

14 March 2006

CONSULTATION DOCUMENT ON A SIMPLIFICATION OF THE TITANIUM DIOXIDE DIRECTIVES

1. Do you think the specifications of certain wastes from the titanium dioxide industry (Article 2 (2)), which are relevant for Article 4 and 6, could be further simplified? If so, which consequences would this have for Articles 4 and 6?

Some of the current definitions are no longer appropriate and misleading in places. The key fact is that since the introduction of these TiO₂ directives the TiO₂ industry has developed a strong co product marketing strategy in which co products such as copperas, gypsum, sulphuric acid, residues etc have practical commercial use. These are sold in large quantities often for environmentally beneficial purposes. This underlines an important generic principle that should be included and that is a material is only a waste if it has no further use and is being discarded. The materials defined in this directive are only wastes when they are being disposed of (Waste Framework Directive 75/442/EEC). There are numerous examples where the materials are put to good use.

It would be possible to go further and simplify it further by removing all the detailed definitions of waste completely and to rely on the generic definition as given above. In the event that this requires further detailed input then we would be very pleased to work with you to ensure full compatibility with our process.

However the point has been made that the regulatory authorities at a local level have been accustomed to working with the current definitions for some years with no problems so simplification may not be helpful.

Given the development of the co products it would probably be helpful to define the boundaries of TiO₂ production process and the co product development processes

Definitions:

- *TiO₂ process: The TiO₂ process shall comprise all activities at an industrial establishment directly related to TiO₂ production, starting from feedstock receipt through to TiO₂ despatch but with the following clarifications:*



For the sulphate process this shall include copperas extraction, acid re-concentration including ferrous sulphate monohydrate extraction and gypsum production where practiced but shall exclude any further processing of products other than TiO₂ such as ferric sulphate production, thermal drying of gypsum, roasting of iron salts to produce SO_x for acid production and the manufacture of other products from iron salts.

For the chloride process this shall include any recycle separation of ore and / or coke for recycle or sale and iron chloride separation but exclude conversion of ferrous to ferric chloride and processes to recover chlorine values such as metal chloride roasting.

(These definitions are in line with the proposed Large Volume Inorganic Chemical - Solids BAT reference document under IPPC Directive 96/61/EC)

Please note for article two there is an omission in paragraph 7. It should read 'all kinds of dust'

Article 4 would become:-

- *Member states shall prohibit the dumping of any waste from the TiO₂ process into a water body, sea or ocean by any waterborne vessel or airborne craft.*

Member states shall ensure that industrial establishments meet the following total emission limit values for discharges to water bodies, sea or ocean: Sulphate process < 800kg sulphate per tonne of TiO₂ produced; Chloride process < 130kg (Natural rutile), <228kg (Synthetic rutile), < 450kg (Slag) total chloride per tonne of titanium dioxide (or proportionate values for uses of mixtures of these substances) .

For discharges to air the definitions of dust, SO_x and can be retained, the definition of chlorine is not needed as this is a chemical element.

Article 6 should be changed as follows:

- *Item 1 should revert back to the text used in Article 9 (iii) of directive 92/112/EEC which required an installed means to preventing the emission of acid droplets – an absolute emission prohibition is not practical.*
- *Item 2 - Part 1 on dusts can be retained*
Part 2 needs to refer to digestion and calcination as in article 9 part1 (a) ii in the existing directive. Part3 is not comprehensible and needs to refer to acid concentration plants as in the existing directive (article 9 part1 (a) iv). Part 5 on chlorine is unchanged and should be retained (note spelling error for 'chlorine').
- *Protection for human health and the environment. The language of Council Directive 92/112/EEC should be retained*
- *It may be noted that Authorization will be under IPPC Directive, 96/61/EC*

2. Do you think the prohibition of disposal of certain wastes from the titanium dioxide industry into water as well as the emission limit values (Article 4 (1) and (2)) could be further simplified in light of other pieces of Community legislation, such as Article 4 of Directive 75/442/EEC, emission limit values of the Water Directives, such as Directive 86/280/EEC? If so, please specify in what way.

Our proposed changes are detailed under question 1 and are compatible with these generic directives however we believe that it helpful for the regulators to have all the relevant information in this one directive.

3. Do you think the system of prior authorisations and monitoring of the releases to the environment (Article 4 (5) and (6), Article 5 (2) Article 6 (3) and Annex I-V) could be further simplified in light of other pieces of Community legislation, such as Directive 96/61/EC on IPPC? If so, please specify in what way.

