ENVIRONMENTAL ASSESSMENT

1. **Date:** July 24, 2000

2. **Name of Notifier:** Coalition on PET Safety

3. **Address:** All communications on this matter are to be sent in care of Counsel for the Notifier, John B Dubeck, Keller and Heckman LLP, 1001 G Street, N.W., Suite 500 West, Washington, D.C. 20001. Telephone: (202) 434-4125.

4. **Description of the Proposed Action**

This Notification is being submitted to allow for the use in indirect food additive applications of polyethylene terephthalate (PET) copolyesters that are diethylene glycol- and isophthalate-modified. The polymers will contain a total of not more than 10 mole-percent of diethylene glycol (DEG) and isophthalate (IP) units, with the DEG content expressed as mole-percent of total glycol units and the IP content expressed as mole-percent of total (tere/iso)phthalate units. This Notification seeks clearance for the subject polyester resins (hereinafter referred to as "PET copolyesters") that will provide for their use in the full spectrum of food-contact applications for which the polyester resins currently described in Section 177.1630 are now used.

The need purpose of this submission is described in full in the introductory portion of the Notification. For the ready reference of the environmental impact review staff, this discussion is reproduced below.

Section 177.1630 permits the use of PET produced by the condensation of dimethyl terephthalate or terephthalic acid with ethylene glycol in all food-contact applications provided the finished article complies with the applicable extractability specifications. While diethylene glycol (DEG) is not listed as a monomer deliberately employed in the production of these polymers, PET polymers cleared under Section 177.1630 typically contain low levels of polymer units derived from DEG due to its formation from ethylene glycol during the characteristic polymerization reactions that occur in the manufacture of the polymer. DEG may also be present due to its presence in suitably "pure" ethylene glycol. The level of DEG incorporated into the finished polymer can vary due to a number of factors, such as the purity of the starting monomer, the content of "recycled" ethylene glycol recovered from the process, and the polymerization conditions. Variations in the DEG content from one production unit to another can adversely impact the processing of the resin to fabricate food-contact articles. As a result, it is desirable to standardize the DEG content for each commercial product by the addition of low levels of the compound to the monomer stream.

This Notification is being submitted to permit the use of PET copolyesters otherwise cleared under Section 177.1630 of the food additive regulations, but which are produced with the deliberate addition of diethylene glycol at non-trivial levels to achieve incorporated DEG levels in the polymer that will optimize processing.

In addition to ethylene terephthalate "homopolymers," Section 177.1630 also clears ethylene terephthalate-isophthalate copolymers containing 0 to 3 weight-percent or 17 to 23 weight-percent of "ethylene isophthalate" units (equivalent to isophthalate content expressed as 0 to 3 mole-percent or 17 to 23 mole-percent of total (tere/iso) phthalate units, respectively). This Notification seeks to expand the copolymer composition range to permit the use of isophthalate levels not currently allowed under the regulation.

The subject PET copolyesters are expected to be used in the same range of applications as is "conventional" PET currently on the market. Based on current use patterns for cleared PET polymers, the PET copolyesters are expected to be used largely to package carbonated soft drinks. The containers thus will consist largely of two-liter and one-liter containers, with some one-half liter containers. Additional foods and beverages packaged may include non-carbonated drinks and juices as well as alcoholic beverages, water, food oils, and the like. Estimated bottle weights are about 54.2 grams for a two-liter bottle[1/] 27.5 grams for a half-liter bottle, and 46.8 grams for a one-liter bottle.[2/] For each bottle size, the food packaged is expected primarily to be carbonated beverages, although the other beverages and foods identified may also be packaged in such containers.

Food packaging materials produced from the subject PET copolyesters are expected to be used in patterns corresponding to national population density and to be distributed across the country. Therefore, it is anticipated that disposal will occur nationwide with the materials ultimately being landfilled, incinerated, or recycled. The patterns of disposal are expected to be comparable to current disposal patterns for PET bottles, as discussed in Item 9 below.

