International Civil Aviation Organization

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WORKING PAPER

DANGEROUS GOODS PANEL (DGP)

TWENTY-SIXTH MEETING

Montréal, 16 to 27 October 2017

Agenda Item 7: Other business

REPORT OF THE DANGEROUS GOODS PANEL (DGP) WORKING GROUP MEETING (DGP-WG/16)

Montreal, 17 to 21 October 2016

1. INTRODUCTION

1.1 The meeting of the Dangerous Goods Panel Working Group Meeting (DGP-WG/16) was convened from 17 to 21 October 2016. Ms. M. Paquette was elected Chairperson of the meeting and Mr. B. Firkins was elected Vice-Chairperson.

1.2 Mr. Farid Zizi, President of the Air Navigation Commission (ANC) welcomed participants. He reminded participants that the safety of the aviation system was their first priority. He noted that the lithium battery discussion had raised concerns on the ANC and the Council with respect to the way the provisions for all dangerous goods were developed and whether aviation safety needs were being adequately addressed by the United Nations agencies dealing with dangerous goods. He noted interactions between ICAO and other international organizations whereby a harmonized position of all States was voiced. He suggested that a similar mechanism should be considered for dangerous goods so that the full strength of all States could be voiced and not just one ICAO representative attending a UN meeting.

1.3 The President reminded the working group that the ANC and Council's decision to prohibit the transport of lithium batteries as cargo on passenger aircraft was considered temporary until controls were in place which established an acceptable level of safety. These included the SAE package performance standard for lithium batteries, the development of risk assessment provisions through coordination with the Flight Operations Panel (FLTOPSP) and the Airworthiness Panel (AIRP), and addressing the disconnect between Annex 8 — *Airworthiness of Aircraft* and Annex 18. He emphasized that the risk assessment provisions needed to address all dangerous goods, not just lithium batteries. He also emphasized that the SAE standard was only one part of the solution. A method to ensure transparency throughout the supply chain needed to be developed to ensure that the hazards of what was being transported were known.

1.4 The President noted the increased need for collaboration among various panels and encouraged members to familiarize themselves with the work programmes of the other panels, especially

FLTOPSP and AIRP. He reminded participants that this information was provided on the "ANCPanels" secure website accessible through the ICAO Secure Portal. He noted that as a result of decreasing resources, the ANC was trying to prioritize the air navigation work programme by working with the Secretariat and the panels to assess every task in terms of their benefit to safety and efficiency.

2. ATTENDANCE

2.1 The meeting was attended by the following panel members, advisers and observers:

Members	Advisers/Observers	State/International Organization
	M. Böhm	Austria
B. Firkins		Australia
B. Carrara	H. Guedes P. Macário	Brazil
M. Paquette	D. Evans P. Juneau	Canada
J. Jin	T. Guo Q. Yang Z. Qiu C. Chan (Hong Kong SAR)	China
	J. Wiren Bengtsson	Denmark
P. Tatin	Y. Haboury	France
H. Brockhaus	U. Wienecke	Germany
P. Privitera	C. Carboni A. Pellas	Italy
H. Sugimoto	A. Awano Y. Funai Y. Matsushita K. Takeda A. Uchizawa	Japan
T. Muller	R. Dardenne D. Kampman K.Vermeersch	the Netherlands
S.W. Park	K. Paik	Republic of Korea
D. Mirko	D. Kurdchenko I. Manakhov	Russian Federation
	T. Zembe	South Africa
	M.Á. de Castro	Spain
H. Al Muhairi	A.W. Wagih K.A. Al Belooshi H. Jamil	United Arab Emirates
	D. Warden	United Kingdom
A. Stubblefield	M. Givens R. Hill S. Kelley K. Leary J. McLaughlin H. Webster	United States

Members	Advisers/Observers	State/International Organization
D. Brennan	P. Horner P. Oppenheimer	International Air Transport Association (IATA)
P. Rohrbach	D. Ferguson	International Coordinating Council of Aerospace Industries Associations (ICCAIA)
S. Schwartz		International Federation of Air Line Pilots' Associations (IFALPA)
	K. Rooney L. McGuigan	International Civil Aviation Organization (ICAO)
	M. Samaan	World Health Organization (WHO)
	E. Sigrist	European Chemical Industry Council (CEFIC)
	A. Altemos G. Leach N. McCulloch	Dangerous Goods Advisory Council (DGAC)
	L. Calleja	European Aviation Safety Agency (EASA)
	B. McClelland A. McCulloch	Global Express Association (GEA)
	C.J. (Cor) Van Zijl	North Atlantic Treaty Organization (NATO)
	B. Desnoyers A. Presta	World Nuclear Transport Institute (WNTI)

3. REVIEW OF THE REPORT

3.1 Agenda Item 1: Development of proposals, if necessary, for amendments to Annex 18 — *The Safe Transport of Dangerous Goods by Air*

3.1.1 Formation of the Working Group on Restructuring Annex 18 (DGP-WG/16-WP/35)

3.1.1.1 Reference was made to the recommendation made by the DGP Working Group on Reporting (see paragraph 3.5.2) for the establishment of a dedicated working group to enhance the provisions in Annex 18 so as to more clearly outline States' responsibilities with respect to the safe transport of dangerous goods by air. It was suggested that should the DGP agree to establish such a working group, the importance of strengthening the relationship between Annex 18 and Annex 19 — *Safety Management* should not be overlooked. It was noted that the eight critical elements required of a State safety oversight system in accordance with Annex 19 were considered to be the foundation of a

State safety programme. Amendment 1 to Annex 19 had integrated these elements with the Annex's detailed State safety programme framework elements into a streamlined set of safety management responsibilities. It was suggested that the relationship between Annex 18 and the State safety management responsibilities required of Annex 19, including the eight critical elements, should similarly be established. This would facilitate the maintenance of dangerous goods safety management provisions and help focus States' attention on the importance of integrating safety management activities.

3.1.1.2 There was unanimous support for this proposal. The meeting agreed that a solid framework outlining States' responsibilities with respect to the safe transport of dangerous goods by air was missing in Annex 18, as concluded by the DGP Working Group on Reporting (see paragraph 3.5.2). While references to the more detailed requirements in the Technical Instructions were necessary, there were some cases where such requirements needed to be included in the Annex. The approach taken by the DGP had always been to include guidance material in the Supplement to the Technical Instructions, but perhaps some high-level guidance material would be more effective in Annex 18. The panel had become increasingly aware of a need to clarify interdependencies between Annex 18 and other Annexes; this was something that could also be considered for inclusion as guidance.

3.1.1.3 The meeting recognized that enhancing the provisions in Annex 18 would be a big undertaking and that clearly defining the problem, scope and expected outcome of the work would be critical. A separate working group met to develop terms of reference to be included in an ANC job card. The meeting reviewed the job card (see Appendix C) and recommended it be submitted to the ANC for approval.

3.2 Agenda Item 2: Development of recommendations for amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2019-2020 Edition

3.2.1 Part 1 — General

3.2.1.1 Avalanche Control Activity (DGP-WG/16-WP/5)

3.2.1.1.1 A new remotely-operated avalanche control system had been developed for carriage by helicopter. An amendment to the current provision excepting dangerous goods used in connection with avalanche control was proposed to ensure it applied to this new type of system.

3.2.1.1.2 There was support in principle for adding a reference to equipment transported by sling. However, concerns were raised with respect to the prescriptive nature of the exception which focused on end use. The need for a more performance-based approach to describe all the exceptions would reduce the need for updates whenever new technology emerged.

3.2.1.1.3 A revised proposal was presented which replaced the word "dropping" with "using". It was argued that this would provide for a more performance-based approach. While there was some support for the amendment, concerns that the scope of the exception would be expanded were raised. While the exception was intended to apply to dangerous goods which were required to be used for an operation during flight, the amendment proposed might be interpreted to mean the goods could be transported. The amendment was therefore not agreed.

3.2.1.1.4 A new proposal, based on comments raised, would be prepared for the next working group meeting.

3.2.1.2 **Definition of Approval for the Transport of Radioactive Material (DGP-WG/16-WP/11)**

3.2.1.2.1 It was noted that the definition for approval for the transport of radioactive material distinguished between multilateral approval and unilateral approval with respect to which States were involved, but it did not specifically define what was meant by the word “approval”. An amendment indicating that an approval was a confirmation of conformity issued by the competent authority was proposed. While some felt that the amendment provided clarification and could support it, others could not support it as this would create a lack of harmonization with the UN Model Regulations. It was suggested the UN Sub-Committee or the International Atomic Energy Agency (IAEA) would be a better forum to address the issue.

3.2.1.2.2 The proposer emphasized that the problem the proposal was attempting to address was unique to the air mode in that there was a conflict between the issuance of approvals and exemptions applicable to all dangerous goods versus approvals specifically applicable to radioactive material. There were cases of shippers requiring exemptions to ship consignments of radioactive material which could not be packaged in full compliance with the Technical Instructions and also requiring approvals from the competent authority because of higher radioactive material activity levels. Several documents would be required for such a consignment, e.g. for package design, special arrangement and exemption from all States concerned. The many documents created confusion with operators and added complexity to communication with shippers. It was suggested that a note of clarification could be developed. Work on the issue would continue and a new proposal would be presented to the next working group meeting.

3.2.1.3 **DPO’S Approval for Lithium Batteries DGP-WG/16-WP/18**

3.2.1.3.1 Difficulties in translating the requirement for designated postal operators to receive specific approval from the civil aviation authority before they could introduce the acceptance of lithium batteries contained in or packed with equipment into other languages were reported. An amendment to clarify its intent was agreed. The meeting supported the amendment in principle, but alternate wording was suggested, i.e.: “the designated postal operator (DPO) must have received specific approval from the civil aviation authority before the DPO can introduce the acceptance of lithium batteries as identified in 2.3.2 d) and e)”. The revised wording was agreed.

3.2.1.4 **Exceptions for Dangerous Goods of the Operator (DGP-WG/16-WP/22)**

3.2.1.4.1 It was noted that Part 1;2.2.1 b) provided a prescriptive list of items carried aboard an aircraft by the operator for use or sale on the aircraft during the flight or series of flight which were not subject to the Technical Instructions. The working group was asked to consider whether the use of a prescriptive list was appropriate or if a more general provision could be developed as was done for the other exceptions for dangerous goods of the operator in Part 1;2.2.1.

3.2.1.4.2 Some members did not think any changes were necessary, as the provisions in Part 1;2.2.1 a) allowed for the State of the Operator to authorize an exception from the Instructions for articles and substances needed on the aircraft to meet special requirements. Others supported the need to review the provisions and to consider making them more performance based.

3.2.1.4.3 The working group was also asked to consider whether the phrase “unless otherwise authorized by the State of the Operator”, which preceded each of the provisions requiring articles or substances intended as replacements for those subject to the exceptions for dangerous goods of the operator to be transported in accordance with the Instructions (Part 1;2.2.2, 2.2.3 and 2.2.4), was

appropriate. It was suggested that this provided too much flexibility in States and could lead to a lack of international harmonization and the introduction of risks should a State decide to allow the exceptions when the dangerous goods were being transported as replacements.

3.2.1.4.4 While some did not see a problem, others did agree clarification was needed. Some thought referring to an approval instead of "authorized" would be more appropriate, as this would make it clear the provisions for an approval in Part 1;1.1.2 applied and that an overall level of safety in transport equivalent to the level provided in the Instructions was achieved. The presenter believed removing the phrase would be most appropriate, as this would make the granting of an exemption from all States concerned necessary.

3.2.1.4.5 The presenter appreciated the comments provided and would take them into account in developing a proposal for the next working group meeting.

3.2.1.5 **Definition of Shipper (DGP-WG/16-WP/26)**

3.2.1.5.1 A definition for shipper was proposed for inclusion in Part 1;3. It was argued that the shipper played a critical role in ensuring the safe transport of dangerous goods, and the title was referred to throughout the Instructions. It was argued that not having a definition created ambiguity and the potential for differences of opinion with respect to who the shipper was, whereas having a definition would make it very clear who the responsible party was.

3.2.1.5.2 While there was some support in principle, the majority did not support the addition of a definition. They did not believe the lack of a definition caused any problems but believed that introducing one could cause problems. There was agreement that identifying the shipper was not always evident, but not all believed creating a definition would change that. Shippers did not clearly fall within the aviation setting; whereas other entities in the aviation industry were certificated with clear responsibilities and were easy to identify, shippers were not certificated and did not have harmonized responsibilities. The framework of the Instructions was function specific, and defining a job title would contradict this approach. There could be multiple people from multiple organizations involved in preparing a consignment for transport, each performing a different function. In such a case identifying "the shipper" would not be possible. In acknowledging the function-based approach employed in the Instructions, a suggestion was made that the title of Part 5 should be changed from "shipper's responsibilities" to "shipping responsibilities".

3.2.1.5.3 The proposal was not agreed.

3.2.1.6 **Alignment of Term "Material" (DGP-WG/16-WP/39)**

3.2.1.6.1 It was suggested that the term "material" was used inconsistently throughout the Technical Instructions which caused difficulties when it came to translating the provisions into different languages. The word had different meanings depending on the context in which it was used. The term was used as an alternative to the term "dangerous goods" in four cases. Inconsistencies between the use of the term in the Technical Instructions and the UN Model Regulations were also noted.

3.2.1.6.2 The working group was invited to consider whether there was justification in amending the Technical Instructions to address the inconsistencies, and amendments were proposed. The working group supported the need to provide consistency and supported the amendments in principle. Alternate wording was proposed and agreed. It was noted that some of the changes were to text originated from the UN Model Regulations. The Secretary would advise the UN Sub-Committee of the amendments.

