safety briefing. The passenger safety briefing and the associated briefing card shall be in a language understood by the passengers. The briefing cards shall be aircraft and cabin layout specific.

### 22.1.3 Passenger Weights

On all Company flights actual passenger, and baggage weights must be used wherever practical. Due to the probability of overloading, standard passenger weights must not be used unless specifically agreed by the company responsible manager. Any exemptions do not absolve the operator from ensuring that loads are within limits and from weighing passengers in borderline cases.

### 22.1.4 Passenger Responsibilities

All passengers are responsible to familiarise themselves with the emergency procedures and safety information for the aircraft they are travelling in. Passengers should read the provided passenger briefing cards as aircraft models and configurations may vary.

### 22.1.5 Selective and Corporate Passenger Requirements

Vale Exploration shall ensure that wherever possible, the number of key management or project staff travelling together in the same aircraft will be kept to a minimum. This is to ensure the continuity of ongoing business activities in the case of a serious aircraft accident or incident.

## 22.2 Baggage & Cargo Requirements

All baggage shall be accurately weighed and stored in a secure area after the check in process has been completed.

### 22.2.1 Baggage and Freight Weights

On all company flights actual baggage and freight weights must be used. Due to the probability of overloading, standard baggage weights must not be used.

Cabin baggage and freight should be to be kept to a minimum. Large items must be stored in a secured baggage area, overhead bin or otherwise restrained. All items of freight carried in the cabin must be adequately restrained and not block normal or emergency exits or impede passenger access to those exits.

---

### 22.2.2 Prohibited Items

Where a passenger has a query or concern over the carriage of any item, the aircraft crew or Aviation Service Providers check in staff should be consulted.

Plastic bags should never be carried, used or discarded in proximity to aircraft as they may enter the engines, rotors and propellers, should they become airborne.

It is forbidden to transport alcoholic beverages or illegal materials on contracted aircraft.

### 22.2.3 General Cargo

It is required, whenever possible, cargo is carried in a compartment separate from the passenger cabin by a resistant partition, equipped with an independent system to detect fire and smoke and fire extinguishing.

In addition to the considerations relating to the handling of dangerous cargo, it is essential that the entire cargo is securely tied inside the aircraft.

Each cargo item must be weighted and the manifest completed, to allow the pilot to properly calculate the aircraft's performance when loaded, leaving an adequate safety margin in case of engine or other system failure.

Operator shall ensure only authorised personnel are permitted to place, tie and remove cargo and luggage from the aircraft.

## 22.3 Authority of Crew

The aircraft Captain has full authority regarding, flight conduct, operational safety, refuelling operations, loading and control of embarked passengers. Passengers shall abide by all reasonable instructions provided by the aircraft's crew.

**Note:** Where a passenger or passengers have concerns over the use of an Aviation Service Provider Vales Corporate Aviation Area should be contacted immediately.

## 22.4 Dangerous Goods

Regulatory requirements restrict carriage of certain types of goods on aircraft for safety reasons. Depending on the type of operation and quantities, some restricted goods may be permitted. It is important to check with the pilot or Aircraft Operator prior to flight. If an operation involves moving or carrying Dangerous Goods, it is important to decide early in a project.

### 22.4.1 Ground Crew and Shippers

Staff members involved with the handling or shipping of dangerous goods travelling by aircraft must be trained to the aviation regulatory requirements. The Air Service Provider is responsible for carriage of Dangerous Goods and shall be consulted in the development of processes involving such cargo.

---

#### 22.4.2 Passengers

Passengers are responsible to declare the carriage of any dangerous goods to the pilot or Air Service representative prior to boarding.

If in doubt about whether an item or substance can be carried, refer the matter to the pilot or check in staff for guidance.

Items to consider are:

- Compressed gases e.g. refrigerants, Pressurised butane, oxygen, diving equipment
- Corrosives e.g. acids, alkalis, mercury and wet cell batteries
- Explosives munitions, fireworks and emergency flares
- Flammable liquids and solids e.g. lighter or heating fuel, matches, paints and articles easily ignited
- Infectious substances e.g. live virus substances, blood samples
- Radioactive materials and all poisons e.g. calibration samples, insecticides and weed killers.

Airlines also restrict items in carry-on luggage such as medicines and toiletries to 100mls. Alcoholic beverages are often restricted to checked luggage only and the amount may be limited,

The carriage of dangerous goods is to occur only if the goods are:

- Declared
  - Carried under IATA guidelines or by specific procedures that have been approved by the air operator and the local regulator.
-

## 23 Geophysical Survey Operations

This section defines the requirements for airborne geophysical survey operations for Vale Exploration. Airborne survey is a demanding flight regime encompassing many operational risks to both fixed and rotary wing aircraft. Prior to any geophysical survey commencement, the operator is required to submit an operational risk assessment conducted in accordance with Section 9 Operational Risk of this guideline. It should be noted that local regulatory requirements take precedence over this section where they are more stringent.

Survey companies utilised by Vale Exploration shall:

- Be a member of IAGSA
- Comply with the IAGSA Safety Manual &
- Have sub-contracted aviation service providers (where used) or their own aircraft and aviation management systems audited by a Vale approved aviation safety consultant prior to the commencement of flight operations.

### 23.1 Pilot Experience

Pilots must have recent and relevant experience as described in Section 13 Pilot Experience Requirements of this guideline. In addition to this, pilots must:

- Have successfully completed a Geophysical Survey Training Program conducted by the operator
- Be appropriately rated and endorsed for low level flight by the state of registration in which the aircraft is registered
- Have 12 months or more experience in geophysical survey operations
- In the case of Helicopter operations utilizing under slung equipment Pilots must have 300 hours external load experience.