1/ *Characterization of Municipal Solid Waste in the United States: 1994 Update*, EPA/530-S-94-042, U.S. Environmental Protection Agency, Washington, D.C. 20460. Calculated from Table 24.

2/ *Comparative Energy and Environmental Impacts for Soft Drink Delivery Systems, Final Report*, prepared for The National Association for Plastic Container Recovery (NAPCOR), Franklin Associates, Prairie Village, Kansas (1989), Table 3-3.

Environments potentially affected by disposal are watersheds or groundwater receiving leachate from land disposal sites and areas subject to air emissions from incineration sites. Disposal releases of the subject polymers should be equivalent to any releases from disposal of regulated polyethylene terephthalate polymers.

Polyethylene terephthalate copolymers are now resin identification coded as "PETE-1," and are routinely collected for recycling. The presence of the proposed additional low levels of bound IP and DEG polymer units in PET polymers in the recycle stream will have no adverse effects on current "depolymerization" procedures, such as methanolysis or glycolysis, used to treat the recycled polyesters, since these are currently present in the polyethylene terephthalate polymers being recycled. In addition, testing described in Item 9 below demonstrates that containers produced from the subject copolyesters may successfully be included in general PET recycling streams with no adverse effect on the properties of the recycled product. For these reasons, the use of PET copolyesters in the production of food containers is not expected to have any adverse impact on current or future recycling systems.

5. Identification of the Chemical Substance that is Subject to the Proposed Action

The additives that are the subject of this Notification are certain PET copolyesters, specifically, copolymers manufactured by the condensation of dimethyl terephthalate or terephthalic acid with ethylene glycol and with one or more of the following: dimethyl isophthalate, isophthalic acid, and diethylene glycol. The finished polymer shall contain a total of not more than 10 mole-percent of diethylene glycol and isophthalate units, with the diethylene glycol content expressed as mole-percent of total glycol units and the isophthalate content expressed as mole-percent of total (tere/iso) phthalate units. For purposes of the notification language proposed for the polymers, they are identified as polyethylene terephthalate copolyesters (diethylene glycol-isophthalate modified). They are generally referred to herein as PET copolyesters.

As is clear from this description, the subject polyesters may be produced by the reaction of a variety of starting monomers. For example, the terephthaloyl content may be obtained by use of dimethyl terephthalate or terephthalic acid, while the isophthaloyl content may be derived from either dimethyl isophthalate or isophthalic acid. In addition, both the isophthalate and diethylene glycol starting materials are optional. For this reason, no single polymer identity, or corresponding Chemical Abstracts Service Registry Number (CASRN), can be given to cover all the various starting monomer combinations. A series of copolyesters are identified in Table 1 for the various potential combinations of monomers.[3/]

Table 1
Copolyester Identities for
Various Monomer Combinations

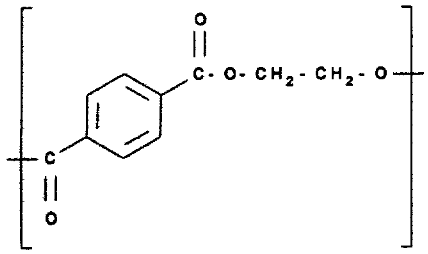
Starting Monomers	CASRN	CAS Nomenclature; Chemical Formula
Dimethyl terephthalate Ethylene glycol Diethylene glycol	29154-49-2	1,4-Benzenedicarboxylic acid, dimethyl ester, polymer with 1,2-ethanediol and 2,2'-oxybis [ethanol]; $(C_{10}H_{10}O_4 \cdot C_2H_6O_2 \cdot C_4H_{10}O_3)_X$

[3/] Table 1 does not contain polymers produced with the use of dimethyl terephthalate with isophthalic acid or polymers produced with terephthalic acid and dimethyl isophthalate. These combinations are not currently practiced, but would yield the same polymers. Table 1 is not intended to restrict the combinations in which the various starting reactants may be used to product the finished polymer.

