EXHIBIT I

1-Hour NO_2 NAAQS Analysis

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois 62794-9276 • (217) 782-2829
James R. Thompson Center, 100 West Randolph, Suite 11-300, Chicago, IL 60601 • (312) 814-6026

PAT QUINN, GOVERNOR DOUGLAS P. SCOTT, DIRECTOR

Chris Romaine

MEMORANDUM

Date: April 8, 2010

To: Minesh Patel, Permit Section

From: Matthew Harrell, Air Quality Planning Section Mwtt

Subject: Vulcan-Manteno PSD Updates (091806AAB - Construction Permit 96020014)

Background

The purpose of this memorandum is to address a couple of issues raised by the Permit Section related to the Vulcan-Manteno project and final issuance of its current construction permit. The first issue involves updating Vulcan's Full Impact Analysis results for 24-hour PM_{10}. The second issue is the preparation of a conservative estimate of 1-hour NO_2 impacts from the lime kiln in anticipation of USEPA's new 1-hour NO_2 standard.

Updated 24-hour PM_{10} Full Impact Analysis Results

Vulcan's 2006 Full Impact Analysis results for 24-hour PM_{10} were reevaluated after the background count for the Midlothian monitor was updated from 2004-2006 to 2007-2009. Between 2006 and 2009 the background count for this monitor increased from 52 ug/m3 to 54 ug/m3. This change pushed Vulcan's Full Impact Analysis results slightly over the standard of 150 ug/m3.

The highest 6th high receptor from the 2006 modeling was examined further and it was determined that its concentration of 96.81 ug/m3 was primarily related to three background sources at North Central Materials (091806AAJ) located northwest of the Vulcan lime kiln. Vulcan's highest significant impact at this receptor was 1.31 ug/m3, which is well below the significant impact level of 5 ug/m3. Closer inspection of the three sources at the North Central Materials facility showed that the emission rate for the Screening process was based on Total Suspended Particles (TSP), not PM_{10}. As a result, emissions from this background facility were grossly overestimated.

The Inventory and Data Support Unit examined the data for North Central Materials and provided corrected PM_{10} emissions for all three background sources: P135, P136, and

P137. Emissions for P135 decreased from 3.788 to 3.34 lbs/hour. Emissions for P136 decreased from 11.41 to 3.83 lbs/hour, while emissions for P137 increased from 1.24 to 1.82 lbs/hour. The 2006 24-hour PM_{10} Full Impact Analysis model was re-run using these updated emission values and the concentration at the critical receptor dropped to 56.81 ug/m3. The highest 6th high concentration is now 89.02 ug/m3. When this value is added to the 2007-2009 background count of 54 ug/m3, the resulting model design concentration is 143.02 ug/m3, which is below the 24-hour PM_{10} standard of 150 ug/m3.

Estimated Maximum 1-hour NO_2 Impact from the Lime Kiln

USEPA will soon promulgate a new 1-hour standard for NO_2 of 100 parts per billion (ppb). The Permit Section requested that the Modeling Unit prepare an estimate of the lime kiln's potential 1-hour NO_2 impact based on currently available data. This was accomplished by using the 2009 1-hour CO significant impact results to create a scaling factor for NO_x. The lime kiln's annual NO_x emission rate of 243 lbs/hour is actually based on a peak short-term value. Thus, this emission rate can be scaled using the 1-hour CO significant impact data to produce a reasonable estimate of the peak short term NO_x impact from the lime kiln as shown below:

1-hour CO emission rate: 620 lbs/hour
1-hour CO maximum significant impact concentration: 328.3 ug/m3

Estimate of 1-hour NO_x maximum significant impact concentration:

620 lbs/hour CO / 328.3 ug/m3 CO = 243 lbs/hour NO_x / x ug/m3 NO_x,
or, x = 128.67 ug/m3 NO_x

1 ug/m3 of NO_x = 0.53 ppb; thus, 128.67 ug/m3 NO_x x 0.53 = 68.2 ppb NO_x

This estimate is doubly conservative. First, it assumes that all NO_x consists of NO_2 (it is usually assumed that only 75% of NO_x consists of NO_2). Second, compliance with the new standard is based on the average of the 8th highest (98th percentile) daily maximum values over three years, not a single highest 1st high hourly concentration value. Therefore, it is highly unlikely that operation of the lime kiln will cause a violation of the new 1-hour NO_2 standard.

cc: Chris Romaine, Permits
Jeff Sprague, AQP
Matt Will, AQP

File:zephyr:/home/matth/pc/docs/Vulcan-Manteno Memo April 2010.doc