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### **UPM IS GREEN**

Following are comments briefly describing the Unique corporate position relative to environmental issues involving cutback asphalt. Both water and air concerns are addressed. The Unique product of primary interest is UPM<sup>®</sup> Permanent Pavement Repair Material.

Volatile Organic Carbon (VOC): Throughout the US many states are reviewing and updating their State Implementation Programs (SIPs) relative to emissions. Several are inquiring as to the contribution of emissions due to the use of cutback asphalt.

**The Unique position is “UPM does not contribute to VOC”. Measured values from three independent contract labs (California, Illinois and Florida) as well as the Unique lab (Ohio) verify a zero percent VOC at 500°F following the ASTM D-402 procedure used by most states.**

Unique is actively marketing in all fifty states and working with selected states reviewing cutback asphalt issues. Select vendors marketing competitive cutback products are mis-leading customers with claims that UPM does not meet state regulations, but their “like UPM” product meets the regulation and provides equivalent performance. We have received comments from customers and regulators in several states. These claims cannot be substantiated and are causing confusion.

Some claims use misleading terms like proprietary softening agents, stabilizing agents, high boiling point solvents or blends of non-crude oil based solvents. It is suspected that at least one supplier is using high concentrations of recycled asphalt (RAP) and simply adding a solvent to soften or modify the asphalt on the aggregate. This

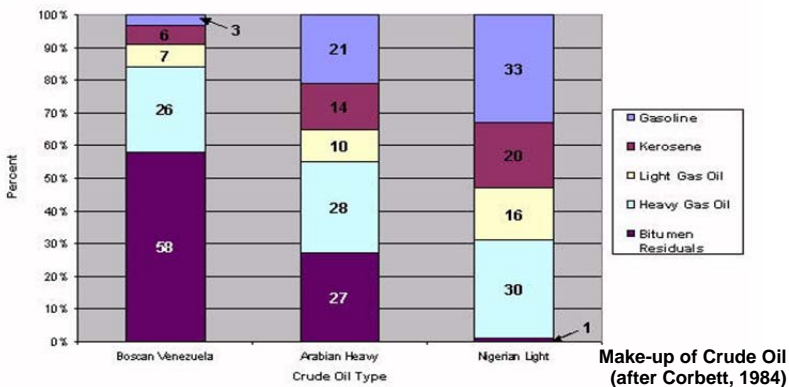
approach skirts the cutback definition; in that the solvent is not added to the asphalt concrete (AC) making a cutback, but added to the AC on the RAP after it is cured.

The intent of the regulation is to limit VOC, not employ techniques to defraud the law. Using this approach with low boiling point solvent has the potential to increase VOC beyond state regulations, however, for now the approach is not being challenged.

For the sake of simplicity and cost, most vendors claim one grade meets all seasonal conditions from 100°F plus in Arizona to less than zero in Alaska. These claims are considered by Unique as misleading or false. **Very few marketers focus on performance, the primary reason customers buy premium cold mix.**

Historically, cutback asphalt is simply a combination of AC and a solvent. The solvent is used to reduce asphalt viscosity to improve workability at ambient temperatures. The cutback used to make the cold mix requires viscosity modification to the AC providing workability; this is also required for emulsion based cold mix. If AC viscosity is not modified, the cold mix will be classified as hot mix and will not be workable at ambient temperature.

Crude source and refining techniques determine distillation characteristics of both AC and solvent. The chart shows that using percent distilled, kerosene and bitumen could be the same. This is not a correct interpretation, but is used by some to confuse. Using this interpretation, one might claim their material is not a cutback as no additional solvent is added to modify viscosity. This is totally misleading.



*For those needing a refresher course in chemistry an organic solvent is any solvent containing carbon.*

UPM has been certified for use in California and is promoted among users as the “Super Cold Mix” because of superior performance. Unique will continue to work with state regulators and our customers who support UPM as the “Best-in-Class” premium cold mix.

In addition, modern refining techniques are converting more of the bitumen residuals into higher-value components; changing the AC uses in road construction. As more severe refining is utilized, selected cuts from the distillation process must be added back to the AC to meet industry specifications for viscosity and hardness.