3.2.2 **Part 2 — Classification of Dangerous Goods**

3.2.2.1 **Division 2.1 (DGP-WG/16-WP/15)**

3.2.2.1.1 A proposal to delete a redundant note under Part 2;2.2.1 a) ii) explaining when UN 1950 **— Aerosols** and UN 2037 **— Receptacles, small containing gas** were classified as Division 2.1 was agreed.

3.2.2.2 **Classification of Infected Animals (DGP-WG/16-WP/31)**

3.2.2.2.1 The classification criteria for infected animals in the Technical Instructions and corresponding guidance in the Supplement was modified at the twenty-fifth meeting of the Dangerous Goods Panel (DGP/25) to correct identified inconsistencies. The UN Sub-Committee was advised of the amendments. This initiated the need to consider amending the corresponding text in the UN Model Regulations. Additional inconsistencies and lack of clarity were identified at the UN. The working group was invited to comment on comprehensive amendments to address these consistencies developed by the World Health Organization (WHO) and the Food and Agriculture Organization (FAO). These will be considered by the UN Sub-Committee on the Transport of Dangerous Goods at the Fiftieth Session.

3.2.2.2.2 Although the working group was in favour of the approach taken, the need for further simplification was expressed. A small working group met with the representative of the WHO to discuss the concerns. These would be raised during the discussion of the paper at the UN Sub-Committee.

3.2.2.3 **Alignment with the UN Model Regulations Division 4.3 Classification (DGP-WG/16-WP/42)**

3.2.2.3.1 A proposal to remove the Part 2;4.4.1.1 heading for Division 4.3 substances which, in contact with water, emit flammable gases was agreed. The heading was a repeat from the heading above it in Part 2;4.4 and was therefore redundant. It did not appear in the UN Model Regulations making it reasonable to assume it had been inadvertently repeated.

3.2.3 **Part 3 — Dangerous Goods List, Special Provisions and Limited and Excepted Quantities**

3.2.3.1 **Pharmaceutical Products (Medicines) Ready for Use (DGP-WG/16-WP/4)**

3.2.3.1.1 A new special provision excepting ready-to-use pharmaceutical products manufactured and packaged for retail sale or distribution for personal or household consumption from the Instructions was proposed. It was noted that these products were not subject to the European dangerous goods regulations for transport by road, rail or inland-waterways.

3.2.3.1.2 There was no support for the proposal. Adopting it would create disharmony among the different international modes of transport, as it was not in the UN Model Regulations nor was it in the International Maritime Dangerous Goods Code. Regardless, the amendment proposed did not establish any limits nor did it require any special requirements. It was effectively deregulation based on end use. As a matter of principle, provisions in the Technical Instructions were not developed based on end use.

3.2.3.2 **Revision of Special Provision A59 (DGP-WG/16-WP/6)**

3.2.3.2.1 Special Provision A59 provided relief from regulation for unserviceable or damaged tire assemblies provided the tires were completely deflated. There had been cases of tires which could be re-

treaded and returned to a serviceable state but for which successful re-treading required the retention of nitrogen gas and the prevention of air from entering the tire. It was reported that the best way to achieve this was to deflate the tire to a lower pressure while maintaining a pressure above atmospheric pressure. Accordingly, an amendment to Special Provision A59 was proposed to quantify what "completely deflated" meant by specifying that an unserviceable or damaged tire assembly was not subject to the Instructions if the tire was completely deflated to a gauge pressure of less than 200 kPa at 20ºC.

3.2.3.2.2 Concerns were raised with whether the pressure limit specified would provide for an acceptable level of safety for all sizes of tires and whether applying the provision to damaged tires could cause a safety risk. The majority did not have any safety concerns recognizing that gases of Division 2.2 transported at a pressure of less than 200 kPa at 20°C were not subject to the Instructions. The amendment was agreed.

3.2.3.3 **Test for Packages of Dangerous Goods in Excepted Quantities (DGP-WG/16-WP/44)**

3.2.3.3.1 An inconsistency between the provisions for a stacking test required for dangerous goods in excepted quantities in the Technical Instructions and the corresponding provisions in the UN Model Regulations was discovered. The Technical Instructions indicated that the 3 m height required for the stack test included the "drop" sample, while the UN Model Regulations indicated that the 3 m height included simply the "sample". Some had interpreted the provision in the Technical Instructions to mean that a sample used in the drop test must be used in the stack test and, if this were the case, were unsure of which sample should be used since multiple drops were required and different but identical packages could be used for each drop. It was agreed that the inclusion of "drop" was an inadvertent error and could be deleted.

3.2.3.4 **Excepted Quantity Limits for UN 1219 (DGP-WG/16-WP/52)**

3.2.3.4.1 Small quantities of UN 1219 — **Isopropanol** were used to prepare and sterilize materials and equipment for health care purposes. The excepted quantity limits for UN 1219 — **Isopropanol** were 30 mL per inner packaging and 500 mL per outer packaging. The working group was invited to consider the adoption of a new special provision which would allow flexibility with respect to these quantity limits so as to allow 1 L per outer packaging, provided the quantities per inner packaging did not exceed 1 mL. It was argued that the amendment proposed provided flexibility for the industry without compromising safety.

3.2.3.4.2 There was little support for the proposal on the basis that it would break away from the well-defined criteria established for excepted quantities. The criteria were established based on risk and not on end use. Straying from these criteria to satisfy a facilitation need could not be justified. The amendment was not agreed.

3.2.4 **Part 4 — Packing Instructions**

3.2.4.1 **Revision to Packing Instruction Y963 (DGP-WG/16-WP/7)**

3.2.4.1.1 For the sake of alignment, the addition of exceptions from the requirement for the orientation arrows included in Part 4 were proposed for inclusion in Packing Instruction Y963 (assigned to ID 8000 **— Consumer commodities**). The amendment was agreed in principle, but a suggestion to add text clarifying which provisions in the packing instruction the exceptions applied was made. A revised amendment referring to the specific provisions was agreed.

3.2.4.2 **Correction of the Term "Outer Package" DGP-WG/16-WP/40)**

3.2.4.2.1 It was suggested that the term "outer package" was used incorrectly in Part 3;5.1.2.1 and in Packing Instruction 650, paragraphs 7 f) and 8 d). The use of this term contradicted the meaning of "package" and "packaging" as defined in Part 1;3. An amendment replacing the term with "outer packaging" was therefore agreed. A suggestion to simply refer to the package instead of specifying "outer" package was considered. This was not agreed as the use of "outer packaging" was used throughout the Instructions. The amendment, as proposed, was agreed.

3.2.4.3 **Use of Cylinders (DGP-WG/16-WP/49)**

3.2.4.3.1 This working paper was withdrawn.

3.2.5 **Part 5 — Shipper's Responsibilities**

3.2.5.1 **Freight Containers for Radioactive Materials (DGP-WG/16-WP/10)**

3.2.5.1.1 The definition for freight container in the case of radioactive material included a statement specifying that a freight container may be used as packaging for the transport of radioactive material. Part 6;4.4.2 indicated that freight containers with the characteristics of a permanent enclosure could be used as industrial package Type 2 (IP-2) or 3 (IP-3). A number of questions were raised with respect to the interpretation of the provisions when freight containers in the case of radioactive material were used as packaging, i.e.:

a) Did the multiplication factors for freight containers provided in Table 5-1 need to be used when determining the transport index (TI)?

b) Did the requirement to placard freight containers apply, or were the labelling requirements sufficient for packages?

c) Did Category III-Yellow freight containers used as packaging need to be transported under exclusive use and special arrangement? It was noted that packages, overpacks, and freight containers with a transport index greater than 10 were assigned to Category III-Yellow. Category III-Yellow packages and overpacks were required to be transported under exclusive use and special arrangement. The provisions specific to freight containers required transport under exclusive use when the transport index above 50, but did not require special arrangements.

3.2.5.1.2 There were reports of differences of opinions on the above among competent authorities which resulted in different TI calculations. The presenter wanted to clarify the intent of the provisions.

3.2.5.1.3 Differences of opinion among panel members made it clear that there was a lack of clarity in the regulations. Clarity would need to be sought from the IAEA before any provisions could be amended. The Secretary, recognizing the long amendment cycle for IAEA provisions, would communicate with the IAEA Secretariat for guidance on how best to proceed. She noted that there would be a meeting of the inter-agency group at the IAEA in November at which she could raise the issue.

3.2.5.2 **Exclusive Use Shipments of Radioactive Materials (DGP-WG/16-WP/9)**

3.2.5.2.1 The working group was invited to discuss potential weaknesses in the provisions for exclusive use shipments of radioactive material in freight containers with respect to proper arrangements between shippers and operators. It was noted that with the exception of packages or overpacks subject to exclusive use because of high transport indexes or high radiation levels on the external surface, which required special arrangement, the only method of advising the operator of an exclusive use shipment of radioactive material required by the Technical Instructions was through a statement on the dangerous goods transport document. While the need for coordination with the operator would be automatic when it came to exclusive use of an aircraft, it would not necessarily be automatic when it came to exclusive use in relation to freight containers. The working group was invited to consider whether additional requirements for advance communication between the shipper and the operator of exclusive use shipments needed to be added to the Technical Instructions.

3.2.5.2.2 Some were of the opinion that coordination between the shipper and the operator was self-evident and that there was no need to change anything in the Instructions. Effective training was all that was missing. Others felt that the absence of a specific requirement in the regulations linking the shipper to the operator created an ambiguity that needed to be addressed. Panel members reported cases of exclusive use consignments arriving at an airport without warning, making it clear that not all shippers believed it was necessary to coordinate with the operator. A lack of harmonization between the Technical Instructions, the IAEA standards and operational procedures was noted, further complicating matters.

3.2.5.2.3 A small working group met to identify gaps and differences between the various documents. The group recommended that the issues raised be brought to the attention of the IAEA interagency group via the Secretary. A list of specific questions would be provided and, if necessary, a working paper to address the gaps, based on IAEA input, would be prepared for the next DGP working group meeting.

3.2.5.3 **Covering of Marks and Removal of Labels (DGP-WG/16-WP/19 (Revised))**

3.2.5.3.1 It had been discovered through inspections that operators did not always reject cargo not offered as dangerous goods despite the fact that dangerous goods labels appeared on the package or overpack. The working group was invited to consider whether the provisions were clear enough with respect to the need to remove or cover labels from packages or overpacks not containing dangerous goods. It was noted that a shipper requirement to remove or cover labels that did not relate to the contents was included in the Part 5;3.2.6 labelling provisions for packages, overpacks and freight containers containing radioactive material. It was suggested that this requirement be separated from the radioactive material provisions so that it would apply to all dangerous goods.

3.2.5.3.2 While there was no objection to moving the paragraph away from the radioactive provisions, not everyone believed this would solve the problem. A consignment that did not contain dangerous goods would not be subject to the Technical Instructions, so the provision would not reach the intended audience. Some felt that the onus was on the operator to reject packages with dangerous goods labels on them and that more effective training was needed to address this.

3.2.5.3.3 While there was sympathy for the issues raised and agreement that there was a problem, there was no consensus on how to fix it. The presenter would have informal discussions with other members and potentially prepare another working paper for the next working group meeting.

3.2.5.4 **Affixing of Cargo Aircraft Only Label on Small Packages (DGP-WG/16-WP/25)**

3.2.5.4.1 It was noted that applying the cargo aircraft only label on the same surface of the package near the hazard labels as required by 5;3.2.12 a) 3) was not always possible on small packages. The working group was asked to consider amending the Technical Instructions to address this. Two options for amending the provision were provided. The first was a proposal to amend 5;3.2.12 a) 3) by specifying that the provision applied only when the package dimensions were adequate. The second was a proposal to amend the handling label specifications in 5;3.5.2 by allowing the cargo aircraft only label to be fifty percent smaller when the normal sized label did not fit on the package.

3.2.5.4.2 There was little support for the proposal in general and none for allowing a smaller cargo aircraft only label. Provisions in the Technical Instructions made it clear that packages must be of such size to provide adequate space for application of all the labels and marks. These provisions were introduced deliberately to ensure all labels were easy to see. The need to easily see the cargo aircraft only label, especially for operators with both cargo and passenger aircraft, was critical to safety. The amendment was not agreed.

3.2.5.4.3 An inconsistency between the provisions for affixing primary and subsidiary hazard labels and the provisions for the cargo aircraft only label was noted during discussion. While the former required the labels to be located on the same surface of the package near the proper shipping name mark, if the package dimensions were adequate, the latter required the label to be affixed on the same surface of the package near the hazard labels with no exception based on package dimensions. There did not appear to be anything preventing hazard labels from being displayed on two separate surfaces, provided they were next to each other. It was agreed that consideration be given to clarifying the provisions.

3.2.6 **Part 6 — Packaging Nomenclature, Marking, Requirements And Tests**

3.2.6.1 **Proposal for Review of the Pressure Differential Requirements Applicable to Packagings Containing Radioactive Material (DGP-WG/16-WP/53)**

3.2.6.1.1 Optimization of the requirement for packages containing radioactive material to be subject to a pressure differential test for transport by air had been a topic of discussion at meetings of the IAEA Transport Safety Standards Committee, where it had been decided that input from appropriate aviation organizations was needed. Members of the DGP with appropriate expertise were invited to join an expert group to address the issue. The Secretary noted that there were advisers to members of the DGP with specialized radioactive material experience and encouraged them to join the group. She also noted the importance of having a balance of aviation safety and airworthiness expertise to complement radioactive material expertise. Accordingly, an appropriate mix of participants from the DGP volunteered to be part of the group. The working methods of the group had yet to be established, but there would be a degree of flexibility so as to take into account travel budgets and efficiency.

