

**REPORT OF THE  
VIRGINIA DEPARTMENT OF  
WASTE MANAGEMENT ON THE**

**Safety of Vehicular  
Crossings on the Norfolk  
Southern Railway Under  
Study for Relocation  
in the Cities of  
Portsmouth, Chesapeake  
and Suffolk**

**TO THE GOVERNOR AND  
THE GENERAL ASSEMBLY OF VIRGINIA**



**HOUSE DOCUMENT NO. 41**

**COMMONWEALTH OF VIRGINIA  
RICHMOND  
1990**

# GENERAL ASSEMBLY OF VIRGINIA – 1989 SESSION

## HOUSE JOINT RESOLUTION NO. 422

*Requesting the Department of Waste Management to continue the study of relocation of the Norfolk Southern Railroad into Interstate Route 664 and the Western Freeway.*

Agreed to by the House of Delegates, February 2, 1989

Agreed to by the Senate, February 23, 1989

WHEREAS, the 1988 Session of the General Assembly directed the Virginia Department of Transportation to study the relocation of the Norfolk Southern Railway located in the Churchland area of the City of Portsmouth into Interstate Route 664 and the Western Freeway; and

WHEREAS, certain issues pertaining to the safety of existing vehicular crossings on such railroad were submitted to the Department of Emergency Services and the Virginia Department of Transportation in connection with said study; and

WHEREAS, the issues pertaining to the safety of vehicular crossings on such railroad were not fully addressed in the report of the study; and

WHEREAS, the Virginia Department of Transportation has agreed to cooperate with and assist the federal government in locating federal funding for such relocation; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That the Department of Waste Management, in cooperation with the Virginia Department of Transportation and the Department of Emergency Services, is hereby requested to continue this study pertaining to the relocation of the Norfolk Southern Railroad into Interstate Route 664 and the Western Freeway and to address the issues of the safety of existing vehicular crossings on such railroad which were not fully included in the report of the study. The Department shall complete its work in time to submit its findings and recommendations to the Governor and the 1990 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for processing legislative documents.

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## I. INTRODUCTION

The General Assembly asked the Department of Waste Management to study the relocation of the Norfolk Southern Railway from the Churchland area of the City of Portsmouth to I-664 and the Western Freeway. Specifically, the General Assembly requested that the study of the safety of vehicular crossings be continued. Issues related to the relocation of the railway have been studied previously by the Department of Emergency Services, see House Document No. 35 (1989), and the Department of Transportation, see House Bill No. 1050 (1988).

The Department of Waste Management has regulatory programs governing the following: solid waste management, hazardous waste management, hazardous materials transportation, and infectious waste management. In addition, the Department participates in the federal program to clean up abandoned waste sites--"Superfund"--and administers a similar state program to remediate sites that do not qualify for treatment under the federal program. The Department also has programs to encourage waste reduction and recycling, and to prevent littering.

Finally, the Department, through the Virginia Emergency Response Council (VERC), administers the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), also known as Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA Title III). The VERC is comprised of the heads or designees of the heads of the following state agencies: Department of Waste Management (chair), Department of Emergency Services, Department of Fire Programs, Department of Air Pollution Control, Department of Labor and Industry, Department of Health, Department of State Police, and the State Water Control Board. Staff support is provided by the Department of Waste Management.

SARA Title III requires industries that use or produce certain chemicals to report that use or production to the VERC, to the local emergency planning committee, and to the local fire department. SARA Title III also requires local emergency planning committees to develop local emergency response plans which must then be reviewed by the VERC.

## II. DESCRIPTION OF ANALYSIS

To evaluate the impact on the location of the railway on programs implemented by the Department, an analysis was performed on each program administered by the Department, a review of the regulated community was conducted, and conclusions drawn about whether the railway's location has any impact.

Because the probabilities of accidents were discussed in the Department of Emergency Services report, this analysis focused on the probable outcome of an accident, assuming that one occurs.

Sources relied upon were state documents, local industries, and state and local officials.

The issue of accidents associated with shipments of chemicals by rail is the question most closely related to functions of the Department of Waste Management. Therefore, this study focused on the effect of a rail accident by a train carrying chemicals. This required an analysis of the local emergency response plan submitted by the City of Portsmouth and reviewed by the VERC. Issues related to the Department's Regulations Governing the Transportation of Hazardous Materials, enforced by the Department of State Police, are also addressed in this analysis.

Other Department programs are not affected by the railroad location issue and only minimal attention was given to those activities.

### III. HAZARDOUS MATERIALS INCIDENT ANALYSIS

#### A. SARA TITLE III

The City of Portsmouth has submitted a hazardous materials emergency response plan to the Virginia Emergency Response Council (VERC) that meets the requirements set forth in Section 303 of SARA Title III.<sup>1</sup> (See, Exhibit III. A.1.) The plan identifies eight

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<sup>1</sup>The comprehensive emergency response plan for hazardous chemical emergencies within each emergency planning district must include the following elements:

- Identification of facilities subject to the emergency planning requirements of SARA Title III;
- Identification of routes used for the transportation of extremely hazardous substances;
- Identification of risk-related facilities (i.e., natural gas facilities, hospitals);
- Emergency response procedures, on-site and off-site;
- Designation of a community emergency coordinator and facility emergency response coordinators to implement the plan;
- Emergency notification procedures;
- Methods for determining the occurrence of a release and the probable affected area and population;
- Description of community and industry emergency equipment and

(8) facilities within Portsmouth that either produce, use or store extremely hazardous substances (EHSs) in excess of specific threshold planning quantities (i.e., minimum levels) established by the U. S. Environmental Protection Agency. Such facilities are required by Section 302 of SARA Title III to notify the VERC and the local emergency planning committee (LEPC) of the existence of such substances. Only one (1) facility, Hoechst Celanese, is using the Norfolk Southern Railway to ship EHSs to or from the facility.

## 1. HAZARDS ANALYSIS

Emergency planners and responders need to obtain as complete a picture as possible of the specific EHSs handled over a recent 6-12 month period, the types and capacities of their containers, the general frequency of individual shipments, and the frequency of trains which haul the EHSs. SARA Title III requires the LEPC in each emergency planning district to conduct site-specific hazards analyses for airborne releases of EHSs. A hazards analysis is a necessary step in comprehensive emergency planning for a community. There are three components of a hazards analysis--hazard identification, vulnerability analysis and risk analysis. The hazards analysis serves as the basis for the development or revision of the emergency response plan. It can also assist in identifying what additional response capabilities are needed. A succinct explanation of the hazards analysis process is contained in Table III. A.1.

The hazards analysis process described here will be limited to an analysis of those EHSs shipped by rail to or from the Hoechst Celanese facility in Portsmouth. Seven EHSs were shipped via the Norfolk Southern Railway to or from the Hoechst Celanese facility during 1988 and during the first quarter of 1989. The seven EHSs are contained in Table III. A.2. The frequency of such shipments and the quantities of the EHS in each shipment vary with customer demand for the various products.

It is important to note that in March 1989, Hoechst Celanese decided to discontinue the use of sulfur dioxide at its Portsmouth facility. See, Exhibit III. A.2. That decision eliminated the

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facilities, and the identity of persons responsible for them;

- Evacuation plans;
- Description and schedules of training programs on chemical emergency response for local emergency response and medical personnel; and
- Methods and schedules for exercising the emergency response plan.

risk of a serious accidental release of that EHS from a rail car travelling over the Norfolk Southern Railway. Moreover, Hoechst Celanese expects significant reductions in rail traffic to and from its Portsmouth facility by January 1990.

The second part of the hazards analysis is the vulnerability analysis. A vulnerable zone is an estimated geographical area that may be subject to concentrations of an airborne EHS at levels that could cause irreversible acute health effects or death to human populations within the area following an accidental release. Vulnerable zones are based on estimates of the quantity of an EHS released to air, the rate of release to air, airborne dispersion, and the airborne concentration that could cause irreversible health effects or death. Release and dispersion methodologies are not precise and provide only estimates of the actual distances and areas that may be affected by an accidental release.

The size of an estimated vulnerable zone depends upon the distance the airborne chemical travels before it disperses and is diluted in the air to a concentration below a "level of concern" for acute health effects or death. At the time of an accidental release, only some portion of the estimated vulnerable zone will actually be involved. The specific area covered by the plume (i.e., the cloud formation of an airborne chemical that results from a release) will be determined principally by wind direction and the degree of dispersion of the plume. The area through which the plume moves is generally referred to as a plume "footprint." Several exhibits are attached which show the plume footprint for the release of two of the six EHSs at issue. It is important to note that the actual concentration of an airborne chemical tends to decrease as it moves further downwind from the release site because of continual mixing and dilution (dispersion) of the chemical with air. The plume movement is also affected by the speed of the wind.

Although a footprint represents the area enveloped by a plume, it is not possible to predict with any degree of accuracy the wind direction and wind speed. Moreover, both wind direction and speed may change during the course of the release. Therefore, the direction and shape which the plume may take at the time of an accidental release remains uncertain.

## 2. VULNERABILITY ANALYSIS

The following plume dispersion maps were produced using the Emergency Information System\Chemical Version's (EIS\C) air release modeling capabilities. The EIS\C program is adapted from the National Oceanic and Atmospheric Administration's air model, known as ALOHA, an acronym for Areal Locations of Hazardous Atmospheres. The plume dispersion model assumes that the spill occurs at ground level and calculates the concentration on the ground. The model's

visual output is a diagram that shows the top view of the plume, or the plume's "footprint." In the following exhibits, the release was assumed to be a continuous release, with the entire amount of chemical being released within ten minutes.

As shown in the "Plume Information" screens accompanying each of the plume dispersion maps, the ALOHA model requires several types of information. These include humidity, temperature, relative pressure, atmospheric stability, surface roughness, time of day, atmospheric stability height, cloud cover, and wind speed and direction. In addition, the rate of the release as well as latitudinal and longitudinal information must be supplied. In an effort to maintain consistency with the Department of Emergency Services' study, the following assumptions were made: (1) atmospheric stability of "D", representing moderate windspeed and less stable atmospheric conditions; (2) "urban" surface roughness; and, (3) windspeed of 11.9 miles per hour.

In addition, based on the previous study, winds were determined to be from the north, northeast, and east 37 percent of the time and from the south, southwest, and west 45 percent of the time; as noted below, both of these conditions were modeled. Time of day was assumed to be 4:00 p.m. Cloud cover and atmospheric stability (height) were assumed to be 20 percent and 1001 feet, respectively. After several runs of the model, it became obvious that the effect of temperature was negligible; therefore, all scenarios were assumed to have occurred on a day with 90°F and 90 percent humidity.

For purposes of analysis, the following four scenarios were developed for each of the two chemicals studied, ammonia and cyclohexylamine:

- A Railcar derailment occurs at the intersection of the proposed relocated railway and the cross-street. Winds are from the northeast (45°).
- B Railcar derailment occurs at the intersection of the existing railway and the cross-street. Winds are from the northeast (45°).
- C Railcar derailment occurs at the intersection of the proposed relocated railway and the cross-street. Winds are from the southwest (225°).
- D Railcar derailment occurs at the intersection of the existing railway and the cross-street. Winds are from the southwest (225°).

The scenarios are labelled accordingly. For instance, the model for a release of ammonia occurring at the intersection of the proposed relocated railway and Cedar Lane with winds from the

northeast is called "Exhibit A - 1: Plume Dispersion Model for Cedar Lane - Ammonia (Relocated Railway/Northeast Winds)." The model for a release of ammonia at the existing intersection of Cedar Lane and the railway under the same wind conditions is called "Exhibit B - 1: Plume Dispersion Model for Cedar Lane - Ammonia (Existing Railway/Northeast Winds)."

The ALOHA model calculates plume dispersion based on levels of concentration of the chemical, which is measured in parts per million (ppm). For instance, the Threshold Limit Value-Time-Weighted-Average (TLV-TWA)<sup>2</sup> level for anhydrous ammonia is 25.00 ppm. The Immediately Dangerous to Life or Health (IDLH)<sup>3</sup> level is 500 ppm. Zones of 25.00, 250.00, and 500.00 ppm concentration were calculated and are denoted by different colors. For cyclohexylamine, the TLV-TWA is 10.00 ppm. Zones of 10.00 and 50.00 ppm concentration were calculated.

It is apparent from the plume dispersion models that virtually the same populations would be at risk should a hazardous materials incident occur either at the intersection of the proposed relocated railway and Cedar Lane or at the intersection of the existing railway and Cedar Lane. Likewise, virtually the same populations would be at risk should a hazardous materials incident occur either at the intersection of the proposed relocated railway and Lilac Drive or at the intersection of the existing railway and Lilac Drive.

### 3. OTHER EMERGENCY RESPONSE PLANNING CONSIDERATIONS

One additional factor that should be considered for emergency response planning purposes is how segments of the proposed rail system may be accessed or approached by emergency response personnel and vehicles. Planning for the relocation of the rail system should include multiple access points (i.e., gates) for the emergency responders along the railway. These access or right of way points will be critical given the type of the hazardous materials release.

Basically, there are two types of events that involve releases of hazardous materials from rail accidents. The most serious would

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<sup>2</sup>The time weighted average concentration limit for a normal eight hour workday and 40 hours per week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

<sup>3</sup>The maximum level to which a healthy male worker can be exposed for 30 minutes and escape without suffering irreversible health effects or loss of life.



be the accident that involves a collision or derailment since each typically involves a large spill or discharge. Derailments generally occur at switching stations or at grade changes. The second type of release may arise from fitting or seal leaks, relief valve leaks, and other releases involving improper tightening of closures or defective equipment. It has been estimated that these releases account for 70% of the roughly 1,000 releases each year.<sup>4</sup>

The proposed railroad siting in the median of the Western Freeway would involve the use of a rail switch along the railway. In addition, the location of three sharp curves within one and one half miles of each other on the proposed relocation route results in a pitch or grade change. Each of these factors increase the risk probability of a train derailment occurring along the proposed relocated railway.

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<sup>4</sup>Harvey, A.E., P.C. Conlon and T.S. Glickman. Statistical Trends in Railroad Hazardous Materials Transportation Safety - 1978 to 1986, Publication R-640, Association of American Railroads, Washington Systems Center, September 1987.

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COMMONWEALTH of VIRGINIA  
VIRGINIA EMERGENCY RESPONSE COUNCIL

February 27, 1989

Department of Air  
Pollution Control  
Department of  
Emergency Services  
Department of  
Fire Programs  
Department of  
Health  
Department of  
Labor and Industry  
Department of  
State Police  
Department of  
Waste Management  
State Water  
Control Board

Mr. Don Brown  
Portsmouth Emergency Services Department  
P.O. Box 820  
Portsmouth, Virginia 23705

Dear Mr. Brown:

I have reviewed the revisions submitted by the City of Portsmouth Local Emergency Planning Committee on its comprehensive emergency response plan and would like to compliment the Committee for its obvious effort. The revised plan meets the nine specific requirements set forth in Section 303 of SARA, as well as the requirement in subsection 303(e) for coordination of all plans between neighboring jurisdictions.

The Virginia Emergency Response Council encourages the Committee to continue its planning efforts, updating, refining, and testing the plan to insure that it fulfills its purpose. Future reviews will be based on the guidance contained in the National Response Team documents. Specifically, the next emergency response plan review will focus on the items which "should" be included in such a plan, as identified by NRT-1A (pages 6-30). If you have any questions, please contact me at (804) 225-2581.

Sincerely,

Sharon M. Kenneally  
Environmental Programs Analyst

SMK/jrt

TABLE III. A.1.

<b>HAZARDS ANALYSIS</b>		
<b>HAZARDS IDENTIFICATION</b>	<b>VULNERABILITY ANALYSIS</b>	<b>RISK ANALYSIS</b>
<b>Chemical Identity</b>	<b>Estimating Vulnerable Zone</b>	<b>Likelihood of a Release Occurring</b>
<b>Location</b>	<b>Human Population</b>	<b>Severity of the Consequences</b>
<b>Quantity</b>	<b>Critical Facilities</b>	
<b>Nature of the Hazard</b>	<b>Environment</b>	

TABLE III. A.2.

