

QUALITY ASSURANCE OF INPUTS TO SOURCE
INFORMATION FOR CHLORINATED ORGANICS

FINAL REPORT

DCN No. 86-203-024-79-09
EPA Contract No. 68-02-3889
Radian No. 203-024-79

QUALITY ASSURANCE OF INPUTS TO SOURCE
INFORMATION FOR CHLORINATED ORGANICS

FINAL REPORT

Prepared for:

Dr. Larry Zaragoza
Pollutant Assessment Branch
Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency
Research Triangle Park, North Carolina 27711

Prepared by:

Kathleen Q. Kuhn and David P. Seifert

Radian Corporation
3200 Progress Center
Research Triangle Park, North Carolina 27709

September 29, 1986

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 INTRODUCTION	1
2.0 RESULTS	2
3.0 VERIFICATION PROCEDURE	4
4.0 REFERENCES	10
APPENDIX A: Chlorine Production Category	A-1
Table of Contents	A-2
Table A-1. Sources of Current Modeling Information	A-3
Source Verification Summary Sheets	A-4
References	A-22
APPENDIX B: CFC Production Category	B-1
Table of Contents	B-2
Table B-1. Sources of Current Modeling Information	B-3
Source Verification Summary Sheets	B-4
References	B-31
APPENDIX C: Other Chemical Plants Category	C-1
Table of Contents	C-2
Table C-1. Sources of Current Modeling Information	C-3
Source Verification Summary Sheets	C-4
References	C-49
APPENDIX D: Chlorinated Organics Production Category	D-1
Table of Contents	D-2
Table D-1. Sources of Current Modeling Information	D-3
Source Verification Summary Sheets	D-4
References	D-61

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
APPENDIX E: Pesticides Production Category	E-1
Table of Contents	E-2
Table E-1. Sources of Current Modeling Information	E-3
Source Verification Summary Sheets	E-4
References	E-13
APPENDIX F: EDC Production Category	F-1
Table of Contents	F-2
Table F-1. Sources of Current Modeling Information	F-3
Source Verification Summary Sheets	F-4
References	F-51

1.0 INTRODUCTION

In recent studies of several source categories of chlorinated organic compound emissions, the U.S. Environmental Protection Agency (EPA) identified several sources that may pose high human health risks. These compounds are ethylene dichloride, carbon tetrachloride, chloroform, perchloroethylene, trichloroethylene, and methylene chloride. This report examines (1) certain inputs used in dispersion modeling and (2) the likelihood that locations immediately surrounding facilities that emit the compounds identified above could be habitable.

Radian confirmed the existing model inputs or provided corrected information for each of the point sources of concern. The information evaluated for the point sources is documented in the source summary sheets. This information includes:

- the latitude and longitude of the source,
- the most appropriate STAR meteorological station for the source,
- a description of the topography and habitability of the area of maximum modeled concentrations (for each chemical, in the case of multiple pollutants from one source), and
- a description of the topography and population density of the area within 50 kilometers of the source.

Section 2.0 is a summary of the results of the verification work. Section 3.0 is a description of the verification methodology. Section 4.0 contains a list of the references used in verifying all the point sources of concern in this project. The summary sheets containing the source information described above, photocopies of the maps containing source locations, and concentration grid overlays for use with the maps are included in the Appendices by source category. A list of the sources of the current modeling information and a list of references used to verify the latitudes and longitudes is also included in each Appendix.

2.0 RESULTS

A summary of the suggested changes in the modeling information is presented in Table 1. Changes in the modeling inputs were suggested for 14 of the 62 sources verified in this project. Changes in latitude and longitude only were recommended for ten sources, changes in the STAR site selection were recommended for two sources, and changes in both latitude and longitude and STAR site selection were recommended for two sources. Radian recommended that the dispersion modeling be repeated, with the suggested changes, for the 14 sources listed in Table 1. Sources for which differences in reported and verified coordinates were different by more than 1.5 minutes were highlighted. The reported coordinates are those that were being used to model risk at the time that the source data were being verified.

The topographic analysis indicates that 38 of the sources studied, or 61%, are located within 0.5 kilometers of a nonhabitable area. In addition, the predicted maximum concentrations of pollutants from six of the sources studied, or 10%, occur within 0.1 kilometers of a nonhabitable area. Nonhabitable areas are usually bodies of water, such as bays, rivers, streams, and settling and disposal ponds. A review of the population density within 50 kilometers of each source has shown that 13 of the sources studied, or 21%, are located in urban areas. An urban area is one in which the population density is greater than or equal to 200 persons per square kilometer. This is the population density at which 50% of the area within 50 kilometers of the source is indicated to be urban on the topographic map.

TABLE 1. SUMMARY OF SUGGESTED CHANGES IN THE HEM SOURCE INPUTS FOR CHLORINATED ORGANICS

Source Category	Facility/Location	Suggested Change
Chlorine Production	Diamond Shamrock Delaware City, DE	STAR site
CFC Production	Allied Chemical Danville, IL	latitude & longitude ^a
	Racon Wichita, KS	latitude & longitude
Chlorinated Compound Users	Dow Chemical Pittsburg, CA	latitude & longitude
(Other Chemical Plants)	Du Pont Beaumont, TX (hypalon)	latitude & longitude
	B.F. Goodrich Cleveland, OH #1 (rub. acc.)	city latitude & longitude STAR site
Chlorinated Hydro-carbon Production	Diamond Shamrock Belle, WV	latitude & longitude STAR site
	LCP Moundsville, WV	latitude & longitude
	Stauffer Chemical Axis, AL	STAR site
	Vulcan Chemicals Wichita, KS	latitude & longitude
Ethylene Dichloride Production	B.F. Goodrich Calvert City, KY	latitude & longitude ^a
	B.F. Goodrich La Porte, TX	latitude & longitude
	Dow Chemical Oyster Creek, TX	latitude & longitude ^a
	Formosa Point Comfort, TX	latitude & longitude

^aThe verified latitude and longitude for these sources differs by less than 1.5 minutes from the current coordinates. But because it was estimated that habitability of the area of predicted maximum concentration would change significantly if the verified coordinates were used, it was recommended that the coordinates be changed.

3.0 VERIFICATION PROCEDURE

This section contains a summary of the procedure used to select sources to be verified, verify source information, gather information on population and topography, and determine the habitability of the area of predicted maximum concentrations. The procedure for verifying the coordinates of colocated sources is also described in this section.

Selecting Sources to be Validated

For some pollutants or source categories, model inputs for all of the source locations can be evaluated. However, the level of effort for this project prohibited verifying all sources in a category because there were too many locations. Higher risk sources were selected from computer printouts of the Human Exposure Model previously run by EPA that were provided to Radian. The sources to be evaluated in this study include those resulting in a maximum individual lifetime risk of cancer of 1×10^{-4} or greater (when the maximum individual risks for all the pollutants emitted from a source are summed). (This will likely provide an overestimate of the maximum individual risk because different pollutants may have different points of maximum concentrations.) Unless otherwise directed by the EPA Technical Project Officer, Radian identified sources that (1) have an aggregate risk of ten percent of the aggregate risk for that chemical (across all sources categories) and (2) meet the 1×10^{-4} maximum individual (combined chemical) risk cutoff.

Verifying Latitude and Longitude

The locations of the sources were identified on U. S. Geological Survey maps using the existing latitude and longitude information. If the location indicated by the latitude and longitude did not appear to be the location of the plant, the coordinates were evaluated using one or all of the following sources of information. First, latitude and longitude were obtained from the Section 114 responses, when available. Second, state agencies were asked to provide the latitude and longitude supplied by the facility in state air permit applications. Third, summaries of the National Emission Data System (NEDS), when

available, were examined for their latitude and longitude information. Fourth, if the location of a facility was still uncertain, then the plant address and latitude and longitude was obtained directly from the plant personnel. The Technical Project Officer was notified when plant personnel were contacted.

If the verified latitude and longitude of a facility differed from the existing information by more than one and one-half minutes (approximately 2 kilometers), Radian recommended that the model inputs be updated to reflect the verified coordinates. Radian also recommended changing the latitude and longitude if habitability of the area of predicted maximum concentrations was significantly different at the current and the verified locations. Based upon sensitivity analyses of the HEM, it was recommended that the dispersion modeling should be repeated when changes in the verified latitude or longitude were different by 1.5 minutes or more. [Note: 1 minute = 1.5 kilometers.] The verified source location was marked on the photocopied map with a large cross (+).

STAR Site Selection

The HEM uses meteorological data for air dispersion modeling near a source. The HEM chooses meteorological data from the STAR (STability ARray) site closest to the facility being modeled. However, meteorological information from the STAR site nearest to the facility may not provide the best basis for dispersion modeling of that source. Wind patterns at the source location may differ significantly from those at the nearest STAR site if the source is located in complex terrain or near a coastal region. For sources located in these topographically complex regions, further analysis of the STAR site selected by the HEM is necessary to ensure that the meteorological conditions at the STAR site selected are truly representative of those at the facility.

The following is a description of the procedure followed by Radian's staff meteorologist to evaluate the appropriateness of the STAR site chosen by the HEM for each facility. The STAR sites selected for each facility were obtained from the HEM printouts provided by the Technical Project Officer.

A four-step procedure was used to verify that the HEM selected an appropriate STAR site for each source. First, the location of the STAR site was identified on a U. S. Geological Survey topographical map. Second, the coordinates of nearby STAR site locations were identified from STAR site selection maps in SAI's "Human Exposure to Atmospheric Concentrations of Selected Chemicals, Volume 1."¹

Third, the topography around the source was examined to identify any significant features, such as river valleys, mountains, or coastal areas that may affect wind flow near the source. The topography of the area around the current STAR site was examined in the same way. If the topography of the source location causes severe wind flow distortions not found at the current STAR site, an alternate STAR site was considered.

Fourth, the annual surface wind rose patterns in the area near the source were examined. Climatological wind rose patterns were obtained from the U. S. Department of Commerce Climatic Atlas of the United States.² If wind rose patterns at the source location were significantly different from those at the STAR site selected by the model, then the wind rose patterns at other nearby STAR sites were examined to identify a more appropriate STAR site. The possible influence of topography on wind flow at the STAR site was also considered.

Alternate STAR sites were selected from the STAR Tabulations Master Lists.^{3,4} Only STAR sites within 200 kilometers of the point source were considered as alternates. If an alternate STAR site was suggested, Radian recommended that the dispersion modeling be repeated with the new STAR site. The choice of STAR site has been found to significantly affect the results of the dispersion modeling.

Gathering Population and Geographical Data

Population density was estimated using the latest available U. S. census data.⁵ The population density in the area within 50 kilometers of a source was estimated by summing the populations of all census tracts within a 50-kilometer radius of the facility and dividing by the area (7,850 km²). Geographical and terrain descriptions were prepared by studying U. S. Geological Survey maps and an atlas of the United States.

Determining the Habitability of the Area Within 0.5 Kilometer of a Source

The HEM generates a single point estimate for the point of maximum concentration. In order to assess the reasonableness of the maximum individual risk estimate, the point of predicted maximum concentration has been examined to determine if that point was likely to be habitable.

Although the HEM provides a single point estimate as the point of maximum concentration, there are several reasons that the point of maximum concentration should be examined as an area of maximum concentration when interpreting HEM results. First, there is uncertainty associated with input parameters used in the HEM (e.g., emission rates, stack gas velocity). Second, even when a particular model input may be well defined, such as in cases where years of meteorological data are available, the input parameters may be better characterized statistically (e.g., a mean with some variance) than by a single point estimate. Third, the information on population distributions near facilities and the assumptions employed in the HEM are only intended to provide reasonable estimates of the relationship between population distribution and modeled concentrations.

The HEM models emissions as though they originate with a single point when actually individual emission points can be widely separated. Because of the uncertainty in dispersion parameters, as well as the uncertainty in dispersion modeling techniques, the maximum concentration can reasonably be characterized as an area that reflects the distribution of the probable points of maximum concentration. Therefore, the area that surrounds the point of maximum concentrations has also been examined. Following discussions with individuals familiar with the HEM, meteorology, and dispersion modeling in general, it has been decided, with EPA agreement, to examine the area within a 0.5 kilometer radius of the point of maximum impact.

There is one additional reason for providing descriptive information about the area surrounding the point of maximum modeled concentration. If better or different information characterizing the source to be modeled becomes available, the area predicted to experience the maximum concentration may shift to a nearby point. In this case, it

would be useful to know whether the new predicted point of concentration was habitable.

U. S. Geological Survey maps were examined to identify any nonhabitable areas within a 0.5-kilometer radius of a source. The distance and bearing of nonhabitable areas in relation to the source and to the point of predicted maximum concentration were described. Photocopies of the sections of the topographic maps containing the source locations were made and the area within 0.5 kilometers of the source were delineated on them. The point of predicted maximum concentration was marked on the map with a small "x". The location of the point of predicted maximum concentration relative to the location of the source is described in the source summary sheet. When more than one compound is emitted from a source and the points of predicted maximum concentration of these compounds occur in different locations, then the location of each point of predicted maximum concentration is described. The Technical Project Officer provided overlays of concentration grids, for each scale of map, for use in locating the area within 0.5 kilometers of a source and the points of predicted maximum concentrations. The photocopied maps and overlays are included in Appendices A through F.

Verifying Latitude and Longitude of Colocated Sources

Some emission sources, such as chemical plants, contain more than one process unit that emit pollutants of concern. Often, these plants submit a separate Section 114 response for each chemical. In these cases, it may be difficult to determine whether the chemicals are emitted from the same process unit or are emitted from different (colocated) process units, having different latitudes and longitudes, within the same plant. Such differences in location may cause significant differences in modeling results, particularly in some of the very large chemical plants, where process units may be located at considerable distances from each other. When this situation occurred, the Section 114 responses, when available, were examined to determine whether a unique latitude and longitude were submitted for each process unit. If

it remained unclear as to the colocation of process emission points, then ESED or SASD personnel who were working on the chemical or source category were consulted.

If these two steps failed to identify a reasonable latitude and longitude, then the latitude and longitude of the process units or directions to the process units were obtained from plant personnel. If directions to the process units were obtained, the latitude and longitude were estimated from the topographic map. This procedure was used to make a best estimate regarding the colocation of process units.

4.0 REFERENCES

1. Systems Applications, Incorporated. Human Exposure to Atmospheric Concentrations of Selected Chemicals. EPA Contract No. 68-02-3066. Prepared for the Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina. February 10, 1982.
2. U.S. Department of Commerce. Climatic Atlas of the United States. National Climatic Center, Asheville, North Carolina. 1968.
3. U.S. Department of Commerce. STAR Tabulations Master List. National Climatic Data Center, Asheville, North Carolina. May 1983.
4. U.S. Department of Commerce. WBAN Station Numbers Master List. National Climatic Center, Asheville, North Carolina. August 1978.

APPENDIX A:
CHLORINE PRODUCTION CATEGORY

SOURCE SUMMARY SHEETS FOR CHLORINE PRODUCTION

TABLE OF CONTENTS

<u>Facility/Location</u>	<u>Page</u>
Table A-1. Sources of Current Modeling Information	A-3
1. Diamond Shamrock/Battleground, TX	A-4
2. Diamond Shamrock/Deer Park, TX	A-7
3. Diamond Shamrock/Delaware City, DE	A-10
4. Diamond Shamrock/Mobile, AL	A-13
5. Diamond Shamrock/Muscle Shoals, AL	A-16
6. Vulcan Chemical/Geismar, LA	A-19
References	A-22

TABLE A-1. SOURCES OF CURRENT MODELING INFORMATION

Maximum Individual Risk Values

1. Memorandum from Zaragoza, L.D., EPA: SASD, to the Files. Carbon Tetrachloride Exposure and Risk Analysis. August 6, 1985.
2. Memorandum from Mohin, T.J., EPA: SASD, to the Files. Chloroform Exposure and Risk Assessment. June 10, 1985.
3. Memorandum from Vandenberg, J.J., EPA: SASD, to the Files. Perchloroethylene Exposure and Cancer Risk Analysis. November 15, 1985.

Latitude & Longitude, STAR Site, and Predicted Maximum Concentration

4. Human Exposure Model Printout for Carbon Tetrachloride. March 4, 1986.
5. Human Exposure Model Printout for Chloroform Emissions from CFC Production. February 27, 1986.
6. Excerpts from Human Exposure Model Printouts for Perchloroethylene Users and Perchloroethylene Producers. Phase I data. Received from John Vandenberg, EPA: SASD. Undated.

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Diamond Shamrock
Location: Battleground, Texas
Source Category: Chlorine Production
Compound: Carbon tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	29 44 03	29 43 53	8,9
Longitude:	95 05 00	95 05 02	8,9
STAR Site:	# 12906	# 12906	
Location:	Houston, TX	Houston, TX	
Distance from source:	15.34 km	15 km	
Bearing from source:	212	210	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain in Gulf Coast region. Source is about 2 km SE of Buffalo Bayou. Urban.