3.2.7 **Part 7 — Operator's Responsibilities**

3.2.7.1 **Allowance for the Information to the Pilot-In-Command as Data (DGP-WG/16-WP/2)**

3.2.7.1.1 The use of electronic flight bags (EFB) for flight crews was becoming more and more common. It was suggested that they could offer the opportunity for operators to transmit dangerous goods

information to the pilot-in-command (NOTOC) electronically to the EFB. An amendment to the NOTOC provisions allowing for the transmission of the information electronically was therefore proposed.

3.2.7.1.2 The member nominated by IFALPA expressed no objection to allowing electronic submission of the NOTOC provided the pilot-in-command would also have access to a printed paper copy. He noted that electronic flight bags were typically used for static documents and that extracting dangerous goods information from them in the event of an emergency would not always be possible or practical. An incident on an aircraft during flight could result in either deliberate or accidental loss of electric power, which could affect access to the data. An incident could also result in the need to divert to an unknown destination in a remote area where data signals were not available, and the only way to present a NOTOC to first responders would then be with a paper NOTOC. There could also be readability and physical limitations for aircraft rescue and firefighting (ARFF) personnel in trying to read electronic versions of the NOTOC on the scene of an incident. The Instructions required that the operator ensure immediate availability of the information on the NOTOC to the pilot-in-command at all times. He argued that the lack of a paper copy would result in non-compliance with the Technical Instructions.

3.2.7.1.3 Some members did not have any problems with the proposal, believing it should be up to the operator to determine how best to comply with the requirements. Others agreed in principle, but recognized the concerns raised by the member nominated by IFALPA (see paragraph 3.2.7.1.2 above) needed to be considered before adopting any amendment for electronic dissemination. It was noted that some operators already had an electronic system for distribution of the NOTOC, with an adviser from one State noting that the pilot-in-command still received a printed copy utilising the printer in the aircraft cockpit. It was suggested a similar approach could be taken in developing provisions for the Technical Instructions.

3.2.7.1.4 The presenter appreciated the comments and would prepare a new proposal for the next working group meeting.

3.2.7.2 **Information to the Pilot-In-Command (DGP-WG/16-WP/8)**

3.2.7.2.1 An amendment to include the date of the flight with the information required to be provided to the pilot-in-command (NOTOC) in Part 7;4.1 of the Instructions was proposed. It was argued that this information would serve as an important safety control for operators that had daily flights to and from the same airports. It would also provide a mechanism to ensure compliance with the three-month retention of information requirement. It was reported that requiring the date of the flight was already a requirement in one State and had not caused any significant compliance issues or added costs.

3.2.7.2.2 There were no objections to requiring the date of the flight, noting this was already the practice for many operators. There had been instances of the wrong NOTOC being provided to pilots, so this measure would help prevent that from happening. There was a suggestion that the date of the scheduled flight should be required in universal co-ordinated time (UTC). This would be in alignment with Annex 10 — *Aeronautical Telecommunications*, Volume II — *Communication Procedures including those with PANS status* which required UTC for aeronautical telecommunication services. The majority supported the proposal as written, believing that the format of the date should be up to the operator. The amendment, as proposed, was agreed.

3.2.7.3 **Loading of Cargo Aircraft (DGP-WG/16-WP/16 (revised))**

3.2.7.3.1 It was noted that the provisions for loading of cargo aircraft in Part 7;2.4.1 applied to packages or overpacks of dangerous goods bearing the “Cargo aircraft only” label. It was questioned whether this was intentional as this would mean that those packages or overpacks not bearing a cargo

aircraft only label, i.e. those permitted on both passenger and cargo aircraft and subject to the same net quantity limitations, would not be subject to any loading restrictions on a cargo aircraft other than the prohibition from being carried on the flight deck (Part 7;2.1.1). The working group confirmed that this was the intent and that adding additional requirements for cargo aircraft would be unjustified. There were various mitigating measures on cargo aircraft that were not available on passenger aircraft. Being too restrictive could potentially deter cargo operations from implementing some of those measures. The presenter appreciated the feedback provided and would consider developing a formal amendment for the next working group meeting.

3.2.7.4 **Loading of Dangerous Goods in the Cabin of Helicopters (DGP-WG/16-WP/17)**

3.2.7.4.1 The working group was asked to consider the interpretation of the provisions pertaining to loading dangerous goods bearing the cargo aircraft only label, the allowance for such goods to be loaded in the cabin for helicopter operations with the approval of the State of the Operator in Part 7;2.4.1.1, and the exception from these requirements for certain classes of dangerous goods in Part 7;2.4.1.2. It was suggested that the exception with respect to helicopters could be interpreted in one of two ways, i.e.:

a) that packages or overpacks of dangerous goods bearing a cargo aircraft only label classified as one of the classes or divisions listed in 7;2.4.1.2 could be loaded in the cabin for helicopter operations without the approval of the State of the Operator; or

b) that packages or overpacks of dangerous goods bearing a cargo aircraft only label classified as one of the classes or divisions listed in 7;2.4.1.2 were not permitted in the cabin for helicopter operations;

3.2.7.4.2 It was suggested that some of the dangerous goods listed in 7;2.4.1.2 could pose risks if in contact or in close proximity to persons. Allowing the loading of these dangerous goods in the cabin for helicopter operations without the approval of the State of the Operator, as would be the case if the provisions were interpreted as outlined in sub-paragraph a) above, would be inappropriate. However, forbidding substances listed in 7;2.4.1.2 such as Class 3 flammable liquids of Packing Group III from being loaded in the cabin for helicopter operations under any circumstance, as would be the case if the provisions were interpreted as outlined in sup-paragraph b) above would seem unjustified when flammable liquids of Packing Groups I and II were permitted in the cabin under an approval from the State of the Operator. It was suggested that an amendment clarifying the provisions was necessary.

3.2.7.4.3 The working group recognized that an inconsistency had inadvertently been introduced when helicopter provisions were added. An amendment which corrected the inconsistency was agreed. The Secretary was asked to consider incorporating the change into the 2017-2018 Edition of the Technical Instructions via a corrigendum.

3.2.7.5 **Dangerous Goods not Required to Appear in the Information to the Pilot-In-Command (DGP-WG/16-WP/23)**

3.2.7.5.1 It was noted that UN 2807 **— Magnetized material**, UN 3164 — **Articles, pressurized hydraulic** containing non-flammable gas and UN 3164 — **Articles, pressurized, pneumatic** containing non-flammable gas were listed in Table 7-9 as substances and articles that did not need to be included with the information to pilot-in-command. It was suggested, however, that this exception did not apply in all cases for these substances and articles. The working group was asked to consider whether an amendment to Table 7-9 was necessary.

3.2.7.5.2 The working group agreed that extra requirements needed to be considered for magnetized material with higher field strengths, since these materials could only be transported with the prior approval of the appropriate authority of the State of Origin and the State of the Operator.

3.2.7.5.3 With respect to UN 3164, a potential inconsistency between the Technical Instructions and the UN Model Regulations was discovered which made the UN document more restrictive than the Technical Instructions, but it was determined that more research was needed before making any conclusions.

3.2.7.5.4 The presenter would work with other panel members to develop an amendment to address the need for extra requirements and the apparent inconsistencies.

3.2.7.6 **Separation vs. Segregation (DGP-WG/16-WP/41)**

3.2.7.6.1 The meeting was invited to consider an amendment replacing the term “segregation” with “separation” in Parts7;2.2.2.5 and 7;2.9.3.3.

3.2.7.6.2 Part 7;2.2.2.5 referred to Table 7-2 which was entitled “Separation of explosive substances and articles”. Part 7;2.9.3.3 b) referred to the minimum segregation distances established in 7;2.9.6 which included requirements for “separation” of radioactive material from persons, undeveloped photographic film and live animals. Replacing “segregation” with “separation” in both cases would provide for consistency. The amendment was agreed.

3.2.7.7 **Separation of Explosives (DGP-WG/16-WP/43)**

3.2.7.7.1 The working group was invited to consider deleting Part 7;2.2.2.4 which allowed for explosives of different compatibility groups to be stowed together regardless of whether or not they belonged to the same division, except for as provided in Table 7-2. It was argued that this provision contradicted the separation requirements for explosives provided in the Supplement and a corresponding provision in the UN Model Regulations (7.1.3.1.2 (c)). Part 7;2.2.2.4 was also believed to be unnecessary as the separation of explosive substances and articles table (Table 7-2) outlined all of the requirements for separation of explosives.

3.2.7.7.2 Although there was some concern that the amendment would be inconsistent with the UN Model Regulations, it was agreed that the provision was redundant. The amendment was agreed.

3.2.8 **Part 8 — Provisions Concerning Passengers and Crew**

3.2.8.1 **Limitation of Alcoholic Beverages and Securely Packaged Cartridges Carried by Passengers (DGP-WG/16-WP/24)**

3.2.8.1.1 The working group was invited to discuss how variations among customs, aviation safety, and aviation security provisions for carriage of commodities by passengers were dealt with in their States. The carriage of alcohol and Division 1.4S cartridges was specifically referred to. The working group was also asked to consider whether the quantity limits applied to these products by the Technical Instructions was justified. Taking into account the actual risks posed by these dangerous goods, it was questioned whether there was a safety case for the quantity limits set and whether consideration could be given to increasing them.

3.2.8.1.2 The working group was not in favour of increasing the limits for alcohol simply to align with limits set by other agencies, and there were no issues with the 5 kg limit for Division 1.4S cartridges.

Members reported that local clubs often arranged for ammunition to be available at large sporting events so that the participants did not have to travel with it. No changes were made to the Technical Instructions.

3.2.8.2 **Battery Powered Mobility Aids (DGP-WG/16-WP/37)**

3.2.8.2.1 DGP/25 had considered a proposal to revise the passenger provisions for battery-powered mobility aids whereby the three entries currently included in Table 8-1 for mobility aids powered by non-spillable wet batteries, mobility aids powered by spillable batteries, and mobility aids powered by lithium ion batteries were merged into one. Recognizing that the existing provisions had included requirements that could only be applied by the operator and which were out of the passenger's control, the new single entry limited the provisions to those which were within the passenger's control. It was proposed to move those which were the responsibility of the operator to a new section in the storage and loading chapter of Part 7 (Part 7;2.13).

3.2.8.2.2 Members had noted that the provisions related to "collapsible" mobility aids were unclear and caused problems for operators. A mobility aid would be called collapsible if the seat could be removed or folded down or if the handle bars could be lowered, but that did not necessarily mean that the batteries needed to be removed to collapse it. It was generally believed that the batteries should remain installed in the mobility aid, but there were circumstances when this was not possible or safe to do, in which case the batteries needed to be removed. This was the case when batteries were not afforded adequate protection when installed in the mobility aid or when the mobility aid was designed to be collapsible and the battery needed to be removed to do so.

3.2.8.2.3 Three options for amending the storage and loading chapter of Part 7 were proposed which addressed comments raised at DGP/25. The first contained one section for all provisions relating to the loading of battery-powered mobility aids, and the second and third contained three sections, each of which addressed the loading of a specific type of battery-powered mobility aid. The content of the second and third option was the same, but the format was different.

3.2.8.2.4 There was strong support for the moving of requirements which only the operator could apply to Part 7, with the majority supporting the three-section approach. The presenter acknowledged that more work on clarifying the terms "collapsible" and "adequate protection" was needed and asked members for suggestions.

3.2.8.2.5 The current provisions in Table 8-1 for mobility aids powered by non-spillable batteries referred to requirements in special provisions and Packing Instruction 872. Expecting passengers to comply with these provisions seemed unreasonable since they would not have access to them. They were therefore not included with the proposal. Some panel members, while acknowledging it was unreasonable to expect passengers to comply, believed the provisions did serve a purpose in making manufacturers develop products that complied with these provisions.

3.2.8.2.6 The comments of the working group would be taken into account and the presenter would prepare a revised proposal for the next working group meeting.

3.2.8.3 **Revision to Part 8 (DGP-WG/16-WP/38)**

3.2.8.3.1 DGP/25 was invited to comment on revisions aimed at simplifying the passenger provisions in Table 8-1 for incorporation in the 2019-2020 Edition of the Technical Instructions. The introduction of more and more entries into the list had resulted in the structure of Table 8-1 becoming increasingly complex. The list was simplified by grouping entries according to their hazard and function. This allowed for the removal of redundant text that had been repeated in the existing provisions. The

revised provisions also separated items which were not intended to be carried by the average passenger, such as instruments carried by the Organization for the Prohibition of Chemical Weapons, into a separate Table 8-2. Some additional amendments were also proposed, including:

a) A modification to the provisions preceding the table was made restricting carriage of dangerous goods permitted to passengers or crew for non-commercial use only. This was an attempt to prevent salespersons and retailers from carrying large quantities of items in accordance with the provisions for passengers and crew, something which had been reported;

b) A modification requiring lithium batteries to be carried in the cabin; and

c) The "on the person" column was removed as the requirement for passengers to carry dangerous goods "on the person" applied only to lighters and matches. The requirement was included with the other restrictions for those articles.

3.2.8.3.2 The presenter acknowledged that more work on the provisions was needed but asked the working group to provide feedback that would be used to develop a final proposal.

3.2.8.3.3 There was support for the approach taken in developing the proposed amendments and appreciation for the work done. While there was no objection to addressing current occurrences of sales people carrying unlimited quantities of permitted dangerous goods in accordance with the passenger provisions, there was concern with whether the wording of the new provision achieved this objective and whether it could introduce other complications. While there was support for the division of categories, some suggested the titles of the categories needed to be more specific and that the "miscellaneous dangerous goods" category should be renamed to differentiate it from Class 9 dangerous goods.