### 23.2 Towed Bird or Array Operations

Operations involving towed bird or array configurations must:

- Incorporate a weak link that is certified by the regulatory authority or a regulatory approved facility for towed bird or array configurations
  - Be appropriately located for the type of operation, i.e. with aircraft located at the bird and for helicopters at the hook
  - Be subject to a daily documented inspection prior to flight to ensure serviceability and operational adequacy
  - Not conduct flight operations with the array or bird not attached to the line
-

- Aircraft must be equipped with:
  - Four-point harnesses with a lockable inertia reel,
  - Radar altimeter with a readable / expanded scale for operations at or below 500' Above Ground Level (AGL) with a settable audible or visual warning system,
  - Protective assemblies between the Skid and Fuselage to prevent cable interference (anti snag device),
  - External load viewing mirror useable from the pilot's seating position,
  - Electric cockpit hook release, a manual cockpit release and an external release on the hook.

### 23.3 Aircraft Fit Out

In addition to the requirements in Section 8 Aircraft Selection, survey aircraft must be equipped with:

- Four-point harnesses with a lockable inertia reel
  - Radar altimeter with a readable / expanded scale for operations at or below 500' Above Ground Level (AGL) with a settable audible or visual warning system
  - A clear unscratched canopy or windshield
  - Systems not requiring operators on board must not increase the workload of the pilot. Any required input by the pilot, such as line changes, must be located within easy reach of the Pilot and within normal operating field of view
  - All modifications to the aircraft must have been certified by the aviation regulatory authority in which the aircraft is registered
  - GPS flight following system capable of 1-minute reporting intervals
  - A satellite telephone
  - A portable 406 EPIRB/ELT
  - A fuel totaliser.
-

## 23.4 Operational Requirements

### 23.4.1 Fuel Reserves

- IFR Flight Planning

Turbine aeroplanes must carry a minimum fixed fuel reserve of 30 minutes at the normal cruise consumption rate plus a variable reserve of 10% of calculated trip fuel in addition to any holding or alternate destination or IFR fuel requirements.

Piston engine aeroplanes must carry a fixed reserve of 45 minutes plus a variable reserve of 15% in addition to any holding or alternate destination or IFR fuel requirements.

- VFR Flight Planning

The fuel should be sufficient for the route proposed, plus 10% of contingency and another 30 minutes. The fuel for starting and taxi should also be considered.

### 23.4.2 Minimum Survey Speeds

The Minimum survey speed for Vale Exploration fixed wing surveys shall be the greater of:

- 130% of the clean stall airspeed of the aircraft
- 110% of the best single engine rate of climb speed
- Helicopters wherever possible should be operated outside of the velocity/height avoid curve as published by the helicopter manufacturer.

### 23.4.3 Minimum Survey Height

Minimum heights for survey shall be:

- Fixed wing 100 metres
  - Rotary wing 60 metres
  - Operations with towed arrays or birds shall have a minimum height clearance of 50 metres
  - Where operations occur in jungle environments the tree canopies shall be defined as the datum for height
  - Where a proposed survey height is to be lower than published above the proposed operations requires a full risk assessment both by the Geophysical Operator and the Aviation Advisors. The outcome of these assessments will be used to evaluate proposed heights. The final decision must be approved by the relevant Regional Exploration Manager.
-

#### 23.4.4 Additional Safety Equipment

- Pilots and crew shall wear flight helmets for geophysical surveys conducted below 500 feet AGL
- Effective Radio communication is essential between the loadmaster and pilot in the case of helicopter towed array systems
- Cotton or flame-resistant clothing such as Nomex is preferred for personnel working around aircraft. Chemical reactions from fuel and other aircraft associated chemicals or fire can cause synthetics to melt to skin.

#### 23.4.5 Ground Crew

- Only persons trained and approved by the operator and/or the regulatory authority where applicable can conduct or take part in operations and must meet the requirements as per Section 17 Ground Crew and Loadmaster Requirements
  - Towed arrays and birds are considered external loads.
-

## 24 Aerial Photography Operations

Vale Exploration may require on an as needed basis aerial photography of its sites, access routes or tenements. Wherever possible a suitable twin-engine aircraft should be used. In the case of a single engine aircraft being the most suitable or only available aircraft, the following guidelines are required to be adhered to as a minimum:

- The aircraft pilot and Aviation Service Provider as minimum must have been the subject of a desktop audit for a one-off task, ongoing operations require a full audit
  - A full risk assessment has been completed
  - Approved aviation safety advisors have approved the operation
  - Only persons operationally required are to be carried aboard the aircraft
  - The Aviation Service Provider provides a Job Safety Analysis for the proposed task
  - The aircraft is operated in such a manner that in the event of an engine failure a forced landing can be reasonably assured
  - Flights are conducted during daylight hours under the Visual Flight Rules (VFR) in Visual Meteorological Conditions (VMC)
  - The task is not conducted below 500ft above ground level
  - Upper torso restraint is required for all occupants
  - An approved flight following system is in place
  - If doors are to be removed or opened the aircraft is to be rated for such activities and a harness is to be provided for the photographer, or those in proximity to open doors
  - Where the flight is undertaken over a mine site the resident mine manager / SSE is to be adequately briefed and a formal clearance obtained.
-

## 25 Non-Standard Flight Operations

### 25.1 Private Flying Operations

Vale Exploration personnel are not authorised to pilot or operate aircraft on behalf of the Company. Personnel piloting aircraft for private travel to their place of employment are required to operate outside of rostered work hours and Vale Exploration is not in any way responsible for the conduct or the safety of the flight operations.

### 25.2 Flights Not Sanctioned by Vale Exploration

Vale Exploration personnel shall not travel for the purposes of company business on charter or private flights not authorised by the company.

### 25.3 Emergency Flight

In the event where there is grave and imminent danger to persons on board, or persons on the ground which requires immediate aviation support, a flight may be conducted without the standard protocol ensuring additional risks do not exceed the initial danger. Vale Exploration management is to be contacted immediately.