HOECHST CELANESE  
CHEMICALS SHIPPED  
VIA THE  
NORFOLK SOUTHERN RAILWAY  
IN 1988-89\*

CHEMICAL NAME	CAS #	QUANTITY LBS	STATE	LOC (G/M3)	LIQUID FACTOR AMBIENT (LFA)	RATE OF RELEASE LBS/MIN	EVAC DIST MI D STABILITY URBAN
ALLYLAMINE	107-11-9	186,000	LIQUID	.0032	.02	5,208	10
SULFURIC ACID	7664-93-9	186,000	LIQUID	.0080	.00000000005	.00001	
PROPIONITRILE	107-12-0	186,000	LIQUID	.0037	.0010	260	1.0
CYCLOHEXYLAMINE	108-91-8	186,000	LIQUID	.1600	.0005	130	0.1
SULFUR DIXOIDE	7446-09-5	186,000	GAS	.0260	N/A	18,600	10
AMMONIA	7664-41-7	186,000	GAS	.0350	N/A	18,600	10
HYDROGEN PEROXIDE	7722-84-1	186,000	LIQUID	.0100	.0001	26	0.1

CHEMICAL NAME	CAS #	QUANTITY LBS	STATE	LOC (G/M3)	LIQUID FACTOR AMBIENT (LFA)	RATE OF RELEASE LBS/MIN	EVAC DIST MI F STABILITY URBAN
ALLYLAMINE	107-11-9	186,000	LIQUID	.0032	.02	5,208	10
SULFURIC ACID	7664-93-9	186,000	LIQUID	.0080	.00000000005	.00001	
PROPIONITRILE	107-12-0	186,000	LIQUID	.0037	.0010	260	3.5
CYCLOHEXYLAMINE	108-91-8	186,000	LIQUID	.1600	.0005	130	0.3
SULFUR DIXOIDE	7446-09-5	186,000	GAS	.0260	N/A	18,600	10
AMMONIA	7664-41-7	186,000	GAS	.0350	N/A	18,600	10
HYDROGEN PEROXIDE	7722-84-1	186,000	LIQUID	.0100	.0001	26	0.5

CAS # (Chemical Abstracts Service Number): A number assigned to a chemical compound and all its synonyms for identification purposes.

LOC (Level of Concern): The concentration of a chemical in grams per cubic meter above which there may be serious irreversible health effects or death as a result of a single exposure for a relatively short period of time.

LFA (Liquid Factor Ambient): A factor used to estimate the rate of evaporation of a liquid at ambient temperatures to determine release quantities.

D STABILITY: Moderate windspeed of 5.2 meters per second (about 12 mph), and less stable atmospheric conditions.

F STABILITY: Low windspeed of 1.5 meters per second (3.4 mph), and moderately stable atmospheric conditions.

\*Based on the Department of Emergency Services study conducted in 1988.

Performance Products Division  
Hoechst Celanese Corporation  
801 Water Street  
Portsmouth, VA 23704  
804 393 3100  
Telex 6717746

December 11, 1989

Mr. Wayne Halbleib  
VIRGINIA DEPT. OF WASTE MANAGEMENT  
101 N. 14th Street  
Monroe Bldg, 18th Floor  
Richmond, VA 23219



Dear Mr. Halbleib:

In response to our recently series of telephone discussions, I am pleased to provide the following information which you requested.

Regarding the change in rail shipments of liquid sulfur dioxide, prior to January 1989 the West Norfolk plant site of Hoechst Celanese was a major transfer terminal for sulfur dioxide. Tank car quantities of this product were shipped into the plant, then reloaded into smaller tank trucks for reshipment to customers in the mid-Atlantic, southeastern and northeastern market areas. This terminal operation was suspended in early 1989 and since March 1989 has eliminated all tank truck and tank car shipments to and from the West Norfolk plant.

I don't believe any press release or public announcement was made concerning the suspension of this terminal operation; however, I have located a draft copy of an internal memo which was written in late July 1989 which states...."The liquid sulfur dioxide terminal (at West Norfolk) has been relocated to the company's plant in Leeds, S.C." This relocation actually began in January 1989 and was completed by the end of March 1989.

Concerning the Amines drumming terminal located at the West Norfolk Plant site, several amines produced at the West Norfolk and other Hoechst Celanese production facilities has been drummed at the West Norfolk site in the past. Several of these products were brought into West Norfolk in rail cars. This amines drumming operation was suspended on December 1, 1989.

A copy of the press release dated August 1, 1989 announcing this change is attached for your information.

EXHIBIT III. A.2.  
(CONTINUED)

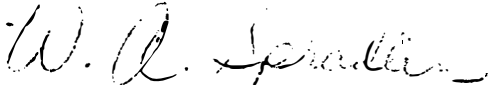
Status change of seven EHS products identified in the Dept. of Emergency Services Report dated January 1989.

I have listed in the attached summary, the seven products identified in the January 1989 report we discussed. This summary compares the status of shipments into and out of our West Norfolk plant, between January 1989 and what will occur by January 1990.

<u>Product</u>	<u>Product Form</u>	<u>Average Daily Inven. Jan., 1989</u>	<u>Avg. Daily Inv. Change-Eff. Jan. 1990 vs. Jan. 1989</u>	<u>Method of Shipment</u> I = Into Plant F = From Plant
Hydrogen Peroxide	Liquid	12,000#	No Significant Change	Drums only (I)
Allylamine	Liquid	100,000#	Slight Increase	Tank trucks only (I&F)
Sulfuric Acid	Liquid	150,000#	Some Reduction	Tank trucks or drums (I)
Cyclohexylamine	Liquid	600,000#	Totally Eliminated	N/A
Sulfur Dioxide	Compressed Gas	1,800,000#	Totally Eliminated	No tank car or tank trucks shipped since March, 1989
Ammonia	Compressed Gas	80,000#	Significantly Reduced	Tank trucks only (I)
Monoisopropylamine	Liquid	150,000#	Totally Eliminated	N/A

In summary, you will see from the information provided in this letter a significant reduction in rail traffic to and from our West Norfolk plant since January 1989. We are in the process of updating the data on shipments which was supplied to Mr. Pitts in March 1989, and the average daily inventory figures supplied to the Dept. of Emergency Services in January 1989. As soon as this updated information has been completed we will send you a copy.

Sincerely,

  
W. A. Spradlin  
Manager Public Relations  
Performance Products Division  
Hoechst Celanese Corp.

slw  
attachments

REF: L-A16





# Hoechst Celanese

## EXHIBIT III. A.2. (CONTINUED)

**Fine Chemicals Division**  
Hoechst Celanese Corporation  
801 Water Street  
Portsmouth, VA 23704  
804 393 3100  
Telex 6717746

### PRESS RELEASE

**FOR RELEASE 11:00 A.M. - AUGUST 1, 1989:**

The Fine Chemicals Division of Hoechst Celanese Corporation will discontinue its Sodium Bisulfite and Sodium Sulfite production at its West Norfolk Plant in Portsmouth, VA. The part of the production complex located in West Norfolk which makes these products is targeted for complete shutdown by November 1, 1989. After plant shut down shipments to customers will continue until inventories are depleted. At that time, the company will withdraw from all sales of these products.

The termination of Sodium Bisulfite and Sodium Sulfite production at Portsmouth was a difficult decision. After months of careful and detailed analysis a study team concluded that continued capital investment in this plant is not economically feasible. The comprehensive Study Group reviewed several options before recommending that plant closure best served the long term viability of the Portsmouth Production Facility.

Concurrent with the division's decision to discontinue Sodium Bisulfite and Sodium Sulfite production, the Amines distribution and drumming terminal at West Norfolk will cease operations by December 1, 1989. Alternate arrangements for drumming and bulk distribution of amines have been made.

These decisions will result in a reduction of the plant's work force. We are currently reviewing the personnel impact and those affected will be notified during coming weeks as the implementation plan is finalized.

No other production units located at the West Norfolk Plant will be affected by this change.

EXHIBIT 1: PLUME DISPERSION BASE MAP

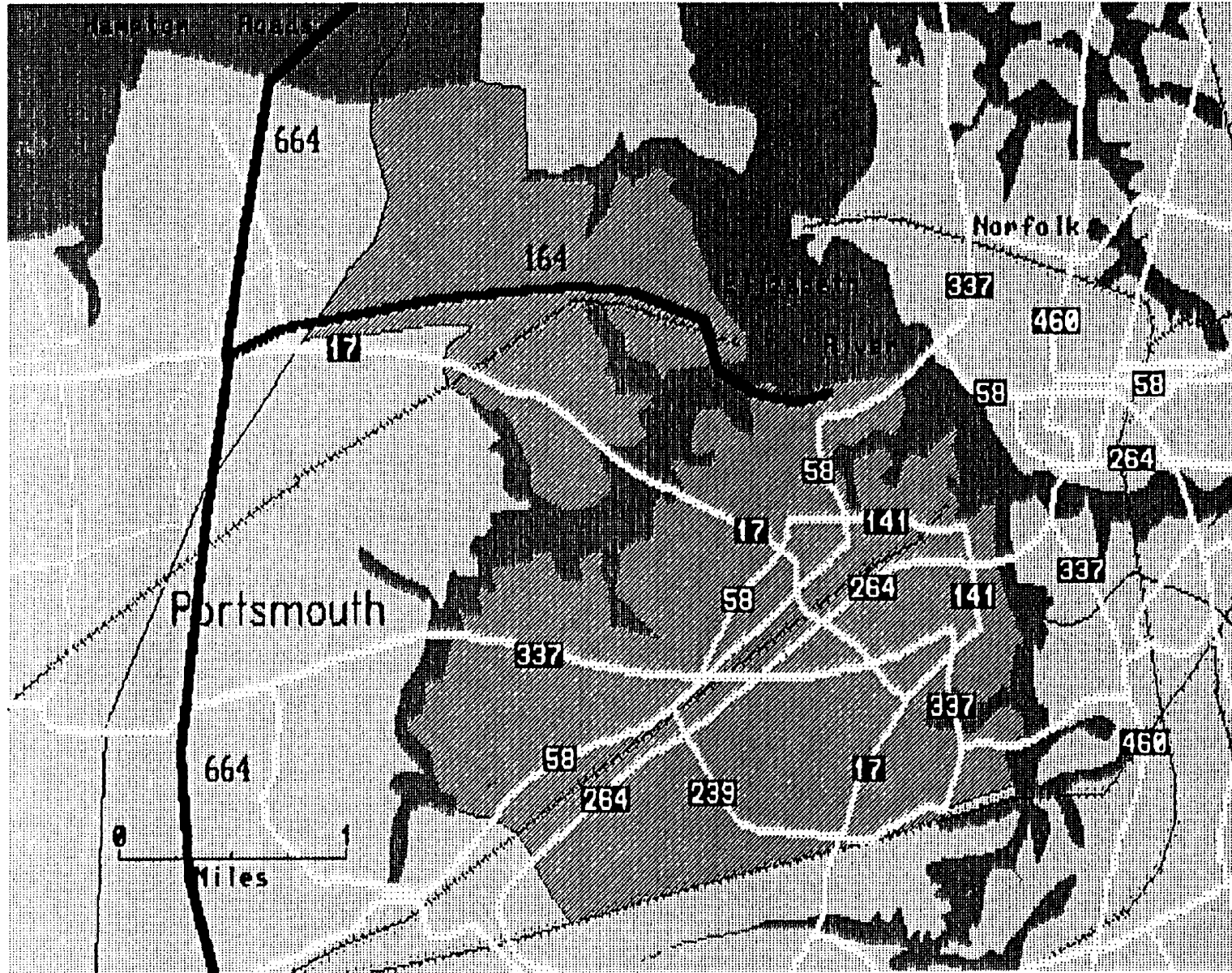


EXHIBIT 2: MAP SHOWING POTENTIAL VULNERABLE ZONES FOR AMMONIA RELEASE  
(FOR BOTH RELOCATED RAILWAY AND EXISTING RAILWAY)

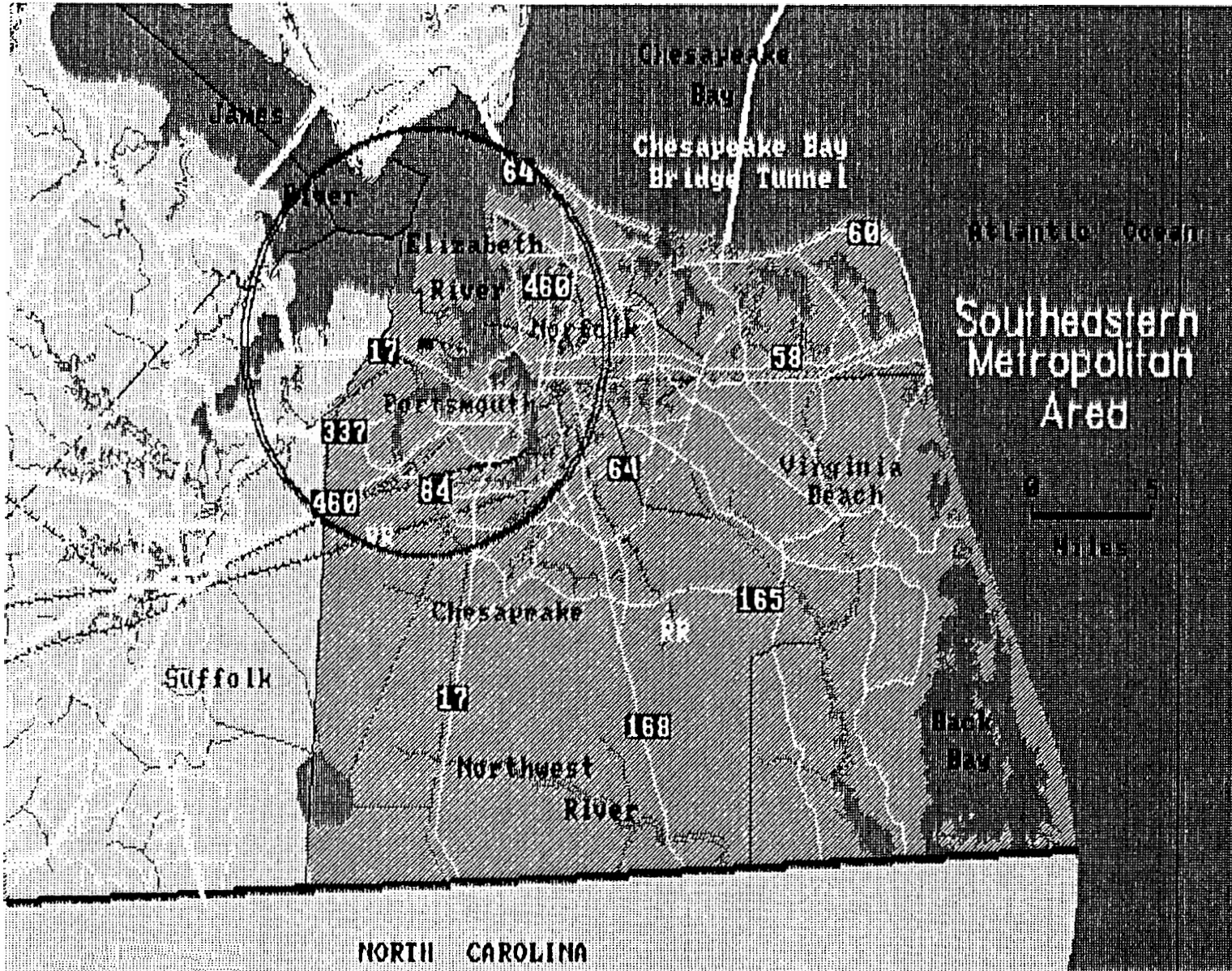




EXHIBIT 3: MAP SHOWING POTENTIAL VULNERABLE ZONES FOR CYCLOHEXYLAMINE RELEASE

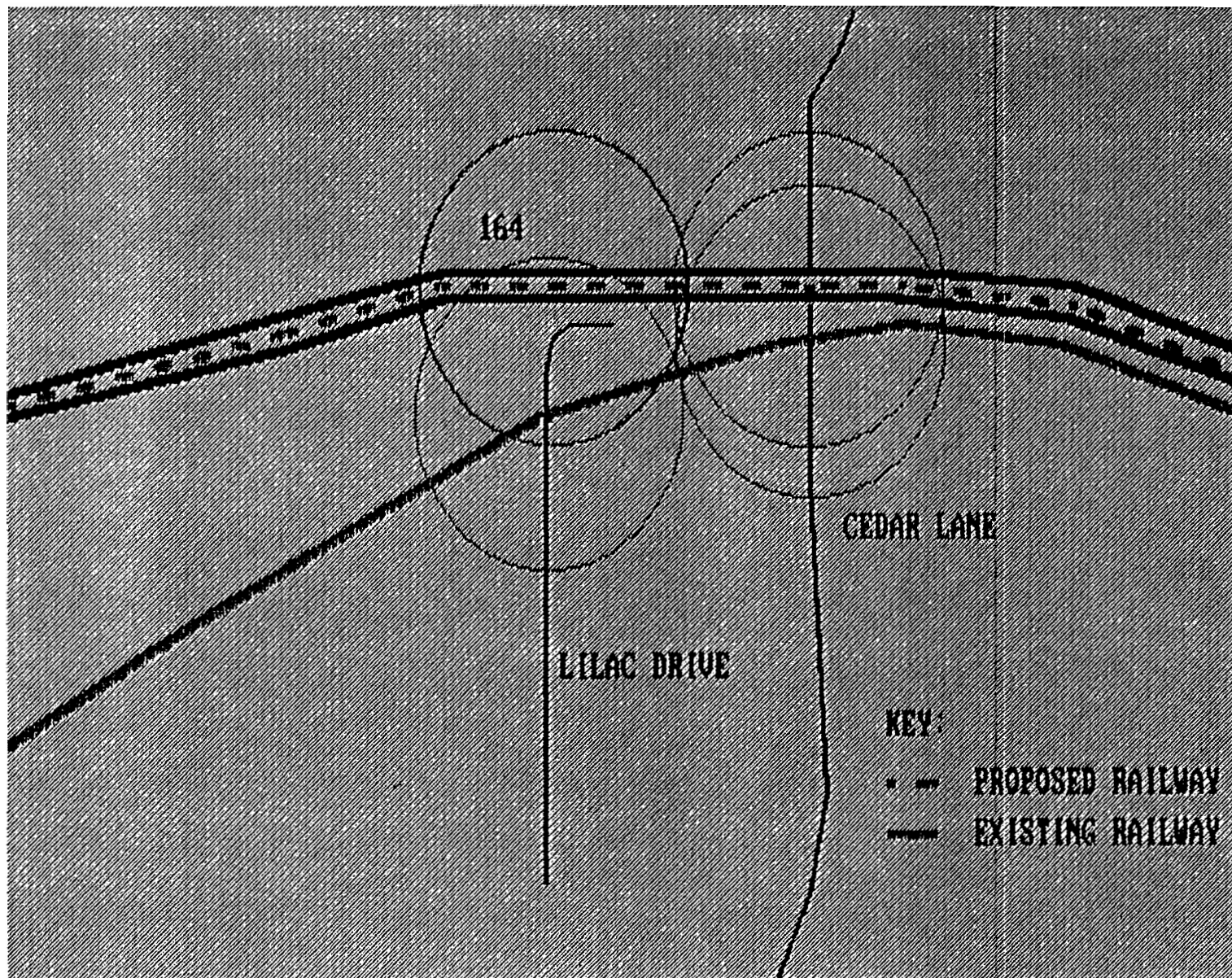


EXHIBIT A - 1: PLUME DISPERSION MODEL FOR CEDAR LANE - AMMONIA  
(RELOCATED RAILWAY/NORTHEAST WINDS)