3.2.8.3.4 While the benefit of creating risk-based categories and moving away from adding specific items to the list was recognized, concern was raised that this may have the unintended consequence of broadening the provisions beyond what passengers typically needed to carry. It was suggested that this could be addressed by developing guiding principles for the DGP to use when considering future amendments to the list. It was noted that the panel had developed guidance material to aid in the preparation of the Technical Instructions and supporting documents which had not been updated in some time. Some newer panel members were not even aware of its existence. It was agreed that maintaining this document should become a standing practice of the panel. One panel member volunteered to bring an updated version to the next working group meeting.

3.2.8.3.5 The comments of the working group would be taken into account and the presenter would prepare a revised proposal for the next working group meeting.

3.3 Agenda Item 3: Development of recommendations for amendments to the *Supplement to the Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284SU) for incorporation in the 2019-2020 Edition

3.3.1 Labelling and Marking of Class 1 Dangerous Goods (DGP-WG/16-WP/12)

3.3.1.1 An exception from the marking and labelling requirements of individual packages within an overpack was proposed for dangerous goods transported on cargo charter flights under an exemption. It was argued that requiring marking and labelling on each individual package was onerous and unnecessary in

cases where large quantities of dangerous goods were transported from manufacturers in remote areas at airports with limited infrastructure to support the proper preparation of the goods for carriage.

3.3.1.2 The majority did not support the proposal, although there was some sympathy after it was clarified that the exception was intended solely from the requirement for the cargo aircraft only label on the individual packages. The operations described involved direct transport via truck to and from the aircraft. The packages did not require the cargo aircraft only label for road transport, and applying the label to each individual package for air transport was a burden that did not seem justified. Although there was no support for the proposal as written, there was some sympathy for the issue. A revised proposal would be developed for the next working group meeting.

3.4 Agenda Item 4: Development of recommendations for amendments to the *Emergency Response Guidance for Aircraft Incidents involving Dangerous Goods* (Doc 9481) for incorporation in the 2019-2020 Edition

3.4.1.1 A proposal to amend the drill code for lithium batteries was discussed under Agenda Item 5.3 (see paragraph 3.5.3.6).

3.5 Agenda Item 5: Specific work items identified by the Air Navigation Commission

3.5.1 Agenda Item 5.1: Aviation security/dangerous goods coordination (ANC job card DGP.001.01)

3.5.1.1 Undeclared Dangerous Goods (DGP-WG/16-WP/30)

3.5.1.1.1 Non-compliance with respect to the transport of lithium batteries by air was an on-going concern on the DGP. Many members believed the prohibition on the transport of lithium batteries as cargo on passenger aircraft would result in an increase in misdeclared or undeclared lithium battery consignments. It was recognized that even when measures were put in place which all parties agreed were sufficient to mitigate the risks posed by compliant shipments of lithium batteries, the potential for undeclared or misdeclared shipments would remain. It was suggested that collaboration between the Aviation Security Panel (AVSECP) and the DGP to explore feasible methods of identifying undeclared lithium batteries through passenger baggage and cargo security checks could be one approach towards mitigating the risk. It was recommended that a meeting of the joint AVSECP/DGP Task Force be convened to address this.

3.5.1.1.2 There was unanimous support for efforts to improve coordination between aviation security and safety. The Secretary reminded the working group that the ANC had approved a job card on the subject of DGP/AVSECP coordination so would undoubtedly support these efforts. She would ensure coordination within the Secretariat and arrange for communication between the chairpersons of the respective panels.

3.5.2 Agenda Item 5.2: Dangerous goods accident and incident reporting system (ANC job card DGP.002.01)

3.5.2.1 Report of the Working Group on Reporting (DGP-WG/16-WP/36)

3.5.2.1.1 The meeting was presented with a report of the Dangerous Goods Panel Working Group on Reporting (DGP-WG/Reporting) which met from 1 to 5 May 2016 in Abu Dhabi, United Arab

Emirates and had continued discussions through conference calls and correspondence following that meeting.

Scope

3.5.2.1.2 The DGP had expressed a lack of clarity with respect to the ANC's expected purpose of the system and requested the Secretariat to request feedback during the ANC's review of the DGP/25 Report (see paragraph 6.1.1.3 of the DGP/25 Report). Accordingly, the ANC specified that the system should be a management-oriented tool to identify gaps and not an oversight tool (ANC 201-5). The ANC had repeatedly stressed the need for global data to support DGP recommendations, especially in relation to the on-going concerns with levels of non-compliant lithium battery consignments which had influenced decisions of the panel. A global system could provide such support.

3.5.2.1.3 DGP-WG/Reporting considered the massive amount of data that could potentially be collected from such a global system, the need for extensive analysis to generate useful safety-related information from it and the substantial resources that would be needed to do so. It also considered that many States did not have effective reporting systems in place and that there was a lack of harmonization among those that did. The group was not confident that development of an effective global system was feasible. It therefore concluded that the best approach would be to focus on developing provisions and supporting guidance material that would enable development of effective systems within each State and adding a requirement for States to report to ICAO whenever they identified, through their data analysis systems, dangerous goods-related safety issues which might have an impact on global safety.

Amendments to Annex 18

3.5.2.1.4 DGP-WG/Reporting proceeded with developing amendments to Annex 18 to facilitate States in developing effective systems while aligning with Annex 19 and Annex 13 — *Aircraft Accident and Incident Investigation* as follows:

a) Amendments to Chapters 1 (Definitions), Chapter 11 (Dangerous Goods Accident and Incident Reporting) and Chapter 12 (Compliance) were made and a new Chapter 14 consolidating all provisions related to dangerous goods in the mail was created (see sub-paragraph g) below). The order of Chapters 11 and 12 was reversed to align with a more typical sequence of events, and the chapter titles were renamed.

b) Requirements that already existed in Annex 19 were removed from Annex 18, unless further clarity was needed or where entities other than operators needed to be addressed. This approach was based on the one taken in developing Annex 19 whereby material regarding State safety programmes (SSPs), safety management systems (SMSs) and related elements were moved from existing Annexes to Annex 19. Removing redundancies and consolidating all provisions in Annex 19 was a way to encourage States to focus attention on the importance of integrating safety management activities and to facilitate the evolution of safety management provisions.

c) Although there were initial discussions to develop definitions related to dangerous goods accidents and incidents that would provide more granularity in reporting, DGP-WG/Reporting decided not to add any. Work on developing guidance on the scope of the current definitions for dangerous goods accident and dangerous goods incident would instead be the focus. Amendments to the definition for dangerous goods accident to clarify that it might not necessarily occur on board an aircraft and

editorial amendments to the definition for dangerous goods incident to improve its readability were made.

d) Reporting provisions for entities other than operators had been added to the 2013-2014 Edition of the Technical Instructions in the form of a recommendation. When the amendment was introduced, the DGP had agreed to consider mandating the provision once it reached a level of maturity. Accordingly, the working group recommended upgrading the recommendation to a mandatory requirement in the Annex and in the Technical Instructions.

e) Amendments to differentiate between mandatory and voluntary reporting systems as required by Annex 19 were also made. DGP-WG/Reporting concluded that it would not be practical or feasible to mandate voluntary systems for entities other than operators performing dangerous goods functions. They therefore made the provision for these entities a recommendation. More work on voluntary reporting systems was needed.

f) A new requirement for States to report identified safety issues related to the transport of dangerous goods which could potentially impact global air safety to ICAO was added.

g) A new Chapter 14 was developed out of existing provisions for dangerous goods in the mail. The group had noted that provisions on dangerous goods in the mail which were not directly related to compliance were included in the current chapter on compliance (Chapter 11). Chapter 10 (Training Programmes) also included provisions related to the mail. The group proposed consolidating all provisions related to dangerous goods in the mail into a new Chapter 14 titled “Dangerous Goods in the Mail”. Although not related to the DGP-WG/Reporting’s work, these changes were considered editorial.

3.5.2.1.5 DGP-WG/Reporting did have concerns that not repeating relevant Annex 19 provisions in Annex 18 could cause problems, as there was a risk that some entities were not aware that Annex 19 provisions applied to dangerous goods. The group recommended that a stronger connection between Annex 19 and Annex 18 was necessary, with a suggestion that this could be addressed through new Chapter 14 in Annex 6 — *Operation of Aircraft* on dangerous goods.

Amendments to Technical Instructions

3.5.2.1.6 Consequential amendments to the Technical Instructions were developed, including:

a) Alignment of definitions for dangerous goods accident and dangerous goods incident with the revised definitions in Annex 18 (see 3.5.2.1.4 a)).

b) Mandating reporting of dangerous goods accidents and incidents and undeclared or misdeclared dangerous goods by entities other than operators (see 3.5.2.1.4 a)); and

c) Consolidating all reporting provisions into one chapter (Part 1, Chapter 7 (Dangerous Goods Occurrence Reporting).

Development of guidance material

3.5.2.1.7 DGP-WG/Reporting also initiated discussions on the development of guidance material which broadened into a bigger discussion on whether States' responsibilities with respect to the safe transport of dangerous goods by air were clearly outlined in Annex 18. The Annex was intended to be a high level document with references to more detailed requirements in the Technical Instructions. While this was necessary, the group considered that there were cases where more detailed requirements needed to be included in the Annex. DGP-WG/Reporting also identified a need to consider whether some guidance material currently contained in the Supplement should be moved to the Annex as an attachment and whether further guidance was needed for inclusion in the Annex. A separate working paper on this subject was presented to the meeting (see paragraph 3.1.1) under Agenda Item 1. DGP-WG/16 agreed, during discussions of that working paper, to a new job card on the structure and detail of Annex 18 (see Appendix C).

Review by DGP-WG/16

3.5.2.1.8 DGP-WG/16 was invited to review the amendments to Annex 18 and the Technical Instructions and to provide comments on the approach taken in developing them, with the understanding that the amendments would be further reviewed to ensure the removal of redundancies did not inadvertently result in the omission of provisions.

3.5.2.1.9 There was general support for the approach taken and the amendments proposed. The following comments were raised:

a) A suggestion to include a requirement in Annex 18 for reporting of any occasion when dangerous goods not permitted to be carried by passengers or crew was made.

b) A concern was raised that moving all dangerous goods in the mail provisions to one chapter could result in a perception that nothing else in Annex 18 applied. It was questioned whether designated postal operators should be subject to dangerous goods reporting of Annex 18 or if their own reporting systems were sufficient, although panel members stated that the latter should be the case.

c) There were some concerns with upgrading the recommendation for reporting by entities other than operators to a mandatory requirement, but it was also recognized that these entities played a critical safety role and reporting from them was necessary in order to identify safety issues. It was recognized that this would be a significant change for some entities and suggested that sufficient warning of these changes needed to be provided. The Secretary noted that entities should have sufficient warning through the State consultation process in which States and interested international organizations would have opportunity to comment on the amendments and any impacts they may have.

3.5.2.1.10 The meeting expressed its appreciation for the work done. DGP-WG/Reporting would continue its work on the amendments with the aim of bringing a more mature proposal to DGP-WG/17. The group would also begin developing supporting guidance material that would enable development of effective reporting systems within each State.

3.5.3 Agenda Item 5.3: Mitigating risks posed by the carriage of lithium batteries by air (ANC job card DGP.003.01)

3.5.3.1 Active Baggage Tags Fitted with Lithium Batteries (DGP-WG/16-WP/1)

3.5.3.1.1 An amendment to the passenger provisions in Table 8-1 was proposed which specifically referenced electronic baggage tags in the entry for portable electronic devices. The amendment was proposed in follow-up to a similar one made at DGP/25. DGP/25, while supporting the amendment, recognized that there were two issues that needed to be addressed with respect to electronic baggage tags. The first related to the safety of the battery and the second related to electromagnetic interference with aircraft systems. DGP/25 supported the amendment with respect to the former issue but recognized that the details of the latter were beyond its purview and recommended the issue be raised with the appropriate bodies. The amendment was nevertheless included as part of the comprehensive amendments to lithium battery provisions recommended to the Air Navigation Commission (ANC) (DGP/25, Recommendation 5/3). The third meeting of the Airworthiness Panel (AIRP/3, Montréal, 7 to 11 December 2015) reviewed the amendment proposal and agreed the issue needed to be addressed from an airworthiness perspective. However, more time and more information on the baggage tags and on defined standards that were already in existence was needed before forming any conclusions. Accordingly, the ANC, during its review of the DGP/25 Report, concluded that the AIRP's review needed to be complete before the provisions could be considered for inclusion in Part 8. The amendment was not incorporated in the 2017-2018 Edition of the Technical Instructions.

3.5.3.1.2 It was recognized that these baggage tags were already being used, so the issue needed to be addressed. The majority agreed with the proposal in principle, but not all agreed a requirement for the active devices to meet defined standards for electromagnetic radiation should remain in the passenger provisions. Mitigating the risk of electromagnetic interference with aircraft systems was necessary for many devices, including data loggers and baggage tags that are active during transport. The issue of electromagnetic interference was beyond the scope of the Technical Instructions and would need to be addressed in other Annexes. There were also concerns that a requirement applied to one specific device might lead to the perception that electromagnetic interference did not need to be taken into account for other devices. Whether or not a requirement within the passenger provisions could be implemented was also questioned; how could a passenger know if his or her product met that requirement? Some suggested this was no different from the requirement for lithium batteries to pass UN testing. The expectation was that responsible manufacturers would adhere to these standards and that passengers would ensure they had purchased their batteries from reputable sources.

3.5.3.1.3 A number of concerns were also raised in relation to the safety of the battery. The proposal set the lithium metal content limit to 1 gram. Some felt that this was excessive and unnecessary. Some also felt that the requirement for adequate protection of the battery was ambiguous and that a more quantifiable condition should be established. It was suggested that there was greater potential of damage to the battery since active baggage tags were intended to be attached to the outside of baggage.

3.5.3.1.4 The ANC had requested input from AIRP before making any decisions, so some felt that discussing the issue at DGP-WG/16 was premature. Others had no objection to agreeing to an amendment in principle while waiting for the AIRP's decision with respect to electromagnetic interference.