## 26 Airworthiness Standards

Air Service Providers shall be able to show how the airworthiness of their aircraft is maintained. A process of Continuing Airworthiness Management shall be developed, and the procedures and processes published either within a standalone document or within the company's suite of documents. The procedures and process will include:

- Development and review of a maintenance program for each aircraft type operated. The program may take the form of the manufacturers maintenance program as defined in the logbook statement, a System of Maintenance or an Approved Maintenance Program dependent on the category of operation.
- The receipt and control of all Airworthiness Directives (ADs), Service Bulletins (SBs) and other Instructions for Continuing Airworthiness (ICAs). The control process shall require the validation of such maintenance data by a minimum of two company personnel.
- The rectifications of defects
- Planning of Maintenance and the provision of forecasts
- The accomplishment of modifications
- The proper management of all Continuing Airworthiness Records

The published information regarding the system of Continuous Airworthiness Management will include the duties, responsibilities, qualifications and training requirements of the staff employed to accomplish the above tasks.

### 26.1 The Maintenance Program

The maintenance program shall comply with:

- Instructions issued by the governing authorities
  - Instructions for continuing airworthiness issued by the holders of type certificates and supplemental type-certificates
  - Instructions for continuing airworthiness issued by approved design organisations for modifications and repairs
  - Additional instructions proposed by the operator and approved by the applicable authorities.
-

The maintenance programme should be approved by the governing aviation authority and should be reviewed at least annually, taking into account the environmental conditions and utilization, to:

- Ensure compliance with new and/or modified maintenance instructions included in the documents affecting the programme basis (e.g. From the manufacturer, maintenance review boards (MRB))
- Evaluate the programme effectiveness, aiming to reduce repetitive defects, malfunctions and damage to a minimal level, and
- Ensure adherence to scheduling of inspection and maintenance tasks the source of such scheduling may include internal or external organizations, MRBs, manufacturer instructions or directives from the governing authority.

The maintenance programme shall contain the following basic information:

- The type/model of the aircraft, engines and, where applicable, auxiliary power units and serial number of the aircraft
  - Contents, list of effective pages and their revision status
  - The tasks and the periods (intervals/frequencies) at which each part of the aircraft and its components, including optional installations, should be inspected, replaced and/or overhauled as recommended by the type certificate holder and STC holders, including those approved by the design authority (e.g. Mandatory life limitations) and those derived from modifications/repairs
  - Permitted tolerance, if applicable, to interval/frequency of each maintenance task
  - Mandatory life limitations
  - Description of engine performance trend monitoring. Single engine turbine aircraft are required to have an engine condition trend monitoring (ECTM) system in place.
  - Details of conditional/unscheduled inspections required after flights under unusual conditions, or after exceeding certain limits and values indicated by the instruments, or after operational incident (i.e. Lightning strike, hard landing, etc.)
  - If applicable, details of ageing aircraft system requirements
  - Details of, or cross-reference to, any required reliability programme or statistical methods of continuous surveillance.
-

## 26.2 Maintenance Data

The Air Service Provider will ensure that all applicable maintenance data is current and readily available for use by the continuing airworthiness staff. Methods to comply with this requirement include:

- Subscriptions to OEM subscription services
- Online manufacturer's portals
- Subscriptions to National Aviation Authorities AD services
- Use of dedicated Aviation Maintenance Data Management software

## 26.3 Records

The Air Service Provider shall retain all maintenance and flight records required by the National Aviation Authority including:

- Airframe logbook
- Engine logbook(s) and related components log cards
- Propeller logbook(s)
- Log cards, for any service life limited and tbo (time-between-overhaul) component
- The aircraft technical log

Additionally, they should retain records of:

- Current ADs, SBs and other ICA
- Status of modifications and repairs
- Status of compliance with maintenance programme
- Status of service life limited components
- Mass and balance report
- List of deferred defects.

## 26.4 Maintenance Planning

Maintenance planning shall be achieved through the use of dedicated software preparing forecasts that include all relevant maintenance data. The Air Service Provider may have a system work cards or work sheets by which instructions for the completion of maintenance is conveyed to the maintenance provider.

## 26.5 Minimum Equipment List (MEL)

An operator should have a Minimum Equipment List (MEL) for each aircraft in the fleet, developed by the operator based on the manufacturer's Master Minimum Equipment List (MMEL), and approved by the governing authority. MELs should be readily available to flight crews and maintenance personnel for reference.

---

#### 26.5.1 Use of MEL in Aircraft

Where aircraft have approved Minimum Equipment Lists (MEL), equipment not operable must be placarded so and/or removed from the aircraft and an entry made in the appropriate log. All items not covered by the MEL must be functional. Deferred defects must be addressed within the published timeframes.

## 27 Maintenance Operations

### 27.1 Standards

All aircraft utilised for Vale Exploration shall be maintained in an airworthy condition by an approved aircraft maintenance organisation holding valid and current licenses and approvals. All aircraft shall be current in respect of Airworthiness Directives, overhaul schedules, inspection schedules, calendar dates and have all mandatory service bulletins conducted within specified time frames.

The aircraft operator and/or the maintenance service provider is responsible for ensuring that an adequate number of suitably qualified personnel are available to perform required maintenance tasks, management duties and quality and inspection duties.

A formal fatigue management policy and procedure for engineering staff must be available.

Where an external maintenance service provider is used, evidence of the arrangements between the air service provider and maintenance service provider is required.

### 27.2 Maintenance Organisation Procedures

The maintenance organisation shall establish a set of procedures, including at a minimum:

- The organisation safety and quality policy
- The titles and names of the post holders involved in the maintenance management, including deputies
- The duties and responsibilities of the above-mentioned post holders
- An organisation chart showing associated chains of responsibility
- A general description of manpower resources, including a list of licensed engineers, authorised to release the aircraft to service
- Organization scope of work relevant to levels of maintenance for each aircraft type and components
- The maintenance and quality system procedures required to accomplish the tasks of the maintenance organization
- Initial and recurrent training and qualification procedures for all personnel working in the maintenance organization

### 27.3 Maintenance Records

The Maintenance Provider shall utilise the work cards or work sheets provided by the Air Service provider or utilise their own work card or work sheet system to ensure all tasks required are completed and duly signed off. Additional work cards may be required for the rectification of defects.

Maintenance may only be signed-off by those engineers authorised to do so.

---

Maintenance records should refer to the revision status of the maintenance data used.