Population density: 249 persons/km²

Population of Battleground: --^a

Deer Park: 22,648 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 5.6×10^{-4}

Predicted maximum concentration of compound: 37.256 ug/m³

Location of predicted maximum concentration: 0.2 km N of source.

Topography: Flat.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

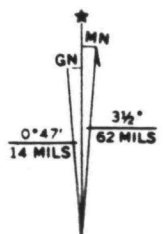
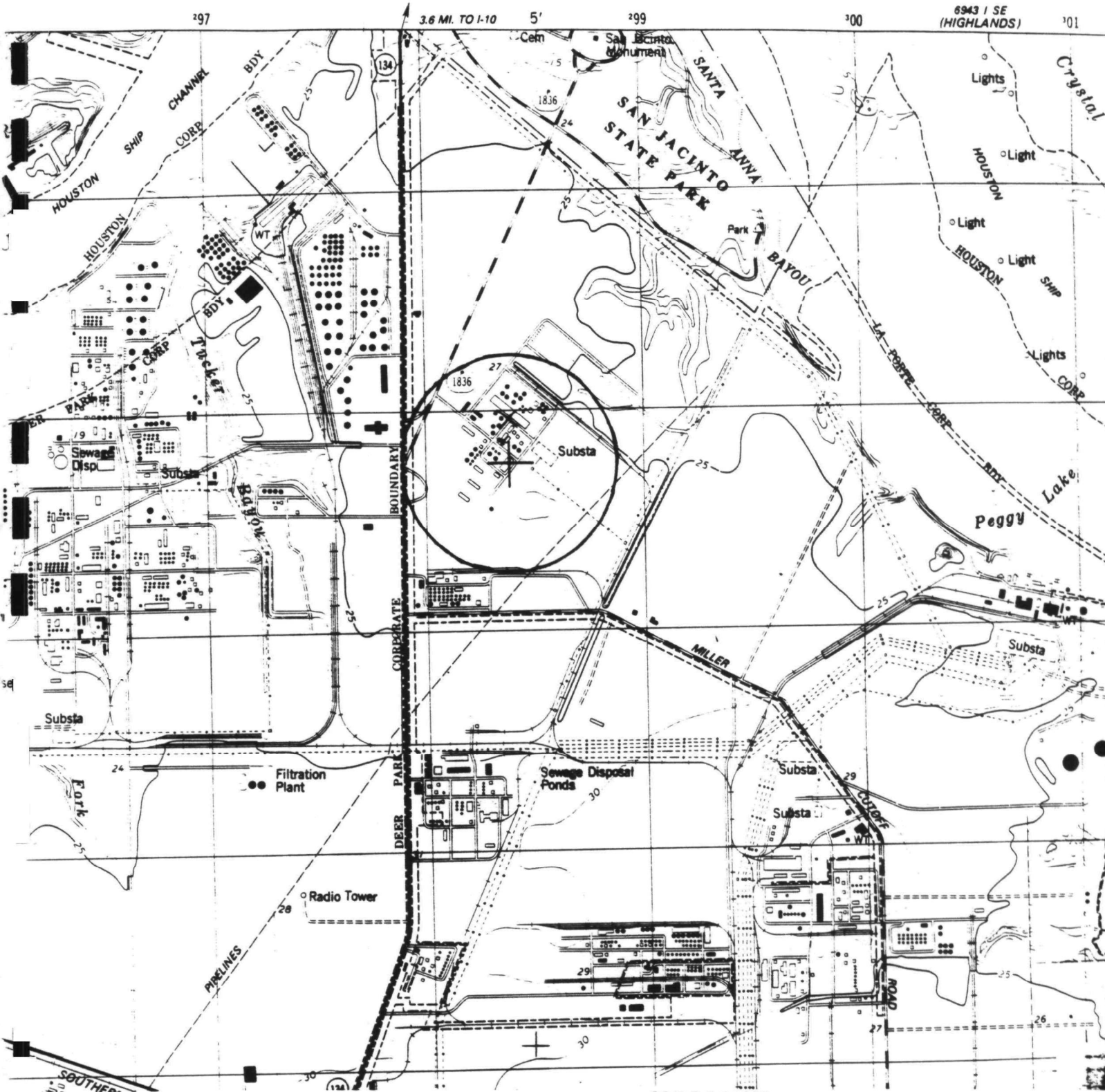
^aNot a census-designated place.

Location of nonhabitable areas relative to source:

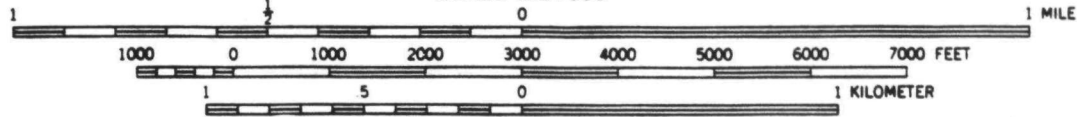
Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude are very close to the coordinates provided by the Texas Air Control Board. However, the coordinates provided by Texas appear more reasonable on the U.S.G.S. map. The Houston STAR site is the most representative site for this source, which is very close to Deer Park.



SCALE 1:24 000



CONTOUR INTERVAL 10 FEET
A-6 DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL
CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

UTM GRID AND 1968 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Diamond Shamrock

Location: Deer Park, Texas

Source Category: Chlorine Production

Compound: Carbon tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	29 43 41	29 43 41	8,9
Longitude:	95 06 35	95 06 35	8,9
STAR Site:	# 12906	# 12906	
Location:	Houston, TX	Houston, TX	
Distance from source:	13.54 km	13.54 km	
Bearing from source:	204	204	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain in Gulf Coast region. Source is about 4 km NE of the city of Deer Park and 2 km W of San Jacinto River. Urban.

Population density: 249 persons/km²

Population of Deer Park: 22,648 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 6.0×10^{-5}

Predicted maximum concentration of compound: 19.628 ug/m³

Location of predicted maximum concentration: 0.2 km N of source.

Topography: Flat.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 10%

Description of nonhabitable areas: Bayou and pond.

Location of nonhabitable areas relative to source: Bayou is 0.3 km W and pond is 0.4 km NE of source.

Location of nonhabitable areas relative to predicted maximum concentration: Bayou is 0.3 km W and pond is 0.3 km NE of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude differ from the coordinates provided by the Texas Air Control Board. The current coordinates were verified on the U.S.G.S. map as being more reasonable.

The Houston STAR site is the most representative site for Deer Park. This STAR site has been verified in other validation studies.

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Diamond Shamrock
Location: Delaware City, Delaware
Source Category: Chlorine Production
Compound: Carbon Tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	39 36 00	39 36 00	10,11,12
Longitude:	75 37 38	75 37 38	10,11,12
STAR Site:	# 13739	# 13707	
Location:	Philadelphia, PA	Dover, DE	
Distance from source:	45.06 km	46 km	
Bearing from source:	46	92	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Relatively flat to rolling terrain in coastal plain region of northeast Delaware. Source is about 1.3 km W of Delaware River. Rural.

Population density: 160 persons/km²

Population of Delaware City: 1,858 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.4×10^{-4}

Predicted maximum concentration of compound: 9.4556 ug/m³

Location of predicted maximum concentration: 0.2 km NE of source.

Topography: Flat.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 15%

Description of nonhabitable areas: Large Creek.

Location of nonhabitable areas relative to source: Creek is 0.25 km N of source.

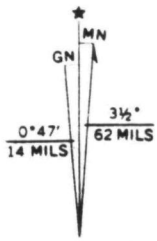
Location of nonhabitable areas relative to predicted maximum concentration: Creek is 0.15 km N of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude are identical to the coordinates provided by Diamond Shamrock. These coordinates were verified on the U.S.G.S. map as being reasonable.

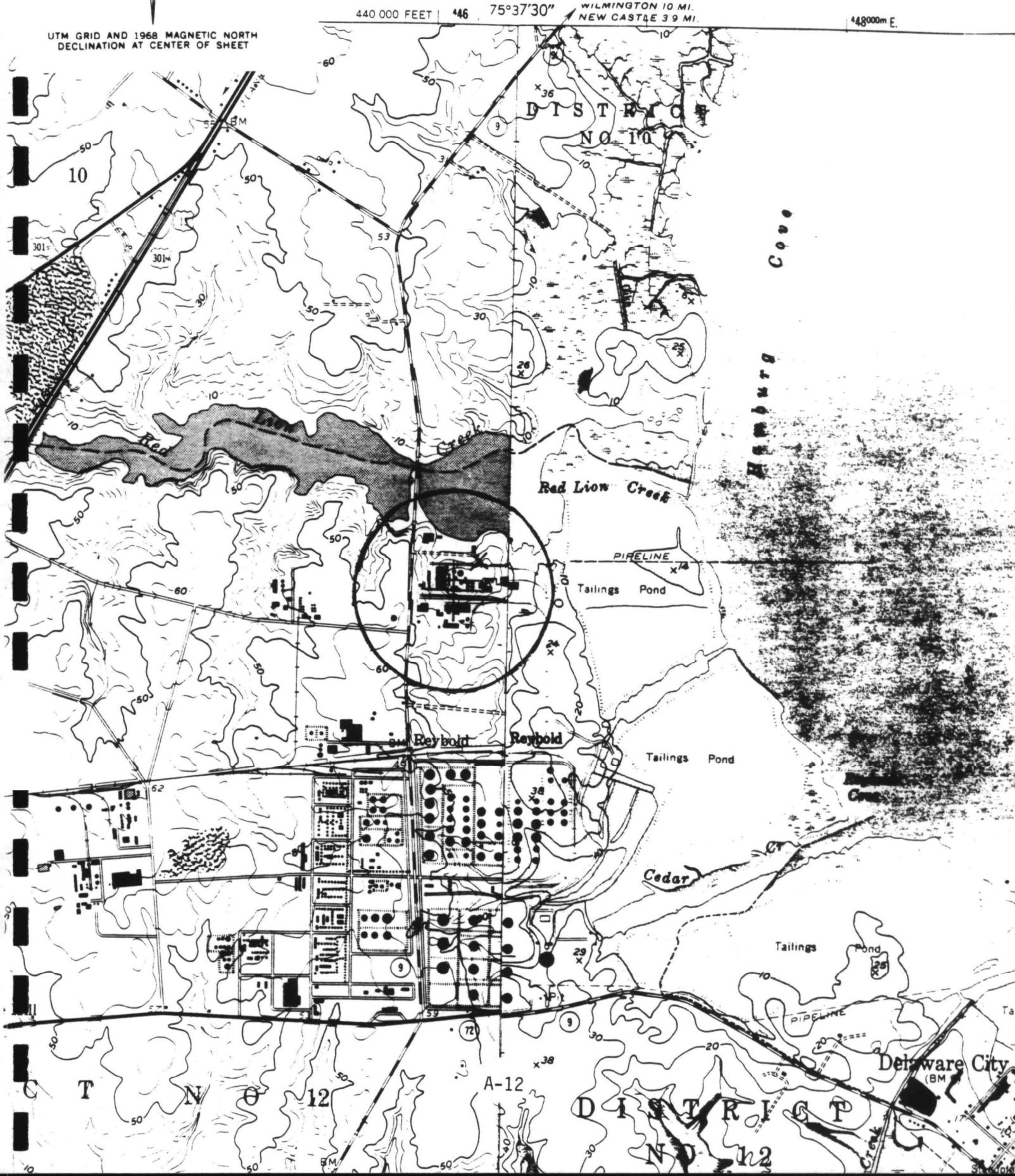
The Philadelphia STAR site is not the most representative site for Delaware City. Delaware City is in a relatively open area along the Bay. The Dover STAR site will be more representative of wind channeling in the Bay area than the Philadelphia site would. It is recommended that the STAR site be updated to Dover.

1 MILE



CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

440 000 FEET 446 15°37'30" WILMINGTON 10 MI.
NEW CASTLE 39 MI. 48000m E



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Diamond Shamrock
Location: Mobile, Alabama
Source Category: Chlorine Production
Compound: Carbon Tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 45 15	30 45 07	13,14,15
Longitude:	88 04 01	88 04 14	13,14,15
STAR Site:	# 03855	# 03855	
Location:	Pensacola, FL	Pensacola, FL	
Distance from source:	84.69 km	82 km	
Bearing from source:	122	120	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat lowland on Gulf coast in southwest Alabama. Source is 5 km W of Grand Bay and about 0.5 km N of the city of Mobile. Rural.

Population density: 55 persons/km²
Population of Mobile: 200,452 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 7.8×10^{-5}
Predicted maximum concentration of compound: 9.2619 ug/m³
Location of predicted maximum concentration: 0.2 km S of source.
Topography: Flat; within plant complex.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

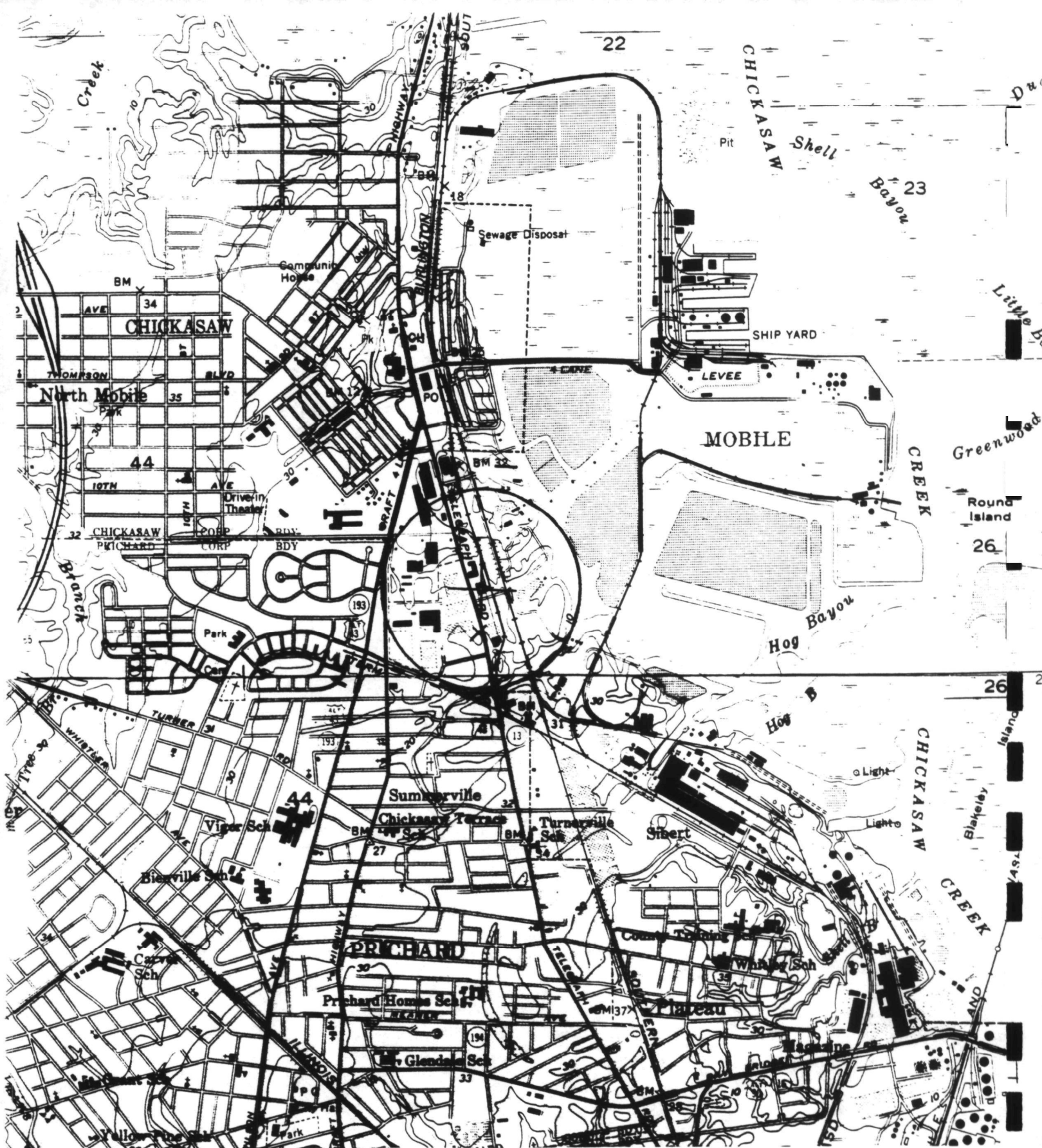
Percent nonhabitable area: 0%
Description of nonhabitable areas:
Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

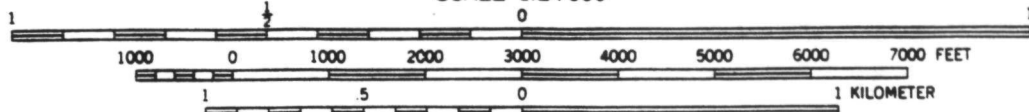
VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude are very close to the coordinates provided by the Alabama Air Pollution Control Commission. The coordinates provided by Alabama were verified on the U.S.G.S. map as being more reasonable.