3.5.3.1.5 A revised proposal which lowered the lithium metal content limit to 0.3 grams and included an editorial amendment was agreed by the working group with the understanding that the issue would be revisited once feedback was provided by the AIRP. A suggestion to inform the Flight Operations Panel (FLTOPSP) of the issue was also supported.

3.5.3.2 **Limits for the Transport of Lithium Batteries for Passengers, Crew, and Operators (DGP-WG/16-WP/3)**

3.5.3.2.1 The operator exception for electronic devices containing lithium cells or batteries and their spares contained in Part 1;2.2.1 d) based its energy limits and other restrictions on the ones established for personal electronic devices containing lithium batteries provided in Table 8-1 — Provisions for dangerous goods carried by passengers or crew. The operator exception was originally intended for devices such as credit card readers and electronic flight bags, both of which contained only one battery. Advances in technology, however, had resulted in the introduction of new types of electronic devices used the by operator, some powered by several lithium batteries. Some operators considered these batteries to be excepted from the Technical Instructions, because the size of the individual batteries in the device fell within the limits established through Part 1;2.2.1 d) and Table 8-1. However, it was argued that the risk posed by these devices was different than the risk posed by the types of devices the exception was originally intended to permit. It was dependent on a number of variables including the number of batteries/cells inside, the energy density of them, and the battery/cell configuration. The working group was asked to consider if additional provisions should be included in the Instructions to address these risks.

3.5.3.2.2 There was agreement that the approach taken with respect to operator exceptions needed to be revisited. The provisions in Part 8 were intended for dangerous goods being *carried* by passengers and crew which was different from the provisions in Part 1 which were intended to be *used* by the operator during flight. The DGP had linked the passenger and crew provisions for personal electronic devices in Part 8 to the operator exceptions in Part 1 with the understanding that the restrictions established in Part 8 would effectively mitigate the risks posed when the dangerous goods were being used by the operator. While the DGP did have the expertise to consider risks posed by dangerous goods during transport, mitigating risks to the operator during use was beyond its purview. There was a sense that the provisions did not belong in Annex 18 or the Technical Instructions but rather in Annex 6. The issue needed to be reviewed by all relevant panels to determine the most appropriate way forward. The Secretary agreed to bring the issue to the attention of the FLTOPSP and the AIRP.

3.5.3.2.3 While not within the scope of the working paper, it became more and more evident during discussion that the limits imposed in Table 8-1 for lithium batteries needed to be revisited. A more risk-based approach which also took into account cabin fire-fighting procedures was needed. The working group supported continued work on the issue. A new working paper would be prepared for DGP-WG/17.

3.5.3.3 **Segregation Requirements for Lithium Batteries (DGP-WG/16-WP/20)**

3.5.3.3.1 The working group was invited to consider whether additional segregation requirements for lithium batteries and flammable materials should be included in Part 7. The investigation of the 28 July 2011 in-flight fire and crash of Asiana Airlines Flight 991 led the Republic of Korea's Aviation and Railway Accident Investigation Board (ARAIB) and the United States National Transportation Safety Board (NTSB) to conclude that the proximity of flammable liquids to lithium ion batteries had contributed to the severity of the accident. The ARAIB issued a safety recommendation (ARAIB/AAR1105) addressed to ICAO recommending that Class 3 flammable liquids and Section I lithium batteries bearing the cargo aircraft only label be segregated and loaded on separate ULDs. The NTSB issued a corresponding official safety recommendation for Class 3 flammable liquids and fully regulated Class 9 lithium batteries to be physically segregated so that they were not placed on the same or adjacent pallets or ULDs.

3.5.3.3.2 It was argued that these recommendations justified the need to establish segregation requirements in the Technical Instructions for lithium ion batteries and flammable liquids. This would

enhance safety by increasing the opportunity for safety systems to address the hazard posed by the individual flammable materials or lithium batteries in the event of a fire, rather than the cumulative effects of a fire involving both goods simultaneously. It was recognized that segregation alone could not fully mitigate all risks posed, but it would be one significant measure as part of a layered approach towards risk mitigation that could substantially reduce the risk.

3.5.3.3.3 Although there was support for segregation in principle, a number of concerns were raised. An informal working group was convened to document comments made and to obtain additional feedback. The informal group provided the following:

a) Segregating batteries from other flammable materials could, in practice, lead to a higher density of batteries being loaded in one location aboard the aircraft. This in turn could result in more batteries being involved in the event of a fire.

b) Different aircraft models and sizes could impact operational implementation of any proposed mitigation measures.

c) Methods and/or distances of segregation between the lithium batteries and flammable materials should be reviewed to ensure feasibility of implementation while providing flexibility to the operator to accomplish the intent.

d) Implementation for small bulk loaded aircraft should be considered.

e) Consideration should be given to ensure that the provisions in the Technical Instructions that allow for multiple dangerous goods in the same package/overpack (i.e. flammable materials and lithium batteries of Class 9) are modified to align with any segregation changes.

f) It was noted that the existing labels for lithium batteries and lithium batteries packed with or contained in equipment were identical. This may pose difficulties for operators as segregation is typically accomplished based on the labels applied.

g) Current methods used by air carriers to load and allocate space for unit load devices on the aircraft should be taken into consideration.

h) It was noted that segregation of Section II lithium batteries would be difficult or impossible given the current provisions.

i) Consideration should be given to the need for both horizontal and vertical segregation (e.g. consider whether leaking packages of flammable liquids loaded above packages containing lithium batteries pose a risk).

j) Consideration should be given to any additional mitigation measures that could impact this work (e.g. enhanced packaging standards under development).

3.5.3.3.4 While there was no proposal to amend the Technical Instructions under this working paper, there was a proposal to include a new requirement for segregation of lithium batteries as one of several measures to mitigate against risks posed by lithium batteries (see paragraph 3.5.3.7). That amendment was not agreed, but the comments raised during discussion of both working papers would be used to consider segregation as one layer of mitigation. Consideration of segregation requirements would

continue which could potentially lead to a formal proposal to DGP-WG/17. Panel members were encouraged to provide any additional comments they might have before that meeting.

3.5.3.4 **Passenger Provisions Addressing Spare Lithium Metal Batteries for Portable Medical Electronic Devices (DGP-WG/16-WP/21)**

3.5.3.4.1 There was concern that the current provisions for spare lithium metal batteries for portable medical electronic devices with a lithium metal content of up to 8 g could be interpreted to allow an unlimited number of spare lithium metal batteries in carry-on baggage with or without an accompanying portable medical electronic device. An amendment requiring batteries exceeding 2 grams to be accompanied by the medical device the battery was intended to operate was therefore proposed. This would provide operators and screeners the ability to determine whether spare batteries were in fact intended for the passenger's portable medical device.

3.5.3.4.2 The working group understood the intent of the proposal, but not everyone agreed an amendment was necessary. There were questions raised as to why the proposal addressed lithium metal batteries and not lithium ion and why it was specific to medical devices and not to personal electronic devices containing lithium batteries. An approach which focused on safety should result in consistent provisions.

3.5.3.4.3 Regardless, most believed it was unreasonable to assume passengers would bring spare batteries without the medical devices and therefore the amendment was not necessary. This was the rationale behind the panel's decision to allow higher energy density batteries for medical electronic devices in the first place. The panel had understood that passengers would carry both the medical device and the spares needed to power it and that there was no need to specify this in the provisions. Therefore, no changes were made to the Technical Instructions.

3.5.3.5 **Deletion of Section II Provisions for Lithium Ion (UN 3480) and Lithium Metal (UN 3090) Battery Shipments (DGP-WG/16-WP/27)**

3.5.3.5.1 The working group was invited to reconsider the amendment proposed at DGP/25 to remove Section II from Packing Instructions 965 and 968 for UN 3480 **— Lithium ion batteries** and UN 3090 **— Lithium metal batteries**. The arguments for removing the section were the same as those made at DGP/25. Additionally, DGP/25 had recommended the development of guidance material for operators and regulators on how to conduct and evaluate a safety risk assessment for the transport of lithium batteries by air (Recommendation 5/2). This recommendation was supported by the Air Navigation Commission (ANC), who subsequently tasked the Flight Operations Panel (FLTOPSP) with developing risk assessment provisions and guidance with the support of DGP and AIRP. It was argued that the provisions of Section II made it impossible to adequately conduct such risk assessments.

3.5.3.5.2 The proposer was aware of one large operator who would be stopping the acceptance of Section II batteries starting 1 January 2017. He also highlighted the increasing concerns of pilots with respect to the risks posed by lithium batteries. Although the recent restrictions on Section II batteries did reduce the potential for a high density of these batteries in one compartment, he did not believe they prevented this from happening. He argued that the elimination of the section would simplify the provisions, resulting in improved compliance. It would provide increased transparency, allowing for more effective risk assessments.

3.5.3.5.3 There was some support for the proposal, particularly with respect to the argument that taking Section II batteries into account when conducting a risk assessment was difficult or impossible to do. However, the majority believed that there had not been enough time to gather data in order to evaluate the effectiveness of the additional restrictions on Section II, which had only been in effect for a little more than six months. Industry was adjusting to the new restrictions, and any changes would create more instability. The majority believed the status quo should be maintained unless there was clear indication that the additional restrictions were not having the intended result.

3.5.3.5.4 It was reported that several operators had already indicated that the number of Section IB batteries being offered for transport had increased, suggesting a reduction in the number of Section II batteries being offered. In this respect, the Secretary noted that the ANC and Council had directed the Secretariat to provide regular updates on progress made on mitigating risks posed by lithium batteries and asked that members provide any data they had. She expected both bodies would be interested in knowing the shift in numbers between Section IB and II.

3.5.3.5.5 The amendment was not agreed.

3.5.3.6 **Lithium Battery ERG Entries (DGP-WG/16-WP/28 and Addendum)**

3.5.3.6.1 The working group was invited to consider whether an additional drill code number in the *Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods* (Doc 9481) should be established for lithium ion and lithium metal batteries which better characterized their inherent risk for dangerous heat, evolution of smoke, and generation of explosive gases. It was noted that the current drill code for lithium metal batteries was 9FZ (“no general risk, flammable, aircraft cargo fire suppression system may not extinguish or contain the fire; consider landing immediately”) and for lithium ion batteries was 9F (“no general risk, flammable”). While assigning drill number 9 might be appropriate for other Class 9 articles or substances, it was suggested that the statement “no general risk” might initially lead some flight crew to ignore the rest of the drill code and not treat a lithium battery event with the urgency implied by the drill letters. As there was already precedence for creating new drill code numbers for certain flammable gases and infectious substances whose inherent risks were not fully accounted for by the class number assigned to them, the working group was invited to do the same for lithium batteries.

3.5.3.6.2 It was noted that drill letter “Z” had been assigned to the lithium ion entries in the 2013-2014 Edition of Doc 9481, but was removed based on test results at that time which indicated that Halon was effective in suppressing a lithium ion fire and preventing the spread of fire to adjacent combustible material (see paragraph 4.3 of the DGP/24 Report (DGP/24-WP/81)). On the basis that more recent tests had indicated a fire involving high-density lithium ion batteries could overwhelm an aircraft’s cargo fire suppression system, the working group was invited to consider re-assigning drill letter Z to all lithium ion battery entries (UN 3480 **— Lithium ion batteries** and UN 3481 **— Lithium batteries packed with** or **contained in equipment**).

3.5.3.6.3 There was unanimous support for the proposal in principle. Some suggested revisions to the values for the new drill number were proposed and agreed. These were:

a) “Toxic” vapour was added to the “inherent risk field” to recognize the potential for batteries in thermal runaway to release toxic gases;

b) “Explosion” was removed from the “inherent risk” field as it was also included in the “risk to aircraft” field which was considered more appropriate; and

c) “Possible abrupt loss of pressurization” was added to the “additional considerations” field.

3.5.3.6.4 It was questioned whether it was necessary to apply the new drill code to lithium batteries packed with or contained in equipment. The proposer maintained it should apply to all recognizing that there was potential for very large batteries to accompany devices and that flight crews needed to know that the fire suppression system may not be effective at suppressing a fire involving them. It was also questioned whether “consider landing immediately” needed to be included in the additional considerations field, recognizing this statement was already included next to drill letter “Z”. The proposer considered it to be a compelling statement and therefore very appropriate to state it twice. He noted that the statement was currently repeated for lithium metal batteries.

3.5.3.6.5 The amendment, as amended in accordance with paragraph 3.5.3.6.3 above, was agreed.

3.5.3.7 **Mitigation Measures for Lithium Batteries on All-Cargo Aircraft (DGP-WG/16-WP/29)**

3.5.3.7.1 Additional restrictions for the loading of UN 3090 — **Lithium metal batteries** and UN 3480 — **Lithium ion batteries** were proposed for inclusion in Part 7;2 of the Technical Instructions. While lithium metal and lithium ion batteries were forbidden as cargo on passenger aircraft, risks posed by lithium batteries on cargo aircraft could not be ignored. Significant quantities of both types of batteries were transported on all-cargo aircraft, and the number of lithium ion batteries being transported had likely increased as a result of the prohibitions on passenger aircraft. Additionally, cargo aircraft did not necessarily have the same fire suppression capability as was available on most passenger aircraft.

3.5.3.7.2 On the basis that there had never been much support for previous proposals prohibiting lithium metal and lithium ion batteries as cargo on all-cargo aircraft and recognizing that performance-based standards and risk assessment provisions would take some time to develop, temporary measures pending a comprehensive solution that would mitigate hazards were proposed. The amendments included requirements that batteries be loaded in a fire resistant unit load device or under a fire resistant cover, in a Class C aircraft cargo compartment or a compartment with the most capable fire suppression system, segregated from other flammable dangerous goods, and separated from other lithium battery shipments in an effort to reduce battery density in a single location.

