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May 22, 1989

Mr. Russell Lee  
Technical Support Division MD-14  
United States Environmental Protection Agency  
Research Triangle Park, North Carolina 27711

Dear Mr. Lee:

On April 25 we discussed some problems with the Industrial Source Complex Short-Term (ISCST) model guidance. In determining the building that causes building wake effects, there are two definitions of "nearby."

One definition is the definition used in the good engineering practice (GEP) stack height guideline document<sup>1</sup> in which a stack must be within 5L of the building (where L is the lesser of the maximum projected width or height of the building). We can refer to this definition as the GEP definition of nearby. In this definition of nearby, a square with rounded corners is drawn around the building at a distance 5L from the sides and the corners of the building. This definition is used to determine which building dimensions should be entered on the source card line for each source.

The second definition comes from the direction specific downwash algorithm as described in the ISCST User's Guide<sup>2</sup> as revised in June of 1988. The stack is considered "nearby" for a direction if the stack is within 5L in the downwind direction, 2L in the upwind direction and .5L in the crosswind directions. The direction specific definition of nearby describes a rectangle. This definition is used to determine which building dimensions should be entered for each direction on the 6 lines following the source card line when the regulatory default option is chosen.

The problem arises when a comparison is made between the two definitions. A stack may be within the direction specific definition of nearby, but not within the GEP definition of nearby. This is illustrated in the enclosed figure. The discrepancy in the definitions can lead to the dominant building in a given direction having a greater GEP than the building used on the source card line.

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<sup>1</sup>U.S. Environmental Protection Agency (EPA), Office of Air Quality Planning and Standards. *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations (Revised))*. Research Triangle Park, North Carolina. EPA-450/4-80-023R. June, 1985.

<sup>2</sup>U.S. EPA, Office of Air Quality Planning and Standards. *Industrial Source Complex (ISC) Dispersion Model User's Guide--Second Edition (Revised)*. Research Triangle Park, North Carolina. December, 1987.

Although the discrepancy between the two definitions may seem trivial, I encountered this problem at the first facility I analyzed.

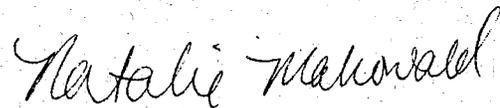
A solution to this problem is to allow a stack to be within the direction specific definition of nearby only if it is also within the GEP definition of nearby.

Because this problem is not unique to any Region, it is preferable that the decision regarding the resolution of this issue come from the EPA in Research Triangle Park.

If you have any questions or comments, please contact me.

Sincerely,

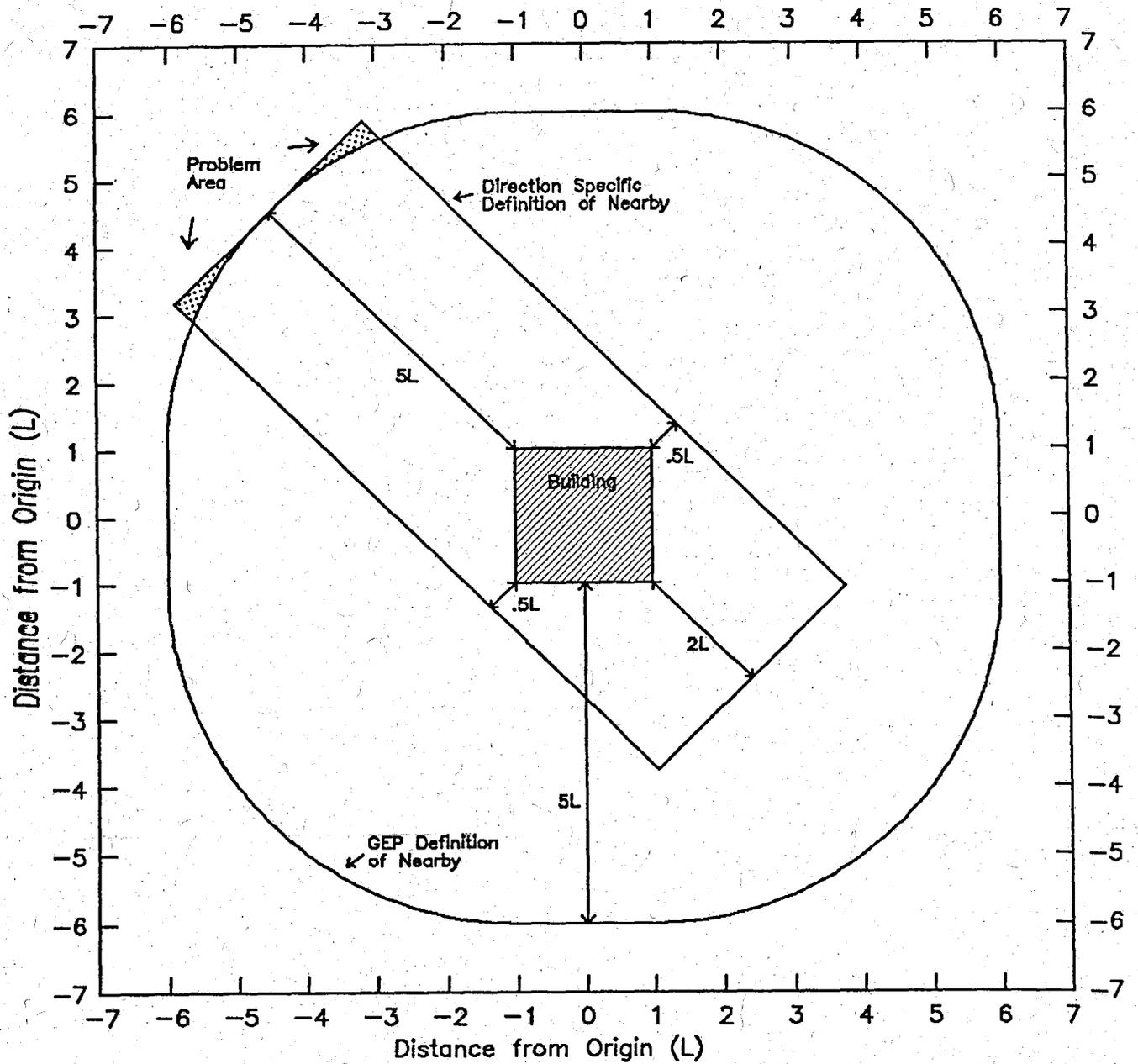
TRINITY CONSULTANTS, INC.

A handwritten signature in cursive script that reads "Natalie Mahowald".

Natalie Mahowald

cc: Mr. Jerry Mersh

## Definition of Nearby



Generally,  $L$  is the lesser of building width and height. In this case,  $L$  is the height. Each side of the building equals  $2L$ .