The Pensacola STAR site is the most representative site for Mobile because they are both coastal sites. The next nearest STAR sites, Tallahassee and New Orleans, are both inland sites and are not representative of a coastal site.

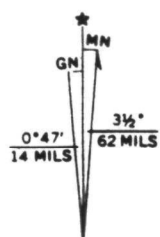


SCALE 1:24 000



CONTOUR INTERVAL 10 FEET

A-15 DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL



UTM GRID AND 1968 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Diamond Shamrock
Location: Muscle Shoals, Alabama
Source Category: Chlorine Production
Compound: Carbon tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	34 46 28	34 46 14	15,16,17
Longitude:	87 37 55	87 37 41	15,16,17
STAR Site:	# 13825	# 13825	
Location:	Columbus, MS	Columbus, MS	
Distance from source:	145.83 km	145 km	
Bearing from source:	211	215	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Rolling hills to mountains in northwestern Alabama.
Source is about 1.5 km S of Tennessee River and 4 km E of the city of Sheffield. Rural.

Population density: 24 persons/km²
Population of Muscle Shoals: 8,911 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 3.4×10^{-4}
Predicted maximum concentration of compound: 22.856 ug/m³
Location of predicted maximum concentration: 0.2 km S of source.
Topography: Occurs at a building in plant complex.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

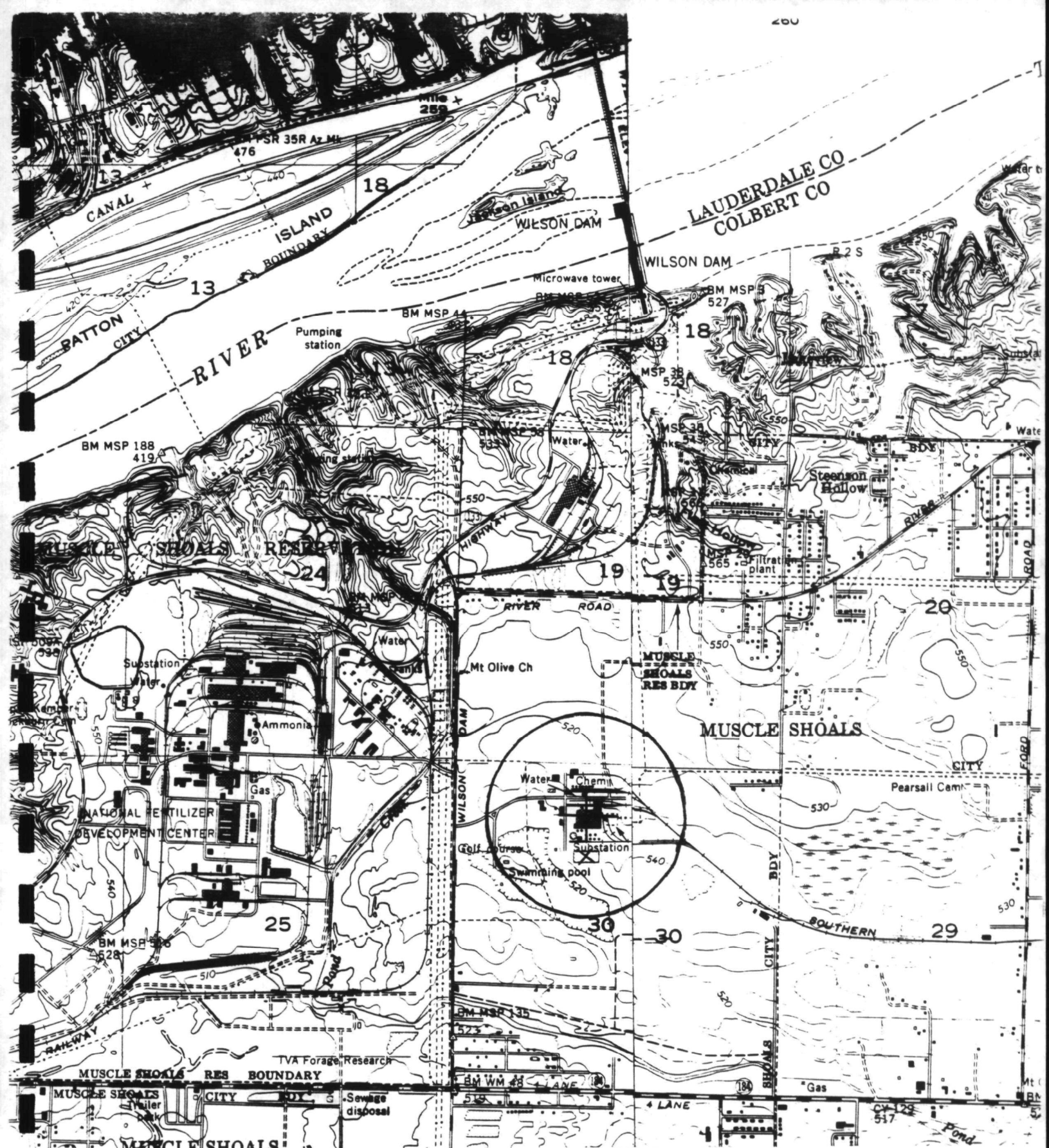
Percent nonhabitable area: 0%
Description of nonhabitable areas:
Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

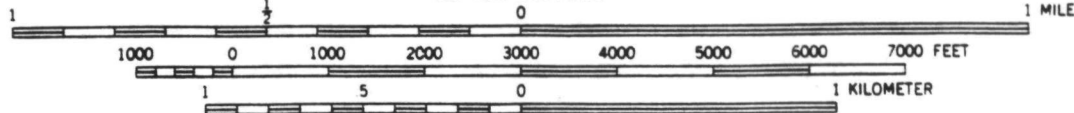
VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude are very close to the coordinates provided by the Alabama Air Pollution Control Commission. The coordinates provided by Alabama were verified on the U.S.G.S. map as being more reasonable.

The Columbus STAR site is the most representative site for Muscle Shoals. The next nearest STAR site is located in Anniston, Alabama, which is in the foothills of the Appalachian Mountains.



SCALE 1:24 000



CONTOUR INTERVAL 10 FEET

A-18 TTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

TO ALABAMA 20' 42000m E.

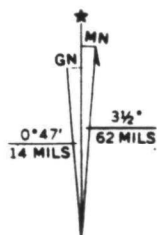
—GEOLOGICAL SURVEY WASHINGTON D C — 1972 (TVA 44-SW)

ROAD CLASSIFICATION

Mapped and edited by Tennessee Valley Authority
Published by the Geological Survey

Control by USCGS, USGS, and TVA

UTM GRID AND 1968 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Vulcan Chemical
Location: Geismar, Louisiana
Source Category: Chlorine production
Compound: Carbon Tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 11 22	30 11 15	2,34
Longitude:	90 58 51	90 58 51	2,34
STAR Site:	# 13970	# 13970	
Location:	Baton Rouge, LA	Baton Rouge, LA	
Distance from source:	41.52 km	40 km	
Bearing from source:	337	337	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain region along the Mississippi River in southeast Louisiana. Rural.

Population density: 60 persons/km²

Population of Geismar: --^a

Gonzales: 7,287 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.1×10^{-4}

Predicted maximum concentration of compound: 7.4049 ug/m³

Location of predicted maximum concentration: 0.2 km W of source.

Topography: Flat.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

^aNot a census-designated place.

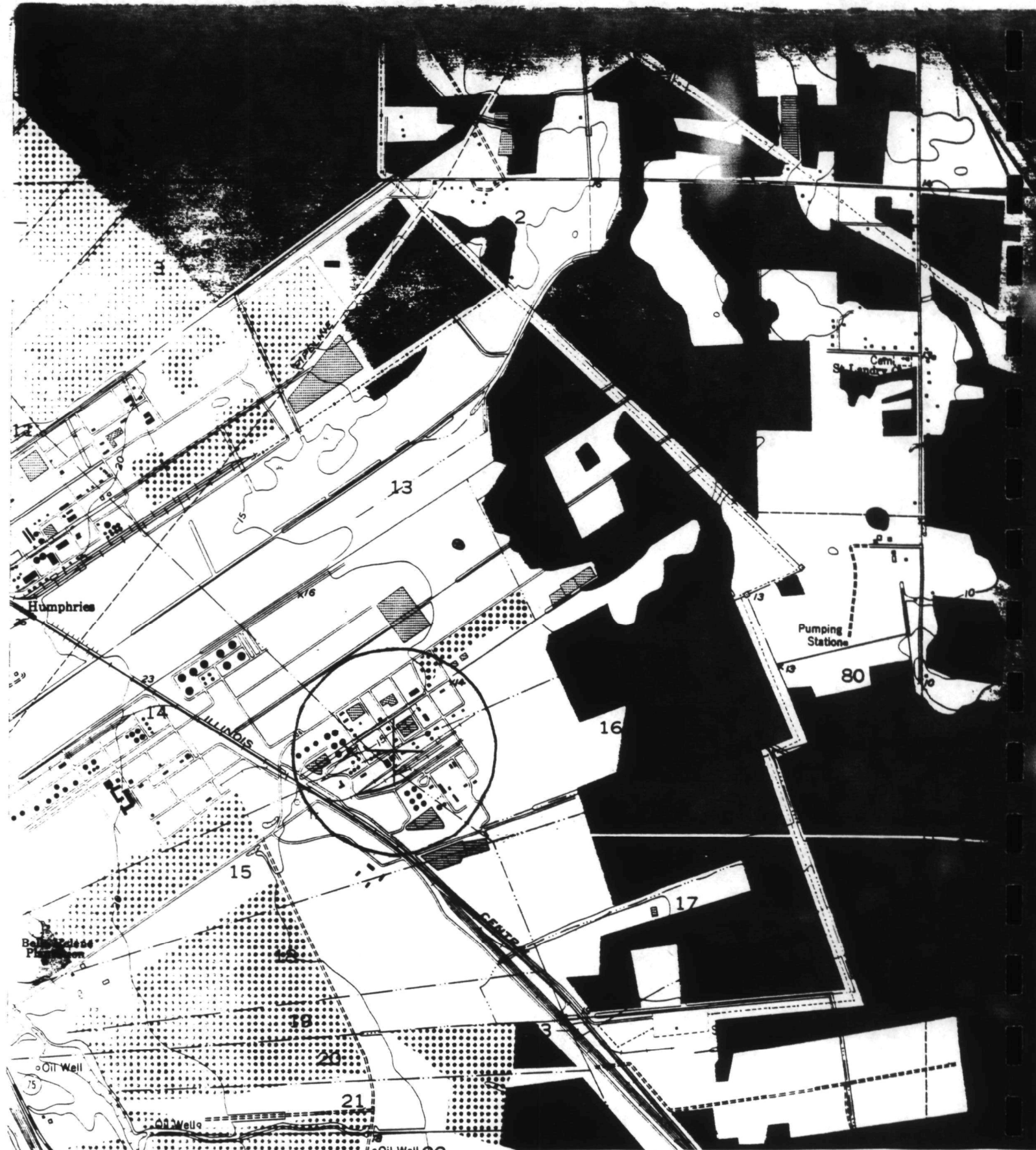
Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

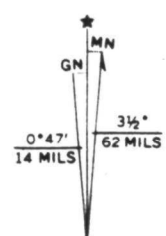
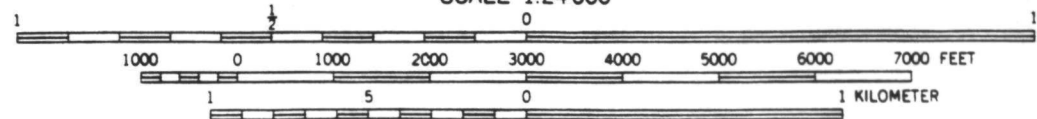
VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude are very close to the coordinates provided by the Louisiana Department of Environmental Quality. The coordinates provided by Louisiana were verified on the U.S.G.S. map as being more reasonable.

The Baton Rouge STAR site is most representative of conditions in Geismar. Baton Rouge and Geismar are both located on the Mississippi River.



SCALE 1:24 000



A-21 CONTOUR INTERVAL 10 FEET
TED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

UTM GRID AND 1968 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

REFERENCES

1. U. S. Geological Survey. 1963. Baton Rouge West, Louisiana. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1971 and 1980.
2. Louisiana Department of Environmental Quality, Air Quality Division. P. O. Box 44066, Baton Rouge, Louisiana 70804. (504) 342-1265.
3. U. S. Geological Survey. 1966. Danville N.E., Illinois. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1978.
4. U. S. Geological Survey. 1966. Danville S.E., Illinois. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1978.
5. Illinois Environmental Protection Agency. 2200 Churchill Road, Springfield, Illinois 62706. (217) 782-7326.
6. U. S. Geological Survey. 1964. Venice, California. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1981.
7. South Coast Air Quality Management District, Records Department. 9150 Flair Drive, El Monte, CA 91731. (818) 572-6200.
8. U. S. Geological Survey. 1982. La Porte, Texas. 7.5 Minute series topographic map, 1:24000 scale.
9. Texas Air Control Board. 6330 Highway 290 East, Austin, Texas 78723. (512) 451-5711.
10. U. S. Geological Survey. 1953. Saint Georges, Delaware. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1970.
11. U. S. Geological Survey. 1948. Delaware City, Delaware - New Jersey. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1970.
12. Telecon. Moody, T., Radian Corporation, with Timmons, R., Diamond Shamrock. February 28, 1986. Verification of latitude and longitude of the Delaware City facility.
13. U.S. Geological Survey. 1953. Chickasaw, Alabama. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1982.
14. U.S. Geological Survey. 1953. Mobile, Alabama. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1982.
15. Alabama Air Pollution Control Commission, Department of Public Health. Federal Drive, Montgomery, Alabama 36130. (205) 271-7700.
16. U.S. Geological Survey. 1971. Florence, Alabama. 7.5 Minute series topographic map, 1:24000 scale.

17. U.S. Geological Survey. 1971. Killen, Alabama. 7.5 Minute series topographic map, 1:24000 scale.
18. U.S. Geological Survey. 1978. Jersey Island, California. 7.5 Minute series topographic map, 1:24000 scale.
19. U.S. Geological Survey. 1978. Antioch North, California. 7.5 Minute series topographic map, 1:24000 scale.
20. U.S. Geological Survey. 1953. Antioch South, California. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1980.
21. U.S. Geological Survey. 1978. Brentwood, California. 7.5 Minute series topographic map, 1:24000 scale.
22. Bay Area Air Quality Management District. 939 Ellis Street, San Francisco, CA 94109 (415) 771-6000.
23. U.S. Geological Survey. 1967. Wilmington South, Delaware - New Jersey. 7.5 Minute series topographic map, 1:24000 scale.
24. U.S. Geological Survey. 1967. Penns Grove, New Jersey - Delaware. 7.5 Minute series topographic map, 1:24000 scale.
25. New Jersey Bureau of Air Pollution Control, Division of Environmental Quality, Department of Environmental Protection, CN027, Trenton, New Jersey 08625 (609) 292-5450.
26. U.S. Geological Survey. 1959. Montague, Michigan. 15 Minute series topographic map, 1:62500 scale.
27. Michigan Department of Natural Resources, Air Quality Division, Saginaw District Office. 411-J E. Genesee, Saginaw, Michigan 48607. (517) 322-1336.
28. U.S. Geological Survey. 1962. Lutchter, Louisiana. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1980.
29. U.S. Geological Survey. 1958. Calvert City, Kentucky. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1968.
30. U.S. Geological Survey. 1982. Little Cypress, Kentucky - Illinois. 7.5 Minute series topographic map, 1:24000 scale.
31. Kentucky Department of Environmental Protection, Division of Air Pollution Control. 18 Reilly Road, Frankfort, Kentucky 40601 (502) 564-3382.
32. U.S. Geological Survey. 1961. Bayneville, Kansas. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1970.

33. Kansas Bureau of Air Quality and Occupational Health, Division of Environment, Department of Health and Environment. Building 740, Forbes Field, Topeka, Kansas 66620. (913) 862-9360.
34. U.S. Geological Survey. 1961. Gonzales, Louisiana. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1980.