3.5.3.7.3 While many panel members were in favour of looking at additional mitigation measures as part of a layered approach to increase the safety of lithium battery transport, they believed an amendment was premature as more work was needed before the measures proposed were ready to be implemented.

3.5.3.7.4 The proposal to include a requirement for segregation of UN 3090 and UN 3480 from other flammable dangerous goods and separation of lithium battery shipments from other lithium battery shipments in a new Part 7;2.15 was discussed in conjunction with a separate request for consideration of segregation as a mitigation layer (see paragraph 3.5.3.3). While some panel members supported the addition of segregation and separation requirements, others did not think effectively implementing this requirement would be feasible, particularly with respect to Section II. While segregation requirements existed for other dangerous goods, those dangerous goods were not transported as routinely as lithium batteries. Operational problems in relation to segregating lithium batteries would be difficult to overcome. There were also concerns that segregation from flammable dangerous goods would have the unintended consequence of a higher-density of lithium batteries in one location, although others believed the proposed separation of lithium battery shipments from each other would help mitigate this risk. Some panel members fully supported adding segregation requirements, particularly since both the ARAIB and

the NTSB recommended segregation of lithium batteries from Class 3 flammable liquids following the investigation of the crash of Asiana Airlines Flight 991 (see paragraph 3.5.3.3). However, some members cautioned against implementing a requirement based on these recommendations before a more holistic approach to determining appropriate segregation was taken. Others noted the major safety improvements that had been made over the years as a result of recommendations stemming from the expertise of aircraft accident investigators. The Secretary noted that the ANC was increasingly conscious of any recommendation that stemmed from an accident investigation and that procedures had been put into place to ensure all relevant recommendations were taken into account. She therefore encouraged the working group to carefully consider the ARAIB and NTSB recommendations.

3.5.3.7.5 It was reported that although development of standards for fire resistant containers and covers was underway, these standards were intended for Class A fires and not fires involving lithium batteries. An adviser from one State provided an overview of work being done on testing fire resistant containers and covers to protect from fires involving lithium ion and lithium metal batteries. It was believed that these types of mitigation measures would be ready in the near future for some types of cells, but they would not be effective for all types. It was also noted that the effectiveness of mitigation measures would vary depending on the aircraft size and type and on the cargo compartment configuration.

3.5.3.7.6 Panel members also cautioned against mandating the loading of batteries in a Class C cargo compartment until further research was done, as there needed to be a way to mitigate against the build-up of gases from thermal runaway which could compromise the fire suppression system.

3.5.3.7.7 While all panel members recognized that mandating all of the measures may be premature, some strongly believed that progressing work on those measures that could be implemented now was justified. However, there was insufficient support to adopt any amendments, so the paper was withdrawn.

3.5.3.8 Identifying Battery-Powered Equipment Capable of Generating Extreme Heat which could Cause a Fire if Activated (DGP-WG/16-WP/32)

3.5.3.8.1 An incident involving lifejacket lights which generated extreme heat and which also contained lithium batteries revealed a suggested weakness in the provisions for passengers and crew in that there was no clear way to determine whether battery-powered equipment was capable of generating extreme heat. The lifejackets were permitted to be carried on board the aircraft by the passenger(s) in accordance with the provisions for portable electronic devices containing lithium batteries. Had it been known that the life jackets were capable of generating extreme heat, the provisions for battery-powered equipment capable of generating extreme heat which could cause a fire if activated may have been applied. In that case, the heat-producing component and the battery would have been isolated from each other in accordance with the provisions in Part 8 and the incident may have been prevented. It was noted that the energy of the battery powering the equipment sold on the market was high and that some batteries had not been UN tested. An example of a battery for a diving lamp which was listed as prototype was provided.

3.5.3.8.2 The working group was invited to consider whether any criteria could be established in the Technical Instructions for identifying battery-powered equipment capable of generating extreme heat and determining which provisions in Part 8 of the Technical Instructions would apply.

3.5.3.8.3 The fact that prototype/untested batteries were on the market was a concern, noting that these were prohibited from transport without an approval. While there was sympathy for the issues raised, the working group did not believe it would be possible to develop criteria to prevent this incident from

happening again. It was suggested that simplifying the provisions for passengers and crew could help reduce the potential for non-compliance.

3.5.3.8.4 The presenter agreed that it would be difficult to develop criteria but wanted to ensure that everyone was aware of the risk. He invited members to continue thinking about ways to ensure the provisions were communicated effectively to passengers and that perhaps discussions could continue at a future meeting.

3.5.3.9 **Watt-Hour for Lithium Batteries Powering Mobility Aids (DGP-WG/16-WP/34)**

3.5.3.9.1 The working group was invited to discuss the current requirements applicable to mobility aids powered by lithium ion batteries. It was noted that mobility aids powered by lithium batteries with a higher watt hour rating than what was permitted in accordance with the passenger provisions were on the market. It was suggested that advances in technology in both the types of mobility aids available and the size of the battery needed to power them would likely lead to a continuous upward trend in battery energy density. This created a conundrum between the rights of passengers with restricted mobility and the need to ensure safety on the aircraft.

3.5.3.9.2 Other panel members acknowledged similar problems in their States. Dealing with passengers with mobility issues was often very challenging. Adding to this was the fact that the provisions were complicated and could be clearer. It was noted that there was a difference between what was required for mobility aids designed to allow the battery to be removed (collapsible) versus those where the battery was fixed. However, the term “collapsible” was not defined and caused confusion. The rationale for setting a lithium watt hour rating for batteries removed from a mobility aid while not establishing a limit for batteries fixed to a mobility aid was questioned. It was noted that this had been a conscious decision in response to new designs of mobility aids on the market which required the lithium ion battery to be removed from the equipment and for which the Watt hour rating of the battery exceeded 160 Wh (see DGP/23 Report, paragraph 5.1.8).

3.5.3.9.3 The working group acknowledged that this was a complex issue and that more work on the subject was needed.

3.5.3.10 **Special Marking Requirements for Lithium Batteries (DGP-WG/16-WP/45)**

3.5.3.10.1 A new mark for lithium batteries excepted from full regulation and provisions for the mark were introduced into the 19th revised Edition of the Model Regulations and, for the sake of multi-modal harmonization, into the 2017-2018 Edition of the Technical Instructions. The lithium battery mark provisions replaced the lithium battery handling label provisions which were uniquely required by the air mode. The specific lithium marking provisions were provided in the Technical Instructions in Part 5;2.4.16, and the actual mark was depicted in Figure 5-3. The provisions in Part 5;2.4.16 indicated what text and UN numbers must appear on the mark and what the shape, dimensions, and look of the mark must be. However, only a reference to Figure 5-3 was included in Section II of Packing Instructions 965- 970. It was suggested that because of the relief from full regulation provided by Section II, the absence of a reference to the actual provisions in 5;2.4.1.6 could result in the mark being applied but not the actual provisions. An amendment to Section II of the packing instructions that included a reference to the provisions in Part 5;2.4.1.6 was therefore proposed. Although there were no exceptions from the marking requirements for Section IB batteries, the reference to 5;2.4.1.6 was included for the sake of consistency.

3.5.3.10.2 The working group agreed there was a gap in Section II that needed to be addressed but did not support adding the reference to Section IB as it was considered redundant. It was noted that the beginning of Section II provided a list of references to provisions that lithium batteries and cells were subject to. It was suggested that the reference should be provided there instead of within the body of Section II. This was agreed. The Secretary was asked to consider incorporating the change into the 2017-2018 Edition of the Technical Instructions via a corrigendum.

3.5.3.11 **Strong Rigid Outer Packagings (DGP-WG/16-WP/46)**

3.5.3.11.1 A proposal to amend Packing Instructions 967 and 969 to remove inconsistencies and redundancies was agreed.

3.5.3.12 **Applicability of Section IA (DGP-WG/16-WP/47)**

3.5.3.12.1 Amendments to correct an anomaly in the introductory text in Packing Instructions 965 and 968 were proposed. It was suggested that the introductory text to Packing Instructions 965 and 968 for Section IA could be interpreted to mean that shippers would *not* be permitted to package their cells or batteries in accordance with Section IA if the Watt hour rating or lithium metal content did *not* exceed the limits established for that section. While it was not the intent to preclude anyone from applying more stringent requirements, it was proposed that the wording be clarified to remove any ambiguity.

3.5.3.12.2 The working group agreed that an anomaly had inadvertently been introduced, but could not agree to the wording used to correct it. A revised proposal would be developed for the next working group meeting.

3.5.3.13 **Outer Packaging Types for Packing Instructions 967 and 970 (DGP-WG/16-WP/48)**

3.5.3.13.1 An amendment specifying the specific types of outer packagings permitted in Section I of Packing Instruction 967, which applied to lithium ion batteries contained in equipment, was proposed. It was suggested that not including the specific packagings was an oversight as they were included in Section I of Packing Instruction 970, which applied to lithium metal batteries contained in equipment. The amendment was agreed. The Secretary agreed to consider incorporating the change into the 2017-2018 Edition of the Technical Instructions via a corrigendum.

3.5.3.14 **State of Charge Clarification (DGP-WG/16-WP/50)**

3.5.3.14.1 The working group was asked to consider whether the new requirement for lithium ion batteries to be offered for transport at a state of charge not exceeding 30 per cent of their rated capacity applied to the individual cells within a battery or if it applied to the entire battery. If the latter was true, it was suggested that there would be potential for cells within the battery pack to be at a higher state of charge while the battery pack remained below the 30 per cent threshold thus negating the effects of the mitigating measures established. The working group was asked to consider whether an amendment to Packing Instruction 965 was necessary in order to ensure that the 30 per cent limit applied to the individual cells within the battery pack.

3.5.3.14.2 Members noted that although the scenario could be possible, it would not be practical. The working group concluded that the state of charge requirement should be applicable to whatever was being offered for transport. If a cell was being shipped, the cell would need to be offered at a state of charge not exceeding 30 per cent of its rated capacity and if the a battery was being shipped, the battery would need to be offered at a state of charge not exceeding 30 per cent of its rated capacity.

3.5.4 Agenda Item 5.4: Scope of Annex 18 (ANC job card DGP.004.01)

3.5.4.1 Review and Revision to the Applicability of Annex 18 (DGP-WG/16-WP/13)

3.5.4.1.1 Whether or not States had oversight authority over entities not knowingly involved with transporting dangerous goods by air had been raised during the development of the new competency-based training provisions for dangerous goods. Although the existing training requirements in the Technical Instructions had mandated training of freight forwarders processing general cargo, some panel members reported that this was not possible within the dangerous goods legal framework of their States. The ICAO Legal Bureau's position was that training for freight forwarders not handling dangerous goods could be recommended but not mandated in Annex 18. While there were differences of opinion among panel members on what was legally possible, there was recognition that entities processing general cargo could play a role in preventing undeclared dangerous goods from entering the air transport stream. Accordingly, the meeting was invited to establish a small working group to review the applicability of Annex 18. It was proposed that this group should develop amendments which would ensure its applicability to freight forwarders, cargo terminal operators and ground handling agents.

3.5.4.1.2 There were differences of opinion as to what the description of the problem was and what the terms of reference for a potential working group should be. Some panel members emphasized that a job title-based approach went against the function-based approach applied when developing the provisions for Annex 18 and the Technical Instructions. This approach provided their national authorities with legal authority to regulate entities performing any function prescribed in the Annex or the Instructions. It was suggested that regulating based on a job title rather than the functions performed could create gaps. The need for a function-based approach was also emphasized during the development of the revised training provisions and during discussions on a proposal to define "shipper" (see paragraph 3.2.1.5). This approach ensured that personnel were trained commensurate with their responsibilities regardless of what job title they held.

3.5.4.1.3 It was noted that although the ANC had tasked the panel with addressing the risk of entities processing general cargo unknowingly introducing dangerous goods into the air cargo stream, it did not specify that this needed to be done through Annex 18 or the Technical Instructions. It was suggested that provisions in other Annexes could help achieve the objective of ensuring any entity processing general cargo was trained to follow procedures aimed at preventing the introduction of dangerous goods into air transport.

3.5.4.1.4 It was agreed that a small group would develop terms of reference which would be circulated to panel members for consideration. A new job card would need to be developed and approved by the ANC.

3.6 Agenda Item 6: Other business

3.6.1 Availability of the Technical Instructions to All Parties in the Transport Chain (DGP-WG/16-WP/14)

3.6.1.1 The meeting was invited to consider advising the Secretariat to make the Technical Instructions freely available on the ICAO public website. It was suggested that not making the document freely available could have a negative effect on levels of compliance by everyone in the supply chain as the information was difficult to find. It was noted that the provisions for transporting dangerous goods by all modes of transport, other than the air and sea modes, were published on publicly accessible websites.

3.6.1.2 A proposal to expand free web access to ICAO documents in support of the No Country Left Behind initiative and to confirm efforts in implementing ICAO Standards and Recommended Practices had been raised to the Executive Committee at the 39th Session of the Assembly. The Technical Instructions were specifically named in this proposal. Although there was strong support for the proposal, it was noted that it could have budgetary implications for the next triennium. The Assembly therefore requested the Council to analyse the proposal and to report back on options for implementation to the 40th Session of the Assembly.

3.6.1.3 There was also strong support for the DGP-WG proposal and agreement that it should extend to the Supplement to the Technical Instructions (Doc 9284SU) and the *Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods* (Doc 9481). Although there was sympathy for the Organization's budget concerns, the Secretary was asked to encourage ICAO officials to study various approaches which could respect copyright issues and maintain a necessary revenue stream. The proposal was for a freely accessible electronic copy. There had been evidence that sales of hard copies of other documents had actually increased after electronic versions were provided for free. The fact that an electronic version could be provided earlier than a printed hard copy would also benefit those needing to implement new provisions into State legislation.

