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**INTERPRETATIONS OF, AND AMENDMENTS TO, MARPOL AND
RELATED INSTRUMENTS**

**Proposal to Designate an Emission Control Area for the Commonwealth of
Puerto Rico and the United States Virgin Islands for Nitrogen Oxides,
Sulphur Oxides and Particulate Matter**

Submitted by the United States

SUMMARY

Executive summary: This document sets forth a proposal to amend MARPOL Annex VI to designate certain waters adjacent to coasts of the Commonwealth of Puerto Rico and the United States Virgin Islands as an Emission Control Area for NO_x, SO_x, and PM, in accordance with regulations 13 and 14 and Appendix III of MARPOL Annex VI.

This proposal shows that the designation of this Emission Control Area is supported by a demonstrated need to control emissions from ships. Moreover, adoption of the proposed Emission Control Area will reduce ambient levels of air pollution and achieve substantial benefits to human health and the environment.

Strategic direction: 7.3

High-level action: 7.3.1

Planned output: 7.3.1.1

Action to be taken: Paragraph 26

Related documents: Revised MARPOL Annex VI; MEPC 59/6/5, MEPC 59/INF.13 and MEPC 61/INF.9

Introduction

1 The United States (U.S.) proposes to amend MARPOL Annex VI to designate certain waters adjacent to the coasts of the Commonwealth of Puerto Rico and the United States Virgin Islands, as an Emission Control Area (ECA) for the control of nitrogen oxides (NO_x), sulphur oxides (SO_x), and particulate matter (PM) emissions. The Commonwealth of Puerto Rico and the United States Virgin Islands are unincorporated territories of the United States, and their residents are U.S. citizens. Consequently, the U.S. Government has a fundamental interest and responsibility in protecting public health and the environment in these areas and in ensuring that these citizens receive the same degree of

protection from ship emissions as that which will be realized for people living under the protection of the recently designated North American ECA. The burden on international shipping as a result of the proposed ECA is expected to be small, while the improvements in air quality and associated health and environmental benefits resulting from designation of this ECA are expected to be significant both within in the proposed area and potentially in downwind areas.

2 Annex 1 to this proposal provides a detailed description and a chart of the proposed ECA. The United States has also prepared draft amendments to MARPOL Annex VI, contained in annex 2 to this proposal, which consist of proposed revisions to regulations 13 and 14 and Appendix VII of Annex VI. Lastly, a detailed description of how the proposal satisfies each of the eight Criteria for Designation of an ECA established under MARPOL Annex VI, Appendix III has been submitted to the Committee as a separate document, MEPC 61/INF.9, herein referred to as the Information Document.

Country submitting this ECA Proposal

3 This ECA proposal is submitted by the United States. The Commonwealth of Puerto Rico and the United States Virgin Islands are unincorporated territories of the United States. These islands are subject to U.S. jurisdiction and sovereignty and their residents are U.S. citizens. Consequently, the U.S. Government has a fundamental interest and responsibility in protecting public health and the environment in Puerto Rico and the United States Virgin Islands.

4 The United States is a Party to MARPOL Annex VI, having deposited its instrument of ratification with the IMO on 8 October 2008.

Summary of Proposal

5 Designation of this ECA will significantly reduce emissions from ships, and deliver health and environmental benefits to the human population of these islands and to marine and terrestrial ecosystems. Neighbouring countries may also experience benefits. Air pollution from ships occurs not just in ports and along coastlines, but is also carried long distances across the sea and over land. When people breathe this polluted air, their health is adversely affected, leading to lost productivity due to increased illnesses, hospitalizations and even premature deaths. In addition, Puerto Rico and the United States Virgin Islands are comprised of many highly sensitive ecosystems that are already vulnerable and are threatened by pollution from ships. The gains that have been made by extensive domestic regulations to control emissions from land-based sources could be eroded or even reversed by expected growth in human and economic activity, including shipping. To maintain and improve air quality, public health and the environment, decisive action must be taken to realize the benefits that can be gained from additional emissions reductions.