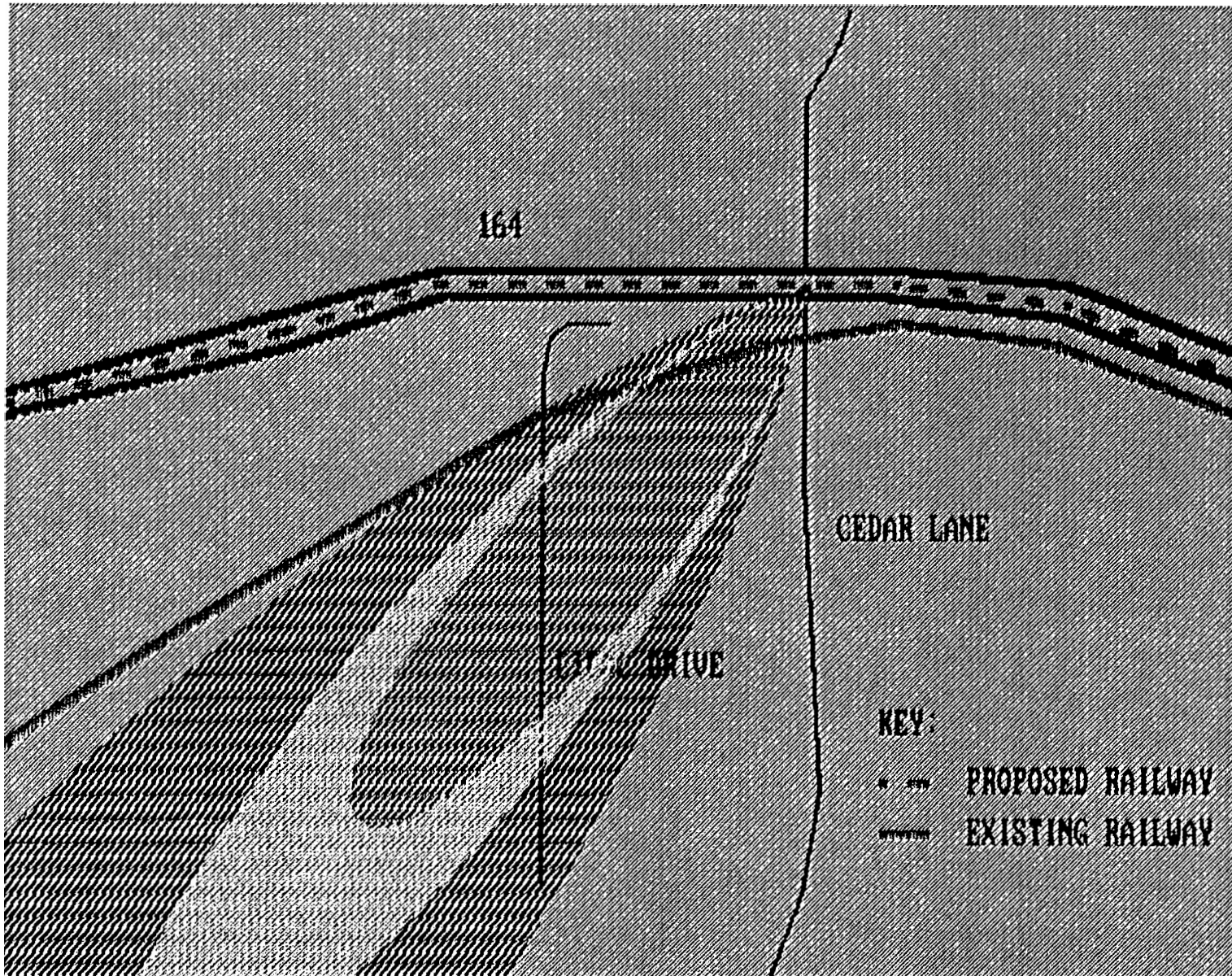


EXHIBIT A-1 (continued)

12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM		11:37
Plume Information			
Plume Name: CEDAR LANE A - AMMONIA Plume File Name: CEDAR1.ALH                      Plume Model: ALOHA			
Weather Conditions		Wind Values	
Humidity(%): 90	Time	Direction	Speed(mph)
Temperature(°F): 90	16:00	45	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
Description			
Release	PLUME DISPERSION MODEL ILLUSTRATING A RELEASE OF ANHYDROUS AMMONIA AT 18,600 POUNDS/MINUTE WITH WINDS FROM THE NORTHEAST AT 11.9 MPH AT THE INTERSECTION OF THE PROPOSED RELOCATED RAILWAY AND CEDAR LANE.		Isopleths(ppm)
Time: :			25.00
Plume			250.00
Time: :			500.00
Max. Distance			
(ft): 53740			12/04/89

EXHIBIT A-1 (continued)

12/05/89	<b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b>		12:47			
<b>Chemical Name: AMMONIA, ANHYDROUS</b>						
<b>Release Type</b>						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;"><b>Puddle Spill</b></td> <td style="width: 33%; text-align: center;"><b>Continuous Release</b></td> <td style="width: 33%; text-align: center;"><b>Puff Release</b></td> </tr> </table>				<b>Puddle Spill</b>	<b>Continuous Release</b>	<b>Puff Release</b>
<b>Puddle Spill</b>	<b>Continuous Release</b>	<b>Puff Release</b>				
<b>Area(ft<sup>2</sup>):</b>	<b>Rate(lbs/min): 18,600</b>	<b>Amount(lbs):</b>				
<b>Concentrations(ppm)</b> 25.00 250.00 500.00	<b>Release Location:</b> Latitude: 37.00 °      Longitude: 76.00 °					



EXHIBIT B - 1: PLUME DISPERSION MODEL FOR CEDAR LANE - AMMONIA  
(EXISTING RAILWAY/NORTHEAST WINDS)

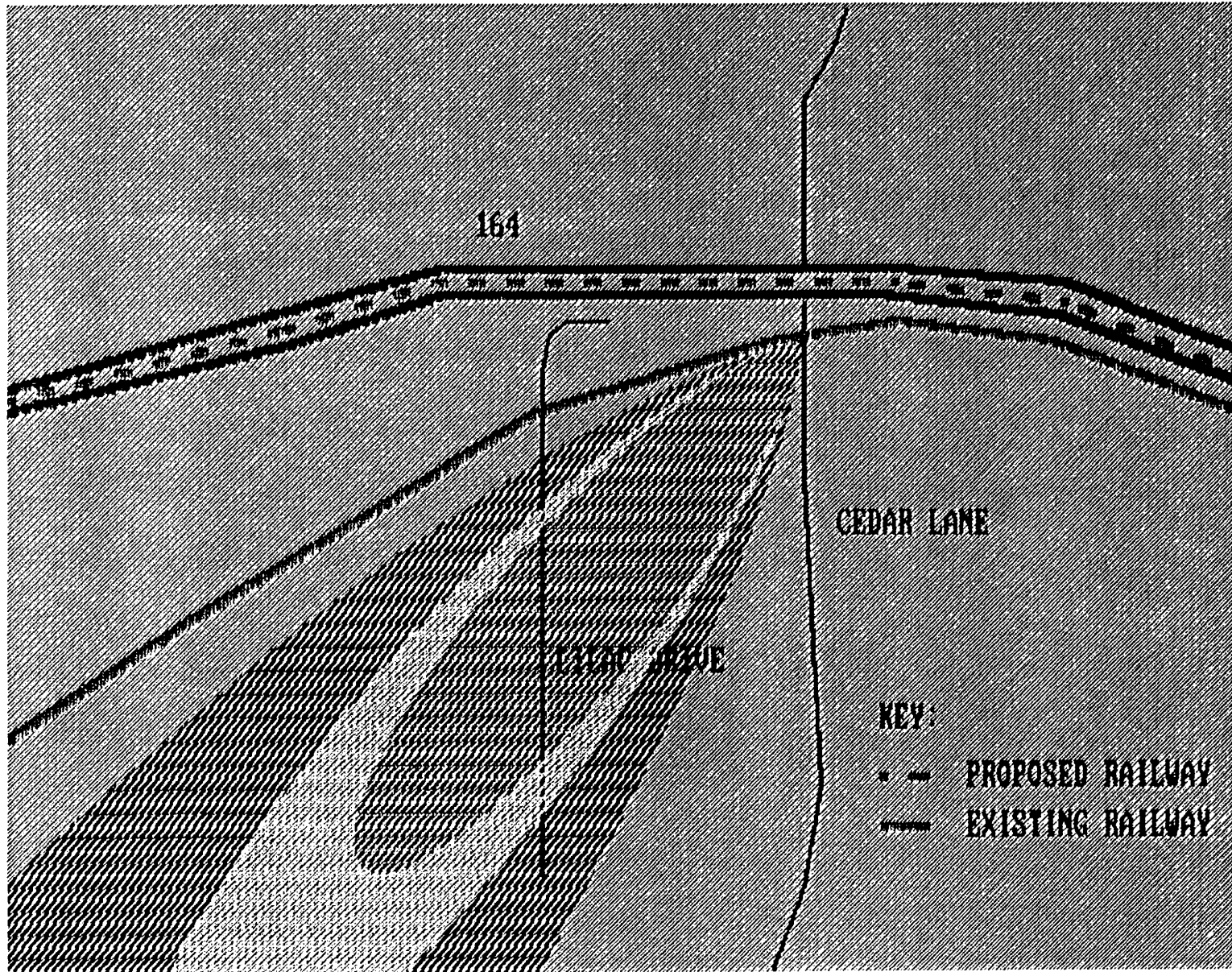




EXHIBIT B-1 (continued)

12/05/89	Virginia Dept. of Waste Management <b>EMERGENCY INFORMATION SYSTEM</b> Plume Information		11:37
Plume Name: CEDAR LANE C - AMMONIA Plume File Name: CEDAR3.ALH                      Plume Model: ALOHA			
<b>Weather Conditions                      Wind Values</b>			
Humidity(%): 90	Time	Direction	Speed(mph)
Temperature(°F): 90	16:00	45	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
<b>Description</b>			
Release Time: : Plume Time: : Max. Distance (ft): 53740	PLUME DISPERSION MODEL ILLUSTRATING A RELEASE OF ANHYDROUS AMMONIA AT 18,600 POUNDS/MINUTE WITH WINDS FROM THE NORTHEAST AT 11.9 MPH AT THE INTERSECTION OF THE EXISTING RAILWAY AND CEDAR LANE.		Isopleths(ppm) 25.00 250.00 500.00
			12/04/89

EXHIBIT B-1 (continued)

12/05/89	<b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b>		12:47
Chemical Name: <b>AMMONIA, ANHYDROUS</b>			
<b>Release Type</b>			
<b>Puddle Spill      <del>Continuous Release</del>      Puff Release</b>			
Area(ft <sup>2</sup> ):	Rate(lbs/min): 18,600	Amount(lbs):	
Concentrations(ppm) 25.00 250.00 500.00	Release Location: Latitude: 37.00 °      Longitude: 76.00 °		

EXHIBIT C - 1: PLUME DISPERSION MODEL FOR CEDAR LANE - AMMONIA  
(RELOCATED RAILWAY/SOUTHWEST WINDS)

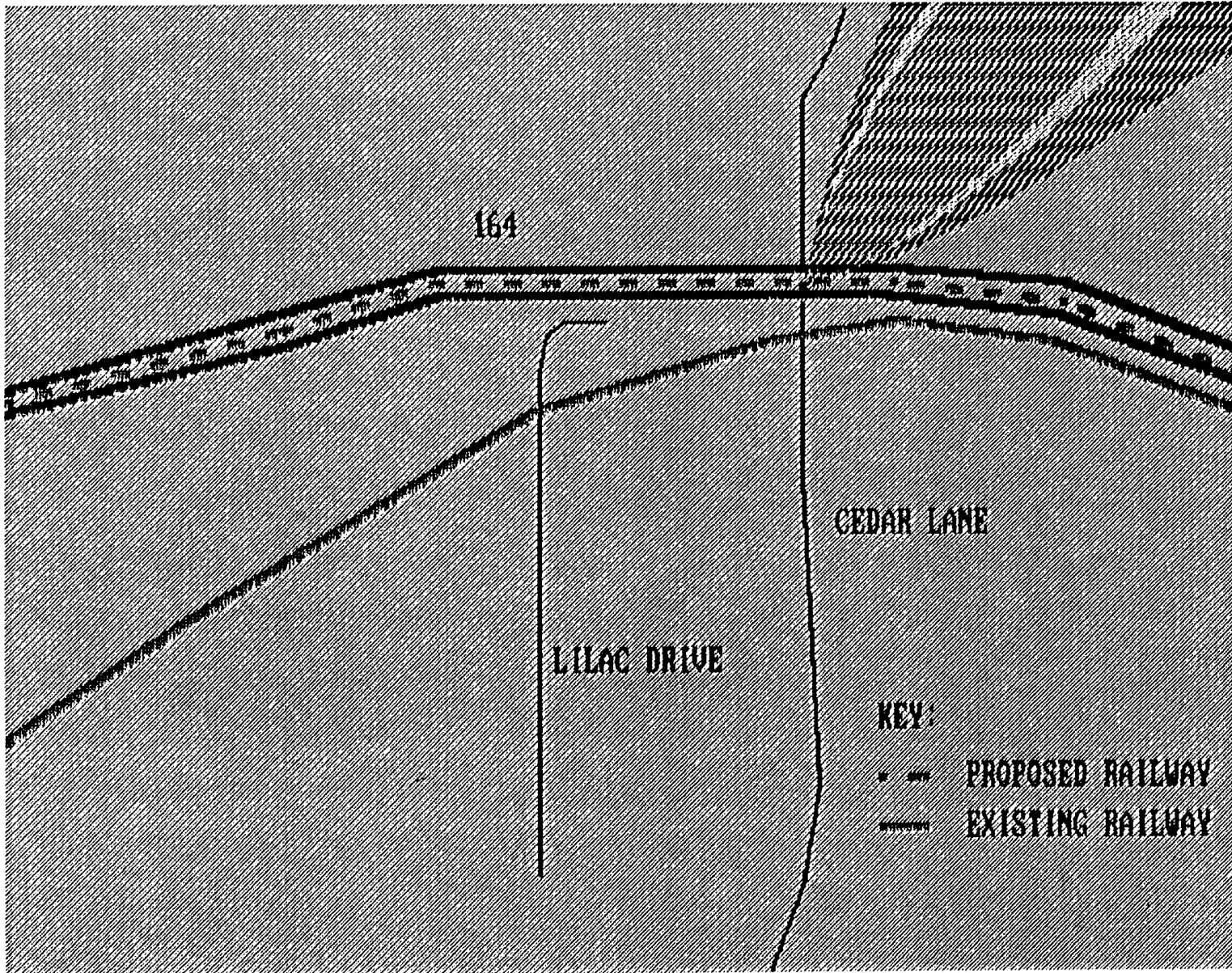


EXHIBIT C-1(continued)

12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM		11:37
Plume Information			
Plume Name: CEDAR LANE B - AMMONIA Plume File Name: CEDAR2.ALH                      Plume Model: ALOHA			
_____ Weather Conditions _____ Wind Values _____			
Humidity(%): 90	Time	Direction	Speed(mph)
Temperature(°F): 90	16:00	225	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
_____ Description _____			
Release	PLUME DISPERSION MODEL ILLUSTRATING A RELEASE OF ANHYDROUS AMMONIA AT 18,600 POUNDS/MINUTE WITH WINDS FROM THE SOUTHWEST AT 11.9 MPH AT THE INTERSECTION OF THE PROPOSED RELOCATED RAILWAY AND CEDAR LANE.		Isopleths(ppm)
Time: :			25.00
Plume			250.00
Time: :			500.00
Max. Distance (ft): 53740			12/04/89