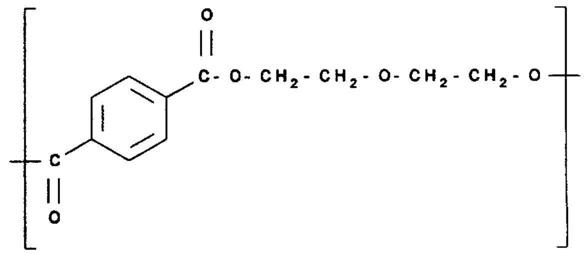
Terephthalic acid Ethylene glycol Diethylene glycol	25052-77-1	1,4-Benzenedicarboxylic acid, polymer with 1,2-ethanediol and 2,2'-oxybis[ethanol]; $(C_8H_6O_4 \cdot C_4H_{10}O_3 \cdot C_2H_6O_2)_x$
Dimethyl terephthalate Dimethyl isophthalate Ethylene glycol	25135-73-3	1,3-Benzenedicarboxylic acid, dimethyl ester, polymer with dimethyl 1,4-benzenedicarboxylate and 1,2-ethanediol; $(C_{10}H_{10}O_4 \cdot C_{10}H_{10}O_4 \cdot C_2H_6O_2)_x$
Terephthalic acid Isophthalic acid Ethylene glycol	24938-04-3	1,3-Benzenedicarboxylic acid, polymer with 1,4-benzenedicarboxylic acid and 1,2-ethanediol; $(C_8H_6O_4 \cdot C_8H_6O_4 \cdot C_2H_6O_2)_x$
Dimethyl terephthalate Dimethyl isophthalate Ethylene glycol Diethylene glycol	57593-45-0	1,3-Benzenedicarboxylic acid, dimethyl ester, polymer with dimethyl 1,4-benzenedicarboxylate, 1,2-ethanediol, and 2,2'-oxybis[ethanol]; $(C_{10}H_{10}O_4 \cdot C_{10}H_{10}O_4 \cdot C_4H_{10}O_3 \cdot C_2H_6O_2)_x$
Terephthalic acid Isophthalic acid Ethylene glycol Diethylene glycol	27027-87-8	1,3-Benzenedicarboxylic acid, polymer with 1,4-benzenedicarboxylic acid, 1,2-ethanediol, and 2,2'-oxybis[ethanol]; $(C_8H_6O_4 \cdot C_8H_6O_4 \cdot C_4H_{10}O_3 \cdot C_2H_6O_2)_x$

The general structure of all the copolyesters will consist of terephthaloyl and isophthaloyl moieties alternating with ethylene glycol and diethylene glycol moieties. The terephthaloyl and isophthaloyl groups are randomly distributed through the polymer chain, as are the ethylene glycol and diethylene glycol groups.

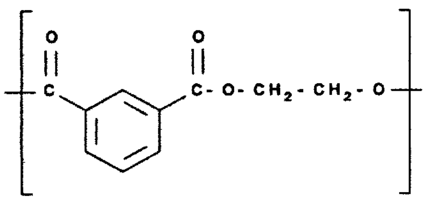
The various potential polymer repeating units may be depicted as follows: (In the following diagram, terephthaloyl and isophthaloyl moieties are labeled as "TP" and "IP" while ethylene glycol and diethylene glycol groups are labeled as "EG" and "DEG," respectively.)



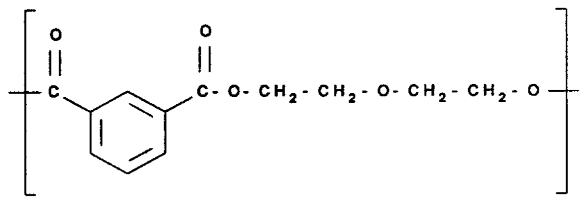
TP - EG



TP - DEG



IP - EG



IP - DEG

To further identify the range of polymer compositions that are intended to be encompassed in this Notification, Table 2 sets forth the specific identities of the starting monomers, including CASRNs, and the permitted content range for each component, expressed in terms of mole-percent of total (tere/iso) phthaloyl moieties and mole-percent of total glycol moieties, as appropriate.