6 The U.S. Federal Government has coordinated with territorial governments and affected stakeholders in proposing this ECA. This proposal takes into account the issues raised during those consultations and strives to minimize the impact on the shipping community, while achieving needed environmental protection. Action at the international level to reduce the impacts of shipping on air quality, human health and ecosystems through designation of this ECA will remove domestic pressures to consider unilateral regulatory actions to reduce ship emissions.

Description of Area

7 The area proposed for ECA designation is illustrated in annex 1 and is described in more detail in section 2 of the Information Document. The size and shape of the ECA were determined as follows. Back trajectory modelling was used to evaluate the probability that offshore ship emissions impact selected onshore sites in Puerto Rico and the Virgin Islands. Then, to construct an emission control area that would be equally protective, on average, as the recently designated North American ECA, the boundaries of the proposed ECA were drawn to reflect similar spatial probabilities as the North American ECA.

8 The proposed area of the ECA includes waters adjacent to the coasts of the Commonwealth of Puerto Rico and the United States Virgin Islands. The northern and southern boundaries of the proposed area would extend roughly 50 nm and 40 nm, respectively, from the territorial sea baseline of the main island of Puerto Rico. The western edge of the proposed area would generally run north-south, about half way between the Puerto Rican island of Mona, and the west coast of the main island. The eastern edge of the proposed area would generally run north-south, but extend eastward through the area between the United States Virgin Islands and the British Virgin Islands and also eastward through the area between Saint Croix and Anguilla and Saint Kitts. The proposed ECA is bounded such that it does not extend into marine areas subject to the sovereignty, sovereign rights, or jurisdiction of any State other than the United States.

9 Puerto Rico and the United States Virgin Islands are a subset of a larger chain of islands located on the boundary of the Caribbean Sea and the Atlantic Ocean. There is considerable ship activity in all parts of this area. Therefore, we welcome the opportunity to coordinate with neighbouring countries with a view toward achieving additional ECA designations and the air quality benefits that would result across the Caribbean area.

Populations and Areas at Risk

10 Section 4 of the Information Document describes the populations and environmental areas at risk from the impacts of ship emissions. Millions of people and many important ecosystems in Puerto Rico and the United States Virgin Islands are deleteriously affected by emissions from ships today, and are at risk of additional harm in the future. These island territories are characterized by rough, hilly terrain with a tropical/subtropical climate. The main island of Puerto Rico is comprised of a coastal plain bisected by a chain of mountains. The United States Virgin Islands are volcanic in origin and mostly hilly to rugged and mountainous with little level land. Due to these characteristics, the populated areas of these islands tend to be near the coasts and highly urbanized. The population of the islands is about 4 million, of which about 40 per cent, or 1.6 million, are children and persons over the age of 65 who are particularly sensitive to air pollution. Puerto Rico has an average population density of about 440 people per square kilometre, second highest in the United States after New Jersey. Only 21 countries in the world have a higher population density. While the United States Virgin Islands has a smaller population, at about 109,000 people, its population density is about 360 people per square kilometre, ranking it 34th in the world.

11 The economies of both Puerto Rico and the United States Virgin Islands are highly dependent on marine transportation. Because of their lack of natural resources, these territories obtain raw materials as well as chemicals, machinery and equipment clothing, food, fish, and petroleum products from outside the islands. Finished goods including chemicals, electronics, apparel, medical equipment, and petroleum products (St. Croix is the location of one of the world's largest petroleum refineries) are mainly destined for the United States. Tourism is also an important economic sector. To handle these transactions, commercial and tourism ports are located throughout these islands. In addition, these islands are located in high transit areas, and ships voyaging to and from Europe, Africa and Asia through the Panama Canal as well as to other countries in the Caribbean and Americas operate in passages to the east and west of these islands. Thus, it is very clear that the dependency of the islands' economies on marine transportation in combination with the physical and human geography of the territories place these populations and environments at an elevated risk from ship-related pollution.