EXHIBIT C-1(continued)

12/05/89	<p>EMERGENCY INFORMATION SYSTEM ALOHA MODEL</p>		12:47						
<p>Chemical Name: AMMONIA, ANHYDROUS</p>									
<p>Release Type</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th data-bbox="302 599 680 649">Puddle Spill</th> <th data-bbox="680 599 1213 649">Continuous Release</th> <th data-bbox="1213 599 1801 649">Puff Release</th> </tr> </thead> <tbody> <tr> <td data-bbox="302 649 680 721">Area(ft<sup>2</sup>):</td> <td data-bbox="680 649 1213 721">Rate(lbs/min): 18,600</td> <td data-bbox="1213 649 1801 721">Amount(lbs):</td> </tr> </tbody> </table>				Puddle Spill	Continuous Release	Puff Release	Area(ft <sup>2</sup> ):	Rate(lbs/min): 18,600	Amount(lbs):
Puddle Spill	Continuous Release	Puff Release							
Area(ft <sup>2</sup> ):	Rate(lbs/min): 18,600	Amount(lbs):							
<p>Concentrations(ppm)</p> <p>25.00</p> <p>250.00</p> <p>500.00</p>	<p>Release Location:</p> <p>Latitude: 37.00 °      Longitude: 76.00 °</p>								

EXHIBIT D - 1: PLUME DISPERSION MODEL FOR CEDAR LANE - AMMONIA  
(EXISTING RAILWAY/SOUTHWEST WINDS)

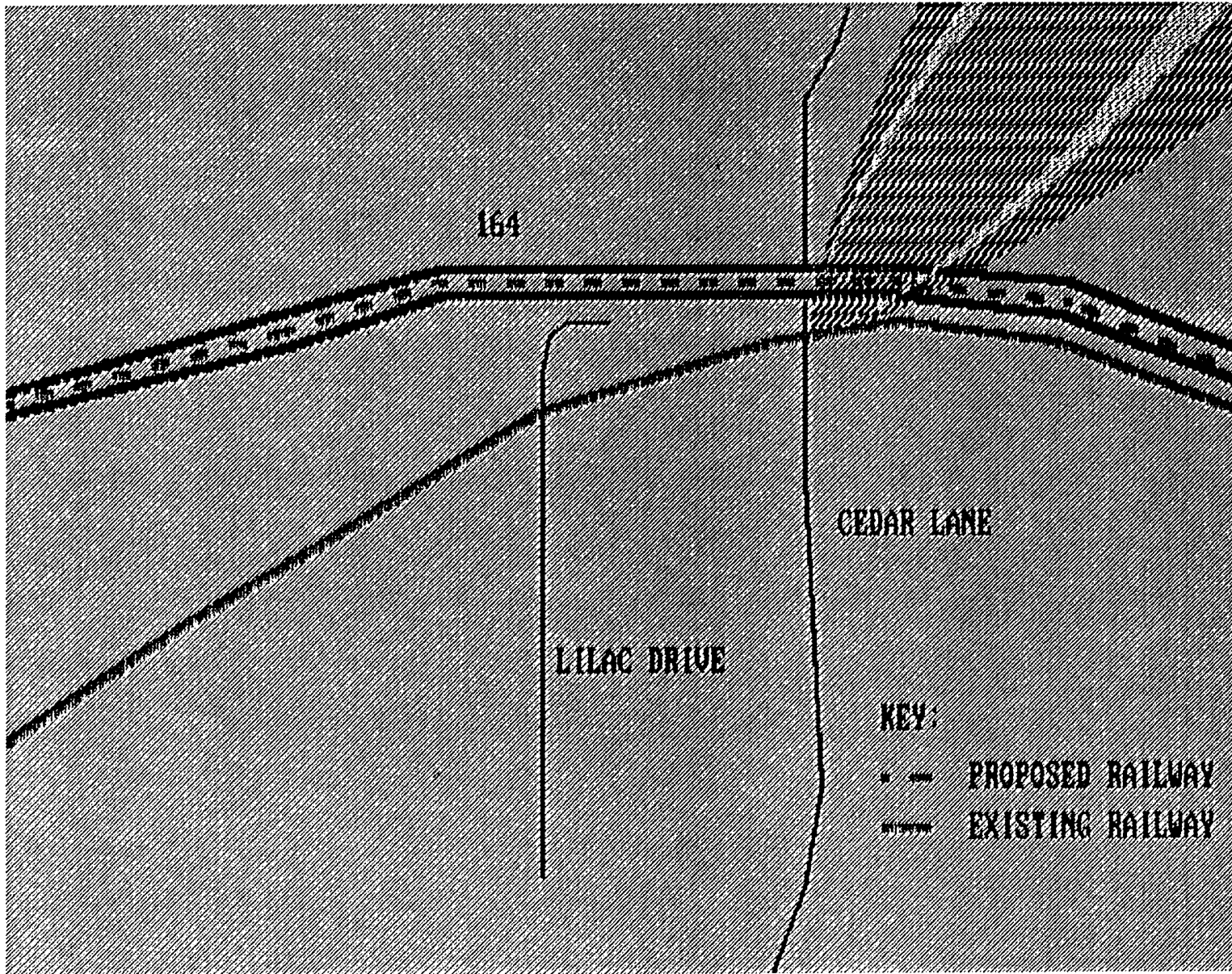


EXHIBIT D-1 (continued)

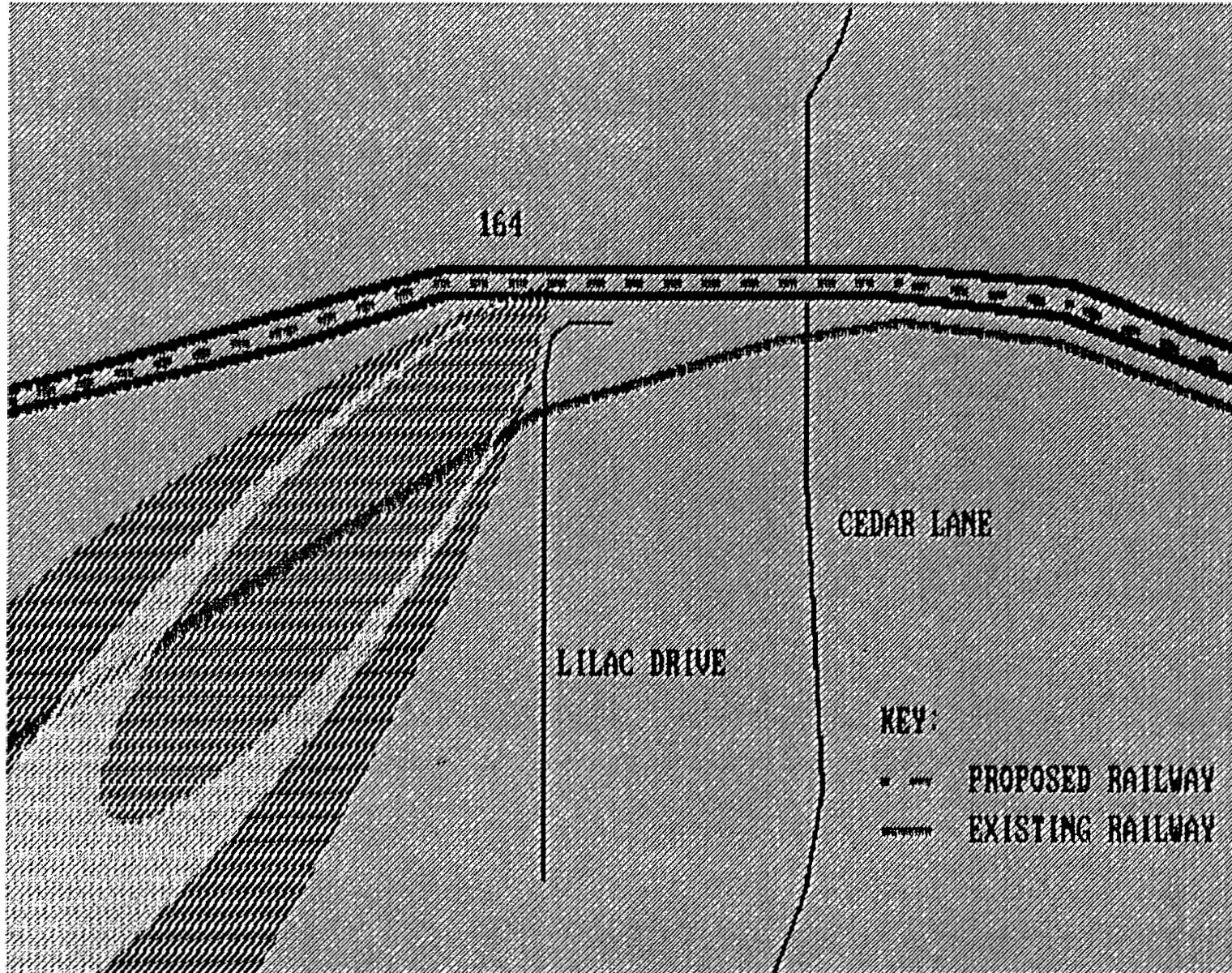
12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM Plume Information		11:37
Plume Name: CEDAR LANE D - AMMONIA Plume File Name: CEDAR4.ALH                      Plume Model: ALOHA			
<b>Weather Conditions</b> <b>Wind Values</b>			
Humidity(%): 90	Time	Direction	Speed (mph)
Temperature(°F): 90	16:00	225	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
<b>Description</b>			
Release	PLUME DISPERSION MODEL ILLUSTRATING A RELEASE OF ANHYDROUS AMMONIA AT 18,600 POUNDS/MINUTE WITH WINDS FROM THE SOUTHWEST AT 11.9 MPH AT THE INTERSECTION OF THE EXISTING RAILWAY AND CEDAR LANE.		Isopleths (ppm)
Time: :			25.00
Plume			250.00
Time: :			500.00
Max. Distance (ft): 53740	12/04/89		

EXHIBIT D-1 (continued)

12/05/89	<b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b>		12:47
Chemical Name: <b>AMMONIA, ANHYDROUS</b>			
<b>Release Type</b>			
<b>Puddle Spill                      Continuous Release                      Puff Release</b>			
Area(ft <sup>2</sup> ):	Rate(lbs/min): 18,600	Amount(lbs):	
Concentrations(ppm) 25.00 250.00 500.00	Release Location: Latitude: 37.00 °      Longitude: 76.00 °		



EXHIBIT A - 2: PLUME DISPERSION MODEL FOR LILAC DRIVE - AMMONIA  
(RELOCATED RAILWAY/NORTHEAST WINDS)



12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM		12:17
Plume Information			
Plume Name: LILAC DRIVE A - AMMONIA Plume File Name: LILAC1.ALH                      Plume Model: ALOHA			
<b>Weather Conditions</b>			
Humidity(%): 90	Time	Direction	Speed(mph)
Temperature(°F): 90	16:00	45	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
<b>Description</b>			
Release	PLUME DISPERSION MODEL ILLUSTRATING A RELEASE OF ANHYDROUS AMMONIA AT 18,600 POUNDS/MINUTE WITH WINDS FROM THE NORTHEAST AT 11.9 MPH AT THE INTERSECTION OF THE PROPOSED RELOCATED RAILWAY AND LILAC DRIVE.		Isopleths(ppm)
Time: :			25.00
Plume			250.00
Time: :			500.00
Max. Distance (ft): 53740			12/04/89

EXHIBIT A-2 (continued)

12/05/89	<b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b>		12:47		
Chemical Name: AMMONIA, ANHYDROUS					
Release Type					
<b>Puddle Spill</b>		<b>Continuous Release</b>		<b>Puff Release</b>	
Area(ft <sup>2</sup> ):		Rate(lbs/min): 18,600		Amount(lbs):	
Concentrations(ppm) 25.00 250.00 500.00		Release Location: Latitude: 37.00 °      Longitude: 76.00 °			

EXHIBIT B - 2: PLUME DISPERSION MODEL FOR LILAC DRIVE - AMMONIA  
(EXISTING RAILWAY/NORTHEAST WINDS)

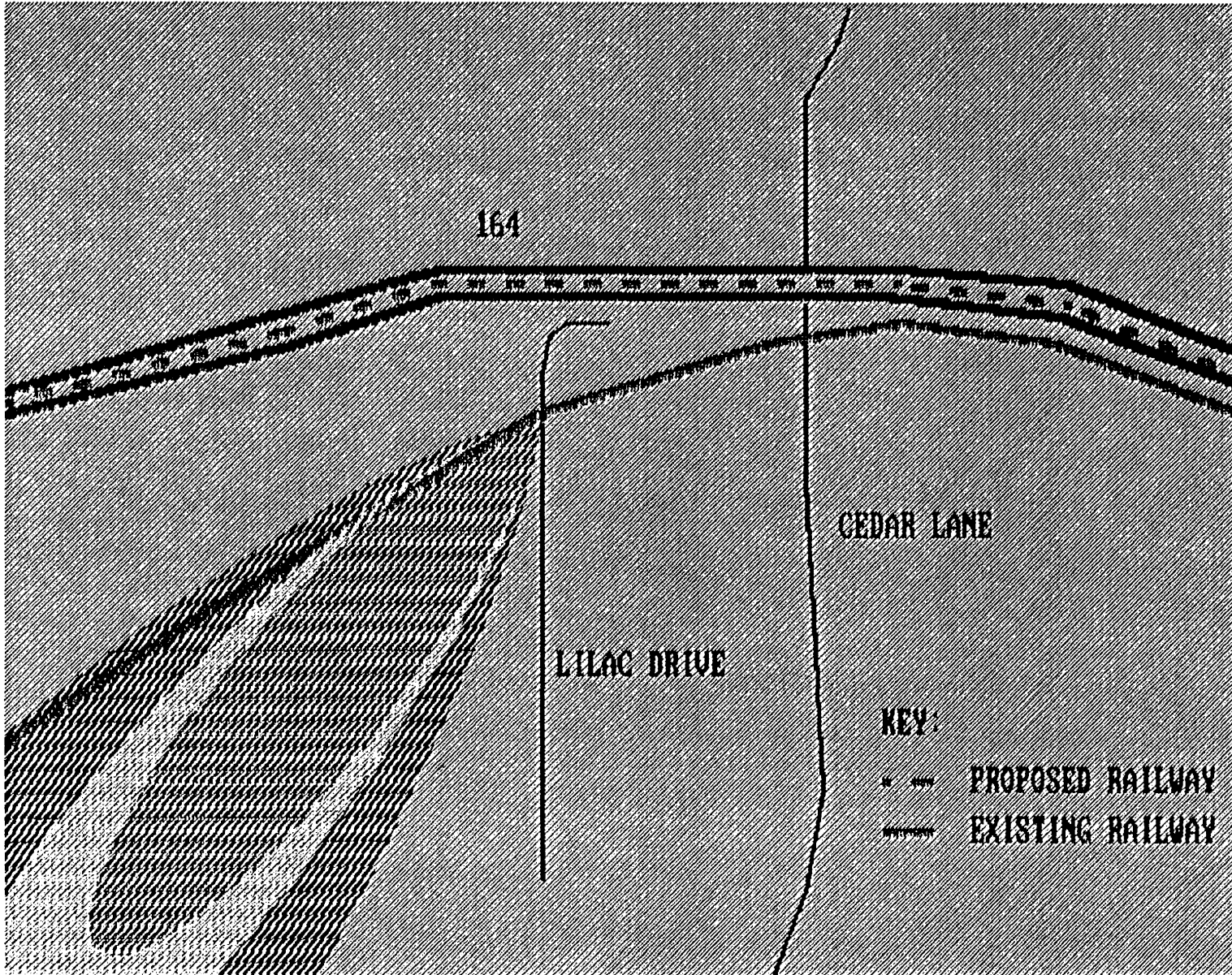


EXHIBIT E-2 (continued)

