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MEMORANDUM:

SUBJECT: Isoxaflutole Tile Drain Water Monitoring Study

TO: Daniel Kenny, PM Team Reviewer
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Summary: Aventis has submitted a site selection report and a draft protocol for two detailed tile drain studies to be conducted in the spring and summer of 2000. The report contains descriptions of nine sites in Indiana and Ohio. For the purposes of this study EFED believes sites 99IN18 and 99IN20 are the best sites. The draft proposed study protocol submitted with the site selection report is a bit weak in some details, and quality assurance needs more attention in particular.

Site Selection: The site selection report gives description of nine potential sites in Indiana and Ohio. The sites range from silt loam to silty clay in texture, tile line spacings of between 33 and 100 ft and organic matter less than 5%. Slopes on all sites are less than 2%. The sites are clustered in three regions, south central Ohio, northeastern Indiana and one site in southeastern Indiana

Only two of the sites sit on a single soil series and they are too close together and too similar to use both. These sites also have the closest tile line spacing of the group at 33 and 40 feet. The site labeled 99IN18 has the 33 ft spacing and also a slightly lower surface organic matter content and despite being the largest site submitted by Aventis is probably a good choice for one of the two final sites. The site 99IN19 is similar, and somewhat smaller, but also has slightly wider spacing of tile lines and somewhat higher organic matter. Site 99IN19 would probably have been the best choice for the second study location except for its proximity and similarity to site 99IN18.

Six of the seven remaining sites are in Ross and Fayette counties in south central Ohio. The seventh is in Owen county, Indiana. The Indiana site (99IN20), which is the second choice for the tile drain study, offers the tightest tile spacing, the lowest organic matter and the shallowest water table of the group. It also has the most regular tile drain pattern of the remaining sites. The biggest problem with this site is that it sits on three soil series, but since all sites except for 99IN18 and 99IN19 sit on multiple soil series, there is no way around this problem. The site 99OH11 would also have been a good choice, but it has slightly wider tile line spacing and a more irregular tile pattern

Protocol: The draft protocol is not specific in many areas and details should be added. It calls for sampling four times daily for the first 100 days and daily after that period, with 18 additional samples taken when needed during high flow periods. It seems the 18 additional samples can be taken for each rainfall event generating sufficient drain flow, but this is not entirely clear in the current wording. It also does not list criteria for taking the additional samples and how taking hourly samples will start, except that it will be flow based. There is no mention of measuring and recording flow rates from the tile drains; this should be included.

The QA samples listed in the draft protocol, a single field spike taken before the start of the study, are insufficient. Field spikes should be taken in the field to accompany each shipment of samples and we recommend a second set of spikes be taken to accompany stored samples. This number of QA samples are necessary because the shipping conditions may be different for each shipment. We recommend at least three field spikes per day, or per shipment to the lab, and this applies to the soil samples as well as the water samples. The water and soil used for these spikes may be taken prior to application, as mentioned in the draft protocol, but should be kept frozen until use. Alternatively, for the water samples, a solution simulating the hardness of the water at the site may be used for the field spikes. We would also like to see a field blank using clean water passed through the sampling device.

The QA/QC portion of the analysis section could also use more specifics about how many QA analyses will be run and how they will be reported, but if the numbers of QA samples are sufficient then the draft protocol is adequate in this regard, perhaps taken at the end of the study.

The soil sampling regime should be extended a bit. The draft protocol doesn't seem to state when soil samples will be taken, so sampling times should be added. It would helpful if soil was used for confirmation of the application rate, either in addition to or in place of the filter paper. This could be done by placing a layer of soil in a petri dish which would be placed out in the field similarly to the filter paper. The confirmation samples should also be analyzed separately to give an idea of the spatial variability of the application rate. The draft protocol calls for compositing of soil samples. Separate analyses of soil samples is most preferable, but compositing samples taken above individual drain areas is probably acceptable. A few suction lysimeters would be helpful in following chemical movement, and samples from them may be able to replace soil samples later in the study. Including some suction lysimeters between and just below the level of the tile lines would also provide an estimate of the amount of chemicals leaching through to groundwater.

There is no mention of the frequency with which weather data will be collected. An hourly frequency is preferable, and any frequency should be stated in the protocol. The weather station should also record an estimate of potential evapotranspiration.

Conducting the study in a dry year will likely give no useful results in which case the study may need to be continued for another year. We recommend the use of some form of irrigation to ensure at least 120% of historical precipitation on the test site. Irrigation is mentioned in the protocol, but more specifics should be added.