12 In addition to impacts on human health, sensitive ecosystems are also at risk from ships' emissions. Deposition of nitrogen and sulphur compounds cause acidification in both terrestrial and aquatic ecosystems, including the acidification of coastal ocean waters by altering surface seawater chemistry. Ship emissions also contribute to the problem of excess nutrient enrichment and eutrophication that promotes increased growth of certain phytoplankton and other marine plants, which may lead to a shift in ecosystems. As such, emissions of NO_x, SO_x, and PM from ships are of particular concern in Puerto Rico and United States Virgin Islands. These islands are comprised of many highly sensitive ecosystems including wetlands, estuaries, and extensive coral reef systems that are already vulnerable and threatened. Given the fragile ecosystems found throughout these islands, reducing ship emissions that contribute to sulphur and nitrogen deposition in both Puerto Rico and United States Virgin Islands is urgently needed to help reduce exposure to these pollutants.

Ships Contribution to Air Pollution and Environmental Problems

13 In developing this proposal, the United States performed a comprehensive analysis to estimate the emissions from ships operating in the proposed ECA. Section 4 of the Information Document contains detailed emission inventories for Puerto Rico and the United States Virgin Islands and the contribution of ship emissions to those inventories. This analysis shows that ships currently contribute about 37 per cent, 36 per cent, and 26 per cent of anthropogenic (man-made) NO_x, SO_x, and PM_{2.5}, respectively, within the proposed ECA.

14 To determine the extent to which ship emissions reach populated areas or sensitive ecosystems, the United States performed back trajectory analyses described in section 5 of the Information Document. This trajectory modelling allows one to simulate the paths that NO_x, SO_x or PM take after they are emitted from a ship and estimate the probability that offshore ship emissions, including emissions both inside and outside the area of the proposed ECA, impact onshore sites in Puerto Rico and the United States Virgin Islands. This analysis shows that in addition to exposure to ship emissions from ships operating in local ports, populations of these islands are also exposed to emissions from ships operating offshore, far beyond the boundaries of the proposed ECA. These port and offshore emissions affect virtually all people living in Puerto Rico and the United States Virgin Islands.

15 Section 5 of the Information Document also discusses the human health and environmental impacts of these ship emissions for Puerto Rico and the United States Virgin Islands. Air pollutants, such as NO_x, SO_x, and PM, travel far from the ships operating in the proposed area. Under certain conditions, NO_x molecules react to form ground-level ozone, and NO_x molecules and SO_x molecules can react to form very small particles, known as PM_{2.5}.¹ Reductions in ambient concentrations of PM_{2.5} and ground-level ozone, through the establishment of the proposed ECA, would result in important health benefits for people in Puerto Rico and the United States Virgin Islands in terms of respiratory and cardiovascular impacts, including premature mortality, reduced hospitalizations, and reduced low-activity days. Reducing ship emissions will also help populations afflicted with asthma. There are well established links between NO_x, SO_x, ozone and PM exposure and asthma, and the asthma mortality rate in Puerto Rico is 2.5 times higher than the rate in the continental United States.

16 Section 5 of the Information Document also describes the damage to sensitive ecosystems that is attributable to emissions from ships. A variety of ecosystems can be sensitive to, and harmed by different pollutants, including nitrogen nutrient loading and acidification. The sulphate wet deposition levels recorded in Puerto Rico are comparable to the wet deposition levels in many areas of the United States for which the North American ECA was established. Based on the United States understanding of the sources of that sulphur, and the similarities to source inventories in other parts of the United States, much of the atmospheric wet deposition originates from ships. The sensitivity of an ecosystem to acidification depends on the ability of the soils to neutralize (or buffer) the deposited acidic pollutants formed from SO_x and NO_x. Differences in soil buffering capacity are an important reason why some areas that receive acid precipitation show a lot of damage, while other areas do not appear to be harmed at all. Improving ship emissions from current performance to ECA standards will significantly reduce the amount of sulphur and nitrogen deposition in sensitive ecosystems.

17 Reducing ship emissions from today's performance to ECA standards will reduce local inventories of NO_x, SO_x and PM_{2.5} in 2020 by approximately 10,000, 28,000 and 3,000 metric tonnes, respectively. The emission reductions that will occur as a result of applying ECA controls in the proposed area will help reduce the damage to human health and the environment that is caused by ship emissions and will help Puerto Rico and the United States Virgin Islands achieve and maintain healthier ambient air quality. Designating this ECA will help areas of environmental and ecological significance begin to recover their natural balance.

