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SCIENTIFIC SUB-COMMITTEE

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CLASSIFICATION OF "TOPPED CRUDE" OILS  
USED AS REFINERY FEEDSTOCKS

(Item II.17 on Agenda)

Reference documents :

- 25.265 Annex IX (Original HSC/19)
- 25.485 Annex I (Original HSC/19)
- 25.502 paragraphs 53-62 (Original HSC/19)
- 25.747 paragraphs 27-36, Appendix O of Annex III (Original HSC/19 - Report)
- 39.769 (HSC/16)
- 39.600 Annex IJ/28 (HSC/16 - Report)
- 40.289 (HSC/17)
- 40.260 Annex IJ/2 (HSC/17 - Report)
- 40.452 (HSC/18)
- 40.600 Annex H/7 (HSC/18 - Report)
- 40.894 (HSC/19)
- 41.176 (HSC/19)
- 41.100 Annex G/4 (HSC/19 - Report)
- 41.298 (HSC/20)
- 41.600 Annex F/10 (HSC/20 - Report)

I. BACKGROUND

1. At its 20th Session, the Harmonized System Committee examined a Canadian proposal concerning the classification of "topped crude" oils. It was generally recognized that "topped crudes" were at present classified in heading 27.10 in terms of the Explanatory Note to that heading (page 227, Part (A)). The Canadian proposal was to reclassify this type of product in heading 27.09 in terms of the present legal texts on the basis that they were very similar to whole crude oils of that heading and were also used in the same way as refinery feedstocks. This view was also supported by the Saudi Arabian Administration which provided additional technical information on this question (see Doc. 41.298).

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2. There was however uncertainty regarding the nature and scope of "topped crude". According to the information provided by the Saudi Arabian Administration, "topped crude" was the residual fraction after the atmospheric distillation of whole crude oil to remove petroleum gases, naphtha, kerosene and gas oil, and that the residual product was used as a feedstock for the vacuum distillation units of refineries. However, the information furnished by Canada indicated that topping of crude was done at varying temperatures depending on the source and nature of whole crude, as well as the product mix required for further processing. "Topped crudes" were not always topped to the fullest possible extent under atmospheric distillation and could contain fractions which could still be distilled under atmospheric pressure. The Canadian Administration had also indicated that "topped crude" oils were used as feed stock for vacuum distillation or introduced into a primary processing unit, depending on the extent of lighter fractions removed. This seemed to indicate that "topped crude" referred to a broad spectrum of residual products.
3. During the discussion in the Committee it was pointed out that the processes mentioned in Items (1) to (6) of the Explanatory Note to heading 27.09 were normal "well-head" operations performed at the site of oil extraction and were quite different from subjecting crude oils to atmospheric distillation, which was usually done in a refinery. However, some delegates wondered whether atmospheric distillation was a "minor" process within the meaning of Item (7) of the Explanatory Note to heading 27.09.
4. Another view expressed was that atmospheric distillation did not alter the essential character of whole crude oils.
5. After discussion, the Committee decided to ask the Scientific Sub-Committee to give its views on the following questions :
  - (a) the nature and scope of the term "topped crudes", that is, whether it covers only those products obtained as residue after removal, by atmospheric distillation, of petroleum gases, naphtha, kerosene and gas oil (topped crude long residue as defined in ISO Standard 1998-1/1997 DIS), or whether it covers a broad spectrum of products remaining after removal of certain lighter fractions from whole crude;
  - (b) whether atmospheric distillation was allowed for the products of heading 27.09; and
  - (c) what process would deprive crude oils of their essential character as "crude oils" of heading 27.09.

## II. SECRETARIAT COMMENTS

### **The nature and scope of the term "topped crudes"**

6. It is not disputed that "topped crude" is the residue after atmospheric distillation of whole crude oils without changing the chemical structures of the components. The temperature of distillation is normally below 340 - 370 °C (see Doc. 41.298) above which hydrocarbons start to decompose thermally (cracking). The boiling point ranges of petroleum gases, naphtha, kerosene and gas oil (atmospheric distillates) are reportedly below such temperature (see the table in Annex II to Doc. 41.298). One possibility is that atmospheric distillation of whole crude oil up to this temperature should result in complete removal of all lighter fractions (i.e. atmospheric distillates). If this understanding is correct, the term "topped crude" would

correspond to the ISO definition of “topped crude long residue”, i.e. crude oil which has been freed of gases, gasoline, kerosene and gas oil.