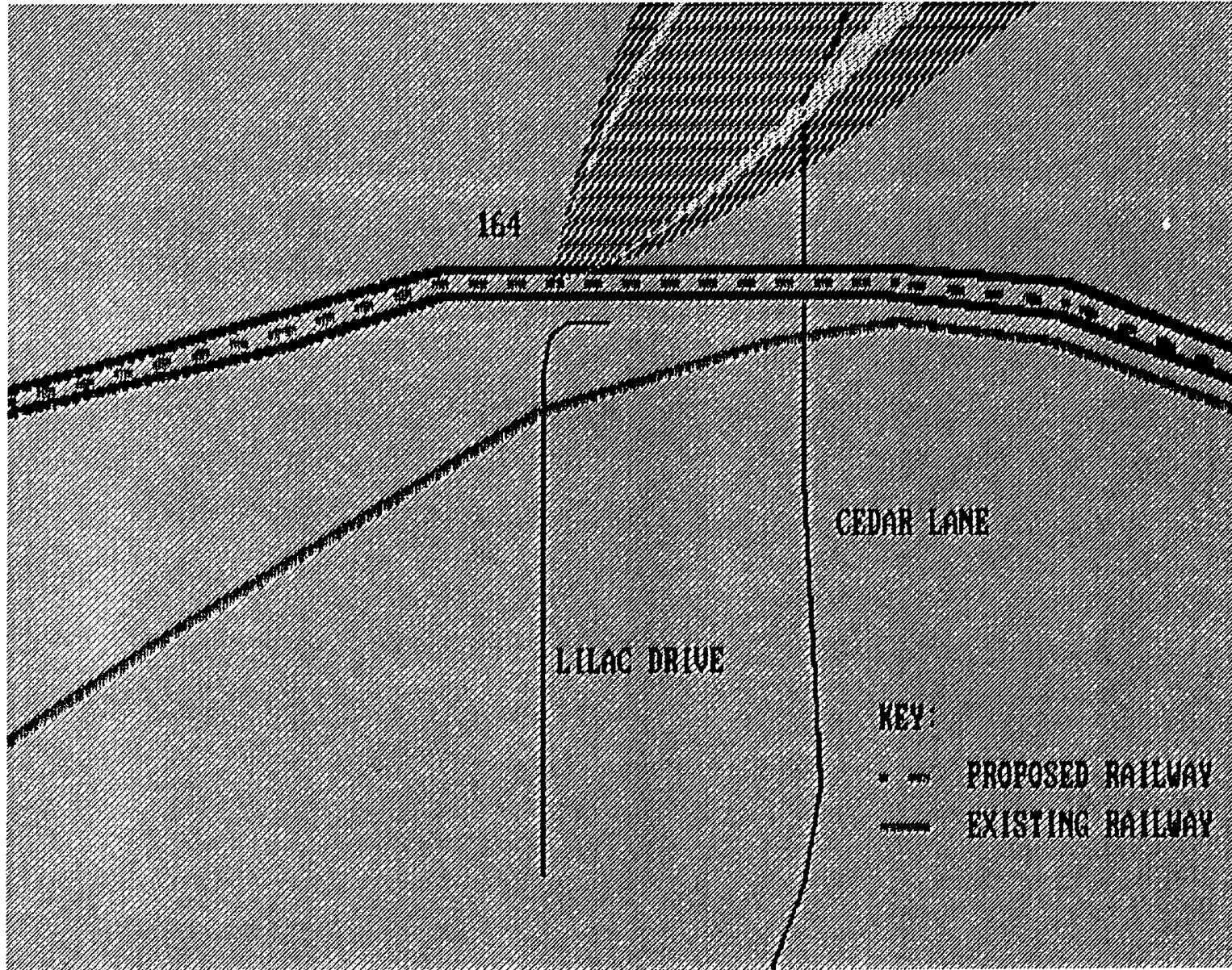
12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM		12:17
Plume Information			
Plume Name: LILAC DRIVE C - AMMONIA Plume File Name: LILAC3.ALH                      Plume Model: ALOHA			
<p style="text-align: center;">————— Weather Conditions —————                      Wind Values —————</p>			
Humidity(%): 90	Time	Direction	Speed(mph)
Temperature(°F): 90	16:00	45	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
<p style="text-align: center;">————— Description —————</p>			
Release	PLUME DISPERSION MODEL ILLUSTRATING A		Isopleths(ppm)
Time: :	RELEASE OF ANHYDROUS AMMONIA AT 18,600		25.00
Plume	POUNDS/MINUTE WITH WINDS FROM THE NORTHEAST		250.00
Time: :	AT THE INTERSECTION OF THE EXISTING RAILWAY		500.00
Max. Distance	AND LILAC DRIVE.		
(ft): 53740			12/04/89

EXHIBIT B-2 (continued)

12/05/89	<p><b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b></p>		12:47									
<p>Chemical Name: <b>AMMONIA, ANHYDROUS</b></p>												
<table border="1" style="width: 100%; text-align: center;"> <tr> <td colspan="3" data-bbox="293 488 1821 565">Release Type</td> </tr> <tr> <td data-bbox="293 565 683 613"><b>Puddle Spill</b></td> <td data-bbox="683 565 1221 613"><del>Continuous Release</del></td> <td data-bbox="1221 565 1821 613"><b>Puff Release</b></td> </tr> <tr> <td data-bbox="293 613 683 688">Area(ft<sup>2</sup>):</td> <td data-bbox="683 613 1221 688">Rate(lbs/min): 18,600</td> <td data-bbox="1221 613 1821 688">Amount(lbs):</td> </tr> </table>				Release Type			<b>Puddle Spill</b>	<del>Continuous Release</del>	<b>Puff Release</b>	Area(ft <sup>2</sup> ):	Rate(lbs/min): 18,600	Amount(lbs):
Release Type												
<b>Puddle Spill</b>	<del>Continuous Release</del>	<b>Puff Release</b>										
Area(ft <sup>2</sup> ):	Rate(lbs/min): 18,600	Amount(lbs):										
<p>Concentrations(ppm)</p> <p>25.00</p> <p>250.00</p> <p>500.00</p>	<p>Release Location:</p> <p>Latitude: 37.00 °      Longitude: 76.00 °</p>											



EXHIBIT C - 2: PLUME DISPERSION MODEL FOR LILAC DRIVE - AMMONIA  
(RELOCATED RAILWAY/SOUTHWEST WINDS)



12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM Plume Information		12:17
Plume Name: LILAC DRIVE B - AMMONIA Plume File Name: LILAC2.ALH                      Plume Model: ALOHA			
————— Weather Conditions —————                      Wind Values —————			
Humidity(%): 90	Time	Direction	Speed(mph)
Temperature(°F): 90	16:00	225	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
————— Description —————			
Release	PLUME DISPERSION MODEL ILLUSTRATING A		Isopleths(ppm)
Time: :	RELEASE OF ANHYDROUS AMMONIA AT 18,600		25.00
Plume	POUNDS/MINUTE WITH WINDS FROM THE SOUTHWEST		250.00
Time: :	AT 11.9 MPH AT THE INTERSECTION OF THE		500.00
Max. Distance (ft): 53740	PROPOSED RELOCATED RAILWAY AND LILAC LANE.		12/04/89



EXHIBIT C-2 (continued)

12/05/89	<p><b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b></p>		12:47						
<p>Chemical Name: <b>AMMONIA, ANHYDROUS</b></p>									
<p>Release Type</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: black; color: white;"> <th data-bbox="327 610 699 662">Puddle Spill</th> <th data-bbox="699 610 1234 662">Continuous Release</th> <th data-bbox="1234 610 1812 662">Puff Release</th> </tr> </thead> <tbody> <tr> <td data-bbox="327 662 699 737">Area(ft<sup>2</sup>):</td> <td data-bbox="699 662 1234 737">Rate(lbs/min): 18,600</td> <td data-bbox="1234 662 1812 737">Amount(lbs):</td> </tr> </tbody> </table>				Puddle Spill	Continuous Release	Puff Release	Area(ft <sup>2</sup> ):	Rate(lbs/min): 18,600	Amount(lbs):
Puddle Spill	Continuous Release	Puff Release							
Area(ft <sup>2</sup> ):	Rate(lbs/min): 18,600	Amount(lbs):							
<p>Concentrations(ppm)</p> <p style="text-align: center;">25.00</p> <p style="text-align: center;">250.00</p> <p style="text-align: center;">500.00</p>	<p>Release Location:</p> <p style="text-align: center;">Latitude: 37.00 °      Longitude: 76.00 °</p>								

EXHIBIT D - 2: PLUME DISPERSION MODEL FOR LILAC DRIVE - AMMONIA  
(EXISTING RAILWAY/SOUTHWEST WINDS)

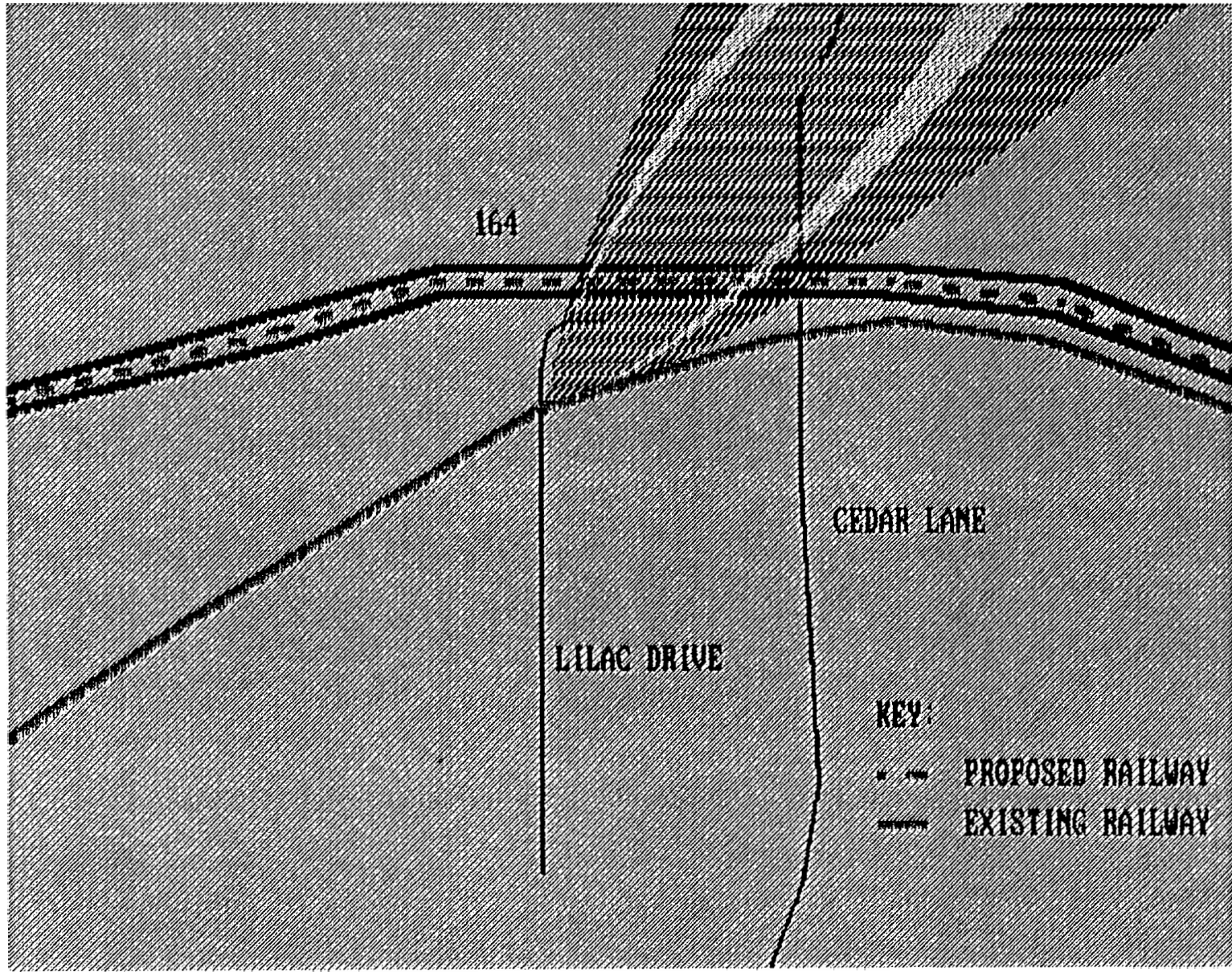


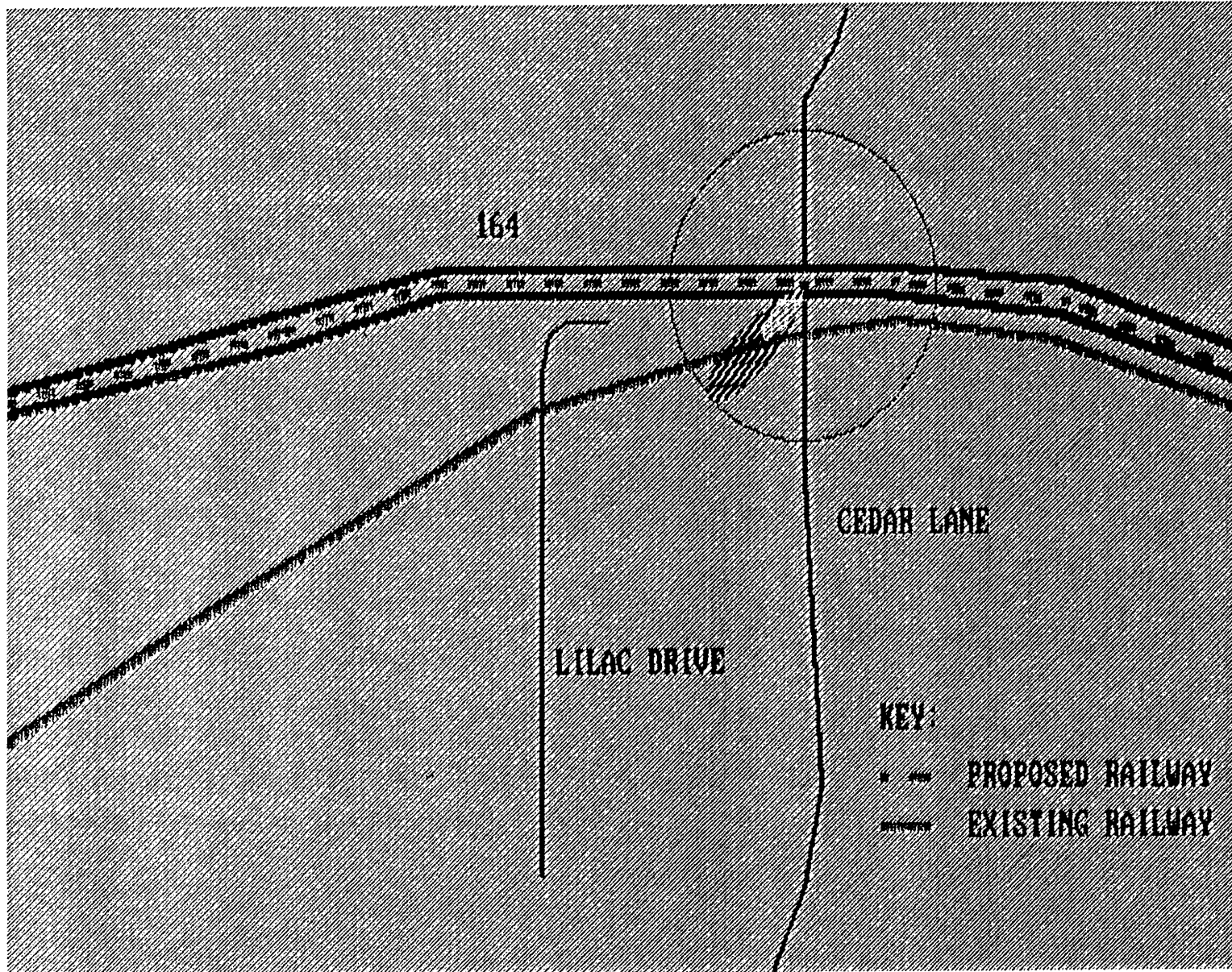
EXHIBIT D-2 (continued)

12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM		12:17
Plume Information			
Plume Name: LILAC DRIVE D - AMMONIA Plume File Name: LILAC4.ALH                      Plume Model: ALOHA			
Weather Conditions		Wind Values	
Humidity(%): 90	Time	Direction	Speed(mph)
Temperature(°F): 90	16:00	225	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
Description			
Release	PLUME DISPERSION MODEL ILLUSTRATING A		Isopleths(ppm)
Time: :	RELEASE OF ANHYDROUS AMMONIA AT 18,600		25.00
Plume	POUNDS/MINUTE WITH WINDS FROM THE SOUTHWEST		250.00
Time: :	AT 11.9 MPH AT THE INTERSECTION OF THE		500.00
Max. Distance	EXISTING RAILWAY AND LILAC DRIVE.		
(ft): 53740			12/04/89

EXHIBIT D-2 (continued)

12/05/89	<b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b>		12:47
Chemical Name: <b>AMMONIA, ANHYDROUS</b>			
<b>Release Type</b>			
<b>Puddle Spill                      Continuous Release                      Puff Release</b>			
Area(ft <sup>2</sup> ):	Rate(lbs/min): 18,600	Amount(lbs):	
Concentrations(ppm) 25.00 250.00 500.00	Release Location: Latitude: 37.00 °      Longitude: 76.00 °		

EXHIBIT A - 3: PLUME DISPERSION MODEL FOR CEDAR LANE - CYCLOHEXYLAMINE  
(RELOCATED RAILWAY/NORTHEAST WINDS)