Ship Traffic and Meteorological Conditions

18 As described above and in section 6 of the Information Document, the economies of Puerto Rico and the United States Virgin Islands are highly dependent on marine transportation. Section 7 of the Information Document illustrates ship activity in the area and shows that this traffic is substantial. Commercial and tourist ports are located throughout these islands. In addition, there is a high degree of ship activity around Puerto Rico and the United States Virgin Islands, both from ships that enter Puerto Rican ports and those that travel around the islands on their way to or from the Panama Canal and the Americas.

¹ PM_{2.5} is defined as Particulate Matter with aerodynamic diameter less than 2.5 micrometres.

19 During the time from being emitted into and removed from the air, pollutants can be transported hundreds of nautical miles over the ocean. Meteorological conditions around Puerto Rico and the United States Virgin Islands ensure that a significant portion of at-sea emissions, and the resulting pollution formed in the atmosphere, is transported to land. Wind patterns commonly observed in the area of Puerto Rico and the United States Virgin Islands are mainly east to west. However, as described in section 6 of the Information Document, meteorological evidence for coastal cities shows that they receive offshore emissions transported by wind from varying directions, although at different intensities. Ultimately, as there is shipping activity on all sides of Puerto Rico and the United States Virgin Islands and regardless of which location is considered, there is a high potential for ship emissions to affect air pollution over land on these islands.

Land-based Emissions Controls

20 Because the Commonwealth of Puerto Rico and the United States Virgin Islands are unincorporated U.S. territories, federal air pollution regulations also apply to them. As a result, emissions of NO_x, SO_x, PM and other air pollutants from a wide range of industrial, commercial and transportation activities are already controlled. Regulated land-based sources include large and small manufacturing plants, smelting and refining facilities, paper mills, chemical and pharmaceutical companies; and combustion sources at factories and power plants such as boilers, turbines, and engines. Transportation sources subject to stringent exhaust emissions restrictions and fuel quality standards include automobiles, trucks, buses and domestic commercial and recreational watercraft.

21 Significant emission reductions of NO_x, SO_x and PM have been achieved via performance standards for new combustion sources and other industrial processes, and via engine and fuel standards for mobile sources. The most significant source categories have applied advanced emission control technology where feasible, which can reduce emissions by over 90 per cent. In comparison, ship emissions are high because they are not required to use advanced technology emission controls or clean fuels. As a result, the relative contribution of ships to local air inventories is high and is expected to become larger in the future, due to both growths in ship activity levels and to continuing decreases in emissions from other sources.

Estimated Costs

22 As presented in section 8 of the Information Document, the costs of implementing and complying with the proposed ECA are expected to be small both absolutely and compared to the costs of achieving similar emissions reductions through additional controls on land-based sources. The U.S. Government estimates the total costs of improving ship emissions from current performance to ECA standards in the proposed area will be approximately \$70 million.

23 The estimated cost-effectiveness of the proposed ECA in 2020 is \$600 per tonne of NO_x removed, \$11,000 per tonne of PM_{2.5} removed, and \$1,100 per tonne of SO_x removed. This compares favourably to the cost effectiveness of land-based programmes in the United States, which range from \$200 to over \$12,000 per tonne of NO_x reduced, from \$2,000 to over \$50,000 per tonne of PM reduced, and from \$200 to \$6,000 per tonne of SO_x reduced.