Work cards or worksheets shall be collated into a workpack to which a summary sheet is attached. The summary sheet or sheets will include:

- Names of Engineers performing maintenance and a sample signature or identifying stamp
- A summary of tasks completed
- A list of calibrated tooling used during the maintenance task including the tooling's certification validity date
- A sign-off by each engineer that all personal tooling is accounted for
- A sign-off by the supervising engineer that the worksite has been checked for tooling and any extraneous materials, including rags, prior to the release to service.

#### 27.4 Production Planning

The maintenance provider shall detail within their maintenance manual procedures to ensure that upon the receipt of a maintenance request from the air service provider planning is conducted to ensure there are adequate resources for the task. These resources may include:

- Sufficient manpower
- Sufficient hangar space
- Correct stores/parts in stock
- Additional equipment/tooling on hand

#### 27.5 Critical Maintenance Tasks

The maintenance provider shall have within their maintenance manual written procedures to ensure that during a maintenance task, a person should not perform work involving the installation of several critical components of the same type on more than one system of the same aircraft.

In the case only one person is available an adequate break should be taken between the tasks and the work subject to reinspection.

#### 27.6 Independent Inspections

The following tasks will be subject to independent inspection:

- Installation, rigging and adjustments of flight controls
  - Installation of aircraft engines, propellers and rotors
  - Overhaul, calibration or rigging of components such as engines, propellers, transmissions and gearboxes.
  - Inspection to include all associated fuel, oil and air lines for the above items
-

The independent inspection should cover as a minimum:

- Correct assembly
- Correct locking
- Full, free and correct movement of controls over the full range of operation
- Manufacturer's settings
- Rigging standards.

Records of independent inspections shall contain a certification of the above requirements by two authorised maintenance personnel. Only in exceptional circumstances should an aircrew member, endorsed on the aircraft type, be allowed to be a signatory to the independent section, and only then in the event that the next flight will be to return the aircraft to the maintenance facility for a confirmation inspection by a second qualified engineer.

## 27.7 Tool Control

The maintenance provider shall document a system of tool control that at minimum:

- Identifies the tool's user, the tools whereabouts and the aircraft concerned
- Provides for a reconciliation of all tooling, daily or prior to an aircraft's release for service, whichever comes first.
- Provides a process to track tools and equipment that require inspection, or service or calibration. A system of labelling all such tools and equipment shall be established to give information on when the next inspection, service or calibration is due, and/or if the item is unserviceable for any other reason.

It is recommended that the use of cut outs, holders and racks are combined with photographs to enable the recording of the contents of personal toolboxes, Company and calibrated tooling.

## 27.8 Stores and Spare Parts

Spare parts and components are required to be traceable, genuine and stored in such a manner so that they are free from contaminants. Clear controlled segregation is required between serviceable and unserviceable parts.

All parts should be stored on shelves or boxes so they are stored individually by reference number and can easily be found.

Every item must be identified by a label, small parts should use the label for a certain amount (for example, a bag or box of gaskets).

A registration system that allows easy location of all spare parts in stock must be maintained, which reflects an accurate record of the inventory levels of each item individually. Periodic, selective and continuous checks of the items should be performed, as well as the total annual verification.

The Aviation Service Provider must have a formal policy regarding the shelf life control accurate records of any items submitted to this control should be in evidence.

---

## 27.9 Facilities

Maintenance facilities are to be approved by the appropriate Aviation Regulatory Body and are to be kept clean and uncluttered with all required safety equipment located in a place(s) that allows personnel access under all scenarios. Facilities shall meet local Health and Occupational Safety guidelines.

## 27.10 Licensed Aircraft Mechanical Engineer (LAME)

Licensed Aircraft Mechanical Engineers shall have been trained and deemed competent by a regulatory authority and hold a current license to maintain the type of aircraft being operated. The LAME will operate within the guidelines published by or in accordance with Local Civil Aviation Regulations at all times.

The LAME shall have attained over five years working as a LAME and preferably have had at least two years' experience maintaining the type of aircraft being operated.

### 27.10.1 Medical Examinations and Physical Fitness

The operator must implement a process to ensure that LAME's and inspectors maintain suitable levels of physical fitness to perform their activities in a safe and efficient manner.

### 27.10.2 Personnel Training

The maintenance service provider and/or the air operator should ensure that refresher training is carried out by licensed engineering staff at intervals recommended not to exceed 3 years. Training for Maintenance Error Management and Engineering related Human Factors including Fatigue Management should be included in the training schedule.

The maintenance service provider shall be able to demonstrate how continuous training and education is delivered for the following:

- Changes in regulatory requirements
- Organisation procedures
- Standards for products being maintained
- Human factors issues identified from any internal or external analysis of incidents
- Information on relevant ADs, SBs or similar documents since the last training

Continuous training may be delivered through Toolbox meetings for which the agenda and attendance records are retained.

---

## 28 Fuel Facility Requirements

Fuelling operations are to conform to local guidelines, standard and or legislation. Wherever possible, fuel and the associated handling should be provided by an authorised fuel supplier or the Aviation Service Provider.

### 28.1 Drum Storage

- Storage areas shall comply with relevant environmental regulations
  - Drums should be stored in a suitable safe location which is well ventilated, away from any source of ignition and stored in such a manner that any product leakage will not damage the environment or pose a risk to people. Whenever possible, the use of well-ventilated buildings is recommended for drum storage. Buildings used to store fuel must comply with local design standards and regulations
  - Drums may be stored upright (typically on pallets) if they are stored under cover or stored with drum top covers. Where this is not the case drums shall be stored on their sides with bungs below the liquid level. Drums shall be stored in a single layer.
  - Fuel must be stored in appropriate approved manner to eliminate the risk of the fuel becoming contaminated
  - Fuel consignments shall be stored in separate batches to facilitate periodic inspection and issued in rotation according to filling date. The earliest filling date shall be used first
  - Drums shall be inspected weekly for leakage after filling
  - Markings shall be checked and renewed as necessary to maintain clear identity of product and batch details
  - Batches remaining in stock twelve (12) months after the filling date and at six (6) monthly intervals, thereafter, shall be sampled and subject to periodic certification testing
  - Drums are heavy objects and safe manual handling techniques utilizing effective mechanical assistance should always be employed. Recommended tools:
    - (a) Drum bung spanner (with tab seal remover),
    - (b) Drum tilting lever,
    - (c) Drum trolley,
  - Where an aviation service provider stores fuel at a Vale Exploration site, the operator must ensure that the fuel is stored in an appropriate manner in accordance with these guidelines and local regulatory requirements.
-