Yes. Article 4 (6) is not required as sufficient protection will be provided via authorisation under IPPC. It can be noted that titanium dioxide manufacture is one of the main ('cornerstone') processes in the Large Volume Inorganic Chemical - Solids BAT reference document and all emissions are covered in detail for both the sulphate and chloride processes.

4. Do you think the prohibition of disposal (Article 5 (1)) could be further simplified in light of other pieces of Community legislation, such as Directive 1999/31/EC and its waste acceptance criteria? If so, please specify in what way.

Article 5 is not needed as written It could be replaced by: 'Member states shall prohibit the disposal of any types of waste from the titanium dioxide industry on land unless prior authorisation provided that the conditions as laid down in Article 4 of Directive 75/442/EEC and the requirements for land filling according to Directive 1999/31/EC are met.'. 'Member states shall also support the development of products other than TiO₂ from the titanium dioxide industry to reduce the quantity of waste'. This is in line with what all producers have been trying to achieve but in some cases have been hindered by local interpretations of waste law. This would also be consistent with recent proposals under the EU thematic strategy on waste.'

5. Do you think the emission limit values to air (Article 6 (1) and (2)) could be further simplified in light of other pieces of Community legislation, such as Directive 96/61/EC on IPPC? If so, please specify in what way.

The majority of the limit values should remain as in the directive as detailed under 1. The concentration units should be mg/Nm³.

6. Do you think the Annexes could be further simplified? If so, please specify in what way.

Our proposals and reasoning for changes to the annexes are detailed below:

- *Remove Annex I. SO_x and dusts are controlled by Article 9 of 92/112/EEC (Article 6 of the new proposal) and the standard national controls on emissions from industries under IPPC should be adequate without the need for specific requirements monitoring under the directive. The reference method of measurement can not be read but if it is unchanged from the directive it is outdated (1980) and needs to be revised.*
- *Amend Annex II (See Appendix below for detailed justification). The Water Column monitoring section should be removed. We suggest keeping the Sediments monitoring section and only the Benthic Fauna part of the Living Organisms section. The minimum annual sampling and analysis frequency should be decreased up to 5 years. We attach an appendix which demonstrates that that this frequency of surveys is quite adequate to ensure no significant damage to the flora and fauna is occurring. Retention of these sections will ensure that the actual environmental impact of a discharge on the ecology can be measured especially as the sediment chemistry and the faunal biology can be correlated statistically to determine which parameters are driving any changes in community structure*
- *Amend Annex III. The Annex should be treated in the same way as Annex II. It may also be possible to further simplify the text by incorporating Annex II & III together. The new Annex could be called "Discharge or Immersion into Salt or Fresh Water".*
- *Remove Annex IV & Annex V as they are no longer needed since sufficient protection will be afforded by application of the landfill directive with the associated site monitoring and waste acceptance criteria.*

Some of the analytical techniques suggested are now outdated, for example water analysis using atomic absorption spectroscopy has now been replaced by ICP-MS for many species. These need to be updated or omitted.

7. Do you think any measures should be added? If so, please specify which ones and give reasons.

There is no need for additional measures though clarifications in terms of process boundaries should be added as described in the answer to Question 1 above.

8. Do you think any measures should be deleted? If so, please specify which ones and give reasons.

A number of proposed deletions are covered above under individual questions.

Appendix justifying the changes recommended for Annex II

The following is an expanded version of our suggestions for changing and reducing the frequency of the receiving water monitoring regime. It is based on many years of water and benthic surveys carried across Europe and at other TiO₂ sites across the world. A more detailed justification of the recommendations including results of statistical analysis could be supplied if necessary but this would take time to prepare.

Amend Annex II as follows:-

Remove the water column monitoring section.

As a consequence of use of abatement techniques such as effluent neutralisation, waste acid re-concentration or a combination of both of these, discharge emissions into salt water (estuarine, coastal or open sea) are much reduced compared to those present when the TiO₂ Directive was introduced. Correspondingly the parameters described in Annex II are much less important as measures of impact of the wastes (e.g.: Fe was a major component of wastes discharged but now most of the Fe in the waste stream is removed as a consequence of the effluent treatment regimes).

Chemical constituents of the waste discharged into saline waters will be controlled under IPPC and specifically referred to in the BREF BAT document for LVIC-S hence their inclusion here in the TiO₂ Directive is duplication. In addition there are controls in place for the emission of Priority Substances (including many metals such as Hg, Cd, Ni, etc) to water under the Water Framework Directive as a result of the imposition of Environmental Quality Standards (EQS) for receiving waters.