24 The economic impacts of complying with the programme on ships engaged in international trade are expected to be modest. With regard to container ships, improving from current performance to ECA standards would increase the cost of shipping a twenty-foot-equivalent container by about US\$0.33 to US\$1.35 depending on the size of the ship and the length of the route. This represents an increase of less than one per cent in the cost of shipping a 20-foot container. Shipowners are expected to pass all or nearly all costs on to the purchasers of marine transportation services in the form of higher container rates. The increased costs would ultimately be passed on in the form of slightly higher prices for the goods being shipped. The price impacts on oil tanker services are also expected to be small, with a price impact of less than US\$0.01 per barrel. With regard to cruise ships, the United States estimate that the price impacts of the proposed ECA on a large cruise ship that travels from the United States East Coast throughout the Caribbean may be \$0.40 per passenger per day; this represents a less than one per cent increase in the price of the cruise. The estimated price impacts on a medium-sized cruise ship that operates a route between the United States and Puerto Rico will be approximately US\$0.60 per passenger per day for a 5-day cruise; this represents a less than one per cent increase in the price of the cruise. The impacts on a small cruise ship that spends nearly one-quarter of the time in the proposed ECA is estimated to be approximately US\$1.30 per passenger per day for an 8-day cruise; this represents a less than one per cent increase in the price of the cruise.

Conclusion

25 Ship emissions contribute significantly to air pollution, adverse human health outcomes and ecosystem damage in the Commonwealth of Puerto Rico and the United States Virgin Islands. Adoption of the proposed ECA will dramatically reduce these effects and improve public health and the environment in the proposed area. Puerto Rico and the United States Virgin Islands have already implemented stringent emission controls on land-based sources of air pollution, and applying similar controls to vessels engaged in international shipping will achieve substantial benefits at comparable, and reasonable, costs. More broadly, adoption of the proposed ECA will further demonstrate the effectiveness of the regional control provisions contained in MARPOL Annex VI toward helping countries achieve their important human health and environmental goals through the application of stringent marine engine emission and fuel sulphur controls.

Action requested of the Committee

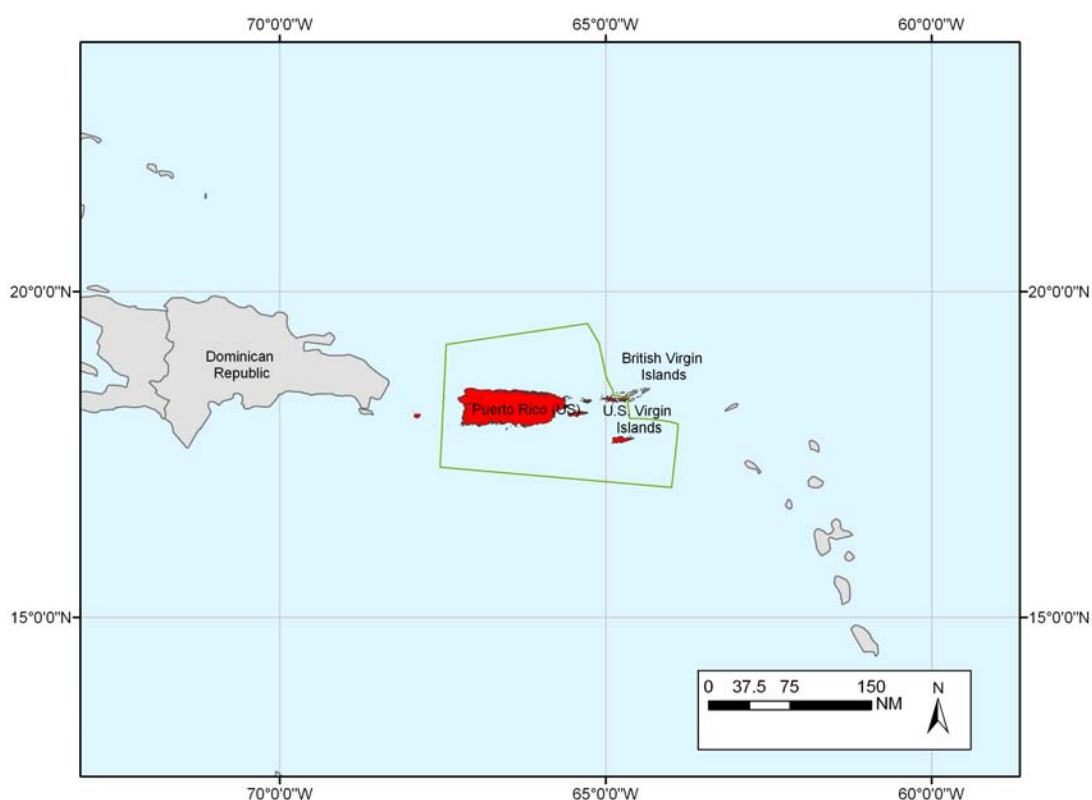
26 The Committee is invited to consider the information presented in this document and its annexes and approve the proposed Emission Control Area, as described, for the control of NO_x, SO_x and PM, with a view to adoption, at MEPC 62, of amendments to regulations 13.6 and 14.3, as shown in annex 2, to formally designate a new Emission Control Area under MARPOL Annex VI.