12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM Plume Information		11:37
Plume Name: CEDAR LANE A - CYCLOHEXYLAMINE Plume File Name: CEDARA.ALH                      Plume Model: ALOHA			
<b>Weather Conditions</b>			
Humidity(%): 90	Time	Direction	Speed(mph)
Temperature(°F): 90	16:00	45	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
<b>Description</b>			
Release	PLUME DISPERSION MODEL ILLUSTRATING A		Isopleths(ppm)
Time: :	RELEASE OF CYCLOHEXYLAMINE AT 130 POUNDS/		10.00
Plume	MINUTE WITH WINDS FROM THE NORTHEAST AT 11.9		50.00
Time: :	MPH AT THE INTERSECTION OF THE PROPOSED		
Max. Distance	RELOCATED RAILWAY AND CEDAR LANE.		
(ft): 885			12/05/89



EXHIBIT A-3 (continued)

12/05/89	<b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b>		12:47
<b>Chemical Name: CYCLOHEXYLAMINE</b>			
<b>Release Type</b>			
<b>Puddle Spill</b>		<b>Continuous Release</b>	
<b>Area(ft<sup>2</sup>):</b>		<b>Rate(lbs/min): 130</b>	
<b>Concentrations(ppm)</b> 10.00 50.00		<b>Release Location:</b> <b>Latitude: 37.00 ° Longitude: 76.00 °</b>	

EXHIBIT B - 3: PLUME DISPERSION MODEL FOR CEDAR LANE - CYCLOHEXYLAMINE  
(EXISTING RAILWAY/NORTHEAST WINDS)

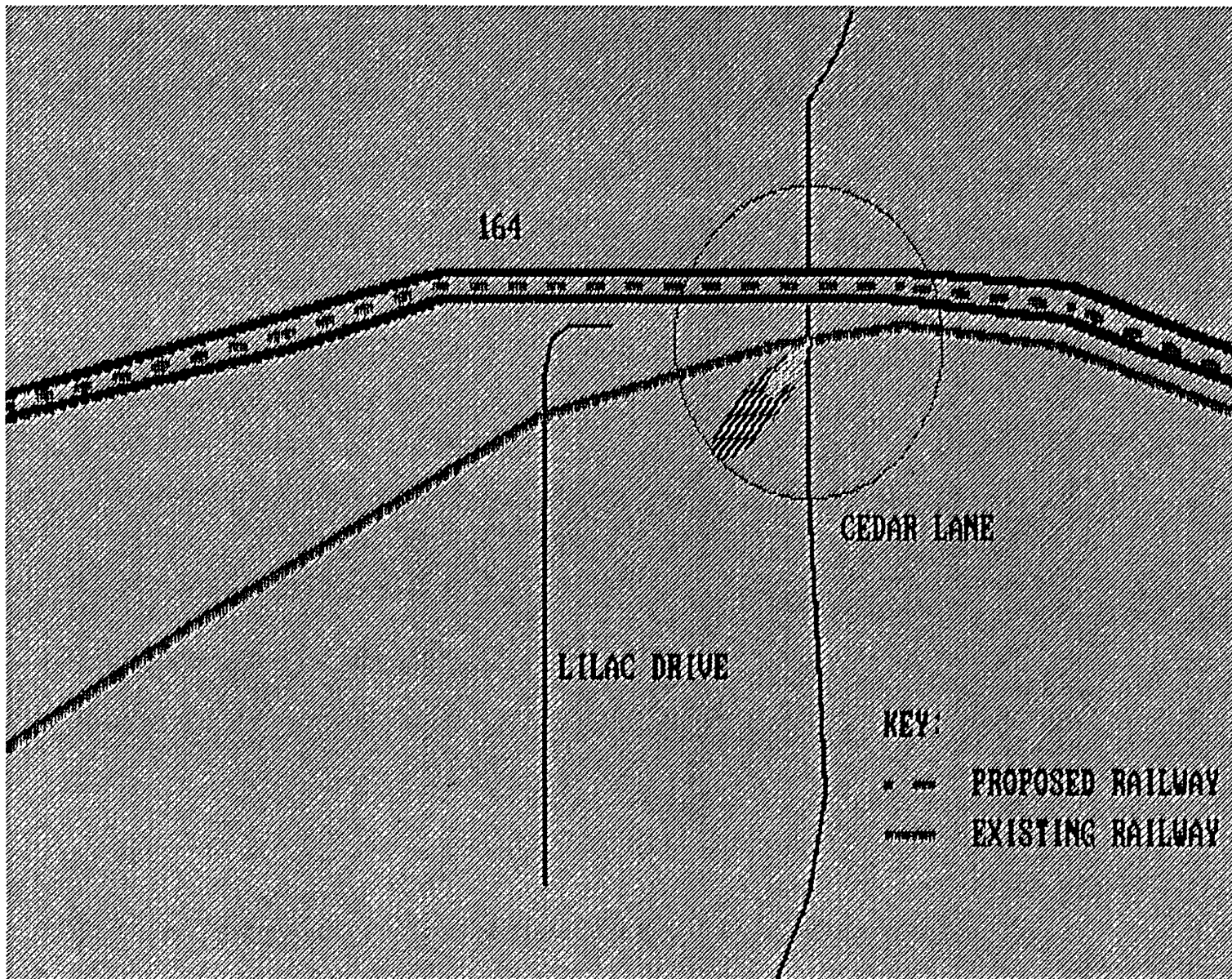


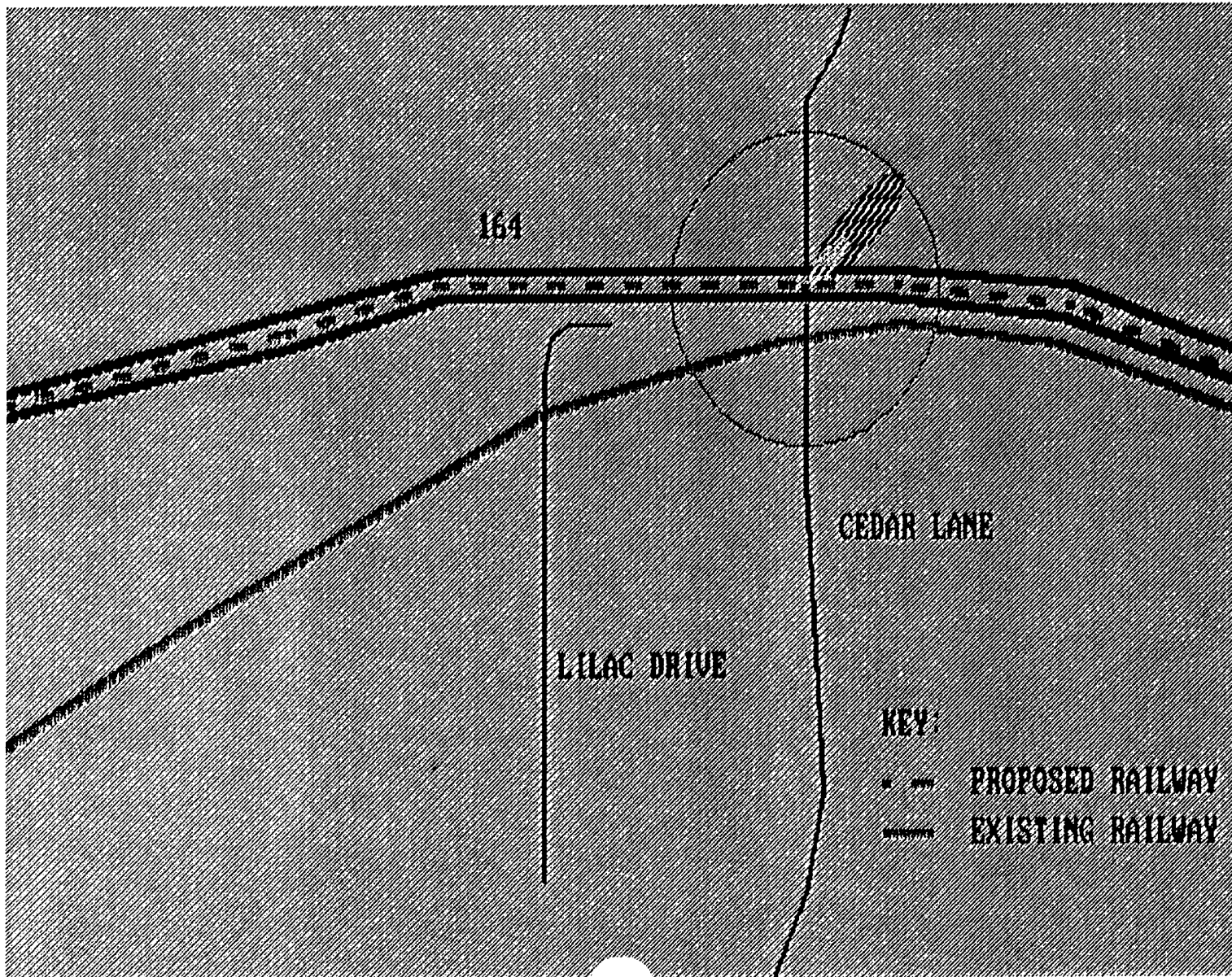


EXHIBIT B-3 (continued)

12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM		11:37
Plume Information			
Plume Name: CEDAR LANE C - CYCLOHEXYLAMINE Plume File Name: CEDARC.ALH                      Plume Model: ALOHA			
Weather Conditions		Wind Values	
Humidity(%): 90	Time	Direction	Speed(mph)
Temperature(°F): 90	16:00	45	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
Description			
Release Time: : Plume Time: : Max. Distance (ft): 885	PLUME DISPERSION MODEL ILLUSTRATING A RELEASE OF CYCLOHEXYLAMINE AT 130 POUNDS/ MINUTE WITH WINDS FROM THE NORTHEAST AT 11.9 MPH AT THE INTERSECTION OF THE EXISTING RAILWAY AND CEDAR LANE.		Isopleths(ppm) 10.00 50.00  12/05/89

12/05/89	<b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b>		12:47		
Chemical Name: <b>CYCLOHEXYLAMINE</b>					
<b>Release Type</b>					
<b>Puddle Spill</b>		<b>Continuous Release</b>		<b>Puff Release</b>	
Area(ft <sup>2</sup> ):	Rate(lbs/min):	130	Amount(lbs):		
Concentrations(ppm) 10.00 50.00		Release Location: Latitude: 37.00 °      Longitude: 76.00 °			

EXHIBIT C - 3: PLUME DISPERSION MODEL FOR CEDAR LANE - CYCLOHEXYLAMINE  
(RELOCATED RAILWAY/SOUTHWEST WINDS)



12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM Plume Information	11:37
Plume Name: CEDAR LANE B - CYCLOHEXYLAMINE Plume File Name: CEDARB.ALH                      Plume Model: ALOHA		
————— Weather Conditions —————      Wind Values —————		
Humidity(%): 90	Time	Direction      Speed(mph)
Temperature(°F): 90	16:00	225              11.9
Relative Pressure(in): 29.9	:	
Atmospheric Stability: D	:	
Surface Roughness: Urban	:	
Time of Day: Day	:	
Stability Height(ft): 1001	:	
Cloud Cover(1-10): 2	:	
————— Description —————		
Release	PLUME DISPERSION MODEL ILLUSTRATING A	
Time: :	RELEASE OF CYCLOHEXYLAMINE AT 130 POUNDS/	
Plume	MINUTE WITH WINDS FROM THE NORTHEAST AT 11.9	
Time: :	MPH AT THE INTERSECTION OF THE PROPOSED	
Max. Distance	RELOCATED RAILWAY AND CEDAR LANE.	
(ft): 885		Isopleths(ppm) 10.00 50.00
		12/05/89

EXHIBIT C-3 (continued)

12/05/89	<b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b>		12:47
<b>Chemical Name:</b> <b>CYCLOHEXYLAMINE</b>			
<b>Release Type</b>			
<b>Puddle Spill</b>		<b>Continuous Release</b>	
<b>Area(ft<sup>2</sup>):</b>		<b>Rate(lbs/min):</b> 130	
<b>Concentrations(ppm)</b> 10.00 50.00		<b>Release Location:</b> Latitude: 37.00 °      Longitude: 76.00 °	

EXHIBIT D - 3: PLUME DISPERSION MODEL FOR CEDAR LANE - CYCLOHEXYLAMINE  
(EXISTING RAILWAY/SOUTHWEST WINDS)

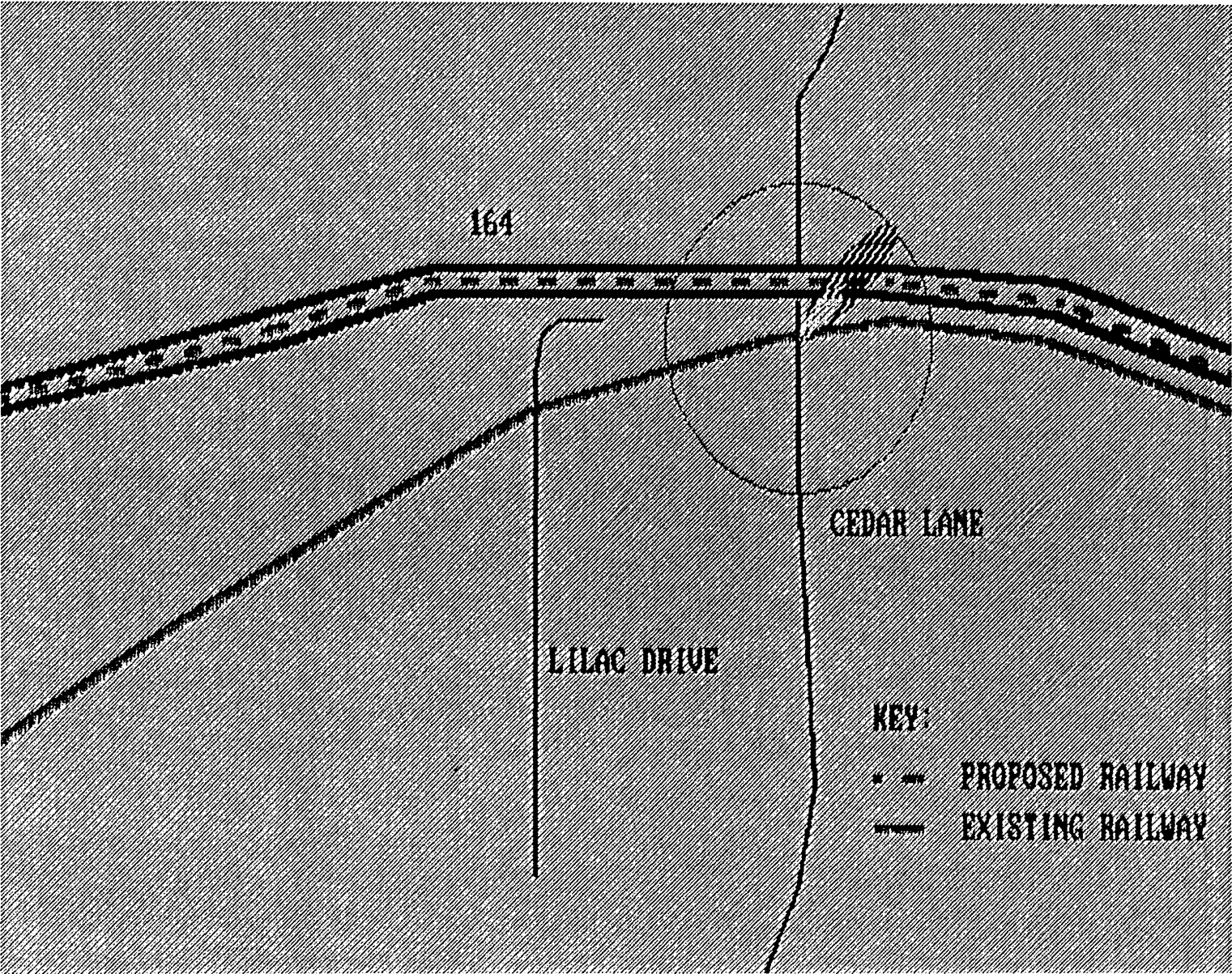


EXHIBIT D-3 (continued)

