AIR POLLUTION CONTROL FOR ASPHALT PAVEMENT RECYCLING

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For the past eight years I have worked in air pollution control with the goal of improving our environment, so the potential ecological benefits from recycling asphalt pavements greatly appeals to me. When I weigh the savings to be realized in raw materials and in transportation costs, and the elimination of the problem of disposing of old pavement, I can't help but be enthusiastic about the recycling concept.

Because of the ecological benefits, I was tempted to agree when some contractors and highway department personnel suggested that these benefits be allowed to offset the potential increase in air pollution from the recycling process. The legal structure involved, however, does not provide for consideration of offsets of this type. Federal regulations and most, if not all, state and local regulations require literal compliance with the standards they establish. Any departure from the standards involves a clearly defined legal process, which would require extensive hearings with a limited probability of the proposed changes being accepted. It appears that the only practical approach is the development and improvement of the recycling process until it is consistently capable of meeting established air pollution control codes.

Throughout this seminar you have been hearing of the progress made toward perfecting the recycling process. Most major manufacturers of asphalt concrete plants have been experimenting with redesigns and modifications with considerable success in obtaining quality asphalt pavement using recycled materials. In studying these redesigns from the air pollution control standpoint, I am encouraged to find that the process changes also lend themselves to controlling the excessive emissions noted when recycling was first attempted. To be specific, methods are being used to isolate the flame and radiation zone from the recycled materials, which in turn allows early injection of the asphalt. These methods not only promote proper coating of the mix but also alleviate the emissions caused by burned asphalt and absorb the fines that would otherwise be emitted to the atmosphere. It appears that the better the separation of the flame and radiation zone from the recycled materials and the earlier the injection of the new asphalt coating material, the better the quality of the recycled product and the lesser the generation of contaminant emissions.

It is probably fair to assume that all drum mix plants have been manufactured since June 11, 1973, which makes them subject to the Federal New Source Performance Standards (NSPS). It also is probable that most, if not all, state air pollution control agencies accept the NSPS as being best available control technology (BACT) when evaluating permit applications for asphalt concrete plants. Therefore, we should be able to base our air pollution control consideraton primarily on compliance with the NSPS.

To summarize, the NSPS for asphalt concrete plants establishes two basic limitations. First, gaseous emissions from the facility shall not contain particulate matter in excess of 0.04 grains per dry standard cubic foot and, seocnd, emissions shall ot exhibit 20% opacity or greater.

To date some plants have been successful in meeting the NSPS limitations, but usually at the expense of considerably reduced production rates. Even than, it appears that consistent compliance with the NSPS is questionable, although I know of firms that are running their plants at or near normal capacity with relatively consistent compliance with air pollution control standards. It is interesting to note that the firms I have in mind do not necessarily use the same approach for meeting NSPS. Although one firm made several equipment changes simultaneously which could have affected emissions, it attributes it success to reworking of the venturi. The firm installed a guage to measure air flow and now is able to accurately adjust the variable throat venturi for various moisture conditions.

Another firm attributes its success to a process change although the change was not made entirely for air pollution control purposes. One of the motives was to increase the temperature of the mix to 260^{o}-270^{o}F so that it wouldn't clog the hot elevator. To do so, they lowered the slope of the drum and increased production to the maximum.

They found the procedure intensified the veil, which alleviated the blue smoke that had been their major air pollution control problem.

Until consistent compliance is achieved, air pollution control agencies probably will be reluctant to grant permits for other than experimental recycling projects. I am certain that the problems being experienced can be overcome and that the NSPS can be achieved, but I hesitate to predict whether it will be by process modification or by the addition of air pollution control equipment. As an engineer, I hope that the problem is solved at the source by a process change.

In the past, in issuing permits for asphalt concrete plants, we mainly have concerned ourselves with control of particulate emissions. With the increased use of fuel oil in lieu of the once plentiful natural gas, sulfur dioxide emissions are becoming a matter of concern.

We now face the problem of determining best available control technology (BACT) for controlling sulfur dioxide emissions from hot mix plants. In Texas, our approach has been based on the precedent we established by determining that the application of BACT for boilers does not require the installation of abatement devices if the sulfur content of the fuel oil to be fired does not exceed 0.7% by weight. In the interest of consistency, therefore, we consider BACT applied to the asphalt concrete plant if the controlled emissions of sulfur dioxide do not exceed a rate equivalent to the uncontrolled emissions that would result from using fuel oil containing not over 0.7% sulfur.

Although the percentages will vary with the aggregate being used, in Texas we estimate that approximately 50% of the sulfur dioxide emissions will be absorbed by the aggregate mix and/or the scrubbing device or baghouse cake. Ordinarily, therefore, we will consider BACT applied if the sulfur content of the fuel oil does not exceed 1.5% by weight.

It is possible that recycling may present an additional sulfur dioxide problem if the flame or radiaton zone comes in contact with the recycled aggregate. Also, the question concerning SO_2 absorption by the recycled pavement probably will require study. Reevaluation of existing policies may be needed as the recycling plants still will be required to meet the same SO_2 limitations required of plants using virgin aggregate.

To summarize, operators of asphalt concrete plants can expect to be required to meet established air pollution control codes when processing recycled materials. The technology to meet these codes is available but needs to be perfected. Until then, pollution control agencies probably will be reluctant to issue permits for other than experimental recycling projects.