7. On the other hand, it was explained by the Delegate of Canada during the discussion (20th Session) that “topped crude long residue” was a subset of the ISO definition of “reduced crude oil” and that there was a wide variety of topped crude oils (e.g., straight run resid, reduced crude oil, etc.).
8. The Secretariat understands that the Saudi Arabian Administration was referring to a specific type of topped crude oil presumably prevailing in Saudi Arabia, while Canada referred to a broader range of topped crudes which may be found on the market. Thus, “topped crudes” have been described as residues of whole crude oils from which all of the lighter fractions (i.e. atmospheric distillates) have been removed by atmospheric distillation (Saudi Arabia), as well as those from which only part of the atmospheric distillates have been removed and which are suitable to be introduced into a primary processing unit (atmospheric distillation unit of a refinery) after mixing with whole crude (Canada). Both Administrations agree that “topped crudes” are used as feedstock for vacuum distillation. The Canadian Administration also indicated that “topped crudes” can be used as fuel oil as such or after necessary further processing. The Sub-Committee is requested to define the nature and scope of “topped crude oil” in precise terms, if possible.

#### **Whether atmospheric distillation is allowed for the products of heading 27.09**

9. The present Explanatory Note to heading 27.09 (page 227) explains processes for preparing whole crude oils for marketing and which do not change the essential character of the product. Item (5) therein permits the removal of “very light” fractions which the Secretariat understands to mean the removal of gaseous hydrocarbons but not the removal of heavier fractions such as naphtha, kerosene and gas oil by atmospheric distillation. Item (7) permits “any minor process” provided it does not change the essential character of crude. It can be argued that this would include atmospheric distillation if “topped crudes” retain the essential character of whole crude oils. On the other hand, it can also be argued that since atmospheric distillation removes a substantial part of the components of whole crudes and thus alters the essential character of crude oils, it cannot be considered as a “minor process” within the meaning of Item (7) of the Explanatory Note to heading 27.09 and is therefore not allowed for the products of heading 27.09. The Secretariat understands that the question of whether atmospheric distillation is allowed for the products of heading 27.09 needs to be considered in conjunction with the following question.

#### **What process would deprive crude oils of their essential character as “crude oils” of heading 27.09 ?**

10. The Secretariat understands that crude oils are subjected to a series of operations, i.e. (i) well-head operations at the site of oil extraction (see Explanatory Note to heading 27.09), (ii) atmospheric distillation (partial or complete removal of atmospheric distillates), (iii) vacuum distillation, (iv) cracking, etc. It appears that operation (i) is permitted under heading 27.09 as a process not depriving crude oil of its essential character, and this is not challenged. The Secretariat also understands that operations (iii) and (iv) qualify for classification outside 27.09 and this is also not challenged. Consequently, the question to be answered is whether operation (ii) (atmospheric distillation) really deprives crude oil of its essential character as “crude oil”.

11. In this connection, it is interesting to note the following typical example of the results of atmospheric distillation of crude oil (cf. Doc. 41.298, Annex II) :

	Non-condensed gas	Gasoline	Kerosene	Gas oil	Fuel residue
Yield % wt.	1	15	12	17	55
B.P. range °C	-	to 150	150-230	230-340	(340)

12. In Doc. 41.298, paragraph 17, the Canadian Administration states : "After topping, the volume of the crude oil remaining, expressed as a percentage of the original crude oils, generally ranges between 50 and 75 %".
13. The question is whether "topped crude" oils, which are petroleum oils remaining after the removal of 25 % to 50 % of components from whole crude oils by atmospheric distillation, still retain the essential character of crude oils. In other words, though the chemical structures of molecules constituting topped crude oils remain basically unchanged, a substantial part or all of the lighter constituents (naphtha, kerosene, etc.), which amount to 25 % to 50 % of the whole crude, are missing. Do such oils still retain the essential character of "crude oils" of heading 27.09 ? This is the question that the Sub-Committee is invited to answer.
14. The Secretariat understands that topped crude oils have been classified in heading 27.10 up to now on the basis of the present terms of the Explanatory Notes. If the Sub-Committee and the HSC wish to transfer them from heading 27.10 to 27.09, it would be more appropriate to do so by amending the legal text of heading 27.09 to read, for example, "petroleum oils and oils obtained from bituminous minerals, crude (including topped crude oils)" rather than by merely amending the Explanatory Notes, because such a transfer (or reclassification) is too serious - a step to be taken merely by means of a change to the interpretation of the legal text. This would, however, require a clear understanding of the scope of "topped crude" oils so as to distinguish them from other products of heading 27.10.

### III. CONCLUSIONS

15. Taking into account the Secretariat's above comments, the Sub-Committee is requested to give its views as to :
- (a) the nature and scope of the term "topped crudes", i.e. whether it covers only those products obtained as residue after removal, by atmospheric distillation, of petroleum gases, naphtha, kerosene and gas oil (topped crude long residue); or whether it covers a broad spectrum of products remaining after the removal of certain lighter fractions from whole crude (see paragraph 8);
  - (b) whether atmospheric distillation is allowed for the products of heading 27.09 (see paragraph 9); and
  - (c) what process would deprive crude oils of their essential character as "crude oils" of heading 27.09 (see paragraphs 10 to 13).