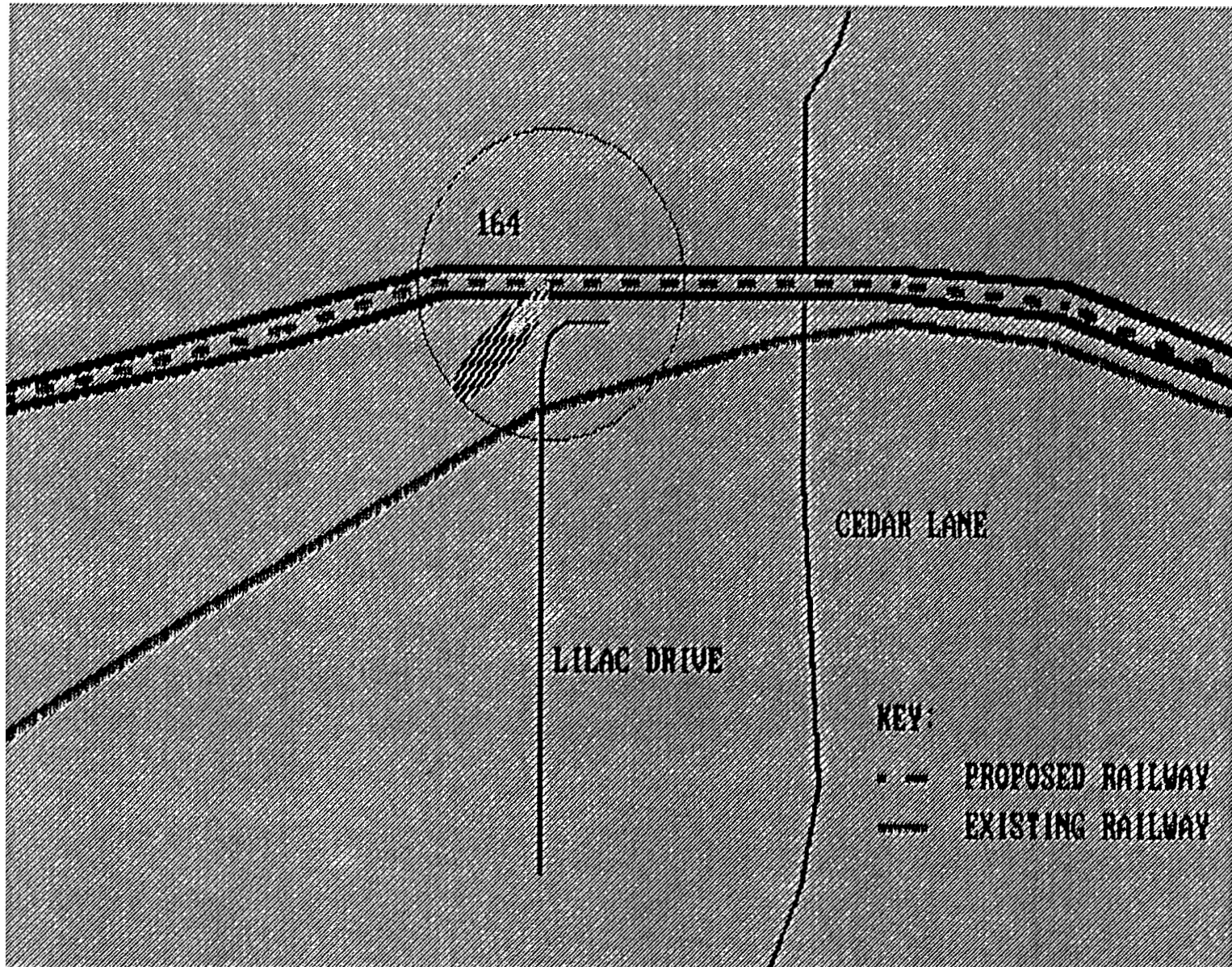
12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM		11:37
Plume Information			
Plume Name: CEDAR LANE D - CYCLOHEXYLAMINE Plume File Name: CEDARD.ALH                      Plume Model: ALOHA			
<b>Weather Conditions                      Wind Values</b>			
Humidity(%): 90	Time	Direction	Speed(mph)
Temperature(°F): 90	16:00	225	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
<b>Description</b>			
Release Time: : Plume Time: : Max. Distance (ft): 885	PLUME DISPERSION MODEL ILLUSTRATING A RELEASE OF CYCLOHEXYLAMINE AT 130 POUNDS/ MINUTE WITH WINDS FROM THE SOUTHWEST AT 11.9 MPH AT THE INTERSECTION OF THE EXISTING RAILWAY AND CEDAR LANE.		Isopleths(ppm) 10.00 50.00  12/05/89



12/05/89	<b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b>		12:47	
Chemical Name: <b>CYCLOHEXYLAMINE</b>				
<b>Release Type</b>				
<b>Puddle Spill</b>		<b>Continuous Release</b>		<b>Puff Release</b>
Area(ft <sup>2</sup> ):	Rate(lbs/min): 130	Amount(lbs):		
Concentrations(ppm) 10.00 50.00	Release Location: Latitude: 37.00 °      Longitude: 76.00 °			



EXHIBIT A - 4: PLUME DISPERSION MODEL FOR LILAC DRIVE - CYCLOHEXYLAMINE  
(RELOCATED RAILWAY/NORTHEAST WINDS)



12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM Plume Information		12:17
Plume Name: LILAC DRIVE A - CYCLOHEXYLAMINE Plume File Name: LILACA.ALH                      Plume Model: ALOHA			
<b>Weather Conditions                      Wind Values</b>			
Humidity(%): 90	Time	Direction	Speed(mph)
Temperature(°F): 90	16:00	45	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
<b>Description</b>			
Release	PLUME DISPERSION MODEL ILLUSTRATING A RELEASE OF CYCLOHEXYLAMINE AT 130 POUNDS/ MINUTE WITH WINDS FROM THE NORTHEAST AT 11.9 MPH AT THE INTERSECTION OF THE PROPOSED RELOCATED RAILWAY AND LILAC DRIVE.		Isopleths(ppm)
Time: :			10.00
Plume			50.00
Time: :			
Max. Distance			
(ft): 885			12/04/89

EXHIBIT A-4 (continued)

12/05/89	<b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b>		12:47						
<b>Chemical Name: CYCLOHEXYLAMINE</b>									
<b>Release Type</b>									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;"><b>Puddle Spill</b></td> <td style="width: 33%; text-align: center;"><b>Continuous Release</b></td> <td style="width: 33%; text-align: center;"><b>Puff Release</b></td> </tr> <tr> <td style="text-align: center;">Area(ft<sup>2</sup>):</td> <td style="text-align: center;">Rate(lbs/min): 130</td> <td style="text-align: center;">Amount(lbs):</td> </tr> </table>				<b>Puddle Spill</b>	<b>Continuous Release</b>	<b>Puff Release</b>	Area(ft <sup>2</sup> ):	Rate(lbs/min): 130	Amount(lbs):
<b>Puddle Spill</b>	<b>Continuous Release</b>	<b>Puff Release</b>							
Area(ft <sup>2</sup> ):	Rate(lbs/min): 130	Amount(lbs):							
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;"> <b>Concentrations(ppm)</b>                      10.00                      50.00                 </td> <td colspan="3" style="text-align: center;"> <b>Release Location:</b>                      Latitude: 37.00 °      Longitude: 76.00 °                 </td> </tr> </table>				<b>Concentrations(ppm)</b> 10.00 50.00	<b>Release Location:</b> Latitude: 37.00 °      Longitude: 76.00 °				
<b>Concentrations(ppm)</b> 10.00 50.00	<b>Release Location:</b> Latitude: 37.00 °      Longitude: 76.00 °								

EXHIBIT B - 4: PLUME DISPERSION MODEL FOR LILAC DRIVE - CYCLOHEXYLAMINE  
(EXISTING RAILWAY/NORTHEAST WINDS)

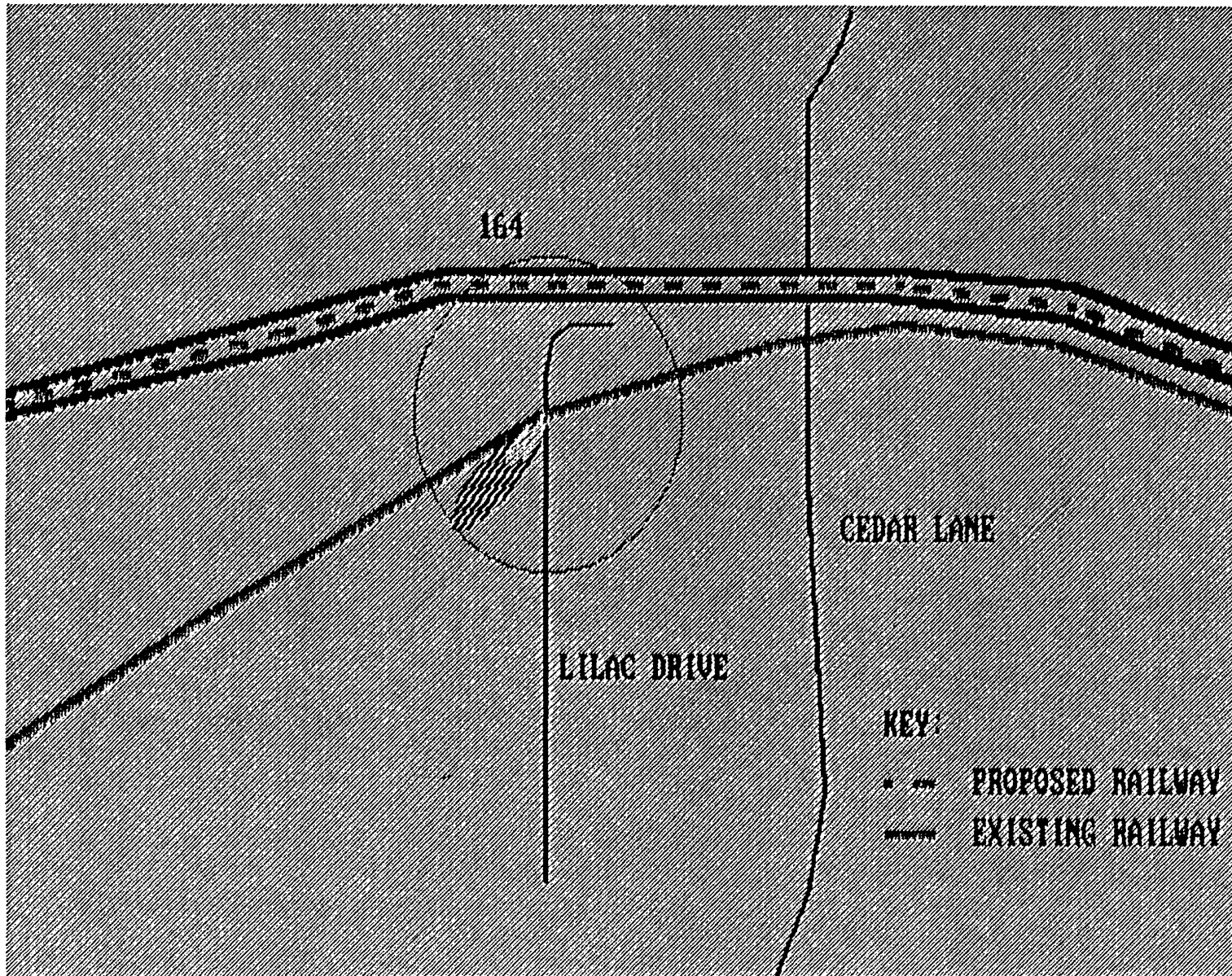


EXHIBIT B-4 (continued)

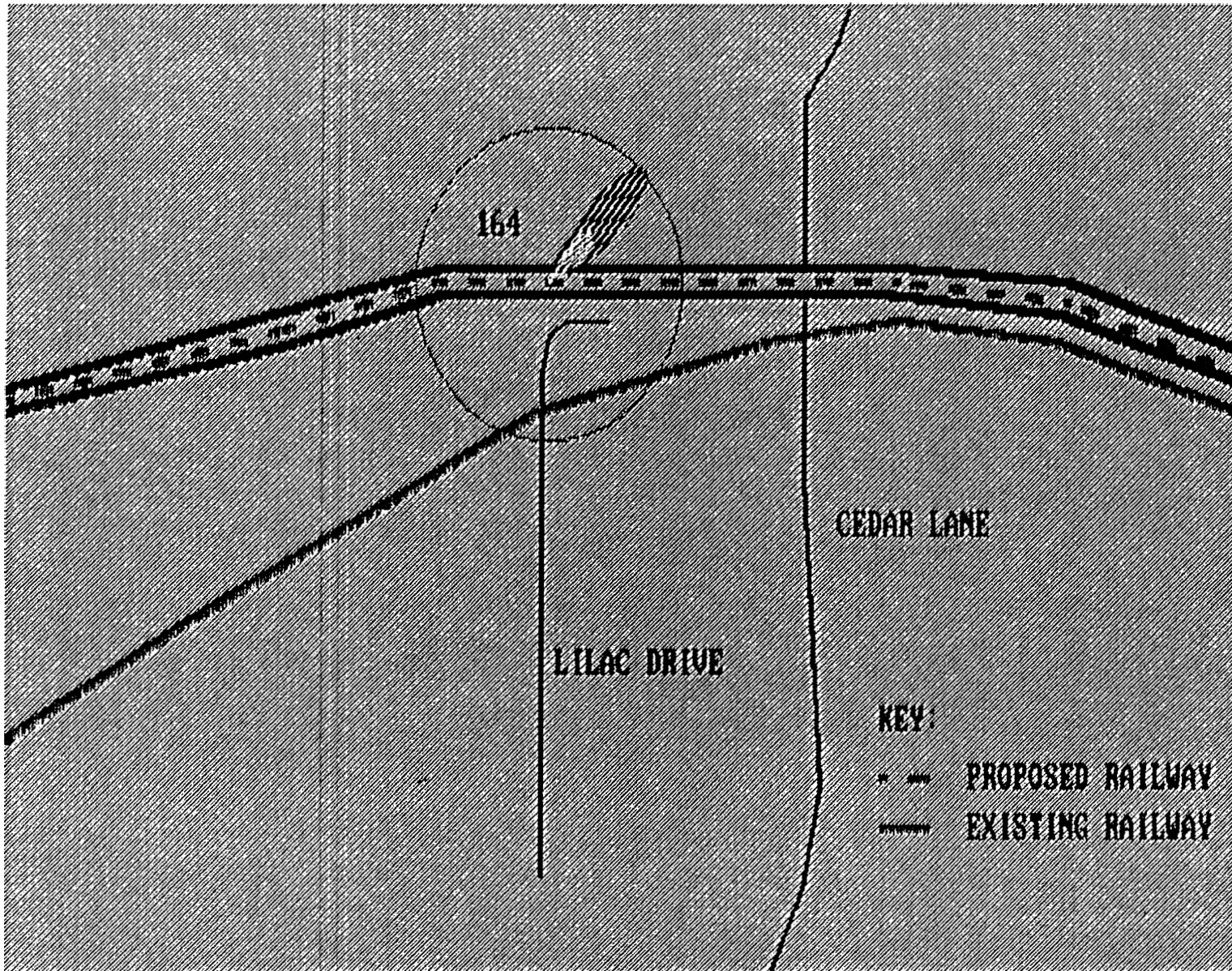
12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM Plume Information		12:17
Plume Name: LILAC DRIVE C - CYCLOHEXYLAMINE Plume File Name: LILACC.ALH                      Plume Model: ALOHA			
Weather Conditions		Wind Values	
Humidity(%): 90	Time	Direction	Speed(mph)
Temperature(°F): 90	16:00	45	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
Description			
Release	PLUME DISPERSION MODEL ILLUSTRATING A		Isopleths(ppm)
Time: :	RELEASE OF CYCLOHEXYLAMINE AT 130 POUNDS/		10.00
Plume	MINUTE WITH WINDS FROM THE NORTHEAST AT 11.9		50.00
Time: :	MPH AT THE INTERSECTION OF THE EXISTING		
Max. Distance	RAILWAY AND LILAC DRIVE.		
(ft): 885			12/04/89

EXHIBIT B (continued)

12/05/89	<b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b>		12:47
Chemical Name: <b>CYCLOHEXYLAMINE</b>			
<b>Release Type</b>			
<b>Puddle Spill                      Continuous Release                      Puff Release</b>			
Area(ft <sup>2</sup> ):	Rate(lbs/min):    130	Amount(lbs):	
Concentrations(ppm) 10.00 50.00	Release Location: Latitude: 37.00 °      Longitude: 76.00 °		



EXHIBIT C - 4: PLUME DISPERSION MODEL FOR LILAC DRIVE - CYCLOHEXYLAMINE  
(RELOCATED RAILWAY/SOUTHWEST WINDS)



12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM Plume Information		12:17
Plume Name: LILAC DRIVE B - CYCLOHEXYLAMINE Plume File Name: LILACB.ALH                      Plume Model: ALOHA			
————— Weather Conditions —————      Wind Values —————			
Humidity(%): 90	Time	Direction	Speed(mph)
Temperature(°F): 90	16:00	225	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
————— Description —————			
Release	PLUME DISPERSION MODEL ILLUSTRATING A RELEASE OF CYCLOHEXYLAMINE AT 130 POUNDS/ MINUTE WITH WINDS FROM THE SOUTHWEST AT 11.9 MPH AT THE INTERSECTION OF THE PROPOSED RELOCATED RAILWAY AND LILAC DRIVE.		Isopleths(ppm)
Time: :			10.00
Plume			50.00
Time: :			
Max. Distance			
(ft): 885			12/04/89



EXHIBIT C-4 (continued)

12/05/89	<b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b>		12:47		
Chemical Name: <b>CYCLOHEXYLAMINE</b>					
<b>Release Type</b>					
<b>Puddle Spill</b>		<b>Continuous Release</b>		<b>Puff Release</b>	
Area(ft <sup>2</sup> ):	Rate(lbs/min): <b>130</b>	Amount(lbs):			
Concentrations(ppm) <b>10.00</b> <b>50.00</b>		Release Location: Latitude: <b>37.00 °</b> Longitude: <b>76.00 °</b>			