3.6.1.4 The Secretary confirmed that the Secretariat supported dissemination of safety information as broadly as possible while recognizing there were constraints from publication rules and budget. She would bring the views of the working group to the ANC and ask that the ANC raise the issue to the Council.

3.6.2 Dangerous Goods Information in FIXM (DGP-WG/16-WP/33 and 51)

3.6.2.1 The Secretary of the Air Traffic Management Requirements and Performance Panel (ATMRPP) informed the working group of the work in progress for the development of provisions to implement the first step of a new flight planning information system known as flight and flow information for a collaborative environment (FF-ICE/1). The exchange of FF-ICE would be supported by a flight information exchange model, which would accommodate changing information needs at the global, regional and state levels. She also informed that the ATMRPP was playing a coordinating role to ensure that the existing flight information exchange model, known as FIXM, evolved to be compliant with the requirements being developed by the ATMRPP.

3.6.2.2 The ATMRPP was examining the contents of the FIXM version 4.0, in particular dangerous goods information, with an effort to rationalizing the list to avoid the potential for unjustifiable costs to air navigation service providers and airspace users. The FIXM version 4.0 core data dictionary contained several dangerous goods related fields, a copy of which was provided to the DGP working group. The ATMRPP agreed that feedback from the DGP on whether these fields were appropriate was necessary.

3.6.2.3 The ATMRP Secretary acknowledged that there were already requirements within the Technical Instructions for dangerous goods information being transported to be provided to the pilot-in-command and to personnel with responsibilities for operational control of the aircraft. She noted that the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444) included a code on an ICAO model flight plan to indicate that a flight was carrying dangerous goods and that special handling by air traffic services might be required. She explained that the ATMRPP recognized that the amount of dangerous goods information in the FIXM core data dictionary far exceeded what was required in the PANS-ATM and that the requirements in the Technical Instructions already allowed for an exchange of more detailed dangerous goods information in the event of an emergency. There was also recognition that the transmission of detailed dangerous goods information may introduce a security risk.

Whether or not the information required by the Technical Instructions could be obtained to support possible rescue activities on the ground in a timely manner through the requirements of the Technical Instructions was expressed as justification for requiring more detailed dangerous goods information in the FF-ICE.

3.6.2.4 One panel member provided comments on the issue through a separate working paper. His opinion was that the addition of dangerous goods data into the flight plan was not warranted based on the significant cost this would entail and the very limited benefit he believed it would provide. He suggested that there may be inconsistencies in the PANS-ATM with what was required by the Technical Instructions and that a review of the two documents was necessary to ensure proper alignment. He argued that compliance with a requirement to include dangerous goods information on a flight plan would not always be possible to achieve since the details of cargo to be carried was not known until after the flight plan was filed. He did suggest that including certain types of dangerous goods on the flight plan might be of benefit, such as those which could only be transported under an exemption or for radioactive material transported under exclusive use.

3.6.2.5 Some members did see value in adding dangerous goods information to the flight plan. The working group's earlier discussions on the provision of information to the pilot-in-command (NOTOC) by electronic means were noted (see paragraph 3.2.7.1). It was suggested adding dangerous goods information to the flight plan could provide a solution to some of the issues raised during that discussion. It was reported that flight plans were amended frequently by flight dispatchers, often during take-off. There should therefore be no reason why the flight plan could not be updated when the details of the cargo to be carried was known, even if this were five or ten minutes before departure. These members welcomed the opportunity to harmonize data types to benefit safety.

3.6.2.6 Other panel members raised concerns that requiring dangerous goods information in the flight plan would have a negative effect on the current process for providing required dangerous goods information to the pilot-in-command. Operators had effective procedures in place making the system work well. There was concern that a new requirement would require re-inputting data which could cause delays. Regardless, the data in the FIXM was considered to be too excessive. Any requirement for dangerous goods information in the flight plan should be limited to what was already required on the NOTOC.

3.6.2.7 The working group expressed its appreciation to the Secretary of the ATMRPP for providing the information and looked forward to continued coordination.

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APPENDIX A

CONSOLIDATION OF AMENDMENTS TO THE TECHNICAL INSTRUCTIONS AGREED AT DGP-WG/16

Part 1

GENERAL

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Chapter 2

LIMITATION OF DANGEROUS GOODS ON AIRCRAFT

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2.3 TRANSPORT OF DANGEROUS GOODS BY POST

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DGP-WG/16-WP/39 (see paragraph 3.2.1.6 of this report):

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2.3.2 The following dangerous goods may be acceptable in mail for air carriage subject to the provisions of the appropriate national authorities concerned and these Instructions ~~which relate to such material~~:

. . .

DGP-WG/16-WP/18 (see paragraph 3.2.1.3 of this report):

2.3.3 The procedures of designated postal operators (DPOs) for controlling the introduction of dangerous goods in mail into air transport are subject to review and approval by the civil aviation authority of the State where the mail is accepted.

2.3.4 ~~Before a~~The ~~designated postal operator~~DPO must have received specific approval from the civil aviation authority before the DPO can introduce the acceptance of lithium batteries as identified in 2.3.2 d) and e) ~~they must have received specific approval from the civil aviation authority~~.

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Part 2

CLASSIFICATION OF DANGEROUS GOODS

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Chapter 2

CLASS 2 — GASES

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2.2 DIVISIONS

2.2.1 Substances of Class 2 are assigned to one of three divisions based on the primary hazard of the gas during transport.

*Note.— UN 1950 — **Aerosols,** UN 2037 — **Receptacles, small, containing gas** and UN 2037 — **Gas cartridges** must be regarded as being in Division 2.1 when the criteria in 2.5.1 a) are met.*

a) Division 2.1 — Flammable gases.

Gases which at 20°C and a standard pressure of 101.3 kPa:

i) are ignitable when in a mixture of 13 per cent or less by volume with air; or

ii) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit. Flammability must be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO 10156:2010). Where insufficient data are available to use these methods, tests by a comparable method recognized by the appropriate national authority must be used.

DGP-WG/16-WP/15 (see paragraph 3.2.2.1 of this report):

~~*Note.— UN 1950 — **Aerosols** and UN 2037 — **Receptacles, small, containing gas** must be regarded as being in Division 2.1 when the criteria in 2.5.1 a) are met.*~~

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Chapter 3

CLASS 3 — FLAMMABLE LIQUIDS

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3.2 ASSIGNMENT OF PACKING GROUPS

DGP-WG/16-WP/39 (see paragraph 3.2.1.6 of this report):

3.2.1 Table 2-4 should be used for the determination of the packing group of a liquid that presents a risk due to flammability. For liquids whose only hazard is flammability, the packing group for the ~~material~~ liquid is the packing group shown in Table 2-4. For a liquid possessing an additional hazard(s), the packing group, determined by using Table 2-4, and the packing group based on the severity of the additional hazard(s), must be considered. In such cases, the table of precedence of hazard characteristics appearing in Table 2-1 should be used to determine the correct classification of the liquid.

. . .

Chapter 4

CLASS 4 — FLAMMABLE SOLIDS; SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION; SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES

. . .

4.4 SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES (DIVISION 4.3)

4.4.1 Definitions and properties

DGP-WG/16-WP/42 (see paragraph 3.2.2.3 of this report):

~~4.4.1.1 Division 4.3 — Substances which, in contact with water, emit flammable gases.~~

~~4.4.1.2~~ Certain substances in contact with water emit flammable gases which can form explosive mixtures with air. Such mixtures are easily ignited by all ordinary sources of ignition, for example, naked lights, sparking handtools or unprotected lamps. The resulting blast wave and flames may endanger people and the environment. The test method referred to in 4.4.2 must be used to determine whether the reaction of a substance with water leads to the development of a dangerous amount of gases which may be flammable. It must not be applied to pyrophoric substances.

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Part 3

DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND LIMITED AND EXCEPTED QUANTITIES

. . .

Chapter 3

SPECIAL PROVISIONS

. . .

Table 3-2. Special provisions

TIs	*UN*

. . .

DGP-WG/16-WP/6 (see paragraph 3.2.3.2 of this report):

A59	A tire assembly unserviceable or damaged is not subject to these Instructions if the tire is ~~completely~~ deflated to a gauge pressure of less than 200 kPa at 20ºC. A tire assembly with a serviceable tire is not subject to these Instructions provided the tire is not inflated to a gauge pressure exceeding the maximum rated pressure for that tire. However, such tires (including valve assemblies) must be protected from damage during transport, which may require the use of a protective cover.

TIs	*UN*

. . .

DGP-WG/16-WP/39 (see paragraph 3.2.1.6 of this report):

A72	(163)	A substance specifically listed by name in Table 3-1 must not be transported under this entry. ~~Materials~~ Substances transported under this entry may contain 20 per cent or less nitrocellulose provided the nitrocellulose contains not more than 12.6 per cent nitrogen.

. . .

Chapter 5

DANGEROUS GOODS PACKED IN EXCEPTED QUANTITIES

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DGP-WG/16-WP/40 (see paragraph 3.2.4.2 of this report):

5.1 EXCEPTED QUANTITIES

5.1.2.1 For gases, the volume indicated for inner packagings refers to the water capacity of the inner receptacle and the volume indicated for outer packagings refers to the combined water capacity of all inner packagings within a single outer ~~package~~ packaging.

. . .

5.3 TESTS FOR PACKAGES

5.3.1 The complete package as prepared for transport, with inner packagings filled to not less than 95 per cent of their capacity for solids or 98 per cent for liquids, must be capable of withstanding, as demonstrated by testing which is appropriately documented, without breakage or leakage of any inner packaging and without significant reduction in effectiveness:

. . .

DGP-WG/16-WP/44 (see paragraph 3.2.3.3 of this report):

b) a force applied to the top surface for a duration of 24 hours, equivalent to the total weight of identical packages if stacked to a height of 3 m (including the ~~drop~~ sample).

. . .

5.6 DE MINIMIS QUANTITIES

Dangerous goods assigned to codes E1, E2, E4 or E5 are not subject to these Instructions when carried as cargo provided that:

DGP-WG/16-WP/39 (see paragraph 3.2.1.6 of this report):

a) the maximum net quantity ~~of material~~ per inner packaging is limited to 1 mL for liquids and gases and 1 g for solids;

b) the provisions of 5.2 are met, except that an intermediate packaging is not required if the inner packagings are securely packed in an outer packaging with cushioning material in such a way that, under normal conditions of transport, they cannot break, be punctured, or leak their contents; and for liquid dangerous goods, the outer packaging contains sufficient absorbent material to absorb the entire contents of the inner packagings;

c) the provisions of 5.3 are complied with; and

d) the maximum net quantity of dangerous goods per outer packaging does not exceed 100 g for solids or 100 mL for liquids and gases.

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PART 4

PACKING INSTRUCTIONS

. . .

Chapter 8

CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

8.1 PACKING INSTRUCTIONS

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DGP-WG/16-WP/40 (see paragraph 3.2.4.2 of this report):

Packing Instruction 650

. . .

7) For liquid substances:

. . .

e) The primary receptacle or the secondary packaging must be capable of withstanding, without leakage, an internal pressure of 95 kPa (0.95 bar);

f) The outer ~~package~~ packaging must not contain more than 4 litres. This quantity excludes ice, dry ice or liquid nitrogen when used to keep specimens cold.

. . .

8) For solid substances:

. . .

d) Except for packages containing body parts, organs or whole bodies, the outer ~~package~~ packaging must not contain more than 4 kg. This quantity excludes ice, dry ice or liquid nitrogen when used to keep specimens cold;

e) If there is any doubt as to whether or not residual liquid may be present in the primary receptacle during transport, then a packaging suitable for liquids, including absorbent materials, must be used.

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Chapter 11

CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

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Packing Instruction Y963

Passenger and cargo aircraft for ID 8000 only

Consumer commodities are materials that are packaged and distributed in a form intended or suitable for retail sale for the purposes of personal care or household use. These include items administered or sold to patients by doctors or medical administrations. Except as otherwise provided below, dangerous goods packed in accordance with this packing instruction do not need to comply with 4;1 or Part 6 of these Instructions; they must, however, comply with all other applicable requirements.

a) Each packaging must be designed and constructed to prevent leakage that may be caused by changes in altitude and temperature during air transport.

. . .

DGP-WG/16-WP/7 (see paragraph 3.2.4.1 of this report):

f) Inner packagings containing liquids~~, excluding flammable liquids in inner packagings of 120 mL or less,~~ must be packed with their closures upward and the upright position of the package must be indicated by "Package orientation" labels (Figure 5-29). These labels, or pre-printed package orientation labels meeting the same specification as either Figure 5-29 or ISO Standard 780-1997, must be affixed to, or printed on, at least two opposite vertical sides of the package with the arrows pointing in the correct direction. The requirements of this sub-paragraph do not apply to:

1) dangerous goods in inner packagings each containing not more than 120 mL with sufficient absorbent material between the inner and outer packagings to completely absorb the liquid contents; or

2) dangerous goods in gas tight inner packagings such as tubes, bags or vials which are opened by breaking or puncturing.

. . .

. . .

Packing Instruction 965

Cargo aircraft only for UN 3480

. . .

DGP-WG/16-WP/45 (see paragraph 3.5.3.10 of this report):

II. **SECTION II**

≠ Lithium ion cells and batteries, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

— Part 1;2.3 (General — Transport of dangerous goods by post);
— Part 5;1.1 g) and j) (Shipper's responsibilities — General requirements);
— Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);
\+ — Part 7;2.1 (Operator's responsibilities — Loading restrictions on the flight deck and for passenger aircraft);
\+ — Part 7;2.4.1 (Operator's responsibilities — Loading of cargo aircraft);
— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
— Paragraphs 1 and 2 of this packing instruction.