Table 2
Monomers Used in Production of PET Copolyesters

Monomer	CASRN	Permitted Range (Mole-%)
Dimethyl terephthalate (or) Terephthalic acid	120-61-6 100-21-0	90 to 100
Dimethyl isophthalate (or) Isophthalic acid	1459-93-4 121-91-5	0 to (10 - DEG)
Ethylene glycol	107-21-1	90 - 100
Diethylene glycol	111-46-6	0 to (10 - IP)

The subject copolyesters are manufactured using processes essentially identical to the processes by which PET polymers complying with Section 177.1630 are currently manufactured. In general, this involves a three-step process in which the starting acids are first esterified by reaction with the diols, or the starting diesters are transesterified by reaction with the diols, to form oligomers. The oligomers are then polymerized by a polycondensation reaction in which diols are liberated as the polymer grows in length; the glycols thus released are recycled to the process. The polymer is extruded into pellets and the molecular weight further increased by means of solid-state polymerization. These processes have been described in detail in various food additive petitions previously submitted for purposes of clearing these polymers under Section 177.1630. The only significant changes involved in the production of the subject polyesters are that (1) the various monomers may be charged at somewhat different ratios to reflect the somewhat different permitted range of isophthaloyl content and (2) diethylene glycol may be deliberately introduced as an additional monomer to replace a portion of the ethylene glycol content previously used.

The high purity of substances used in the manufacture of PET copolyesters precludes inclusion of significant quantities of extraneous materials as impurities. The chemistry of polyester synthesis assures the absence of all but minute amounts of monomers and oligomers in polyester polymers suitable for use as packaging materials.

6. Introduction of Substances into the Environment

FDA's environmental assessment regulations no longer routinely require information on the introduction of substances to the environment resulting from the manufacture of food-contact substances. No extraordinary circumstances apply to the manufacture of PET copolyesters by the Notifiers. Accordingly, environmental introductions and controls exercised at the site of production of the subject copolymers are not addressed here.

The emissions expected during molding of the subject copolyesters into articles will be similar to those of the cleared polyesters and will result primarily from spills and from clean-up of storage and processing equipment. In light of their non-hazardous nature, any resulting waste from molding of the subject polyesters may be disposed of by processors as non-hazardous waste.

Environmental concerns with the potential release of plastic pellets into the aquatic environment received some attention in recent years, culminating in a 1992 study conducted by the U.S. Environmental Protection Agency (EPA) with the assistance and cooperation of

The Society of the Plastics Industry, Incorporated (SPI).[4/] In particular, it was reported that small, buoyant plastic pellets (i.e., plastic pellets that float in water) pose a potential hazard to aquatic organisms that mistakenly ingest the pellets.

To the extent that any pellets made from the subject PET are inadvertently released into the aquatic environment at the site of use or during transport, the pellets will sink due to the fact that the density of PET is greater than that of water. In this way, the pellets made from these copolyester are not readily accessible to animal species that feed at the water body surface, and, therefore, do not present any special concern in this regard.

The current market for ethylene terephthalate polymers in bottles used in food packaging in the United States is approximately 3.5 billion pounds per year.[5/] Since (1) DEG is a naturally occurring component of these polymers, and (2) a large portion of this material contains isophthalate units, the copolyesters that are the subject of this Notification may be viewed as including "conventional" PET that is currently on the market as well as polymers that contain somewhat higher DEG and IP levels. Thus, in terms of composition, the polymers described in this Notification encompass a large fraction of the market for food-contact PET. This is not surprising since the major thrust of the Notification is to clarify the status of currently produced PET under the food additive regulations rather than to allow for introduction of substantially distinct polymers. However, the Notifiers have established that

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4/ The findings of this study were presented in "Plastic Pellets in the Aquatic Environment: Sources and Recommendations," prepared by Battelle Ocean Sciences for the Oceans and Coastal Protection Division, Office of Water (HH-556F), Environmental Protection Agency, Washington, D.C., December 1992. A copy of this report is attached.