EXHIBIT D - 4: PLUME DISPERSION MOD. FOR LILAC DRIVE - CYCLOHEXYLAMINE  
(EXISTING RAILWAY/SOUTHWEST WINDS)

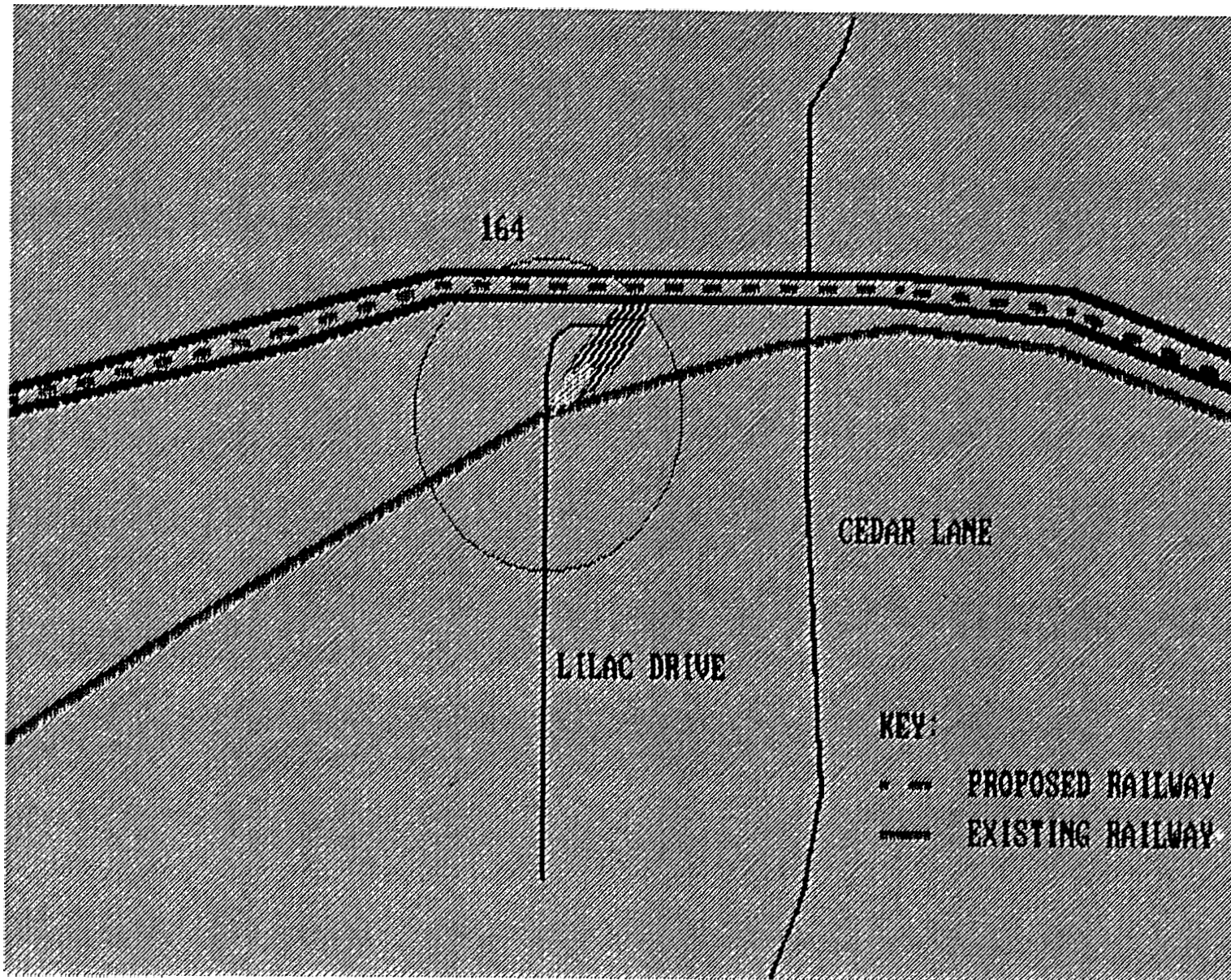


EXHIBIT D-4 (continued)

12/05/89	Virginia Dept. of Waste Management EMERGENCY INFORMATION SYSTEM Plume Information		12:17
Plume Name: LILAC DRIVE D - CYCLOHEXYLAMINE Plume File Name: LILACD.ALH                      Plume Model: ALOHA			
<b>Weather Conditions</b> <b>Wind Values</b>			
Humidity(%): 90	Time	Direction	Speed(mph)
Temperature(°F): 90	16:00	225	11.9
Relative Pressure(in): 29.9	:		
Atmospheric Stability: D	:		
Surface Roughness: Urban	:		
Time of Day: Day	:		
Stability Height(ft): 1001	:		
Cloud Cover(1-10): 2	:		
<b>Description</b>			
Release Time: : Plume Time: : Max. Distance (ft): 885	PLUME DISPERSION MODEL ILLUSTRATING A RELEASE OF CYCLOHEXYLAMINE AT 130 POUNDS/ MINUTE WITH WINDS FROM THE SOUTHWEST AT THE INTERSECTION OF THE EXISTING RAILWAY AND LILAC DRIVE.		Isopleths(ppm) 10.00 50.00  12/04/89

12/05/89	<b>EMERGENCY INFORMATION SYSTEM</b> <b>ALOHA MODEL</b>		12:47
<b>Chemical Name: CYCLOHEXYLAMINE</b>			
<b>Release Type</b>			
<b>Puddle Spill                      Continuous Release                      Puff Release</b>			
<b>Area(ft<sup>2</sup>):</b>	<b>Rate(lbs/min):</b> 130	<b>Amount(lbs):</b>	
<b>Concentrations(ppm)</b> 10.00 50.00	<b>Release Location:</b> Latitude: 37.00 °      Longitude: 76.00 °		

#### IV. WASTE MANAGEMENT PROGRAMS

##### A. Solid Waste Management

###### 1. Municipal Solid Waste

Portsmouth is a member of the Southeastern Public Service Authority (SPSA) which is comprised of eight jurisdictions; the authority manages all municipal solid waste generated by the City. Municipal solid waste is transported by truck to the SPSA landfill in Suffolk or to the refuse derived fuel plant in Portsmouth. The City also operates a construction/demolition debris landfill on Craney Island for the disposal of waste generated by the Portsmouth Redevelopment and Housing Authority. All other construction and demolition debris waste is disposed of at the Suffolk landfill. City trucks transport this waste to this site. No solid waste is transported by rail in the SPSA region or in Portsmouth. Similarly, no infectious waste is transported by rail.

###### 2. Industrial Solid Waste

There are no industrial waste landfills in the City of Portsmouth; No industrial waste is transported by rail.

##### B. Hazardous Waste Management

Department of Waste Management records indicate that there are fifty-nine (59) entities in the City of Portsmouth subject to the Virginia Hazardous Waste Management Regulations (VHWMR). These facilities consist of two (2) storage facilities, eight (8) large quantity generators (greater than 1000 kilograms per month), forty-seven (47) small quantity generators (between 100 and 1000 kilograms per month), and 2 transporters. A list of those regulated is shown in Table IV. B.1. Businesses shipping wastes off-site for treatment, storage, or disposal transport their wastes by highway. No shipments of hazardous wastes occur by rail from or through the City of Portsmouth. Even if hazardous wastes were transported by rail, the same issues would likely be addressed by the analysis in Part III, supra.

##### C. Superfund

The National Priorities List (NPL) is the list of sites identified by the United States Environmental Protection Agency as qualifying for cleanup under the Comprehensive Environmental Response, Compensation and Liability Act or "Superfund." Two sites in the City of Portsmouth are listed on the NPL. The Abex Corporation site and the Atlantic Wood Preservers site will be cleaned up under the federal program. Sixteen (16) additional sites will be investigated to determine if they merit further treatment under Superfund.

Based upon current knowledge, no wastes from Superfund cleanups will be transported by rail.

TABLE IV. B.1.

FACILITIES/TRANSPORTERS WITHIN PORTSMOUTH  
 SUBJECT TO THE VIRGINIA HAZARDOUS WASTE  
 MANAGEMENT REGULATIONS

TSD FACILITIES	EPA ID#	ADDRESS	LOCATION	ZIP
U S NAVY ST. JULIENS ANNEX	VA5170000181	NORFOLK NAVAL SHIPYAR	PORTSMOUTH	VA 23709
U S NAVY NORFOLK NAVAL SHIPYRD	VA1170024813	CODE 410 H BLDG M22 PUB. WORK	PORTSMOUTH	VA 23709
<b>LARGE QUANTITY GENERATORS</b>				
B P OIL, INC	VAD000779843	3950 BURTONS POINT RD	PORTSMOUTH	VA 23704
FIATALLIS NORTH AMERICAN	VAD087340048	2400 WESLEY ST	PORTSMOUTH	VA 23707
HOECHST CELANESE - SPEC. CHEM.	VAD003175262	3349 WEST NORFOLK RD	PORTSMOUTH	VA 23703
PROCTER & GAMBLE MFG CO	VAD003174810	3600 ELM AVE	PORTSMOUTH	VA 23704
SEAGRAVES COATINGS - SEAGUARD	VAD981730377	4030 SEAGUARD AVE	PORTSMOUTH	VA 23701
SEALAND SERVICE INC	VAD132035601	1800 SEABOARD AVE	PORTSMOUTH	VA 23707
U S COAST GUARD SUPPORT CENTER	VA4690320235	4000 COAST GUARD BLVD	PORTSMOUTH	VA 23703
U S NAVY SOUTHGATE ANNEX	VA9170090022	NORFOLK NAVAL SHIPYARD C-400H	PORTSMOUTH	VA 23709
<b>SMALL QUANTITY GENERATORS</b>				
ACTION OLDS CAD GMC TRUCK INC	VAD023873003	1300 HIGH ST	PORTSMOUTH	VA 23704
ALBANO CLEANERS INC	VAD981109721	1140 COUNTY ST	PORTSMOUTH	VA 23704
ALBANO CLEANERS INC	VAD038542114	1501 HAMILTON AVE	PORTSMOUTH	VA 23707
ALBANO CLEANERS INC	VAD981109788	321 HIGH ST	PORTSMOUTH	VA 23704
ALBANO CLEANERS INC	VAD981109846	2854 AIRLINE BLVD	PORTSMOUTH	VA 23701
ASSOCIATED NAVAL ARCHITECTS	VAD003174885	3400 SHIPWRIGHT ST	PORTSMOUTH	VA 23703
ATLANTIC TECHNICAL SERVICE	VAD982696312	2000 SEABOARD AVE BLDG 408	PORTSMOUTH	VA 23707
ATLANTIC WOOD IND.	VAD990710410	3950 ELM AVE	PORTSMOUTH	VA 23704
BAY DIESEL CORP	VAD101719243	607 COMMERCE ST	PORTSMOUTH	VA 23707
BILL LEWIS CHEVROLET CORP	VAD023877640	TURNPIKE RD & HARBOR DRIVE	PORTSMOUTH	VA 23704
BOB EWELL TIRE SERVICE INC	VAD023875693	703 CONSTITUTION AVE	PORTSMOUTH	VA 23704
BOULEVARD MOTOR SERVICE	VAD023873920	1411 AIRLINE BLVD	PORTSMOUTH	VA 23707
CHURCHLAND CLEANERS	VAD089017750	5750 CHURCHLAND BLVD	PORTSMOUTH	VA 23703
CLASSIC FABRICARE	VAD981734882	3537 VICTORY BLVD	PORTSMOUTH	VA 23701
CLEANERAMA CLEANERS	VAD083045245	3231 TYRE NECK RD	PORTSMOUTH	VA 23703
CULPEPPER RADIATOR SERVICE INC	VAD023875123	3511 TACE ST	PORTSMOUTH	VA 23707
CUMBIA'S BODY SHOP INC	VAD023875131	400 CUMBERLAND AVE	PORTSMOUTH	VA 23707
DON COMER FORD INC.	VAD023874779	2525 AIRLINE BLVD	PORTSMOUTH	VA 23701
EXXON CO. USA	VAD982580789	5830 HIGH ST W	PORTSMOUTH	VA 23703
EXXON CO. USA RAS26368	VAD982365694	720 LONDON BLVD	PORTSMOUTH	VA 23704
HAGWOOD LAUNDRY & DRYCLEANERS	VAD982579773	5808 CHURCHLAND BLVD	PORTSMOUTH	VA 23703
HAGWOOD'S INC	VAD023876238	1001 ELM AVE	PORTSMOUTH	VA 23704
INTERNATIONAL SPRING CORP	VAD043429836	3100-B ELMHURST LN	PORTSMOUTH	VA 23701
KOOL, JOHN LINCOLN-MERCURY	VAD981737448	1313 HIGH ST	PORTSMOUTH	VA 23704
MOON ENGINEERING CO.	VAD981744030	2 HARPER RD	PORTSMOUTH	VA 23707
PINNERS POINT TREATMENT PLANT	VAD982570483	320 SEABOARD AVE	PORTSMOUTH	VA 23707
PORTSMOUTH PUBLIC SCHOOLS	VAD981039423	3920 BURTONS POINT RD	PORTSMOUTH	VA 23704
PORTSMOUTH TOOL & DIE CORP	VAD046247276	807 FLORIDA AVE	PORTSMOUTH	VA 23707
PORTSMOUTH, CITY OF	VAD980829691	100 PARK RD	PORTSMOUTH	VA 23707
QUALITY BOATS CO INC	VAD003772605	VICTORY & DEEP CREEK BLVDS	PORTSMOUTH	VA 23702
RIDDLE HONDA	VAD063422463	2615 AIRLINE BLVD	PORTSMOUTH	VA 23701
RYDER TRUCK RENTAL INC	VAD124754508	3009 BALLARD AVE	PORTSMOUTH	VA 23701
SALES SYSTEMS LIMITED	VAD055483846	700 FLORIDA AVE	PORTSMOUTH	VA 23707
SOUTHEASTERN PUBLIC SERVICE	VAD980690846	4 VICTORY BLVD	PORTSMOUTH	VA 23702

TABLE IV. B.1.

FACILITIES/TRANSPORTERS WITHIN PORTSMOUTH  
 SUBJECT TO THE VIRGINIA HAZARDOUS WASTE  
 MANAGEMENT REGULATIONS  
 (CONTINUED)

SMALL QUANTITY GENERATORS (continued)	EPA ID#	ADDRESS	LOCATION	ZIP
STRATEGIC ALLOYS INC	VAD150709772	2001 PONDEROSA ST	PORTSMOUTH	VA 23701
TARMAC - LONESTAR PORT NORFOLK	VAD039050661	101 CHAUTAUQUA AVE	PORTSMOUTH	VA 23707
TOWER TOYOTA DODGE	VAD049955651	2865 AIRLINE BLVD	PORTSMOUTH	VA 23701
U S NAVY REGIONAL MEDICAL CENT	VA6170024818	U S NAVY REGIONAL MEDICAL CENT	PORTSMOUTH	VA 23708
VA INTERNATIONAL TERMINALS	VAD151888757	2000 SEABOARD AVE PMT	PORTSMOUTH	VA 23707
VA NAT GUARD SHOP 6	VAD981111826	3150 ELMHURST LN	PORTSMOUTH	VA 23701
VICTORY MOTORS INC	VAD023881451	3601 VICTORY BLVD	PORTSMOUTH	VA 23701
VIRGINIA TRUCK EQUIPMENT CO	VAD982569592	2808 FREDERICK BLVD	PORTSMOUTH	VA 23707
VOLVO GM HEAVY TRUCK	VAD982573305	750 CHAUTAUQUA AVE	PORTSMOUTH	VA 23707
WAYSIDE CLEANERS INC	VAD023881642	4711 PORTSMOUTH BLVD	PORTSMOUTH	VA 23701
WESTERN BRANCH DIESEL INC	VAD003177086	3504 SHIPWRIGHT ST	PORTSMOUTH	VA 23703
WESTWOOD CLEANERS	VAD981744162	1040 FREDERICK BLVD	PORTSMOUTH	VA 23707
WESTWOOD CLEANERS	VAD981744105	3134 TYRE NECK RD	PORTSMOUTH	VA 23703
TRANSPORTERS				
HOLLAND JOHN C. ENTERPRISES	VAD063426530	2236 RANDOLPH ST	PORTSMOUTH	VA 23704
MARINE LEASING SERVICES INC	VAD982579872	1420 COLUMBUS AVE	PORTSMOUTH	VA 23704



## V. CONCLUSION

Most of the Department of Waste Management's programs are unaffected by the location of the Norfolk Southern Railway. The exception is the community right-to-know and emergency planning program administered by the Department through the VERC. Plume dispersion modeling suggests that the same populations would be affected should a hazardous chemical accident occur on the railway regardless of its location. Moreover, recent chemical production and distribution changes at the Hoechst Celanese facility in Portsmouth have substantially reduced the probability of a hazardous materials incident occurring on the existing Norfolk Southern Railway.