UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I

DATE: May 18, 1992

SUBJ: Modeling Requirements for the Lewiston-Auburn, and the Knox and Lincoln Counties Moderate Ozone Nonattainment Areas in Maine

FROM: David B. Conroy, Acting Chief DBC
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TO: Joseph Tikvart, Chief
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The Clean Air Act (CAA) requires attainment demonstrations for all ozone nonattainment areas classified as moderate, serious, severe, or extreme. Urban Airshed Modeling (UAM) or some other form of photochemical grid modeling is required for all such areas, with the exception of intrastate moderate areas. Region I has been divided into three UAM domains.

Some portions of two moderate nonattainment areas in Maine (Lewiston-Auburn, and Knox and Lincoln counties) fall outside of the present UAM domains. (See attached map.) Since the CAA requires an attainment demonstration for these areas, these areas will require some sort of modeling, but will not necessarily require the use of the UAM. The remainder of this memorandum discusses issues related to these two nonattainment areas and seeks your concurrence on a procedure for resolving these issues.

The four counties of concern are all predominantly rural. The 1990 populations of the counties (from preliminary Bureau of Census data) are: Kennebec, 115,377; Androscoggin, 104,583; Knox, 35,940; Lincoln, 30,045. The only metropolitan statistical area (MSA) in any of these counties, the Lewiston-Auburn area, lies within the Eastern New England (ENE) UAM domain. In contrast, the 1990 population of the upwind classified nonattainment areas in Maine, Massachusetts, and Rhode Island in the ENE domain is approximately 7.4 million.

In addition, anthropogenic emissions from the four counties are small compared to upwind areas. According to 1987 emission inventories, the anthropogenic VOC and NOx emissions from the upwind classified nonattainment areas in Maine, Massachusetts, and Rhode Island in the ENE domain are approximately 1,570 and 1020 tons per day, respectively. In contrast, the anthropogenic VOC and NOx emissions from the Lewiston-Auburn area are approximately 70 and 28 tons per day, respectively, while the anthropogenic VOC and NOx emissions from Knox and Lincoln counties are approximately 18 and 7 tons per day, respectively.

Moreover, because these areas are classified as moderate, Maine is required to adopt Stage II vapor recovery, RACT for all VOC CTG sources, and RACT for all of major stationary sources of VOC (i.e., with potential to emit (PTE) greater than 50 tons per year) and NOx (i.e., with PTE greater than 100 TPY). Since Maine is part of the Ozone Transport Region, there are also requirements for enhanced I/M. Maine has recently received legislative authority to implement enhanced I/M in all four counties. The Maine DEP is also committed to the adoption of California tailpipe standards. In light of this, there are very few additional control strategies available to the state, especially for their rural counties.

Region I sees four possible options to provide the modeling necessary for an attainment demonstration in Maine:

(1) Expand the Eastern New England (ENE) domain to cover these areas. This is impractical since the ENE domain is already larger than the recommended size (it is the largest domain in the nation) and any further increase in size would cause serious delays, and result in reduced accuracy for the entire domain.

(2) Define a separate UAM domain for Maine. Such a requirement is not mandated in intrastate moderate nonattainment areas. This would be resource intensive and not feasible due to time constraints. In addition, Maine does not currently have the expertise or resources needed to undertake modeling for a separate domain, and those states with expertise (Massachusetts, New York, New Jersey, etc.) do not have the time to take the lead in a domain located entirely in Maine.

(3) Model the areas using the Empirical Kinetic Modeling Approach (EKMA). EKMA can be used for intrastate moderate areas. While less costly and resource intensive than UAM, it still would require Maine to write a protocol, select episodes, and run the model, all of which would involve significant resources. Moreover, EKMA is unlikely to provide any useful information for defining additional control strategies that the state is not required or committed to implementing anyway.

(4) Utilize existing urban scale modeling to satisfy the attainment demonstration requirements for these two areas. To fully examine this option, we must look at the two areas separately.

The Knox and Lincoln Counties area was classified as moderate based on the readings from a monitor at Isle au Haut, an island near the Maine coast. These counties are predominantly rural. They could qualify as a rural transport area under section 182(h) of the CAA. In this case, the area would be treated as a marginal nonattainment area, and no modeling would be required.

In the case of the Lewiston-Auburn area (defined as Androscoggin and Kennebec counties), approximately 70% of the geographical area of Androscoggin County and 30% of Kennebec County, including the entire Lewiston-Auburn MSA lie within the ENE domain. The monitor which was used to set the design value is located within the ENE domain. The Lewiston-Auburn area was originally classified as marginal, but Maine requested that Lewiston-Auburn be upgraded to ensure that a consistent level of control would be imposed throughout southern Maine. Most of the ozone and precursor species are advected in to the area from sources that lie within the ENE domain. We feel that the UAM modeling as currently planned will provide sufficient information to define a strategy which will result in attainment for the entire UAM domain including those areas in the Lewiston-Auburn area outside the domain.

Both Maine and Region I feel that additional modeling over and above that planned for the ENE Domain, as well as the associated ROM runs planned for the Northeast, will not provide any significant new information. Therefore, the exercise does not justify the resources necessary to perform it.