. . .

. . .

Packing Instruction 966

Passenger and cargo aircraft for UN 3481 (packed with equipment) only

DGP-WG/16-WP/45 (see paragraph 3.5.3.10 of this report):

II. **SECTION II**

+ Lithium ion cells and batteries packed with equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

— Part 1;2.3 (General — Transport of dangerous goods by post);
— Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);
— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
— Paragraphs 1 and 2 of this packing instruction.

. . .

. . .

Packing Instruction 967

Passenger and cargo aircraft for UN 3481 (contained in equipment) only

. . .

DGP-WG/16-WP/46 (see paragraph 3.5.3.11 of this report):

. . .

I.2 **Additional requirements**

— The equipment must be secured against movement within the outer packaging and be packed so as to prevent accidental operation during air transport.
— The equipment must be packed in strong rigid outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained.
— Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

. . .

DGP-WG/16-WP/48 (see paragraph 3.5.3.13 of this report):

I.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		

~~Strong outer packagings~~

DGP-WG/16-WP/45 (see paragraph 3.5.3.10 of this report):

II. **SECTION II**

≠ Lithium ion cells and batteries contained in equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

— Part 1;2.3 (General — Transport of dangerous goods by post);
— Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);
— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
— Paragraphs 1 and 2 of this packing instruction.

. . .

. . .

Packing Instruction 968

Cargo aircraft only for UN 3090

. . .

DGP-WG/16-WP/45 (see paragraph 3.5.3.10 of this report):

II. **SECTION II**

≠ Lithium metal or lithium alloy cells and batteries, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

— Part 1;2.3 (General — Transport of dangerous goods by post);
— Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);
— Part 5;1.1 g) and j) (Shipper's responsibilities — General requirements);
— Part 7;2.1 (Operator's responsibilities — Loading restrictions on the flight deck and for passenger aircraft);
— Part 7;2.4.1 (Operator's responsibilities — Loading of cargo aircraft);
— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
— Paragraphs 1 and 2 of this packing instruction.

. . .

. . .

Packing Instruction 969

Passenger and cargo aircraft for UN 3091 (packed with equipment) only

. . .

DGP-WG/16-WP/45 (see paragraph 3.5.3.10 of this report):

II. **SECTION II**

≠ Lithium metal or lithium alloy cells and batteries packed with equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

— Part 1;2.3 (General — Transport of dangerous goods by post);
— Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);
— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
— Paragraphs 1 and 2 of this packing instruction.

. . .

DGP-WG/16-WP/46 (see paragraph 3.5.3.11 of this report):

II.2 **Additional requirements**

— Lithium metal cells ~~or~~ and batteries must:
≠ — be placed in inner packagings that completely enclose the cell or battery, then placed in a strong rigid outer packaging; or
≠ — be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a strong rigid outer packaging.

. . .

. . .

Packing Instruction 970

Passenger and cargo aircraft for UN 3091 (contained in equipment) only

. . .

DGP-WG/16-WP/46 (see paragraph 3.5.3.11 of this report):

I.1 **General requirements**

≠ Equipment must be packed in strong ~~rigid~~ outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

. . .

I.2 **Additional requirements**

— The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
— The equipment must be packed in strong rigid outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained.
— The quantity of lithium metal contained in any piece of equipment must not exceed 12 g per cell and 500 g per battery.

. . .

DGP-WG/16-WP/45 (see paragraph 3.5.3.10 of this report):

II. **SECTION II**

≠ Lithium metal or lithium alloy cells and batteries contained with equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

— Part 1;2.3 (General — Transport of dangerous goods by post);
— Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);
— Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
— Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
— Paragraphs 1 and 2 of this packing instruction.

. . .

II.1 **General requirements**

Equipment ~~containing batteries~~ must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

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. . .

Part 7

OPERATOR'S RESPONSIBILITIES

. . .

Chapter 2

STORAGE AND LOADING

. . .

2.2 INCOMPATIBLE DANGEROUS GOODS

. . .

2.2.2 Separation of explosive substances and articles

. . .

DGP-WG/16-WP/43 (see paragraph 3.2.7.7 of this report):

~~2.2.2.4 Except as provided for in 2.2.2.5, explosives of different compatibility groups may be stowed together whether or not they belong to the same division.~~

DGP-WG/16-WP/41 (see paragraph 3.2.7.6 of this report) (para numbering changed consequential to deletion of 2.2.2.4 above:

~~2.2.2.5~~2.2.2.4 For explosives of different division numbers and compatibility groups, the ~~segregation~~ separation scheme shown in Table 7-2 must be followed in order to maintain acceptable distances between such packages.

. . .

2.4 LOADING AND SECURING OF DANGEROUS GOODS

2.4.1 Loading of cargo aircraft

. . .

DGP-WG/16-WP/17 (see paragraph 3.2.7.4 of this report):

2.4.1.2 The requirements of 2.4.1.1 a), b or c) do not apply to:

a) flammable liquids (Class 3), Packing Group III, other than those with a subsidiary risk of Class 8;

b) toxic substances (Division 6.1) with no subsidiary risk other than Class 3;

c) infectious substances (Division 6.2);

d) radioactive material (Class 7);

e) miscellaneous dangerous goods (Class 9).

. . .

2.9 SPECIAL PROVISIONS APPLICABLE TO THE CARRIAGE OF RADIOACTIVE MATERIAL

2.9.1 Limitation of exposure of persons to radiation

. . .

2.9.3 Stowage during transport and storage in transit

. . .

2.9.3.3 Loading of freight containers and accumulation of packages, overpacks and freight containers must be controlled as follows:

. . .

DGP-WG/16-WP/41 (see paragraph 3.2.7.6 of this report):

b) Where a consignment is transported under exclusive use, there is no limit on the sum of the transport indexes aboard a single aircraft, but the requirement on minimum ~~segregation~~ separation distances established in 2.9.6 applies;

. . .

Chapter 4

PROVISION OF INFORMATION

. . .

4.1 INFORMATION TO THE PILOT-IN-COMMAND

. . .

DGP-WG/16-WP/8 (see paragraph 3.2.7.2 of this report):

4.1.1.1 Except as otherwise provided, the information required by 4.1.1 must include the following:

a) the date of the flight;

~~a~~b) the air waybill number (when issued);

Renumber subsequent paragraphs accordingly

. . .

Part 8

PROVISIONS CONCERNING PASSENGERS AND CREW

Chapter 1

PROVISIONS FOR DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

Parts of this Chapter are affected by State Variations US 15, VE 9, VE 10; see Table A-1

1.1 DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

. . .

Table 8-1. Provisions for dangerous goods carried by passengers or crew

Items or articles	*Location*			*Approval of the operator(s) is required*	*The pilot-in-command must be informed*	*Restrictions*
	Checked baggage	*Carry-on baggage*	*On the person*			
. . .						
Consumer articles						
. . .						
DGP-WG/16-WP/1 (see paragraph 3.5.3.1 of this report):						
20) Portable electronic devices (such as watches, calculating machines, cameras, cellular phones, laptop computers, camcorders[, electronic baggage tags])						
Portable electronic devices containing lithium metal or lithium ion cells or batteries (articles containing lithium metal or lithium ion cells or batteries the primary purpose of which is to provide power to another device must be carried as spare batteries in accordance with the item below)	Yes	Yes	Yes	No	No	a) carried by passengers or crew for personal use; b) should be carried as carry-on baggage; c) [except as provided for in paragraph g) below,] each battery must not exceed the following: — for lithium metal batteries, a lithium content of 2 grams; or — for lithium ion batteries, a Watt-hour rating of 100 Wh; d) if devices are carried in checked baggage, measures must be taken to prevent unintentional activation; ~~and~~ [e] if devices are carried outside the baggage, e.g. electronic baggage tags, the device must provide adequate protection for the battery fitted inside the device;

Items or articles	*Location*			*Approval of the operator(s) is required*	*The pilot-in-command must be informed*	*Restrictions*
	Checked baggage	*Carry-on baggage*	*On the person*			
						f) electronic baggage tags, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active. Active devices must meet defined standards for electromagnetic radiation to ensure that the operation of the devices does not interfere with aircraft systems. The device must not be capable of emitting disturbing signals (such as buzzing alarms, strobe lights, etc.) during transport. Active devices in or on checked baggage must be designed with a minimum of two independent means to turn off completely, turn off cellular or mobile functions, or a combination of both when airborne. g) the electronic baggage tag may only contain one lithium battery, which must not exceed the following: — for lithium metal batteries, a lithium metal content of 0.3 grams; or — for lithium ion batteries, a Watt-hour rating of 2.7 Wh; and] ~~e~~h) batteries and cells must be of a type which meets the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38.3.
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APPENDIX B

CONSOLIDATION OF AMENDMENTS TO THE *EMERGENCY RESPONSE GUIDANCE FOR AIRCRAFT INCIDENTS INVOLVING DANGEROUS GOODS* AGREED AT DGP-WG/16

Section 4

CHART OF DRILLS AND LIST OF DANGEROUS GOODS WITH DRILL REFERENCE NUMBERS

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4.3 NUMERICAL LIST OF DANGEROUS GOODS WITH DRILL CODES

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DGP-WG/16-WP/28 Revised and Addendum (see paragraph 3.5.3.6 of this report):

Table 4-1. Aircraft Emergency Response Drills

. . .

DRILL NO.	INHERENT RISK	RISK TO AIRCRAFT	RISK TO OCCUPANTS	SPILL OR LEAK PROCEDURE	FIREFIGHTING PROCEDURE	ADDITIONAL CONSIDERATIONS
	. . .					
10	Gas, flammable, high fire risk if any ignition source present	Fire and/or explosion	Smoke, fumes and heat, and as indicated by the drill letter	Use 100% oxygen; establish and maintain maximum ventilation; no smoking; minimum electrics	All agents according to availability	Possible abrupt loss of pressurization
11	Infectious substances may affect humans or animals if inhaled, ingested or absorbed through the mucous membrane or an open wound	Contamination with Infectious substances	Delayed infection to humans or animals	Do not touch. Minimum re-circulation and ventilation in affected area	All agents according to availability. No water on “Y” drill Letter	Call for a qualified person to meet the aircraft
12	Fire, heat, smoke, toxic and flammable vapour	Fire and/or explosion	Smoke, fumes, heat	Use 100% oxygen; establish and maintain maximum ventilation	All agents according to availability. Use water if available	Possible abrupt loss of pressurization; consider landing immediately
	. . .					

. . .

Amend Tables 4-2 and 4-3 as indicated:

UN No.	*Drill Code*	*Proper shipping name*
3090	~~9FZ~~12FZ	Lithium metal batteries
3091	~~9FZ~~12FZ	Lithium metal batteries contained in equipment
3091	~~9FZ~~12FZ	Lithium metal batteries packed with equipment
3480	~~9F~~12FZ	Lithium ion batteries
3481	~~9F~~12FZ	Lithium ion batteries contained in equipment
3481	~~9F~~12FZ	Lithium ion batteries packed with equipment

— — — — — — — —

APPENDIX C

PROPOSED JOB CARD FOR CONSIDERATION BY ANC — STRUCTURE AND DETAIL OF ANNEX 18

ANWP Job-card

Title	Structure and detail of Annex 18	Reference:	DGP.005.01
Source	DGP/25, Air Navigation Commission (201-5)		
Problem Statement	The current level of detail in Annex 18 does not allow for effective assessment of a State's capability to oversee the safe transport of dangerous goods by air.		
Specific Details (including impact statements)	Work on aligning Annex 18 dangerous goods reporting and oversight requirements in Annex 18 with Annexes 19 and 13 (ANC Job Card DGP.002.01) revealed a lack of sufficient detail in Annex 18 to clearly outline States' responsibilities with respect to the safe transport of dangerous goods by air and the interrelationship of oversight responsibilities between dangerous goods and other aviation activities. This was identified as a contributing factor to safety oversight audit findings on dangerous goods. Annex 18 was originally intended to provide broad provisions for the safe transport of dangerous goods by air with the more detailed requirements in the Technical Instructions. While this is necessary for day-to-day operational use, more detailed requirements with respect to oversight responsibilities need to be included in the Annex. While other Annexes include guidance material in appendices, Annex 18 does not as the approach taken for dangerous goods has been to include guidance material in the Supplement to the Technical Instructions. The work would require: a) a comparison of Annex 18 with other Annexes and associated guidance material to identify and address any ambiguities, inconsistencies, unnecessary duplication and gaps; b) identification of areas requiring collaboration between the DGP and other panels; and c) clarification of the relationship between Annex 18 and State safety management responsibilities, including the eight critical elements required by Annex 19. The work may result in recommendations for amendment to other Annexes to clearly establish their relationship to Annex 18.		
Expected Benefit	A framework allowing for effective assessment of a State's capabiity oversee the safe transport of dangerous goods by air.		
Reference Documents	AN-WP/9021 (ANC Min 201-5) DGP/25 Report, paragraphs 1.2 and 6.2.1.2	Attachments	
Primary Expert Group:	DGP		

WPE No.	Document affected	Description of Amendment proposal or Action	Supporting Expert Group	Expected dates: Expert Group	Effective	Applicability
	Annex 18	Restructuring of Annex 18 to clearly establish the relationship between dangerous goods and safety management, accident investigation, operations, airworthiness, aerodromes, security, facilitation and other responsibilities as identified	SMP, FLTOPS, AIRP, AVSECP, FALP ADOP AIGP			
	Supplement to the Technical Instructions	Moving guidance material affecting State oversight of dangerous goods from the Supplement to Annex 18 while maintaining provisions required for day-to-day operations				
	Technical Instructions	Consequential amendments resulting from amendments to Annex 18				

Initial Issue Date:	Date approved by ANC:	Session/Meeting:

— END —