5/ *Modern Plastics*, January 1999.

the great majority of the PET copolyester market will consist of polymers with relatively low DEG and IP levels comparable to the levels present in current PET. Specifically, a confidential survey was taken of the individual Notifiers, who together represent a large portion of the total PET market. Based on the responses to this survey, we estimate that following approval of the petition about 40% of the total PET market will contain a total (DEG + IP) comonomer content of <4%, about 59% will contain 4-6% comonomer, and 1% will contain >6% comonomer. The maximum expected comonomer level is 8%; the typical ratio of DEG to IP will be close to 1.

Since PET typically contains up to 3% of IP units and may contain percent levels of DEG as a result of its formation during polymerization, only the high-comonomer (>6%) product is expected to represent PET compositions that are not currently marketed for food-contact use.[6/] Thus, for practical purposes, the "new" polymers are expected to account for no more than 1% of the total market for food-contact PET.

Food packaging materials produced from the subject PET copolyesters will be used nationwide. Food-contact articles produced from the polymers are expected to be disposed of in patterns similar to the current disposal of conventional PET containers because of the similarity of the polymers. This statement is supported by data discussed in Item 9 below,

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[6/] For example, one of the PET test specimens used in the extraction testing discussed in Section D of the Notification was produced from a typical post-consumer PET recycle stream. When analyzed, this sample was found to contain DEG units at a level of 2.7% of total glycol and IP at a level of 1.5% of total (tere/iso) phthalate. Considering that IP is now permitted at a level of 3% of total (tere/iso) phthalate units, the PET recycle stream may reasonably be expected to contain polymer with 3% IP and 3% DEG units, or a total "comonomer" content of 6%.

which demonstrate that the polymers may be included in PET recycling streams without adverse affects to the recycled product. Consequently, bottles fabricated from PET copolyesters are expected to bear the resin identification code used for PET containers and are expected to be disposed of similarly to conventional PET.

Thus, in keeping with established disposal patterns for PET bottles, it is expected that about 40% of carbonated beverage containers and 12.8% of custom bottles prepared from PET copolyesters will be recycled.[7] The remaining containers are expected to be disposed of in accordance with usual solid waste disposal patterns; thus, about 76% of the containers not recycled will be disposed of by means of landfill and 24% will be incinerated.

When food packaging materials made from the subject copolyester resins are added to sanitary landfills, no significant amount of leaching of any substance from these materials into the environment is anticipated. This conclusion is based on the low levels of migration of resin components under exaggerated exposure conditions (from an environmental standpoint) as shown in Section D of the Notification. To summarize these data, the maximum quantity of phthaloyl moieties found to migrate when the subject copolyesters were exposed to 8% ethanol at 120°F for 30 days was 0.37 $\mu g/in^2$ of contacted surface. It should be noted that comparable levels of total extractives were determined for a range of polyester compositions that included maximum DEG and IP levels as well as PET containing currently permitted and/or no added DEG or IP. Therefore, any leaching that does occur from newly cleared

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[7] The U.S. Environmental Protection Agency. *Characterization of Municipal Solid Waste in the United States: 1997 Update.* Report No. EPA 530-R-98-007, May 1998, Washington, DC.

copolyesters will be instead of (rather than in addition to) identical leachate from currently regulated polyesters.

Based on the results of the extraction studies (which were conducted to simulate food-contact use conditions rather than landfill conditions), only very low levels of substances are expected to leach from these materials in landfills. Thus, the introduction of these substances into the environment will not threaten a violation of the Environmental Protection Agency's regulations in 40 C.F.R. part 258 that pertain to landfills.[8]

The subject PET copolyester resins are composed of carbon, oxygen, and hydrogen. The precise composition of combustion gases during incineration is critically dependent on the temperature of combustion and the amount of available oxygen. When properly incinerated, the subject copolyesters will generate no hazardous emissions. Because of the nature of the combustion products and their low levels compared to the amounts currently generated by municipal waste incinerators, the combustion of the polymers is not expected to cause municipal waste combustors to threaten a violation of applicable emissions laws and regulations, e.g., 40 C.F.R. part 60 and the relevant state and local laws in the jurisdictions where the polymer will be incinerated.