We suggest the following requirements be considered sufficient for an attainment demonstration for the State of Maine for these two areas:

(1) Require UAM modeling for that portion of Maine which is in the ENE UAM Domain.

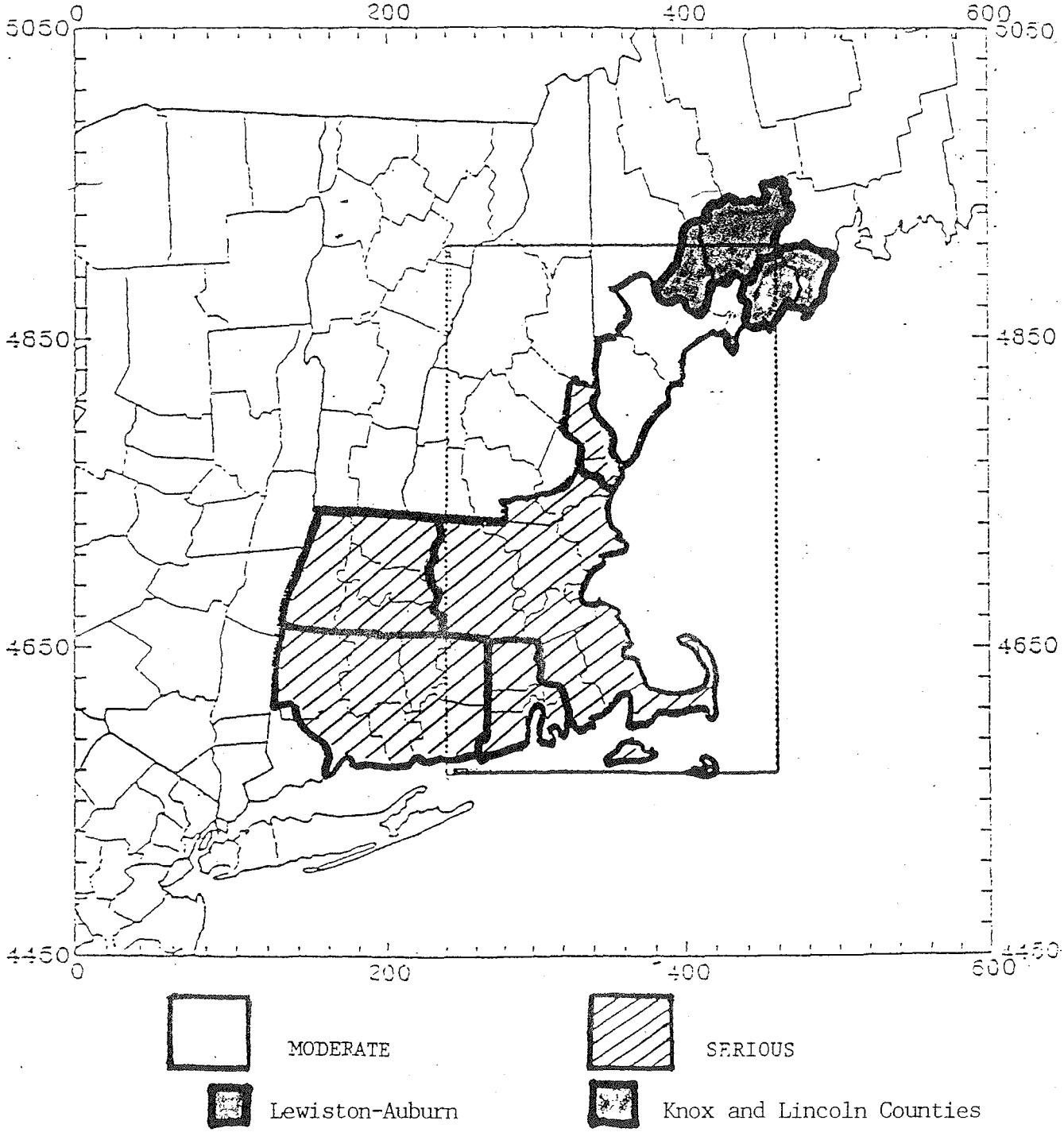
(2) Require that any control strategy necessary for Maine to demonstrate attainment within the ENE domain be required in those portions of Kennebec and Androscoggin Counties and Knox and Lincoln Counties which are outside of the ENE Domain.

(3) Waive the modeling requirement for those portions of Kennebec and Androscoggin Counties and Knox and Lincoln Counties outside the ENE Domain, if ROMNET II runs for the Clean Air Act base case in future years (for all of the episodes selected to be run for the ENE domain) show there are no exceedances in these areas.

We would appreciate your concurrence on our suggestions. Please respond so we can know with certainty whether Maine should prepare a modeling effort for these areas. If you have any questions, please contact Ian Cohen of my staff at 617-565-3229.

Attachment

cc: Brock Nicholson, AQMD
Rich Scheffe, TSD



SERIOUS AND MODERATE OZONE NON-ATTAINMENT IN NEW ENGLAND