APPENDIX B:
CFC PRODUCTION CATEGORY

SOURCE SUMMARY SHEETS FOR CFC PRODUCTION

TABLE OF CONTENTS

<u>Facility/Location</u>	<u>Page</u>
Table B-1. Sources of Current Modeling Information	B-3
1. Allied Chemical/Baton Rouge, LA	B-4
2. Allied Chemical/Danville, IL	B-7
3. Allied Chemical/El Segundo, CA	B-10
4. DuPont/Antioch, CA	B-13
5. DuPont/Deepwater, NJ	B-16
6. DuPont/Montague, MI	B-19
7. Kaiser Aluminum/Gramercy, LA	B-22
8. Pennwalt/Calvert City, KY	B-25
9. Racon/Wichita, KS	B-28
References	B-31

TABLE B-1. SOURCES OF CURRENT MODELING INFORMATION

Maximum Individual Risk Values

1. Memorandum from Zaragoza, L.D., EPA: SASD, to the Files. Carbon Tetrachloride Exposure and Risk Analysis. August 6, 1985.
2. Memorandum from Mohin, T.J., EPA: SASD, to the Files. Chloroform Exposure and Risk Assessment. June 10, 1985.
3. Memorandum from Vandenberg, J.J., EPA: SASD, to the Files. Perchloroethylene Exposure and Cancer Risk Analysis. November 15, 1985.

Latitude & Longitude, STAR Site, and Predicted Maximum Concentration

4. Human Exposure Model Printout for Carbon Tetrachloride. March 4, 1986.
5. Human Exposure Model Printout for Chloroform Emissions from CFC Production. February 27, 1986.
6. Excerpts from Human Exposure Model Printouts for Perchloroethylene Users and Perchloroethylene Producers. Phase I data. Received from John Vandenberg, EPA: SASD. Undated.

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Allied Chemical
Location: Baton Rouge, Louisiana
Source Category: CFC Production
Compound: Chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 28 20	30 28 20	1,2
Longitude:	91 11 35	91 11 35	1,2
STAR Site:	# 13970	# 13970	
Location:	Baton Rouge, LA	Baton Rouge, LA	
Distance from source:	7.94 km	7.94 km	
Bearing from source:	31	31	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain region of the Gulf Coast. Large areas of wetlands. Source is about 0.55 km E of Mississippi River. Rural.

Population density: 62 persons/km²

Population of Baton Rouge: 219,419 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.1×10^{-4}

Predicted maximum concentration of compound: 6.4042 ug/m³

Location of predicted maximum concentration: 0.2 km W of source.

Topography: Gentle slope toward river.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

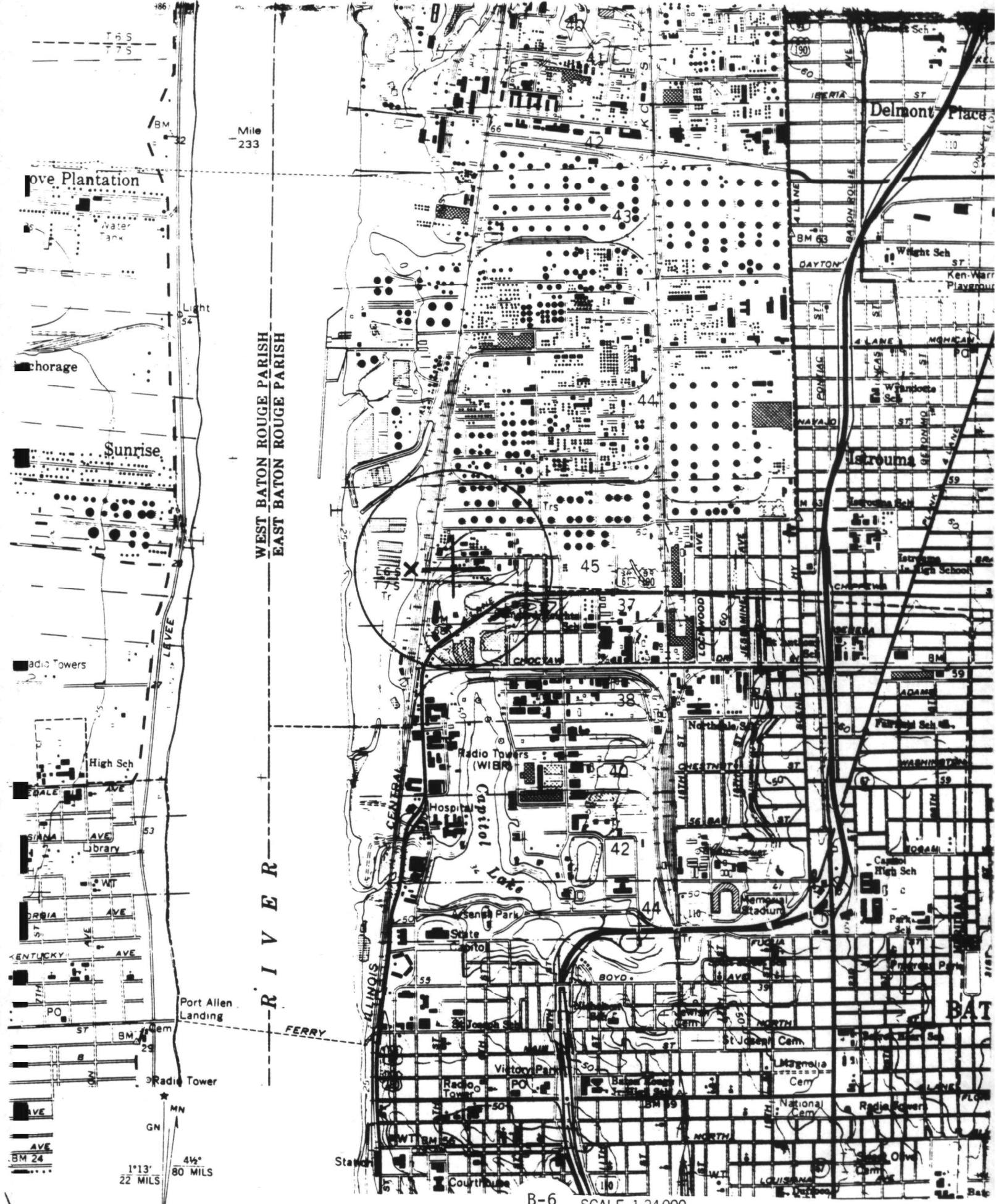
Description of nonhabitable areas:

Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude are very close to the coordinates provided by the Louisiana Department of Environmental Quality. The current coordinates were verified on the U.S.G.S. map using directions provided by plant personnel. The Baton Rouge STAR site is the most representative site for this source.



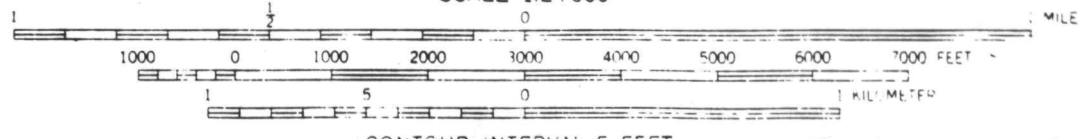
WEST BATON ROUGE PARISH
EAST BATON ROUGE PARISH

RIVER

Mile
233

B-6 SCALE 1:24,000

UTM GRID AND 1981 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Allied Chemical
Location: Danville, Illinois
Source Category: CFC Production
Compound: Carbon Tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	40 08 00	40 07 10	3,4,5
Longitude:	87 33 45	87 33 45	3,4,5
STAR Site:	# 14806	# 14806	
Location:	Rantoul, IL	Rantoul, IL	
Distance from source:	53.18 km	55 km	
Bearing from source:	291	300	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Hills to low mountains in east-central Illinois. Urban area of Danville is 1.5 km NW of source. Source is about 2 km W of Illinois-Indiana state line. Rural.

Population density: 30 persons/km²

Population of Danville: 38,985 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 9.9×10^{-5}

Predicted maximum concentration of compound: 6.5932 ug/m³

Location of predicted maximum concentration: 0.2 km N of source.

Topography: Flat

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 1%

Description of nonhabitable areas: Settling pond.

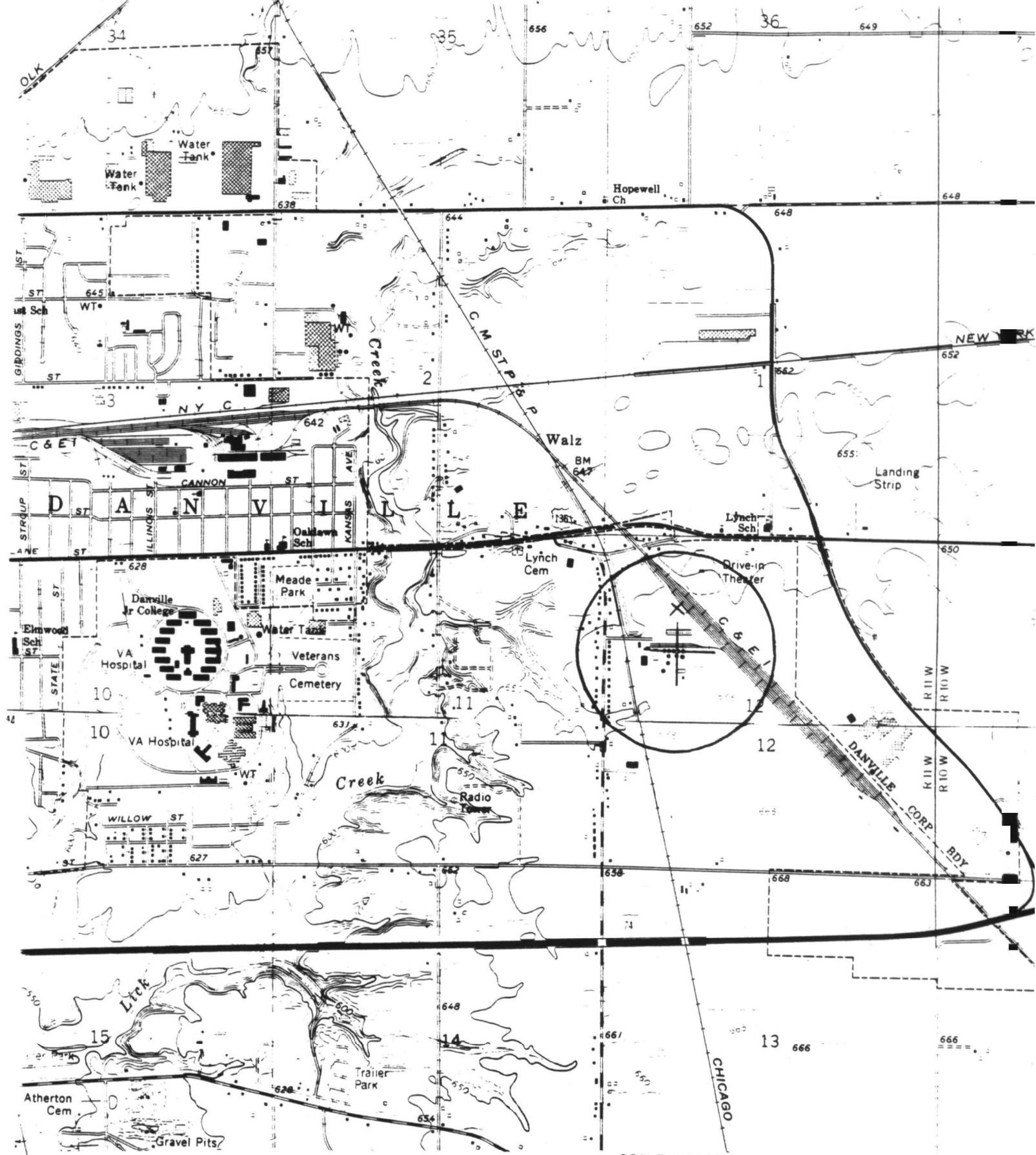
Location of nonhabitable areas relative to source: Settling pond is 0.1 km W of source.

Location of nonhabitable areas relative to predicted maximum concentration: Settling pond is 0.2 km SSW of predicted maximum concentration.

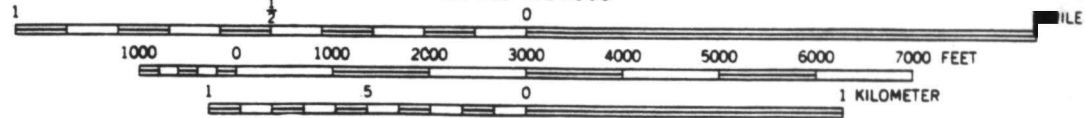
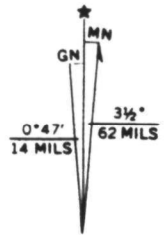
VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude differ from the coordinates provided by the Illinois Environmental Protection Agency. The coordinates provided by Illinois identify a point much closer to a plant in Danville. The verified latitude is the latitude provided by Illinois while the verified longitude is the same as the current longitude.

The Rantoul STAR site is the most representative site for this source. Rantoul and Danville have similar topography and are not subject to micrometeorological effects.



SCALE 1:24 000



B-9 CONTOUR INTERVAL 10 FEET
 TTED LINES REPRESENT 5-FOOT CONTOURS
 DATUM IS MEAN SEA LEVEL

UTM GRID AND 1968 MAGNETIC NORTH
 DECLINATION AT CENTER OF SHEET

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Allied Chemical

Location: El Segundo, California

Source Category: CFC Production

Compound: Carbon tetrachloride and chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	33 54 00	33 54 08	6,7
Longitude:	118 24 00	118 23 40	6,7
STAR Site:	# 23174	# 23174	
Location:	Los Angeles, CA	Los Angeles, CA	
Distance from source:	3.70 km	5 km	
Bearing from source:	0	0	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat to low, rolling hills on coast of southern California. Source is about 2.5 km E of Pacific Ocean and 1.5 km SE of the city of El Segundo. Urban.

Population density: 570 persons/km²

Population of El Segundo: 13,752 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.1×10^{-4} for carbon tetrachloride and 9.6×10^{-7} for chloroform.

Predicted maximum concentration of compound: 6.9908 ug/m³ of carbon tetrachloride and 4.2824 ug/m³ of chloroform.

Location of predicted maximum concentration: 0.2 km E of source.

Topography: Hilly.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

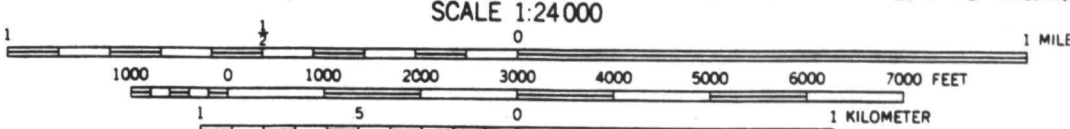
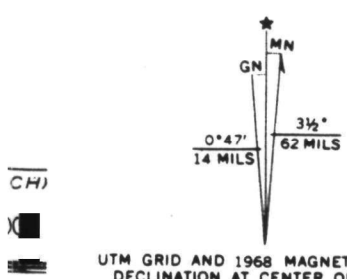
Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

Neither the current latitude and longitude nor the coordinates provided by the South Coast Air Quality Management District identify a plant. They identify points in a residential area of El Segundo. The latitude and longitude were verified on the U.S.G.S. map using directions provided by plant personnel. The verified coordinates are very close to the current ones.

The Los Angeles STAR site is the most representative site for this source. Los Angeles and El Segundo are both near the coast and are approximately 5 km apart.



B-12 CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

REDONDO BEACH 2.4 MI
R 15 W R 14 W
372000m E.
ROAD CLASSIFICATION

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: DuPont

Location: Antioch, California

Source Category: CFC Production

Compound: Carbon Tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	38 00 44	38 00 44	18,19,20,21,22
Longitude:	121 44 50	121 44 50	18,19,20,21,22
STAR Site:	# 23202	# 23202	
Location:	Fairfield, CA	Fairfield, CA	
Distance from source:	32.62 km	32.62 km	
Bearing from source:	330	330	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat lowland to hills in coastal plain region of California. Source is about 0.8 km S of the San Joaquin River and 3.5 km E of the city of Antioch. Montezuma Hills are about 9 km N of source. Rural.

Population density: 69 persons/km²

Population of Antioch: 42,683 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 2.4×10^{-4}

Predicted maximum concentration of compound: 15.880 ug/m³

Location of predicted maximum concentration: 0.2 km ENE of source.