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[8] EPA's regulations require new municipal solid waste landfill units and lateral expansions of existing units to have composite liners and leachate collection systems to prevent leachate from entering ground and surface water and to have groundwater monitoring systems. Although owners and operators of existing active municipal solid waste landfills that were constructed before October 9, 1993, are not required to retrofit liners and leachate collection systems, they are required to monitor groundwater and to take corrective action as appropriate.

7. Fate of Emitted Substances in the Environment

No information need be provided on the fate of substances released into the environment as the result of use and/or disposal of the food additive, because, as discussed above, only small quantities, if any, of substances will be introduced into the environment as a result of use and/or disposal of PET copolyesters. Therefore, the use and disposal of the subject polymers are not expected to threaten a violation of the applicable laws and regulations, e.g., the Environmental Protection Agency's regulations in 40 C.F.R. parts 60 and 258.

8. Environmental Effects of Released Substances

No information need be provided on the fate of substances released into the environment as the result of use and/or disposal of the food additive, because, as discussed above, only small quantities, if any, of substances will be introduced into the environment as a result of use and/or disposal of PET copolyesters. Therefore, the use and disposal of the subject polymers are not expected to threaten a violation of the applicable laws and regulations, e.g., the Environmental Protection Agency's regulations in 40 C.F.R. parts 60 and 258.

9. Use of Resources and Energy

The subject PET copolyesters are expected to be used in the same applications in which currently regulated ethylene terephthalate polymers are now used. As discussed previously, the copolyesters contain only constituents that are present in currently marketed PET. Moreover, all but about 1% of the total market is expected to be essentially identical in composition to current PET. Because of the close similarity between the subject copolymer and conventional ethylene terephthalate polymers currently used in the manufacture of food packaging articles, there will be no change in the amount of polymer required to produce a given food-contact article. For the same reason, the polymers may be processed using the same techniques used to fabricate containers from the currently cleared polymers. Consequently, there will be no change in the consumption of energy and resources in either the production of the polymer or fabrication of food-contact articles.

As discussed above, food-contact articles prepared from the subject PET copolyesters are expected to be recycled along with conventional PET containers. Because the polymers will differ from regulated PET polyesters only in that they may contain somewhat higher levels of DEG and IP units, the presence of the copolyesters in post-consumer PET recycle streams will have no adverse impact on the recycling of these materials. This being the case, the containers are expected to bear the PET resin identification code to facilitate post-consumer collection, as do PET containers currently produced. PET copolyester containers will be included in the same post-consumer stream as other ethylene terephthalate-based bottles and will be processed and sent into appropriate recycle markets with the related polymers. Thus, the use of PET copolyesters will not adversely affect existing collection programs from recycled PET since the notified resins will be indistinguishable from the currently recycled PET resins.

The inclusion of increased levels of DEG and IP units in PET is not expected to adversely affect recycling. To confirm this expectation, a study was conducted by Wellman, Inc. to establish the impact on PET recycling of high-comonomer resin. Because the PET copolyesters will not contain any components not present in the current recycle stream, there is nothing inherent in the polymers that would render them "non-recyclable" using current post-consumer PET processing techniques. Therefore, the only concern presented by the inclusion of high-comonomer PET in the general recycle stream would be the possibility that there will be increased variability in the composition of post-consumer PET that might affect the properties and use of resins containing significant amounts of the "new PET copolyesters." For this reason, a test was designed to determine the effect on recycling of a sudden change in composition of post-consumer PET recycle resulting from the presence of a concentrated amount of PET copolyester articles.