ANNEX 1

DETAILED DESCRIPTION OF AREA PROPOSED FOR ECA DESIGNATION

1 The area proposed for ECA designation is illustrated in Figure 1. This area is located in the Caribbean Sea and consists of waters surrounding the islands of the Commonwealth of Puerto Rico and the United States Virgin Islands. In addition, the draft regulatory text found in annex 2 to this proposal includes the full set of coordinates delineating the proposed area.

Figure 1 – Area Proposed for ECA Designation



2 Overall, the area of the proposed ECA reflects the geographic nature of the included islands, which are generally arranged on a west-east axis. The proposed ECA would not extend into marine areas subject to the sovereignty, sovereign rights, or jurisdiction of any State other than the United States.

3 The western edge of the proposed area would generally run north-south to the east of the Mona Passage, 12 or more nautical miles from the west coast of the main island. This boundary excludes the Puerto Rican islands of Mona and Monito, which are nature preserves that lie between the main island of Puerto Rico and the Dominican Republic. The choice of this boundary attempts to strike a balance between emission reduction benefits for the population and environment of Puerto Rico and the safety of ships operating in the Mona Passage. As proposed, this boundary should have minimal impacts on ships operating in the area.

4 The eastern edge of the proposed area would generally run north-south, but also extend eastward through the area between the United States Virgin Islands and the British Virgin Islands as well as eastward toward the area between Saint Croix and Anguilla and Saint Kitts. To the east, the proposed ECA is bounded such that it does not extend into marine areas subject to the sovereignty, sovereign rights, or jurisdiction of any State other than the United States.

5 The northern edge of the proposed area would extend about 50 nm from the territorial sea baselines of Puerto Rico and the United States Virgin Islands.

6 The southern edge of the proposed area would extend about 40 nm from the territorial sea baselines of Puerto Rico and the United States Virgin Islands.

7 The size and shape of the ECA were determined using the information presented in this annex. Specifically, back trajectory modelling was used to evaluate the probability that offshore ship emissions impact selected onshore sites in Puerto Rico and the Virgin Islands (see section 5.3.1 of the Information Document). Then, to construct an emission control area that would be equally protective, on average, as the recently designated North American ECA, the boundaries of the proposed ECA were drawn to reflect similar spatial probabilities as the North American ECA.

ANNEX 2

PROPOSED AMENDMENTS TO REGULATIONS 13 AND 14 AND APPENDIX VII IMPLEMENTING THE PROPOSED EMISSION CONTROL AREA

1 Paragraph 6 of regulation 13 is amended as follows:

- "6 For the purpose of this regulation, emission control areas shall be:
- .1 the North American area, which means the area described by the coordinates provided in Appendix VII to this annex;
 - .2 the United States Caribbean² sea area, which means the area described by the coordinates provided in Appendix VII to this annex; and
 - .3 any other sea area, including any port area, designated by the Organization in accordance with the criteria and procedures set forth in Appendix III to this annex."

2 Paragraph 3 of regulation 14 is amended as follows:

- "3 For the purpose of this regulation, emission control areas shall include:
- .1 the Baltic Sea area as defined in regulation 1.11.2 of Annex I and the North Sea as defined in regulation 5(a)(f) of Annex V;
 - .2 the North American area as described by the coordinates provided in Appendix VII to this annex;
 - .3 the United States Caribbean sea area as described by the coordinates provided in Appendix VII to this annex; and
 - .4 any other sea area, including any port area, designated by the Organization in accordance with the criteria and procedures set forth in Appendix III to this annex."