Keep the sediments monitoring section.

The measurement of the parameters as described in this section is valid and useful in that the sediment chemistry data can be correlated statistically with benthic fauna data to determine if the chemical parameters are driving any changes in benthic community structure and indicate any potential environmental impact as a consequence of the discharge into saline waters (see Benthic Fauna Section).

The frequency of monitoring of sediment should be decreased to every 5 years to match the proposed frequency of Benthic Fauna monitoring (see Benthic Fauna Section).

The use of atomic absorption spectrophotometry (AAS) as the reference method of measurement of the parameters in sediment is now outdated and ICP-MS is now the method of choice for the majority of this analysis.

Modify the living organisms section.

Remove the fish, planktonic larvae and flora sections.

Keep the Benthic Fauna section. Reduce the sampling frequency to every 5 years.

*Long-term experience in monitoring at sites around the world has shown us that statistically rigorous data are necessary if trends are to be identified and are to provide industry and regulators alike with early warning of deteriorating or improving conditions in the receiving environment that can feedback into the operation of on-site effluent treatment systems. This places certain fundamental requirements on the receptor organisms within the receiving environment that are to be monitored. In brief these are **spatial fidelity**, leading to replicability (repeatability) of quantitative sampling during monitoring rounds and the presence of sufficiently high densities and species richness values (numbers of species) to permit the collection of representative, statistically valid samples that integrate potential effects of effluents and their constituents over time and across a broad range of sensitivities and differing physiologies. Neither fish nor plankton meets these basic requirements. The populations of both at a given point in the receiving environment are highly variable, not just from year to year or season to season or even from day to day, but from minute to minute and for entirely natural reasons. Changes in direction of currents, states of tide, weather conditions, rainfall prior to sampling, water temperatures, the nutrient status of the waters prior to and during the sampling period and the degree cloud cover all have direct effects on the presence and composition of phyto- and zooplankton assemblages. These natural factors also affect their depth distribution within the water column. Fish sampling in the water column is yet more "hit-and-miss" owing to the natural patchiness of distribution of fish within the water-bodies that reflects the shoaling behaviour of many species and the ease with which species are disturbed from water bodies by, for example, percussive forces on boats, engine and winching activity and net deployment and operation.*

Clearly absence of evidence cannot be taken as evidence of absence.

Equally the extent of their free-ranging movements means that the evidence that they provide concerning local prevailing environmental conditions is minimal. As a result, quantitative ecological assessment and monitoring should focus on the lower mobility invertebrate species present within the sediments in the receiving environments as these have a higher degree of spatial fidelity and the populations of individual species, once recruited, are continuously subjected to the constraints of any materials that enter the sediments of overlying waters. The meiofaunal invertebrates are a very good example of this approach with densities in some cases exceeding 40 million individuals per square metre of sediment and with up to a 1,000 species having been recorded in a single monitoring survey area. Their communities include organisms that cover the entire range of sensitivities with species that are amongst the first to disappear as conditions deteriorate and species that are the last to disappear in the most grossly contaminated conditions.

With life-cycles ranging from 10 days up to 5 years ("egg-to-egg"), their community structures respond rapidly to short-term changes in conditions whilst also integrating the effects of long-term prevailing conditions. Statistically-valid sampling is comparatively easily achieved (and demonstrated). Indeed, the data sets derived are robust enough to allow the use of the high-level mathematical analyses (multivariate correlation techniques) that form the basis of ARES systems (Assessment and Ranking of Ecologically Significant Contaminants) which have been used in surveys to identify and rank the actual ecological effects of individual effluent components and to distinguish these from natural background effects (e.g. caused by sediment detritus and individual sediment particle size fractions). None of these analytical methods could be even considered for use with the statistically "noisy" (i.e. exceedingly low mean to variance ratio) data that are derived from water column sampling.

With the adoption of abatement techniques such as effluent neutralization and acid re-concentration by the TiO₂ industry the concentration of contaminants in the effluent discharge has significantly decreased since the introduction of the TiO₂ Monitoring Directive 82/883/EEC in December 1982. Results of recent benthic fauna monitoring surveys have shown that an 'equilibrium' has been reached whereby the main factor affecting the benthic community structure in the vicinity of the discharges is the granulometry (particle size distribution) of the sediments. When taking this and the diminished effluent concentration factor into consideration it is wholly appropriate that the frequency of the sampling be reduced (surveys are costly & average £30,000 per survey) to every 5 years and not annually.