Most cutback regulations are specific to the cutback used to make cold mix, not the final product, cold mix. California is offered as an example.

**California South Coast Air Quality Management District states in rule 1108 Cutback Asphalt is defined as:**

**“Cutback asphalt is a liquid petroleum product produced by fluxing an asphaltic base with a suitable distillate and is classed as medium or slow curing grade, as defined in Section 93 of the January 1981, State of California Department of Transportation Standard Specification.”**

**The requirements of the rule are: “A person shall not sell or offer for sale or use in the District, or use any cutback containing more than 0.5 percent by volume organic compound which evaporates at 260°C (500°F) or lower as determined by ASTM Method D402 (AASHTO T78) or other test method approved by the Executive Officer.”**

**Hazardous waste relative to water pollution is also an issue for selected states.**

Unique sponsored standard industry testing demonstrating UPM is not toxic to aquatic life. Following are excerpts from the study:

The California Department of Health Services (DOHS) has adopted regulations (R-45-78) which define criteria for the identification of hazardous wastes. These criteria are codified in Chapter 30 of Title 22 of the California Code of Regulations.

Toxicity to aquatic life, specifically fish, is one of the criteria used to gauge the hazardous potential of a waste (Section 66696). The bioassay criteria used to specify a toxic waste or material is listed in section 66696 of the Hazardous Waste Criteria Regulations (HWC). This 96-hour LC50 value serves as the numerical indicator of the toxicity of a waste to aquatic life.

The basic bioassay protocols to be followed in determining the LC50 value are those cited in the 17th, or most recent, edition of Standard Methods for the Examination of Water and Wastewater, Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms (Third Edition) by the U.S. Environmental Protection Agency, Standard Practice for Conducting Acute Toxicity Tests with

Fishes. Macroinvertebrates and Amphibians (ASTM E 729-80), Guidelines for Performing Static Acute Toxicity Fish Bioassays in Municipal and Industrial Wastewaters by the California Department of Fish and Game and methods approved by the California Department of Health Services (DHS) with advice from the Department of Fish and Game (DFG).

Bioassays designed to assess waste toxicity under the Hazardous Waste Criteria Regulations should preferably be conducted with fathead minnows, *Pimephales Romelas*. Alternate species are the golden shiner, *Notemigonus Chrysoleucas*, and the rainbow trout, *Salmo Gairdneri*.

Testing sponsored by Unique using fathead minnows demonstrates that UPM is not hazardous to aquatic life. The results for UPM are equal to results for the control group confirming that UPM is non-hazardous.

Unique has been working with state regulators and customers since 1959 on cold mix projects; providing the information necessary for development of performance targets and environmental regulations.

**We lead because we do the hard and expensive work necessary to be the leader.**

Many customers are inquiring about green products. Please be aware the marketing of green or environmentally-friendly products is rampant throughout the industry. Green claims can be based on just about anything: use of recycled asphalt products (RAP), recycled asphalt shingles (RAS) and/or non-crude oil based viscosity modifiers.

**What is green and what does it mean relative to product performance and environmental impact?**

Life-cycle performance is a major component for an environmentally-friendly product, and is

best measured by cold mix survivability or the length of time the product performs. Performance life determines the frequency of re-repairs; which has a direct impact on total cost. In addition, the amount of material raveling out and filling storm drains is inversely proportional to survivability and must be included in calculating total environmental impact and cost.

For those interested in pursuing "green" products, remember UPM is already green! Increasing your cost and possibly reducing performance for a perceived greener product may be of limited value.

**First and foremost, UPM is designed to perform. We control raw materials, the manufacturing process and verify product quality. As a result we warranty UPM to outlast the surrounding road material. Our "Once and Done" philosophy is not the result of wishful thinking.**

**Relative to environmental impact, UPM is 100% recyclable. Following the standard industry protocol, Unique has demonstrated that UPM does not contribute to VOC or environmental damage to aquatic life.**

Questions related to the environmental friendliness of UPM or to discuss "Green" product ideas contact Unique.

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