## 28.2 Quality Control

- Fuel and associated fueling systems must be checked for quality, water and contaminants prior to refueling. This must be done by the Pilot or may be completed by Ground Crew holding the relevant qualifications approved by the Aviation Service Provider, Fuel Supply Company or Vale Exploration. Procedures and equipment used for the testing of the fuel shall be provided, only approved methods of quality and water detection shall be utilised
- Approved aviation grade filters are to be utilised for all installations. Go-no-go filters are recommended however, a particle filter must be installed down line of the go-no-go filter
- Aviation Service Provider are reminded to be mindful of biological contaminants in susceptible areas and climates.

### 28.2.1 Drum checks

- Before decanting or delivery, the seals shall be checked to ensure they are intact, and the correct grade is being used and that the batch is still current
- Expired batches should not be used until they have been tested to confirm they still meet specification requirements
- Ensure that the grade of fuel is correct for the aircraft type.

### 28.2.2 Product checks

- Before decanting or delivery, it is recommended that a sample be taken from the drum and checked for visual signs of water or particulates and any other anomalies
- It is recommended that these checks be done on a bottom sample taken from the lowest point of the drum when it is placed on a tilt and after the drum has been allowed to settle for at least 30 minutes
- It is important to ensure that all sampling equipment is clean and there is no possibility of introducing contamination into the product
- If excessive quantities of water or particulates are found, or if the product is an unusual colour, the drum should be quarantined and should not be released or used for fueling of aircraft.

### 28.2.3 Use of Opened Drums

- The use of already opened aviation fuel drums is not recommended. However, where a partially full drum is left after a delivery and it is not possible to downgrade the fuel to non-aviation use, the drum should be resealed with the original bungs (without tri-sure cap) and marked "Opened – date". It should be stored so that the fuel level covers the bungs. It should be used at first subsequent fueling and checked carefully for the presence of water before use.
  - New aviation drums may be refilled no more than three (3) times after being opened. Each drum must be clearly marked after each refill to ensure that the number of refills can be tracked.
-

- Aviation drums which have been refilled must be checked carefully for water contamination before the fuel is transferred into an aircraft.
- Empty drums may be stored upright if they are stored under cover. Where this is not the case empty drums shall be stored on their sides with bungs positioned parallel to the ground in the 3 & 9 O'clock position.
- Empty drums may be stored in layers no greater than three drums high.

#### 28.2.4 Safety Data Sheets

Safety Data Sheets (SDS) should always be available and easily accessible wherever aviation fuel is stored and / or used.

#### 28.2.5 Traceability

A Chain of Custody must be established by the supplier (Vale / Aviation Service Provider) of aviation fuel and lubricants.

- The chain of custody must be documented and auditable,
- Copies of Release Notes must be retained.

#### 28.2.6 Equipment

Refuelling equipment such as pumps, hoses, earthing cables, filtration equipment etc. must be kept on a register detailing inspection, maintenance and usage dates as well as filter change intervals.

### 28.3 Procedures and Training

- Aircraft refuelling areas shall be clearly defined so that minimum safety distances are adhered to
  - Serviceable fire extinguishers appropriate for fuelling operations shall be provided
  - Each Vale Exploration site where re-fuelling operations are undertaken will have written procedures for the supply and storage of fuel and for the refuelling of aircraft
  - Procedures detailing the control of personnel and passengers shall be included in the refuelling operations
  - Aviation Service Provider utilizing drum fuel must have appropriate procedures and training in place for its use.
-

## 28.4 Requirements for Refuelling in Remote Areas

Refuelling at remote locations should be the responsibility of the Aviation Service Provider and must follow this minimum list of requirements:

- The refuelling manual should include instructions on:
    - Authority and responsibility lines,
    - Training for the refuelling operator,
    - Fuel delivery inspection,
    - Fuel contamination prevention,
    - Use of fuelling equipment,
    - Refuelling for the type of aircraft to be operated,
    - File with records and inspections for: Fuel, Facilities, filters, safety equipment, training programs, individual records of trainings, contracts, etc.
  - Facilities:
    - Pumps marked with fuel type
    - Control and shutoff valves marked with emergency instructions
    - Storage area:
      - | Adequate safety,
      - | Warnings for “Flammable Items” and “Do Not Smoke”,
      - | Marks with the type of fuel,
      - | Appropriate fire extinguishers.
    - Filters should include:
      - | Screen at the entrance,
      - | Signalling system regarding the pressure differential,
      - | Water separator system,
      - | Fuel sample after the filters.
    - Hoses, nozzles and output connectors:
      - | Designed for aircraft fuel,
      - | Spring pressure shutoff valves,
      - | Protected against dust and other potential contaminants.
    - Grounding equipment:
      - | Adequate grounding,
      - | System in good conditions.
-

## 29 Aerodromes and Helipads

### 29.1 General Requirement

- All aerodromes/helipads shall meet International Civil Aviation Organization (ICAO) Annex 14 or equivalent requirements
- Helipads and aerodromes are not to be used unless approved by the pilot in command
- Aerodromes utilised for regular passenger operations within Australia shall be subject to an annual CASA approved survey and inspection
- Licensed Aerodromes and Helipads will be expected to be maintained and inspected in compliance with the governing regulatory requirements
- Vale Exploration aerodromes or helipads will have communication facilities available for communicating with aircraft and shall be manned 30 minutes before aircraft arrival, during aircraft ground operations and 15 minutes after departure
- Personnel utilizing air band radios shall be appropriately trained and licensed
- Any aerodrome or ground facility operated by Vale Exploration, handling passengers or cargo for company business shall have procedures detailing the security, supervision and handling of passengers, baggage and cargo associated with these flights
- Vale Exploration owned or operated aerodromes shall have two wind direction indicators
- Vehicles operating airside will must be equipped with a rotating beacon
- Personnel working airside shall wear high visibility vests.