As the world's largest recycler of PET, Wellman, Inc. has a great deal of experience with the effects that changes in PET composition may have on the properties of processed recycle. Post-consumer PET bottles typically are used to produce polyester fiber, strapping, sheet, and, to some extent, food containers. The largest market for recycled PET is fiber used to produce fiberfill, carpet, and, recently, textile products such as "polar fleece." A number of properties are important to the acceptability of these recycled materials, including physical properties such as modulus and elongation, dye uptake and consistency, and processing characteristics specific to the end-use application. Wellman's experience with recycled PET indicates that the uptake of dyes by PET fiber is relatively sensitive to the polymer composition, so that the dying consistency is affected by smaller changes in composition than are needed to affect other critical properties. That is, variations in fiber dye depth becomes a marketing liability long before the recycled resin will fail to meet physical property specifications. For example, inconsistency of dye uptake, will easily result in unacceptable variations in the color of products such as carpet fiber and textiles.

On this basis, Wellman concluded that examining the impact on fiber dye uptake of changes in the composition of the PET recycle stream would be the most sensitive and effective means of evaluating the impact of such changes on the utility of post-consumer PET. This being the case, the testing conducted by Wellman on PET copolyesters involved measuring the dye uptake of PET recycle processed by the company's usual techniques to produce fiber. The testing was conducted by adding high-comonomer PET copolyester resin to standard PET recycle at levels up to 10% by weight. This maximum additional level is ten times the expected concentration of high-comonomer PET copolyesters in the recycle stream based on the Notifiers' market projections which indicate that no more than 1% of the PET market will consist of such material. Thus, the testing was conservatively designed to ensure that periodic "spikes" in the level of modifying monomers in post-consumer PET will not lead to rejection of the processed product.

Moreover, the two high-comonomer PET copolyester samples used in the study represent an exaggeration of the maximum level of DEG and IP units that will be present in the commercial polymers. Specifically, while the maximum total level of modifying monomers anticipated by the Notifiers in commercial practice is 8% (see Item 6 above), the test samples contained a total of over 11 mole-% of DEG and IP. The samples were prepared to separately represent maximum expected DEG and IP levels, and were blended individually with typical PET recycle at levels up to 10% and used combination at a total level up to 10%.

As shown in the report of this testing set forth in Appendix IX, there was no statistically significant difference in the dye uptake by carpet and textile fiber produced from the PET recyle alone and any of the blends containing added PET copolyesters. All samples were found to have dye depth within the normal commercial limits of variability. Wellman concluded that inclusion of polyester compositions in the range covered by this Notification in the PET recycle stream will not cause a significant shift in fiber dye properties.

For the foregoing reasons, the Notifiers respectfully submit that the proposed use of PET copolyesters containing a total of up to 10 mole-% of DEG and IP units will have no significant adverse impact on current or future recycling programs for post-consumer PET.

10. Mitigation Measures

No adverse environmental effects are anticipated if this notification is approved. Therefore, no mitigation measures are required.

11. Alternatives to Proposed Action

Since no potential adverse environmental effects are expected to occur, no alternative actions are necessary.

12. List of Preparers

The environmental assessment submitted for this notification was prepared for the Coalition on PET Safety by Dr. C. Steven Nichols, Wellman, Inc., and by Holly H. Foley, Keller and Heckman, 1001 G Street, N.W., Suite 500 West, Washington, D.C. 20001. Wellman is the largest recycler of PET in the world, with recycling facilities in the United States and Europe, and is thus an authority on the factors relevant to establishing the compatibility of modified ethylene terephthalate polymers with conventional PET recycling. Ms. Foley has approximately 15 years experience in preparing food additive petitions including environmental assessments.

The report of the recycling study on PET copolyesters, set forth in Appendix IX, was conducted by Dr. C. Steven Nichols, Wellman, Inc.

13. Certification

The undersigned official certifies that the information presented here is true, accurate and complete to the best of his knowledge.

Date: July 24, 2000

John B. Dubeck

Counsel for the Coalition on PET Safety