Topography: Gentle slope.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 10%

Description of nonhabitable areas: Ponds

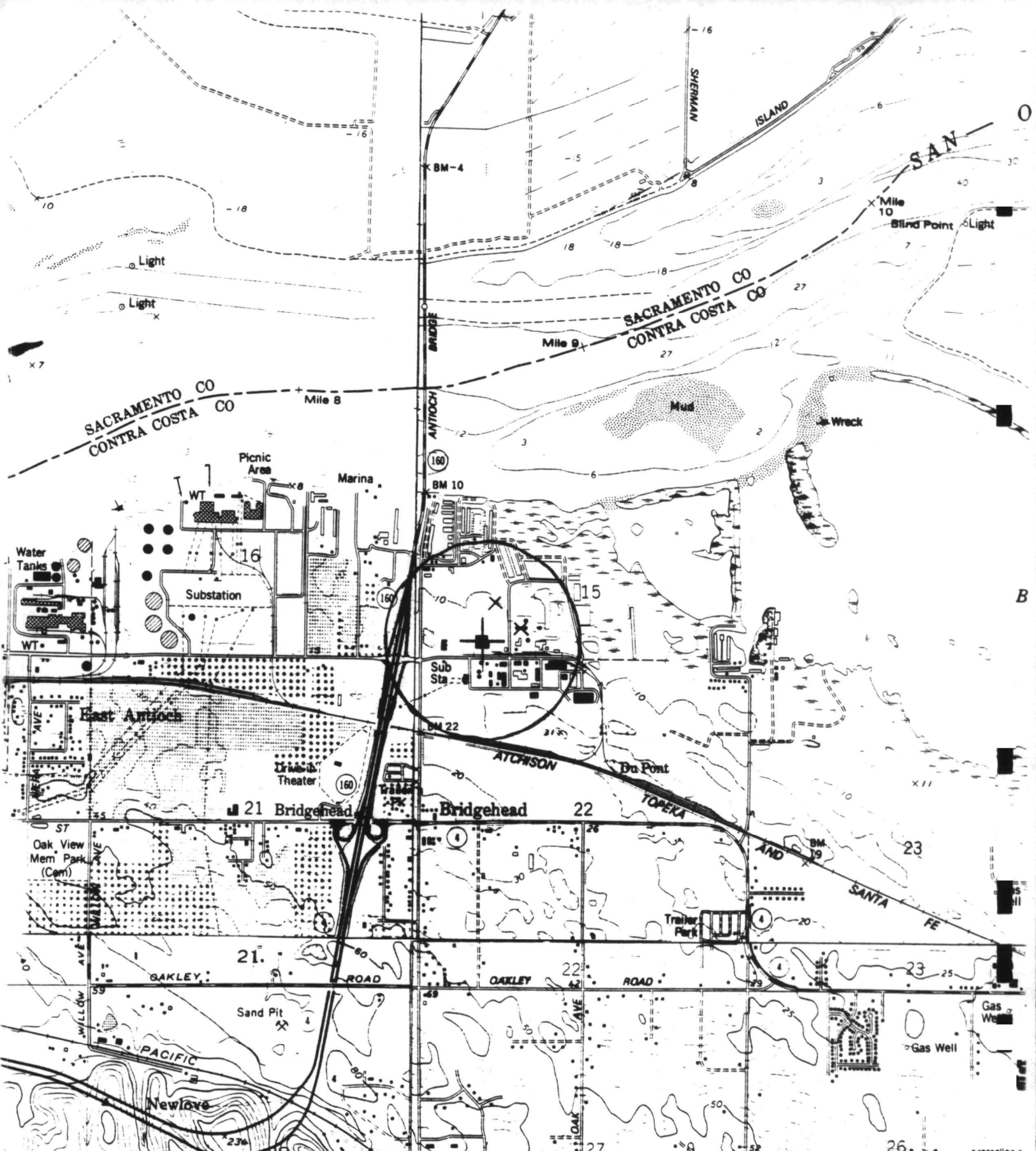
Location of nonhabitable areas relative to source: Ponds are 0.4 km NNE, 0.5 km NNE, and 0.4 km NE of source.

Location of nonhabitable areas relative to predicted maximum concentration: Ponds are 0.25 km NNW, 0.25 km N, and 0.15 km NE of predicted maximum concentration.

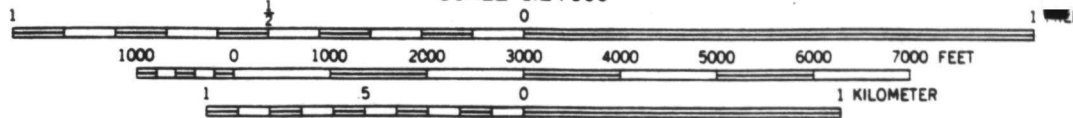
VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude were verified on the U.S.G.S. map as being reasonable. The coordinates provided by the Bay Area Air Quality Management District differ by more than three minutes from the current coordinates and do not appear to be reasonable.

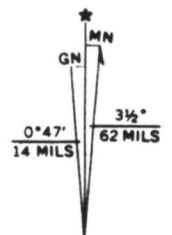
The Fairfield STAR site is the most representative site for this source because Fairfield and Antioch are on the same side of the coastal range. Antioch does experience some local land and sea-breeze effects that an inland site such as Fairfield does not experience. However, Fairfield is more representative than the coastal STAR sites, San Francisco and, Oakland, because these coastal STAR sites are on the other side of the coastal range.



SCALE 1:24 000



B-15 CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL



UTM GRID AND 1968 MAGNETIC NORTH

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: DuPont

Location: Deepwater, New Jersey

Source Category: CFC Production

Compound: Carbon Tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	39 41 25	39 41 24	23,24,25
Longitude:	75 30 35	75 30 34	23,24,25
STAR Site:	# 13739	# 13739	
Location:	Philadelphia, PA	Philadelphia, PA	
Distance from source:	30.86 km	30.86 km	
Bearing from source:	46	46	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat lowland area in coastal plain region of northeast Delaware. Source is about 6 km SE of Wilmington. Large areas of wetlands. Rural.

Population density: 170 persons/km²

Population of Deepwater: --^a

Carney's Point: 7,574 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.7×10^{-4}

Predicted maximum concentration of compound: 11.326 ug/m³

Location of predicted maximum concentration: 0.2 km NE of source; within plant complex.

Topography: Same as above.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 30%

^aNot a census-designated place.

Description of nonhabitable areas: River

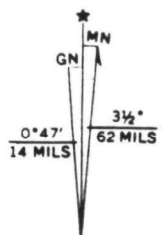
Location of nonhabitable areas relative to source: Delaware River is 0.2 km W of source.

Location of nonhabitable areas relative to predicted maximum concentration: Delaware River is 0.3 km W of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude are very close to the coordinates provided by the New Jersey Bureau of Air Pollution Control. The coordinates provided by New Jersey were verified on the U.S.G.S. map as being more reasonable, even though they are only one minute different from the current coordinates.

The Philadelphia STAR site is the most representative of conditions in Deepwater because both sites are located on the Delaware River. Wind flow in Deepwater is not significantly influenced by the Delaware Bay.



UTM GRID AND 1968 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000
 1 0 1000 2000 3000 4000 5000 6000 7000 FEET
 1 5 0 1 KILOMETER
 B-18 CONTOUR INTERVAL 10 FEET
 DOTTED LINES REPRESENT 5-FOOT CONTOURS
 DATUM IS MEAN SEA LEVEL



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: DuPont

Location: Montague, Michigan

Source Category: CFC Production

Compound: Carbon tetrachloride, chloroform, and perchloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	43 23 49	43 23 49	26,27
Longitude:	86 23 23	86 23 23	26,27
STAR Site:	# 14840	# 14840	
Location:	Muskegon, MI	Muskegon, MI	
Distance from source:	28.55 km	28.55 km	
Bearing from source:	154	154	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Relatively flat coastal plain on eastern side of Lake Michigan. Rural.

Population density: 29 persons/km²

Population of Montague: 2,332 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 4.7×10^{-5} for carbon tetrachloride and 2.2×10^{-5} for chloroform and 6.0×10^{-6} for perchloroethylene.

Predicted maximum concentration of compound: 5.3787 ug/m³ of carbon tetrachloride and 0.96163 ug/m³ of chloroform and 5.9341 ug/m³ of perchloroethylene.

Location of predicted maximum concentration: 0.2 km NW of source.

Topography: Flat.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

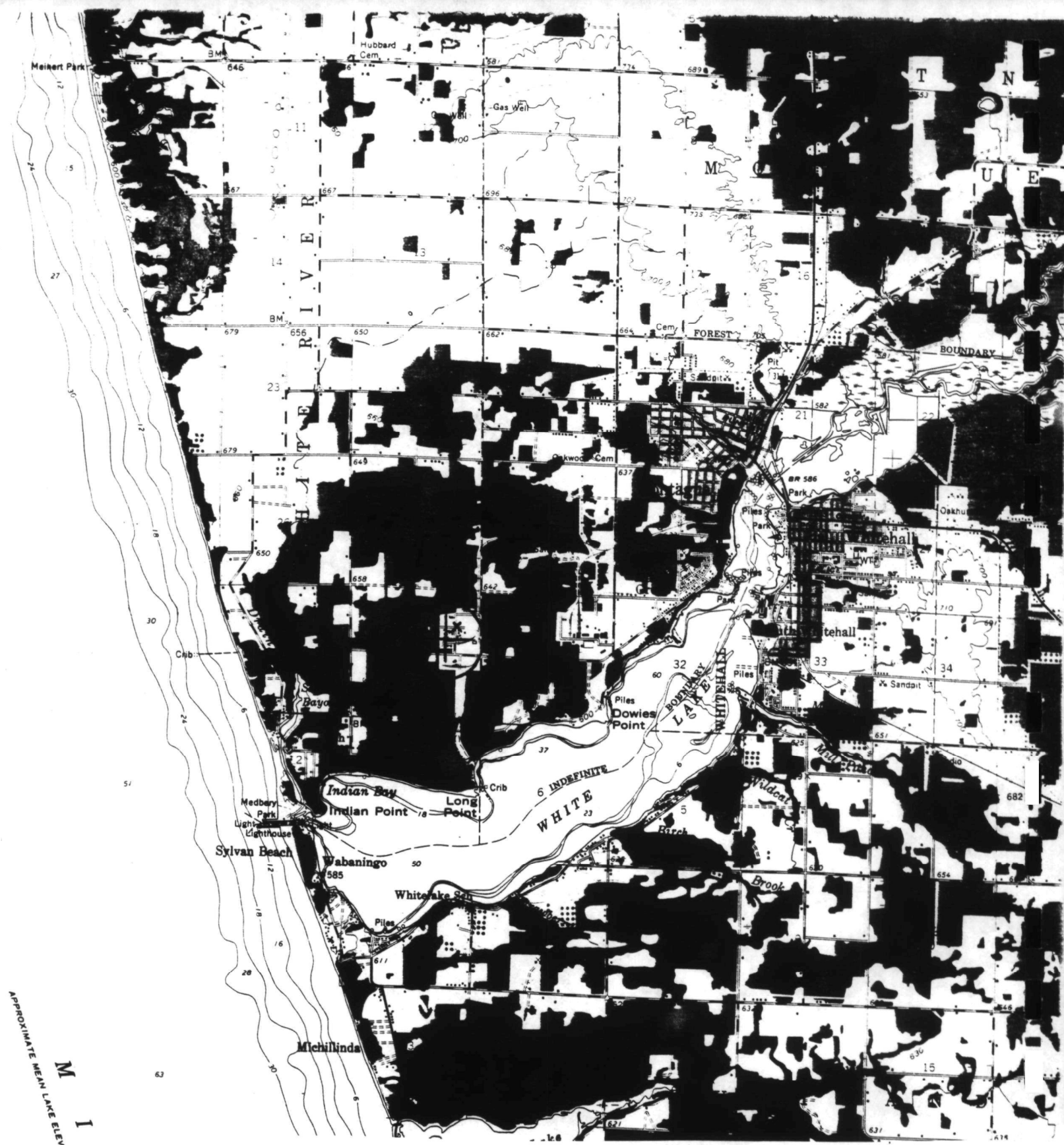
Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

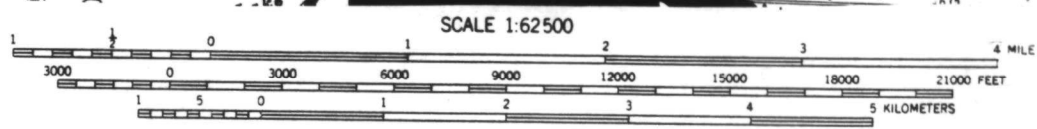
The current latitude and longitude were verified on the U.S.G.S. map as being reasonable. The coordinates provided by the Michigan Department of Natural Resources are very close to the current latitude and longitude.

The Muskegon STAR site is the most representative site for Montague. Both sites are located on the eastern shore of Lake Michigan near small inland bays.



M
I
C
H
I
G
A

TRUE NORTH
 MAGNETIC NORTH
 APPROXIMATE MEAN DECLINATION, 1959



CONTOUR INTERVAL 20 FEET
 DOTTED LINES REPRESENT 10-FOOT CONTOURS
 DATUM IS MEAN SEA LEVEL
 DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS 578 FEET

B-21

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
 FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON 25, D. C.
 A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Kaiser Aluminum

Location: Gramercy, Louisiana

Source Category: CFC Production

Compound: Carbon tetrachloride and chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 02 26	30 03 25	2,28
Longitude:	90 39 36	90 40 13	2,28
STAR Site:	# 12958	# 12958	
Location:	New Orleans, LA	New Orleans, LA	
Distance from source:	66.77 km	69 km	
Bearing from source:	112	110	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain region of southeast Louisiana. Source is 1 km NW of Mississippi River. Large areas of wetlands. Rural.

Population density: 46 persons/km²

Population of Gramercy: 3,211 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 2.1×10^{-4} for carbon tetrachloride and 5.5×10^{-7} for chloroform.

Predicted maximum concentration of compound: 14.278 ug/m³ of carbon tetrachloride and 4.6357 ug/m³ of chloroform.

Location of predicted maximum concentration: 0.2 km N of source.

Topography:

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 1%

Description of nonhabitable areas: Sewage disposal pond.

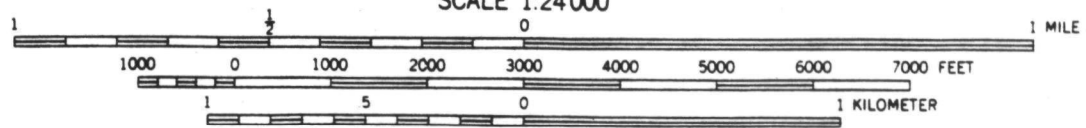
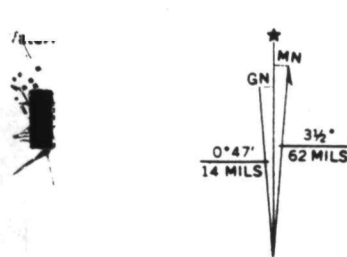
Location of nonhabitable areas relative to source: Sewage disposal pond is 0.45 km W of source.

Location of nonhabitable areas relative to predicted maximum concentration: Sewage disposal pond is 0.5 km SW of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude differ slightly from the coordinates provided by the Louisiana Department of Environmental Quality. The coordinates provided by Louisiana were verified on the U.S.G.S. map as being more reasonable.

The New Orleans STAR site is more representative of conditions in Gramercy than the Baton Rouge STAR site because Baton Rouge is further inland than New Orleans. Gramercy is located midway between New Orleans and Baton Rouge.



B-24 CONTOUR INTERVAL 10 FEET
TED. LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Pennwalt

Location: Calvert City, Kentucky

Source Category: CFC Production

Compound: Carbon tetrachloride and chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	37 03 23	37 03 23	29,30,31
Longitude:	88 21 59	88 21 59	29,30,31
STAR Site:	# 03816	# 03816	
Location:	Paducah, KY	Paducah, KY	
Distance from source:	35.52 km	35.52 km	
Bearing from source:	272	272	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Rolling hills to mountainous terrain in southwest Kentucky. Source is about 0.6 km SE of Tennessee River. Rural.

Population density: 19 persons/km²

Population of Calvert City: 2,388 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 6.0×10^{-4} for carbon tetrachloride and 8.7×10^{-5} for chloroform.

Predicted maximum concentration of compound: 40.163 ug/m³ of carbon tetrachloride and 4.3429 ug/m³ of chloroform.

Location of predicted maximum concentration: 0.2 km N of source.

Topography: Flat; occurs in tailings pond.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude are very close to the coordinates provided by the Kentucky Department of Environmental Protection. The current coordinates verified on the U.S.G.S. map as being more reasonable.

The Paducah STAR site is the most representative site for Calvert City. Paducah is located along the Ohio River and Calvert City is near the Tennessee River. Some channelling of wind flow is expected in both river valleys, but no significant difference is expected between the two sites.

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Racon

Location: Wichita, Kansas

Source Category: CFC Production

Compound: Carbon tetrachloride and chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	37 39 00	37 35 00	32,33
Longitude:	97 25 58	97 25 21	32,33
STAR Site:	# 13969	# 13969	
Location:	Ponca City, OK	Ponca City, OK	
Distance from source:	106.04 km	98 km	
Bearing from source:	164	200	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat to rolling terrain in south-central Kansas. The plant is in a flat area in the Wichita Valley. Rural.