### 29.2 Emergency

- Aerodromes utilised on a regular basis shall have an appropriate Emergency Response Plan in place
- Emergency lighting systems shall be available for accident/incident response
- All helipads and aerodromes at permanent camps or bases must be equipped with Crash Rescue Lockers (Ref: Annex 2), First Aid Kits and Fire Extinguishers and have a level of emergency response capability commensurate with the scope of intended flight operations.

### 29.3 Helipad or Landing Site

- Helicopter take-off, landing areas and parking areas must be selected to provide minimum risk in the event of an engine failure on take-off or landing. Guidance can be found in International Civil Aviation Organization (ICAO) Annex 14 Volume II Heliports and Advisory material issued by the aviation regulator
  - The requirements for any unimproved landing site must be clearly defined during initial planning meetings. Unimproved landing sites must be subject to a formal risk analysis prior to commencement of operations. The meeting must include the assigned pilot,
-

ground crew members and Company representatives.

- Guidance for the establishment of Onshore Helicopter Landing Sites may be found in Section 20 of this document.

## 29.4 Inspections

All Vale Exploration owned, operated or controlled Aerodromes and Helipads will be visually inspected and the inspection documented prior to use for debris, hazards, water damage or retention, and potential animal or bird incursions etc.

- Aerodromes and helipads must be inspected prior to flights daily
- Where an aerodrome is not fenced inspections will occur prior to aircraft arrival and departure
- For aerodromes or helipads not in scheduled use but that may be required by a project, the inspection interval must not exceed 30 days
- Inspections must be documented.

## 29.5 Smoking

Smoking is not permitted:

- Airside (including ramps, apron area, hangars or in the vicinity of aircraft)
  - Outside the designated smoking area at any aerodrome or helipad
  - As directed by aircrew or their company representatives.
-

### 30 Emergency Management for Vale Facilities

Vale Exploration owned or operated aerodrome/helipad facilities shall have an Emergency Response Plan detailing the procedures for aviation incidents or accidents at the facility.

These procedures should include but not be limited to:

- Aircraft Overdue procedures
- Aircraft Emergency/Crash landing procedures
- Aircraft Crash procedures
- Facility fire procedures
- Facility evacuation plan
- Fuel facility fire procedures
- Aircraft crash fire procedures.

The facility Emergency Response Plan shall also include:

- An analysis of potential emergency scenarios
- Resources that are available to assist in scenarios
- Contact details relevant to the operation including emergency services
- Roles and responsibilities of personnel and support organizations
- Communications procedures
- Search and rescue activation and communication
- Training and ERP exercising plans.
- Emergency Response

Vale Exploration owned or operated aerodrome/helipad facilities shall have an annual simulated emergency exercise. Wherever possible the exercise shall be different each year. The exercise will be facilitated / managed by Vale exploration results such exercises will be used to streamline the projects Emergency Response Plan and operating procedures where appropriate.

#### 30.1 Air Service Providers Emergency Response Plan

Air service providers providing services to Vale Exploration shall have an ERP in place that is appropriate to the size and scope of the operation. This shall in the case of regular air service providers be included in the annual audit scope. Air service providers may infrequently be asked to participate in a simulated emergency exercise about Vale Exploration flight operations. See Section 12 for detailed requirements.

---

## 31 Volcanic Ash Clouds

Volcanic ash consists mostly of sharp-edged, hard glass particles and pulverised rock. It is very abrasive and, being largely composed of siliceous materials, has a melting temperature below the operating temperature of modern turbine engines at cruise thrust. A volcanic ash cloud may be accompanied by gaseous solutions of sulphur dioxide (which when combined with water create sulphuric acid), chlorine (which when combined with water create hydrochloric acid) and other chemicals which are corrosive to the airframe and are hazardous to health. In recognition of these facts volcanic ash in the atmosphere poses a serious hazard to aircraft in flight. And as such aircraft should avoid volcanic ash encounters.

Responsibilities:

- The Aviation Service Provider is responsible for the safety of its operations.
  - In order to decide whether to operate into airspace forecast to be, or aerodromes known to be, contaminated with volcanic ash, the air operator should have in place an identifiable safety risk assessment within its SMS.
  - The Aviation Service Provider shall complete the safety risk assessment as part of the SMS before initiating operations into airspace forecast to be, or aerodromes known to be, contaminated with volcanic ash. During its normal annual safety compliance auditing of Vales Aviation Service Providers, the appointed auditor/s shall evaluate the Aviation Service Providers safety risk assessment as an identifiable process of the operator's SMS.
  - The Aviation Service Provider shall have satisfied its CAA regarding the likely accuracy and quality of the information sources it uses in its SMS and its own competence and capability to interpret such data correctly to reliably and correctly resolve any conflicts that may arise among data sources.
  - The Aviation Service Provider is required to revise its safety risk assessment when changes occur that are material to the integrity of the safety risk assessment.
  - The Aviation Service Provider's safety risk assessment shall consider data published by the relevant TCHs regarding the susceptibility of the aircraft they operate to volcanic cloud-related airworthiness effects, the nature of these effects and the related pre-flight, in-flight and post-flight precautions to be observed by the operator.
  - The Aviation Service Provider shall ensure that personnel needing to be familiar with the details of the safety risk assessments receive all relevant information (both pre-flight and in-flight) to be in a position to apply appropriate mitigation measures as specified by the safety risk assessments, especially when the situation deviates from any scenario contemplated in them.
-

- The Aviation Service Provider shall ensure that reports are immediately submitted to the nearest ATS unit using the VAR/AIREP procedures followed up by a more detailed VAR on landing together with, as applicable, an ASR and AML entry for:
  - Any incidents related to volcanic clouds
  - Any observation of volcanic ash activity
  - Any time that volcanic ash is not encountered in areas where it was forecast to be.