3 Appendix VII is revised as follows:

Appendix VII
North American Emission Control Areas
(regulation 13.6 and regulation 14.3)

- .1 The boundaries of emission control areas designated under regulations 13.6 and 14.3, other than the Baltic Sea and the North Sea areas, are set forth in this appendix.
- .2 The North American area comprises:
 - .1 ...
 - .2 ...
 - .3 ...

² The proposed term "U.S. Caribbean" includes only waters adjacent to the United States.

3 The United States Caribbean sea area includes:

- .1 the sea area located off the Atlantic and Caribbean coasts of the Commonwealth of Puerto Rico and the United States Virgin Islands, enclosed by geodesic lines connecting the following coordinates:

POINT	LATITUDE	LONGITUDE			
1	17° 18' 37" N.	67° 32' 14" W.	28	18° 22' 22" N.	64° 40' 60" W.
2	19° 11' 14" N.	67° 26' 45" W.	29	18° 21' 57" N.	64° 40' 15" W.
3	19° 30' 28" N.	65° 16' 48" W.	30	18° 21' 51" N.	64° 38' 23" W.
4	19° 12' 25" N.	65° 6' 8" W.	31	18° 21' 22" N.	64° 38' 16" W.
5	18° 45' 13" N.	65° 0' 22" W.	32	18° 20' 39" N.	64° 38' 33" W.
6	18° 41' 14" N.	64° 59' 33" W.	33	18° 19' 15" N.	64° 38' 14" W.
7	18° 29' 22" N.	64° 53' 51" W.	34	18° 19' 7" N.	64° 38' 16" W.
8	18° 27' 35" N.	64° 53' 22" W.	35	18° 17' 23" N.	64° 39' 38" W.
9	18° 25' 21" N.	64° 52' 39" W.	36	18° 16' 43" N.	64° 39' 41" W.
10	18° 24' 30" N.	64° 52' 19" W.	37	18° 11' 33" N.	64° 38' 58" W.
11	18° 23' 51" N.	64° 51' 50" W.	38	18° 3' 2" N.	64° 38' 3" W.
12	18° 23' 42" N.	64° 51' 23" W.	39	18° 2' 56" N.	64° 29' 35" W.
13	18° 23' 36" N.	64° 50' 17" W.	40	18° 2' 51" N.	64° 27' 2" W.
14	18° 23' 48" N.	64° 49' 41" W.	41	18° 2' 30" N.	64° 21' 8" W.
15	18° 24' 11" N.	64° 49' 0" W.	42	18° 2' 31" N.	64° 20' 8" W.
16	18° 24' 28" N.	64° 47' 57" W.	43	18° 2' 3" N.	64° 15' 57" W.
17	18° 24' 18" N.	64° 47' 1" W.	44	18° 0' 12" N.	64° 2' 29" W.
18	18° 23' 13" N.	64° 46' 37" W.	45	17° 59' 58" N.	64° 1' 4" W.
19	18° 22' 37" N.	64° 45' 20" W.	46	17° 58' 47" N.	63° 57' 1" W.
20	18° 22' 39" N.	64° 44' 42" W.	47	17° 57' 51" N.	63° 53' 54" W.
21	18° 22' 42" N.	64° 44' 36" W.	48	17° 56' 38" N.	63° 53' 21" W.
22	18° 22' 37" N.	64° 44' 24" W.	49	17° 39' 40" N.	63° 54' 53" W.
23	18° 22' 39" N.	64° 43' 42" W.	50	17° 37' 8" N.	63° 55' 10" W.
24	18° 22' 30" N.	64° 43' 36" W.	51	17° 30' 21" N.	63° 55' 56" W.
25	18° 22' 25" N.	64° 42' 58" W.	52	17° 11' 36" N.	63° 57' 57" W.
26	18° 22' 26" N.	64° 42' 28" W.	53	17° 4' 60" N.	63° 58' 41" W.
27	18° 22' 15" N.	64° 42' 3" W.	54	16° 59' 49" N.	63° 59' 18" W.
			55	17° 18' 37" N.	67° 32' 14" W.