Population density: 54 persons/km²

Population of Wichita: 279,272 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.3×10^{-4} for carbon tetrachloride and 7.3×10^{-5} for chloroform.

Predicted maximum concentration of compound: 8.3037 ug/m³ of carbon tetrachloride and 3.0712 ug/m³ of chloroform.

Location of predicted maximum concentration: 0.2 km N of source.

Topography: Flat.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 1%

Description of nonhabitable areas: Settling pond.

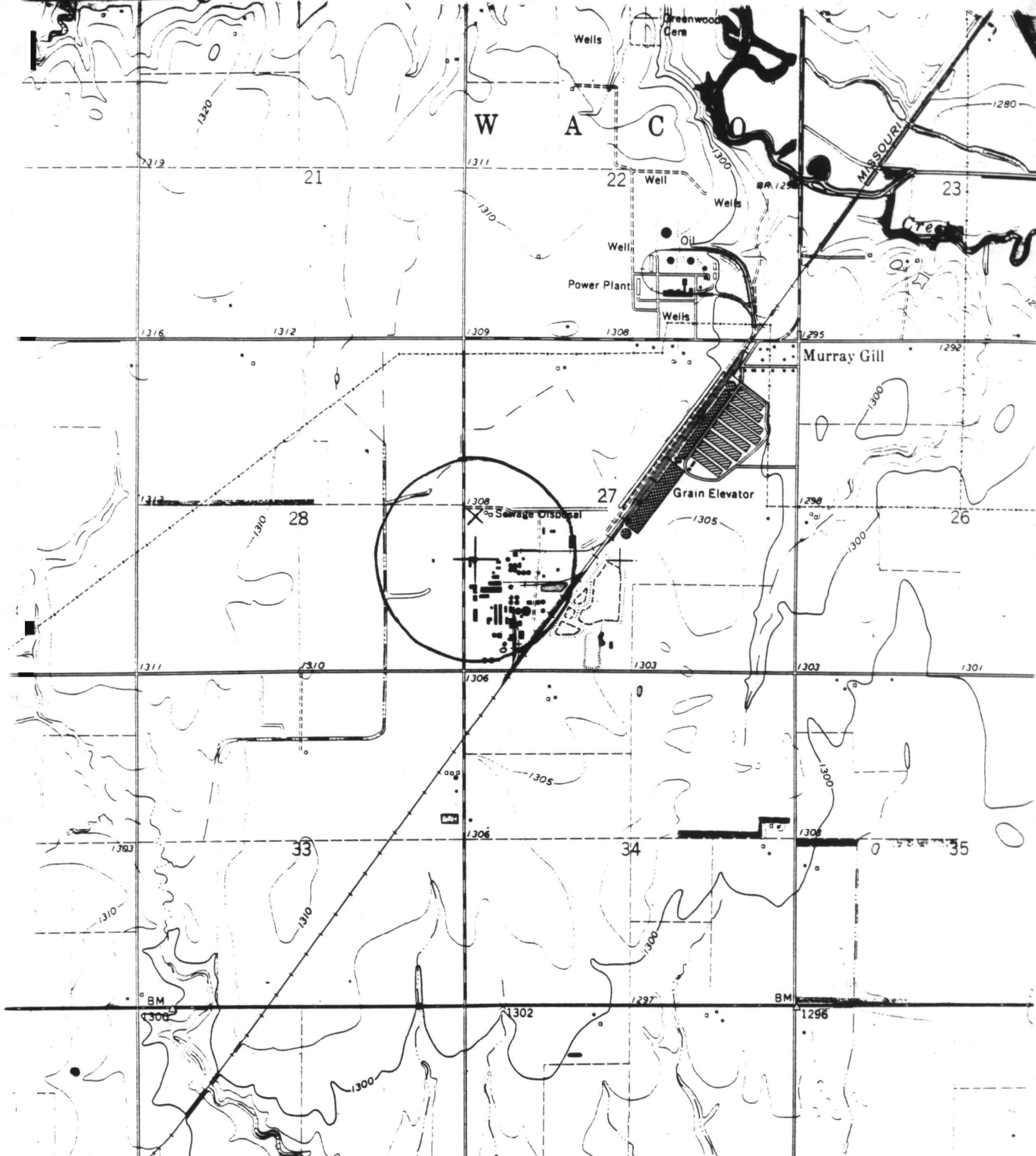
Location of nonhabitable areas relative to source: Settling pond is 0.35 km ESE of source.

Location of nonhabitable areas relative to predicted maximum concentration: Settling pond is 0.45 km SE of predicted maximum concentration.

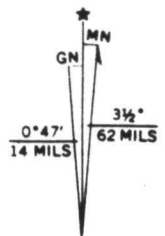
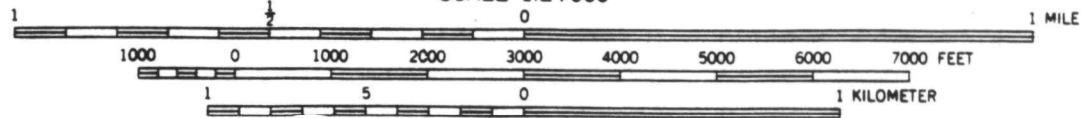
VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude differ significantly from the coordinates provided by the Kansas Bureau of Air Quality and Occupational Health. The coordinates provided by Kansas were verified on the U.S.G.S. map as being more reasonable. It is recommended that the latitude and longitude be updated to the verified coordinates.

The Ponca City, Oklahoma, STAR site is the closest and most representative STAR site for Wichita. The next nearest STAR site is in Kansas City, Missouri, which is approximately 285 km from Wichita.



SCALE 1:24 000



B-30 CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

REFERENCES

1. U. S. Geological Survey. 1963. Baton Rouge West, Louisiana. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1971 and 1980.
2. Louisiana Department of Environmental Quality, Air Quality Division. P. O. Box 44066, Baton Rouge, Louisiana 70804. (504) 342-1265.
3. U. S. Geological Survey. 1966. Danville N.E., Illinois. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1978.
4. U. S. Geological Survey. 1966. Danville S.E., Illinois. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1978.
5. Illinois Environmental Protection Agency. 2200 Churchill Road, Springfield, Illinois 62706. (217) 782-7326.
6. U. S. Geological Survey. 1964. Venice, California. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1981.
7. South Coast Air Quality Management District, Records Department. 9150 Flair Drive, El Monte, CA 91731. (818) 572-6200.
8. U. S. Geological Survey. 1982. La Porte, Texas. 7.5 Minute series topographic map, 1:24000 scale.
9. Texas Air Control Board. 6330 Highway 290 East, Austin, Texas 78723. (512) 451-5711.
10. U. S. Geological Survey. 1953. Saint Georges, Delaware. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1970.
11. U. S. Geological Survey. 1948. Delaware City, Delaware - New Jersey. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1970.
12. Telecon. Moody, T., Radian Corporation, with Timmons, R., Diamond Shamrock. February 28, 1986. Verification of latitude and longitude of the Delaware City facility.
13. U.S. Geological Survey. 1953. Chickasaw, Alabama. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1982.
14. U.S. Geological Survey. 1953. Mobile, Alabama. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1982.
15. Alabama Air Pollution Control Commission, Department of Public Health. Federal Drive, Montgomery, Alabama 36130. (205) 271-7700.
16. U.S. Geological Survey. 1971. Florence, Alabama. 7.5 Minute series topographic map, 1:24000 scale.

17. U.S. Geological Survey. 1971. Killen, Alabama. 7.5 Minute series topographic map, 1:24000 scale.
18. U.S. Geological Survey. 1978. Jersey Island, California. 7.5 Minute series topographic map, 1:24000 scale.
19. U.S. Geological Survey. 1978. Antioch North, California. 7.5 Minute series topographic map, 1:24000 scale.
20. U.S. Geological Survey. 1953. Antioch South, California. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1980.
21. U.S. Geological Survey. 1978. Brentwood, California. 7.5 Minute series topographic map, 1:24000 scale.
22. Bay Area Air Quality Management District. 939 Ellis Street, San Francisco, CA 94109 (415) 771-6000.
23. U.S. Geological Survey. 1967. Wilmington South, Delaware - New Jersey. 7.5 Minute series topographic map, 1:24000 scale.
24. U.S. Geological Survey. 1967. Penns Grove, New Jersey - Delaware. 7.5 Minute series topographic map, 1:24000 scale.
25. New Jersey Bureau of Air Pollution Control, Division of Environmental Quality, Department of Environmental Protection, CN027, Trenton, New Jersey 08625 (609) 292-5450.
26. U.S. Geological Survey. 1959. Montague, Michigan. 15 Minute series topographic map, 1:62500 scale.
27. Michigan Department of Natural Resources, Air Quality Division, Saginaw District Office. 411-J E. Genesee, Saginaw, Michigan 48607. (517) 322-1336.
28. U.S. Geological Survey. 1962. Litcher, Louisiana. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1980.
29. U.S. Geological Survey. 1958. Calvert City, Kentucky. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1968.
30. U.S. Geological Survey. 1982. Little Cypress, Kentucky - Illinois. 7.5 Minute series topographic map, 1:24000 scale.
31. Kentucky Department of Environmental Protection, Division of Air Pollution Control. 18 Reilly Road, Frankfort, Kentucky 40601 (502) 564-3382.
32. U.S. Geological Survey. 1961. Bayneville, Kansas. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1970.

33. Kansas Bureau of Air Quality and Occupational Health, Division of Environment, Department of Health and Environment. Building 740, Forbes Field, Topeka, Kansas 66620. (913) 862-9360.
34. U.S. Geological Survey. 1961. Gonzales, Louisiana. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1980.

APPENDIX C:
OTHER CHEMICAL PLANTS CATEGORY

SOURCE SUMMARY SHEETS FOR OTHER CHEMICAL PLANTS
TABLE OF CONTENTS

<u>Facility/Location</u>	<u>Pollutant Emitted</u>	<u>Page</u>
Table C-1. Sources of Current Modeling Information		C-3
1. Aerojet Sacramento, CA OBPA	Chloroform.	C-4
2. Allied Corporation Elizabeth, NJ	Chloroform.	C-7
3. B.F. Goodrich Cleveland, OH #1	Methylene chloride.	C-10
4. Celanese Rock Hill, SC	Methylene chloride.	C-13
5. Dow Chemical Midland, MI conf. process 1	Carbon tetrachloride.	C-16
6. Dow Chemical Midland, MI conf. process 2	Carbon tetrachloride.	C-19
7. Dow Chemical Midland, MI conf. process 3	Methylene chloride.	C-22
8. Dow Chemical Midland, MI #3	Perchloroethylene	C-25
9. Dow Chemical Pittsburg, CA conf. process 1	Carbon tetrachloride.	C-28
10. Dow Chemical Pittsburg, CA conf. process 2	Carbon tetrachloride.	C-31
11. Du Pont Beaumont, TX Hypalon®	Carbon tetrachloride. Chloroform.	C-34 C-37
12. Du Pont Louisville, KY	Chloroform.	C-40
13. General Electric Mount Vernon, IN	Methylene chloride.	C-43
14. General Electric Pittsfield, MA	Methylene chloride.	C-46
References		C-49

TABLE C-1. SOURCES OF CURRENT MODELING INFORMATION

Maximum Individual Risk Values

1. Memorandum from Zaragoza, L.D., EPA: SASD, to the Files. Carbon Tetrachloride Exposure and Risk Analysis. August 6, 1985.
2. Memorandum from Mohin, T.J., EPA: SASD, to the Files. Chloroform Exposure and Risk Assessment. June 10, 1985.
3. Memorandum from Blanchard, K.L., EPA: SASD, to the Files. Methylene Chloride Exposure and Risk Analysis for Cancer as the Endpoint of Concern. September 3, 1985.
4. Memorandum from Vandenberg, J.J., EPA: SASD, to the Files. Perchloroethylene Exposure and Cancer Risk Analysis. November 15, 1985.

Latitude & Longitude, STAR Site, and Predicted Maximum Concentration

5. Human Exposure Model Printout for Carbon Tetrachloride. March 4, 1986.
6. Human Exposure Model Printout for Chloroform Emissions from CFC Production. February 27, 1986.
7. Human Exposure Model Printout for Chloroform Emissions from Hypalon Production. December 12, 1984.
8. Human Exposure Model Printout for Chloroform Emissions from OBPA Production. December 12, 1984.
9. Human Exposure Model Printout for Methylene Chloride. July 1, 1985.
10. Excerpts from Human Exposure Model Printouts for Perchloroethylene Users and Perchloroethylene Producers. Phase I data. Received from John Vandenberg, EPA: SASD. Undated.

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Aerojet

Location: Sacramento, California (OBPA)

Source Category: Other chemical plants

Compound: Chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	38 36 31	38 36 31	4
Longitude:	121 12 59	121 12 59	4
STAR Site:	# 23232	# 23232	
Location:	Sacramento, CA	Sacramento, CA	
Distance from source:	26.68 km	26.68 km	
Bearing from source:	248	248	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Ranges from relatively flat to the rolling terrain of the Sierra Nevada foothills. Sacramento is approximately 50 km W of the Sierra Nevada range in east-central California. Rural.

Population density: 126 persons/km²

Population of Sacramento: 275,741 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 3.2×10^{-4}

Predicted maximum concentration of compound: 31.592 ug/m³

Location of predicted maximum concentration: 0.2 km N of source

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

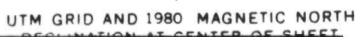
Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude were verified on the U.S.G.S. map as reasonable. The coordinates locate the plant in a small complex of buildings on the outskirts of Sacramento. The STAR site chosen by the HEM is located in Sacramento and is considered the most representative site for this source.

5,300m E



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Allied Corporation
Location: Elizabeth, New Jersey
Source Category: Other chemical plants
Compound: Chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	40 39 48	40 39 48	5, 6
Longitude:	74 10 10	74 10 06	5, 6
STAR Site:	# 94741	# 94741	
Location:	Teterboro, NJ	Teterboro, NJ	
Distance from source:	23.05 km	23.05 km	
Bearing from source:	26	26	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat to rolling hills in coastal region. Newark Bay is approximately 1 km SE of source. Urban.

Population density: 542 persons/km².

Population of Elizabeth: 106,201 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 8.8×10^{-5}

Predicted maximum concentration of compound: 6.5790 ug/m³

Location of predicted maximum concentration: 0.2 km NE of source

Topography: Flat area on shore of Newark Bay.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

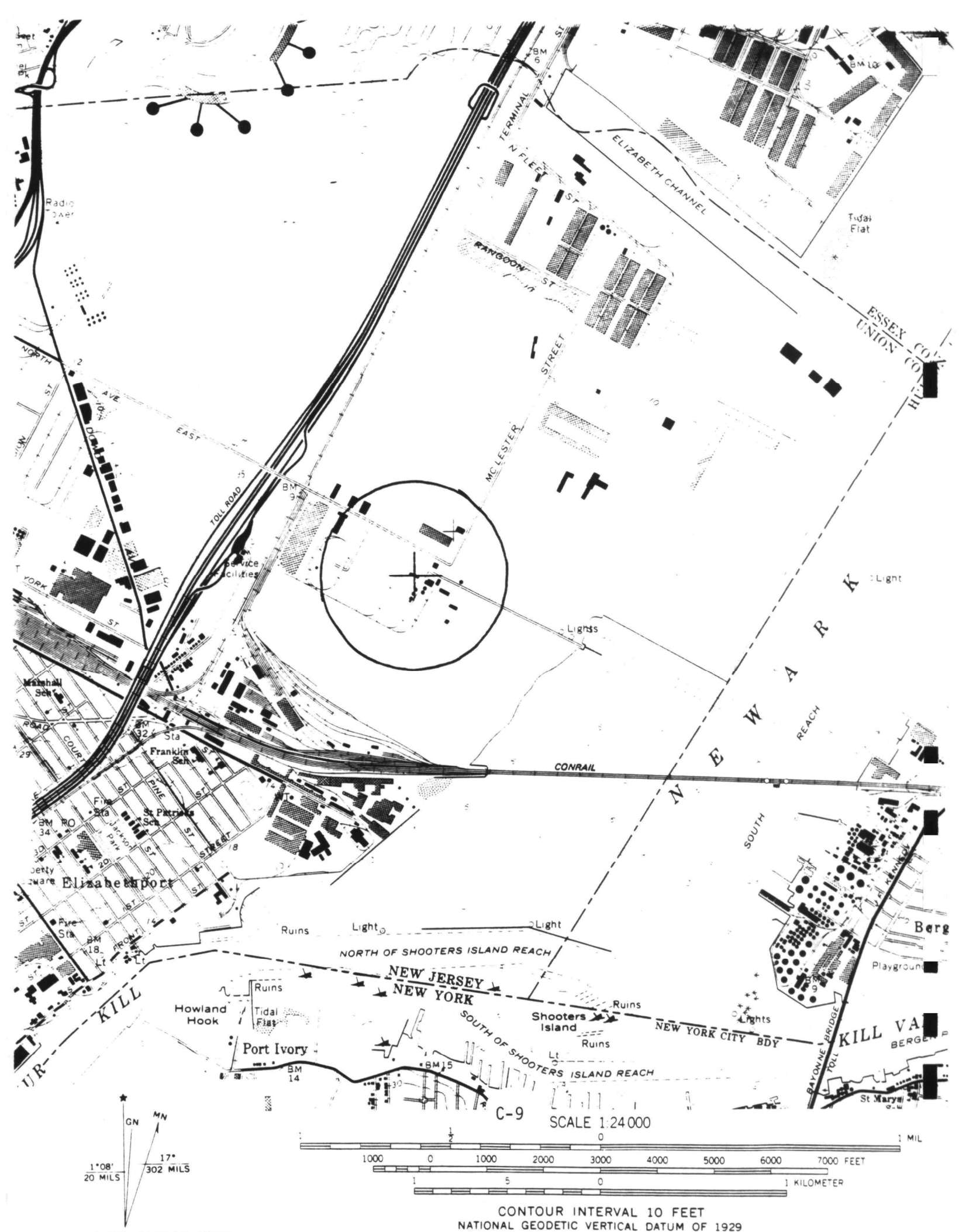
Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The coordinates currently used and those provided by the New Jersey Bureau of Air Pollution Control agree closely (within 4 seconds longitude). The latitude and longitude provided by New Jersey, however, agree more closely with the location of the closest industrial plant on the U.S.G.S. map, and were therefore chosen as the verified coordinates.