Where operations take place in an area that could be susceptible to Volcanic Ash associated with a volcanic eruption, Aviation Service Providers must have specific risk-based procedures in place to provide guidance to both flight and operational crews about the:

- Detection of ash
- Monitoring of ash clouds
- Avoidance of ash
- Emergency procedure for inadvertent entry into an area of ash cloud
- Appropriate considerations for ceasing air operations.

These procedures shall ensure that, flight operations remain within the accepted safety boundaries, as established through the SMS, despite any variations in information sources, equipment, operational experience or procedures. Procedures should include those for flight crew, flight planners, dispatchers, operations, engineering and maintenance personnel such that they are equipped to evaluate correctly the risk of flights encountering airspace contaminated by volcanic clouds and to plan accordingly.

As weather radar is not effective in detecting volcanic ash clouds, crews must be informed by other means of the potential or effective presence of ash clouds on proposed routes to be travelled.

Before and during eruptions, information valuable to the air operator is generated by various meteorological and vulcanological agencies worldwide. The air operator's risk assessment and mitigating actions need to take account of, and respond appropriately to, the information likely to be available during each phase of the eruptive sequence from pre-eruption through to the end of eruptive activity.

Metrological authorities provide forecasts in the form of SIGMET and/or NOTAMs.

In the event of volcanic eruptions that may or could produce an ash cloud in an area where aircraft are operating for Vale Exploration, a volcanic weather watch must be enacted that monitor's ash cloud dispersal.

---

### 32 Service Provider Statement of Compliance

SECTION	COMPLIANT (Please Initial)	NON - COMPLIANT	NOT APPLICABLE	COMMENT
<b>6 Air Service Provider Selection</b>				
6.1 Criteria for Recommendation				
6.2 Aircraft Operators				
6.3 Maintenance Service Providers				
6.4 Insurance				
<b>7 Operational Audits and Compliance Standards for Air Service Providers</b>				
7.1 Audit Procurement Purposes				
7.2 Safety Compliance Audit Scope				
7.3 Validity of Operator Approval				
7.4 Special Assessments				
7.5 Payment of Audit Related Costs				
7.6 Accepted Industry Auditing Standards – (IOSA, IS-BAO & BARS)				
7.7 Annual Audit Plan				
7.8 Audit Program Management				

7.9	Recurrent Safety Compliance Audit Requirements				
7.10	Remote Audits				
<b>8</b>	<b>Aircraft Selection</b>				
8.1	Definitions of Criteria for Aircraft Selection				
8.2	Selection Criteria for Helicopters				
8.3	Selection Criteria for Fixed Wing Aircraft				
8.4	Single Turbine Engine Fixed Wing Aircraft Requirements				
8.5	Aircraft Types not Approved for Vale Operations				
8.6	All Aircraft – Required Equipment				
<b>9</b>	<b>Operational Risk</b>				
9.1	Flight Risk Assessment				
9.2	Specialist Tasks				
9.3	Environmental Management				
<b>10</b>	<b>Quality Management System</b>				
10.1	Internal Audit Plan/Schedule				
10.2	Audit Scope				
10.3	Auditor Qualifications				

10.4	Audit Reports				
10.5	Quality System Management				
10.6	Quality Performance Indicators				
10.7	Feedback to the Accountable Manager				
10.8	External Audit Program				
<b>11</b>	<b>Safety Management Requirements</b>				
11.1	SMS Internal Assurance Processes				
11.2	SMS Training Processes				
11.3	Accident and Incident Report Requirements				
11.4	Mandatory Reporting Responsibilities and Protocols				
11.5	Identification & Reporting of Unsafe Conditions				
11.6	Human Factors				
11.7	Drug & Alcohol Policy Requirements for Air Service Providers				
<b>12</b>	<b>Emergency Response Planning</b>				
12.1	Air Service Provider ERP				
12.2	Interface Management				
<b>13</b>	<b>Pilot Experience Requirements</b>				

13.1	Aeroplane Operations				
13.2	Helicopter Operations				
13.3	Required Pilot's Licenses				
13.4	Additional Licenses, Qualifications and Training				
13.5	Operational Pilots no Multiple Types of Aircraft				
<b>14</b>	<b>Aircrew Training and Checking Requirement</b>				
14.1	Minimum Annual Training				
14.2	Proficiency Evaluations				
14.3	Refresher Training				
14.4	Additional Requirements				
15	Aircrew Composition				
15.1	Single Pilot Operations				
15.2	Additional Considerations				
<b>16</b>	<b>Cabin Crew Requirements</b>				
<b>17</b>	<b>Ground Crew / Load Master / HLO Requirements</b>				
17.1	Training Requirements				
17.2	Personal Protective Equipment				

<b>18 Flight and Duty Time Limitations</b>				
18.1 Standard Requirements				
18.2 Geophysical Survey & Low-Level Operations				
18.3 Helicopter External Load Operations				
<b>19 Helicopter Operations</b>				
19.1 Documented Procedures				
19.2 Pilot Experience				
19.3 Structure of Flight Crew				
19.4 External Load Operations				
19.5 Operational Requirements				
<b>20 Establishment of On-Shore Helicopter Landing Sites (Ref: ICAO Annex 14 c2)</b>				
20.1 Factors to Consider Prior to Using a Helicopter Landing Site				
20.2 Attributes of a Helicopter Landing Site				
20.3 Criteria for Helicopter Landing Sites				
<b>21 Fixed Wing Operations</b>				
21.1 Pilot Experience				
21.2 Aircraft Fit Out				

21.3	Operational Requirements				
<b>22</b>	<b>Passenger and Baggage Requirements</b>				
22.1	Passenger Operations				
22.2	Baggage & Cargo Requirements				
22.3	Authority of Crew				
22.4	Dangerous Goods				
<b>23</b>	<b>Geophysical Survey Operations</b>				
23.1	Pilot Experience				
23.2	Towed Bird or Array Operations				
23.3	Aircraft Fit Out				
23.4	Operational Requirements				
<b>24</b>	<b>Aerial Photography Operations</b>				
<b>25</b>	<b>Non-Standard Flight Operations</b>				
25.1	Private Flying Operations				
25.2	Flights Not Sanctioned by Vale Exploration				
25.3	Emergency Flight				
<b>26</b>	<b>Airworthiness Standards</b>				
26.1	The Maintenance Program				