The STAR site selected by the HEM is considered the most appropriate STAR site for this source. The Teterboro site, which is located north of Elizabeth, is more representative of conditions in Elizabeth than the next closest STAR site, #94789, located at JFK Airport. Elizabeth is more exposed to ocean breezes than JFK Airport is.



UTM GRID AND 1980 MAGNETIC NORTH

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: B. F. Goodrich (Rub. Acc.)

Location: Cleveland, Ohio #1 (Avon Lake, Ohio)

Source Category: Other chemical plants

Compound: Methylene chloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	41 02 42	41 29 25	10, 11
Longitude:	81 32 31	82 03 13	10, 11
STAR Site:	# 14895	# 14820	
Location:	Akron, OH	Cleveland, OH	
Distance from source:	16.92 km	19.71 km	
Bearing from source:	147	121	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Rolling hills on southern shore of Lake Erie. Urban.

Population density: 210 persons/km²

Population of Avon Lake: 13,222 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 7.4×10^{-4}

Predicted maximum concentration of compound: 179.83 ug/m³

Location of predicted maximum concentration: 0.2 km N of source

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The latitude and longitude provided in the Section 114 response from this plant differed significantly from the current information. The current modeling information located the plant near Akron rather than Cleveland. The coordinates provided in the Section 114 response were verified on the U.S.G.S. map as being more reasonable.

The verified coordinates locate the source near Cleveland, but within the corporate boundary of Avon Lake, Ohio. The STAR site corresponding to the verified source location is #14820 in Cleveland, Ohio. It is recommended that the HEM be re-run with the verified city, latitude and longitude, and STAR site information.

6



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Celanese

Location: Rock Hill, South Carolina

Source Category: Other chemical plants

Compound: Methylene chloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	34 58 40	34 58 40	12
Longitude:	80 58 40	80 58 40	12
STAR Site:	# 13881	# 13881	
Location:	Charlotte, NC	Charlotte, NC	
Distance from source:	26.86 km	26.86 km	
Bearing from source:	9	9	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Mountainous region of northern South Carolina.

Catawba River runs west-east through area. Rural.

Population density: 30 persons/km²

Population of Rock Hill: 35,344 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.0×10^{-4}

Predicted maximum concentration of compound: 24.950 ug/m³

Location of predicted maximum concentration: 0.2 km S of source;
at a building within plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

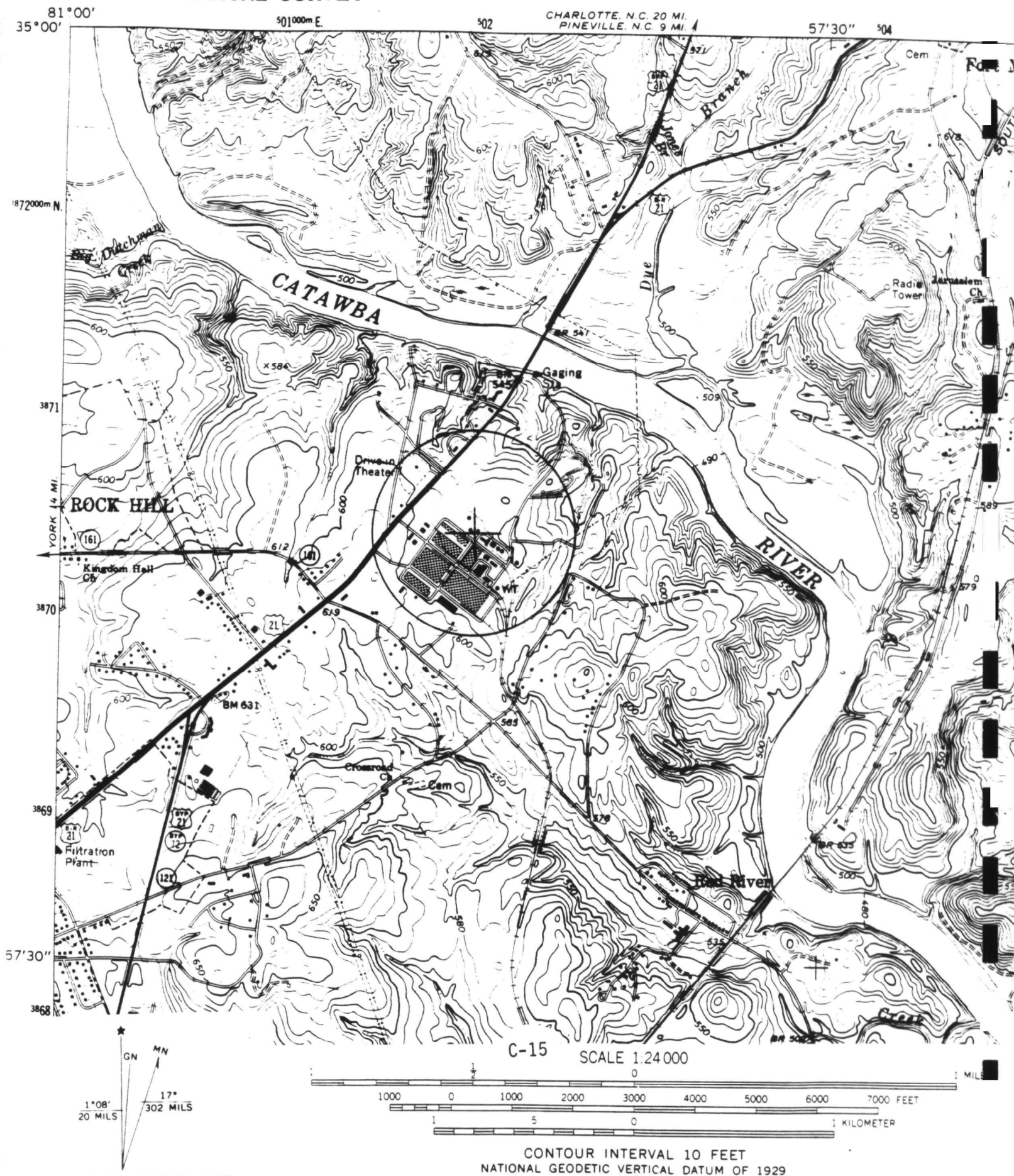
Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum
concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify this plant clearly on the U.S.G.S. map as the only major industrial complex in Rock Hill. The STAR site chosen by the HEM is the most representative site for this source.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical

Location: Midland, Michigan (confidential process 1)

Source Category: Other chemical plants

Compound: Carbon tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	43 36 00	43 36 00	1
Longitude:	84 13 06	84 13 06	1
STAR Site:	# 14845	# 14845	
Location:	Saginaw, MI	Saginaw, MI	
Distance from source:	33.86 km	33.86 km	
Bearing from source:	123	123	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat to rolling topography. Central Michigan. Rural.

Population density: 54 persons/km²

Population of Midland: 37,250 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.5×10^{-3}

Predicted maximum concentration of compound: 100.38 ug/m³

Location of predicted maximum concentration: 0.2 km NE of source; occurs at a building in the plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

Location of nonhabitable areas relative to source:

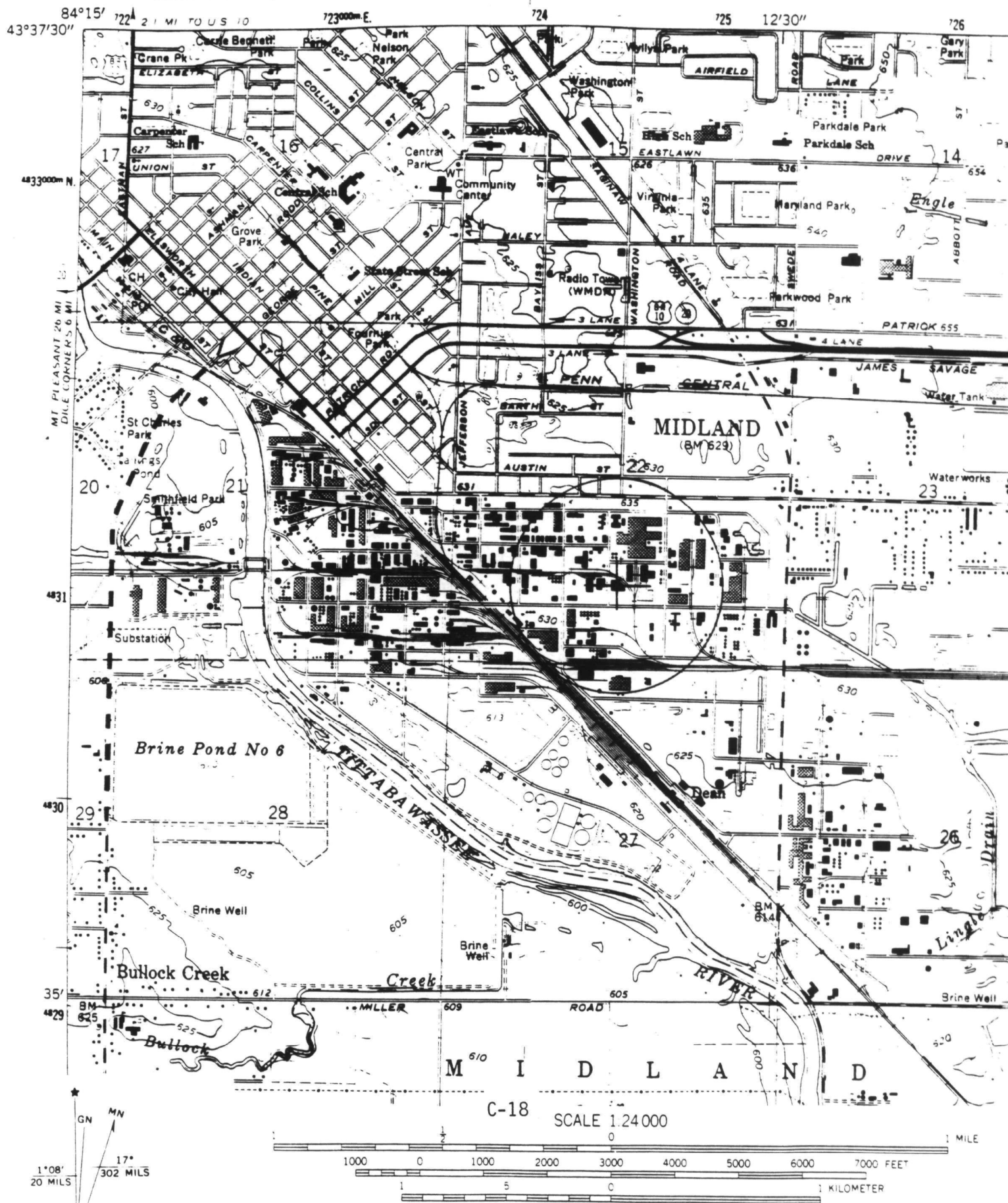
Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude were verified on the U.S.G.S. map as being reasonable. The coordinates locate this plant within Dow's large industrial complex in Midland. The location of the "confidential process" unit marked on the U.S.G.S. map was estimated from these coordinates. The STAR site chosen by the HEM is considered the most representative site for Midland. The next closest STAR site is located in Detroit, Michigan.

471 IIIINE
(AVERILL)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical

Location: Midland, Michigan (confidential process 2)

Source Category: Other chemical plants

Compound: Carbon tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	43 36 09	43 36 09	1
Longitude:	84 13 51	84 13 51	1
STAR Site:	# 14845	# 14845	
Location:	Saginaw, MI	Saginaw, MI	
Distance from source:	34.85 km	34.85 km	
Bearing from source:	123	123	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat to rolling topography. Central Michigan. Rural.

Population density: 54 persons/km²

Population of Midland: 37,250 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 3.2×10^{-5}

Predicted maximum concentration of compound: 2.1575 ug/m³

Location of predicted maximum concentration: 0.2 km NE of source;
within plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

Location of nonhabitable areas relative to source:

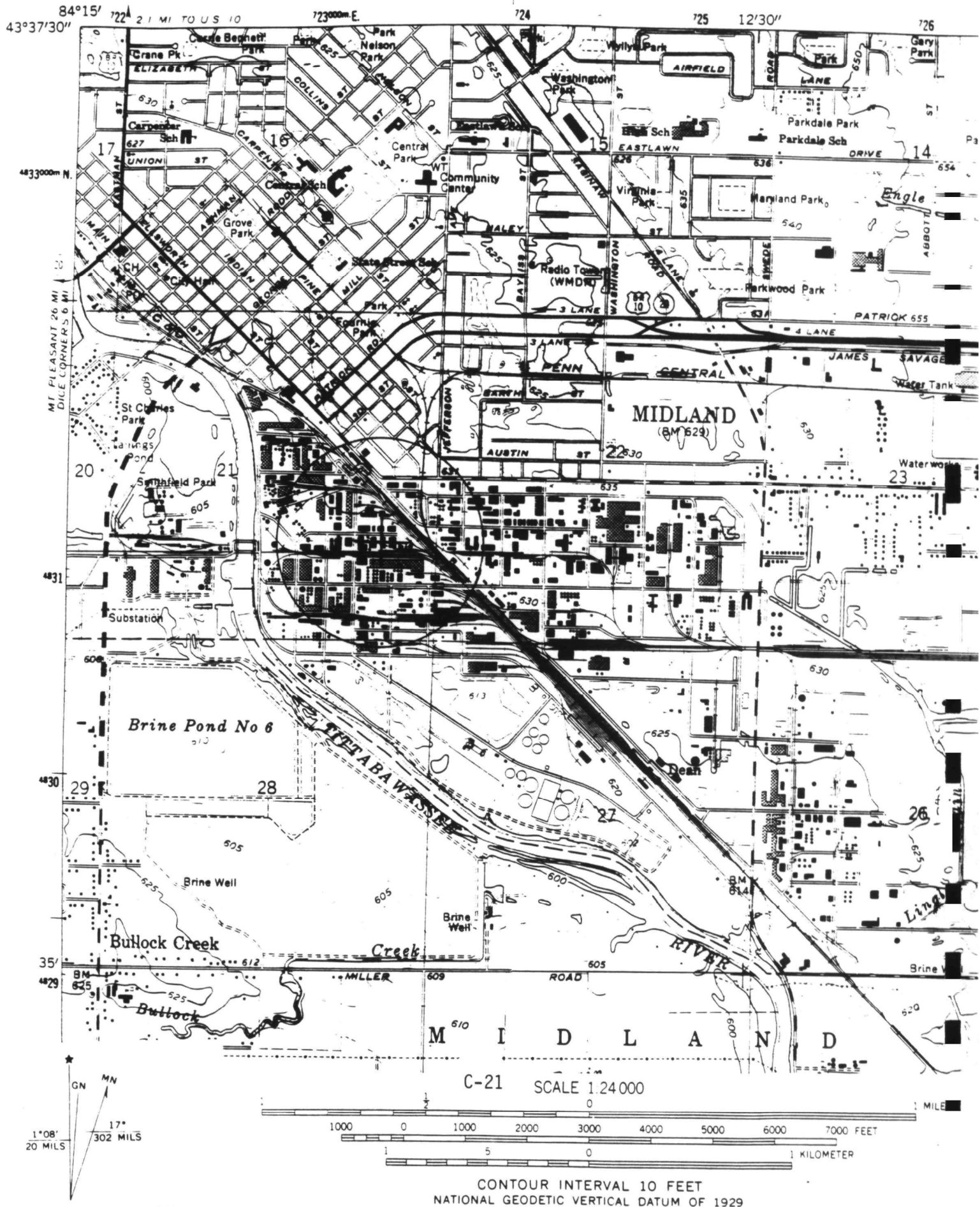
Location of nonhabitable areas relative to predicted maximum
concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude were verified on the U.S.G.S. map as locating this plant within Dow's large industrial complex in Midland. The location of the latex unit marked on the map was estimated from the current information. The STAR site selected by the HEM is considered the most representative site for Midland. The next closest STAR site is located in Detroit, Michigan.