26.2	Maintenance Data				
26.3	Records				
26.4	Maintenance Planning				
26.5	Minimum Equipment List (MEL)				
<b>27</b>	<b>Maintenance Operations</b>				
27.1	Standards				
27.2	Maintenance Organisation Procedures				
27.3	Maintenance Records				
27.4	Production Planning				
27.5	Critical Maintenance Tasks				
27.6	Independent Inspections				
27.7	Tool Control				
27.8	Stores and Spare Parts				
27.9	Facilities				
27.10	Licensed Aircraft Mechanical Engineer (LAME)				
<b>28</b>	<b>Fuel Facility Requirements</b>				
28.1	Drum Storage				
28.2	Quality Control				

28.3	Procedures & Training				
28.4	Requirements for Refuelling in Remote Areas				
<b>29</b>	<b>Aerodromes and Helipads</b>				
29.1	General Requirements				
29.2	Emergency				
29.3	Helipad or Landing Site				
29.4	Inspections				
29.5	Smoking				
<b>30</b>	<b>Emergency Management for Vale Facilities</b>				
30.1	Air Service Providers Emergency Response Plan				
<b>31</b>	<b>Volcanic Ash Clouds</b>				

Rev. 06 – 25/09/2020

Internal use

Air Service Provider (Registered Company Name)	
---	--

**Aviation Guideline**  
**Revision 7**



Name of Authorised Representative			
Position of Authorised Representative			
Signature of Authorised Representative		Date	

## 33 ANNEXES

### 33.1 Annexe 1 - ACRONYMS

<b>Abbreviations</b>	<b>Description</b>
AD	Airworthiness Directive
ADM	Aeronautical Decision Making
AFM	Aircraft Flight Manual
AGL	Above Ground Level
ALAR	Approach and Landing Accident Reduction
AMSL	Above Mean Sea Level
AOC	Air Operators Certificate
ASA	Air Services Australia
ASO	Aviation Safety Officer
ATC	Air Traffic Control
ATPL	Airline Transport Pilot License
ATSB	Australian Transport Safety Bureau
C of G	Centre of Gravity
CAO	Civil Aviation Orders
CAR	Civil Aviation Regulations
CASA	Civil Aviation Safety Authority
CEO	Chief Executive Officer
CFIT	Controlled flight into terrain
CMM	Company Maintenance Manual
COM	Company Operations Manual
CPL	Commercial Pilot's Licence
CRM	Crew Resource Management
CVR	Cockpit Voice Recorder
DG	Dangerous Goods
DI	Daily Inspection
EGPWS	Enhanced Ground Proximity Warning System
ELT	Emergency Locator Transmitter
EPM	Engineering Procedures Manual
ERP	Emergency Response Plan
FDM	Flight Data Monitoring
FDR	Flight Data Recorder
FDT	Flight and Duty Time
FOD	Foreign Object Debris
FRMS	Fatigue Risk Management System

GPS	Global Positioning System
-----	---------------------------

GRN	Goods Receivable Number
HF	High Frequency Radio
HSE	Health Safety and the Environment
HUET	Helicopter Underwater Escape Training
HUMS	Health and Usage Monitoring System
IAGSA	International Airborne Geophysics Safety Association
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
IPC	Inventory Process Control
Kts	Knots
LOFT	Line Oriented Flying Training
LOSA	Line Operations Safety Audit
LSA	Lowest Safe Altitude
MCM	Maintenance Control Manual
MEL	Minimum Equipment List
MOM	Maintenance Operations Manual
MRM	Maintenance Resource Management
Nm	Nautical Mile
NOTAM	Notice to Airmen
OAT	Outside Air Temperature
OGP	International Association of Oil and Gas Producers
OPS	Operations
PA	Passenger Address System
PAX	Passengers
PIC	Pilot In Command
POL	Petroleum, Oil and Lubricants
QMS	Quality Management System
RADALT	Radio Altimeter
RESA	Runway End Safety Area
RPT	Regular Public Transport
RVR	Runway Visual range
SAR	Search and Rescue
SB	Service Bulletin
SDR	Service Difficulty Report
SMS	Safety Management System
TAWS	Terrain Avoidance Warning System

TCAS	Terrain Collision Avoidance System
------	------------------------------------

Rev. 06 – 25/09/2020

Internal use

TTIS	Total Time in Service
UTC	Universal Time Co-ordinate
UTR	Upper Torso Restraint
VFR	Visual Flight Rules
VHF	Very High Frequency Radio
VMC	Visual Meteorological Conditions

### 33.2 Annexe 2 – Helicopter Crash Rescue Locker – Specifications and Contents List



#### Crash Rescue Locker Specifications

Dimensions mm: Height x width x depth: 605 x 935 x 480 Aperture mm: 874W x 354D Internal depth mm: 549 Material Specification:

Colour: Red RAL3000 Material: 3-4mm nominal thickness Door catch: Large Stainless-Steel clips

Hinges: Nylon 6 'T' hinges

Lettering: "Helicopter Crash Rescue Equipment" - 50mm white

#### **Crash Rescue Locker Contents**

- Adjustable wrench 1
  - Large Rescue axe, (non-wedge or aircraft type) 1
  - Cutters, bolt 1
  - Crowbar, large 1
  - Grab Hook 1
  - Heavy Duty Hacksaw with six spare blades 1
  - Fire Resistant Blanket 1
  - Ladder (two-piece) \* 1
  - Life line (15 m in length 5 mm circumference) plus rescue harness 1
  - Side Cutting Plier (Tin Snips) 1
  - Set of assorted screwdrivers 1
  - Harness Knife & Sheath\* \*\*
  - P-2 grade particle masks\*\* \*\*
  - Gloves, fire resistant\*\* \*\*
-

*\* For access to casualties in an aircraft on its side.*

*\*\* This equipment is required for each person who is required to respond in case of accident.*