4171111E
(AVERILL)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical

Location: Midland, Michigan (confidential process 3)

Source Category: Other chemical plants

Compound: Methylene chloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	43 36 11	43 36 11	1
Longitude:	84 13 24	84 13 24	1
STAR Site:	# 14845	# 14845	
Location:	Saginaw, MI	Saginaw, MI	
Distance from source:	34.38 km	34.38 km	
Bearing from source:	123	123	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat to rolling topography. Central Michigan. Rural.

Population density: 54 persons/km²

Population of Midland: 37,250 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 2.7×10^{-3}

Predicted maximum concentration of compound: 663.04 ug/m³

Location of predicted maximum concentration: 0.2 km ENE of source; within plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

Location of nonhabitable areas relative to source:

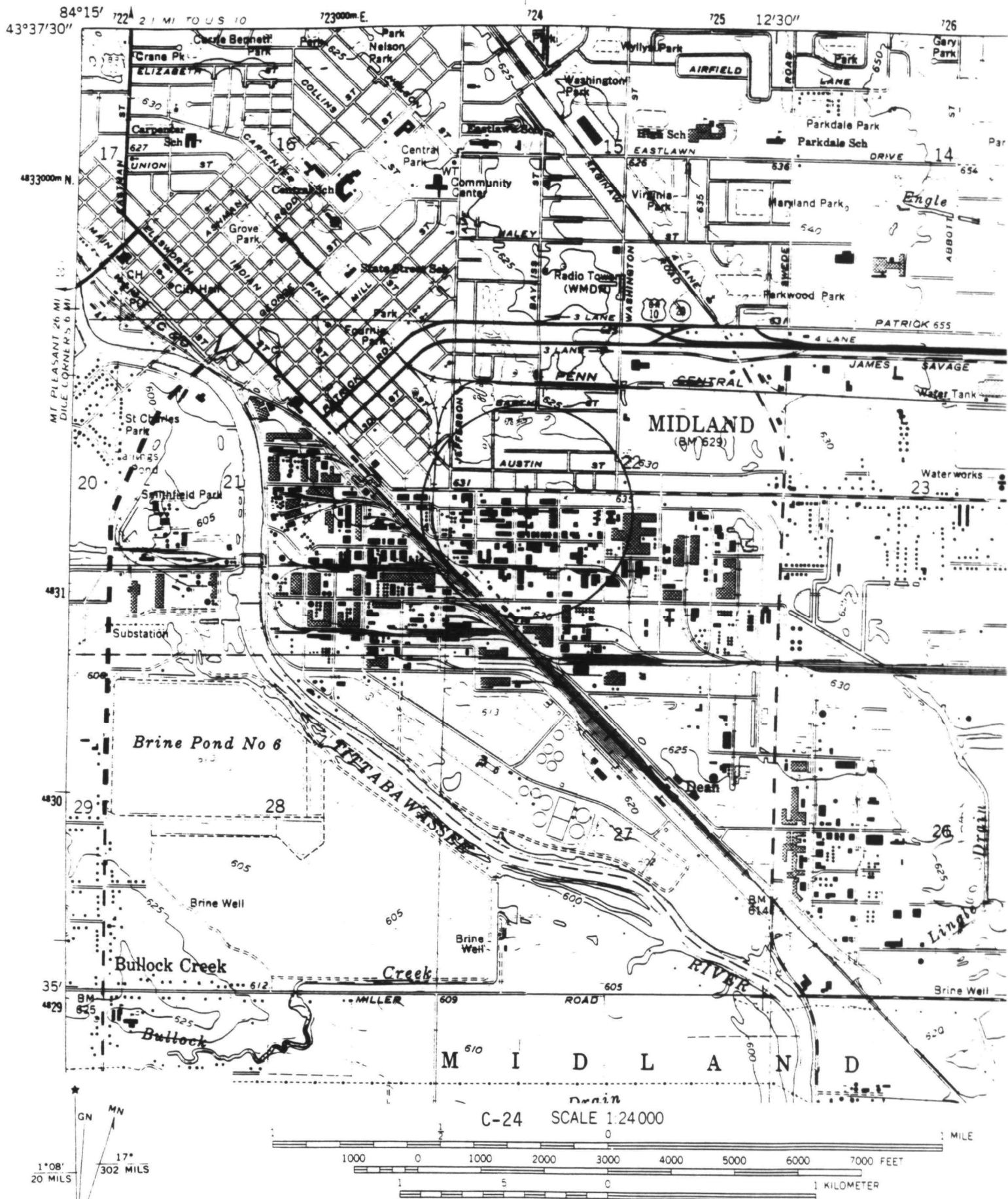
Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude were verified on the U.S.G.S. map as locating this plant within Dow's large industrial complex in Midland. The location of this unit of the facility was estimated from the current information. The STAR site selected by the HEM is considered the most representative site for Midland. The next closest STAR site is located in Detroit, Michigan.

41°11'N
(AVERILL)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical

Location: Midland, Michigan #3

Source Category: Other chemical plants

Compound: Perchloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	43 35 59	43 35 59	1
Longitude:	84 13 04	84 13 04	1
STAR Site:	# 14845	# 14845	
Location:	Saginaw, MI	Saginaw, MI	
Distance from source:	33.80 km	33.80 km	
Bearing from source:	123	123	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat to rolling topography. Central Michigan. Rural.

Population density: 54 persons/km²

Population of Midland: 37,250 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 4.7×10^{-5}

Predicted maximum concentration of compound: 58.667 ug/m³

Location of predicted maximum concentration: 0.2 km NE of source; within plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude were verified on the U.S.G.S. map as locating this plant within Dow's large industrial complex in Midland. The location of unit #3 marked on the map was estimated from the current information. The STAR site selected by the HEM is considered the most representative site for Midland. The next closest STAR site is located in Detroit, Michigan.

4171 III NE
(AVERILL)

84°15'

[illegible]

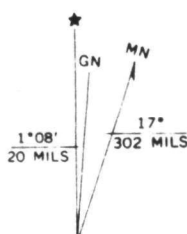
723000m.F

724

725

12/30/

320



CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical

Location: Pittsburg, California (confidential process 1)

Source Category: Other chemical plants

Compound: Carbon tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	38 01 30	38 01 30	2
Longitude:	121 51 15	121 51 15	2
STAR Site:	# 23202	# 23202	
Location:	Fairfield, CA	Fairfield, CA	
Distance from source:	27.73 km	27.73 km	
Bearing from source:	346	346	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Relatively flat area in coastal region on the Suisan Bay. Pittsburg is approximately 50 km from coast. Rural.

Population density: 176 persons/km²

Population of Pittsburg: 33,034 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 2.1×10^{-4}

Predicted maximum concentration of compound: 13.835 ug/m³

Location of predicted maximum concentration: 0.2 km ENE of source; within plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 20%

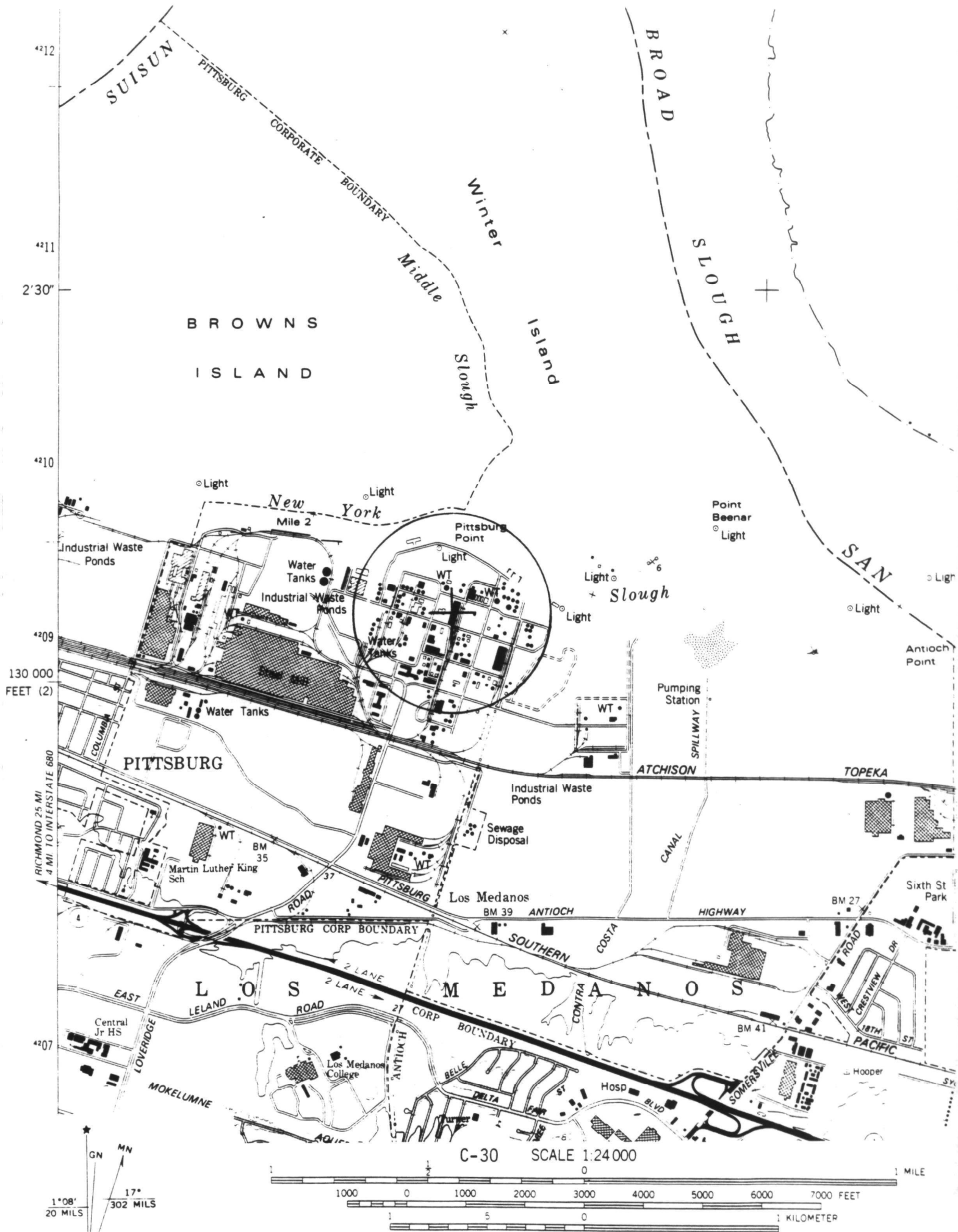
Description of nonhabitable areas: Slough

Location of nonhabitable areas relative to source: Slough is 0.3 km NE of source.

Location of nonhabitable areas relative to predicted maximum concentration: Slough is 0.2 km NE of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude were verified on the U.S.G.S. map. These coordinates locate this plant within an industrial facility in Pittsburg. The STAR site selected by the HEM has been verified in a previous verification task. Wind patterns in Pittsburg are affected by some land and sea breeze influences that are not expected to occur at Fairfield. However, Pittsburg and Fairfield are both coastal sites and therefore experience similar regional meteorological conditions.



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical

Location: Pittsburg, California (confidential process 2)

Source Category: Other chemical plants

Compound: Carbon tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	38 15 00	38 01 30	2
Longitude:	121 45 00	121 51 15	2
STAR Site:	# 23202	# 23202	
Location:	Fairfield, CA	Fairfield, CA	
Distance from source:	16.11 km	27.73 km	
Bearing from source:	277	346	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Relatively flat area in coastal region on the Suisan Bay. Pittsburg is approximately 50 km from coast. Rural.

Population density: 176 persons/km²

Population of Pittsburg: 33,034 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.0×10^{-7}

Predicted maximum concentration of compound: 4.2441 ug/m³

Location of predicted maximum concentration: 0.2 km ENE of source; within plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 20%

Description of nonhabitable areas: Slough

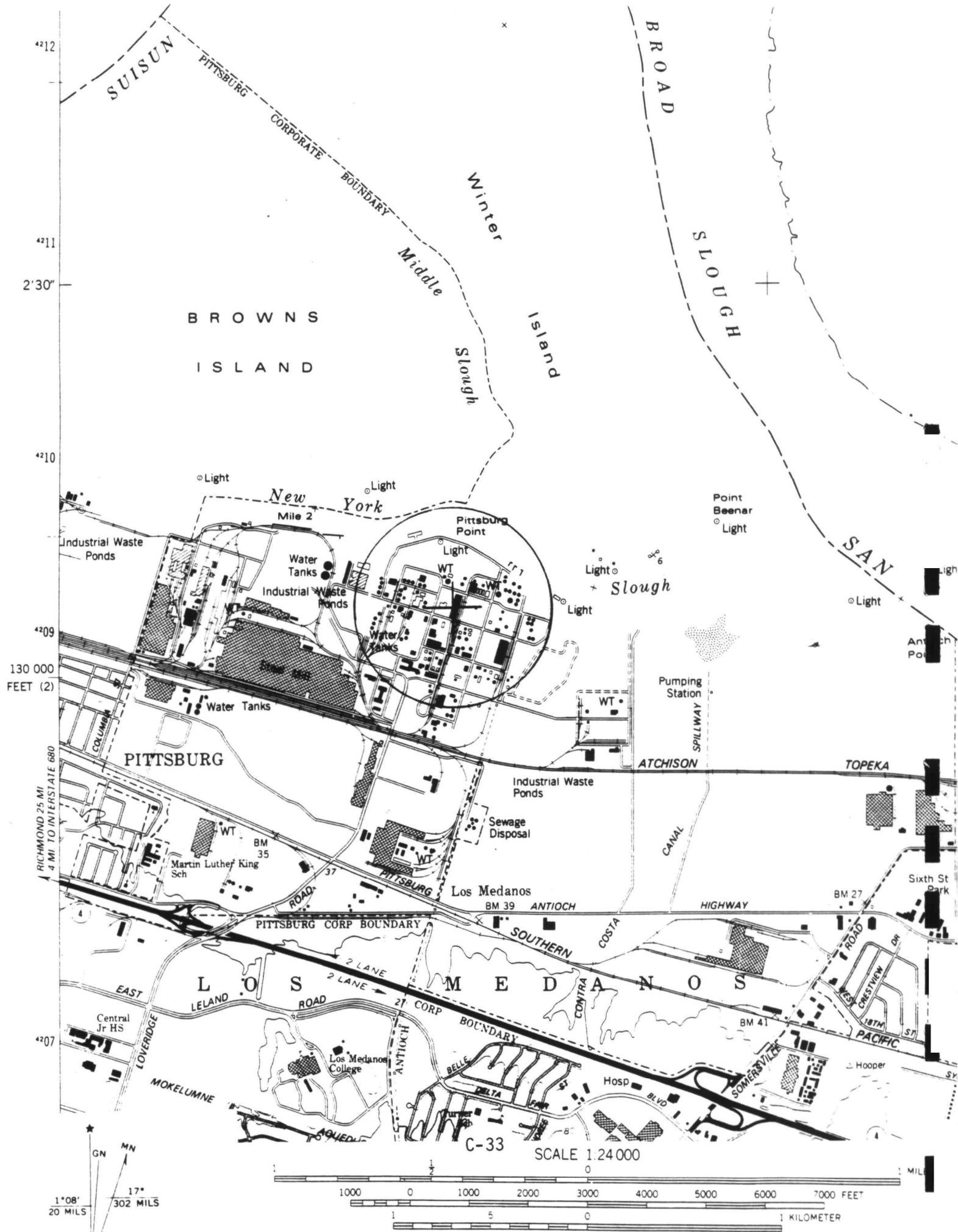
Location of nonhabitable areas relative to source: Slough is 0.3 km NE of source.

Location of nonhabitable areas relative to predicted maximum concentration: Slough is 0.2 km NE of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude differed significantly from the coordinates currently used for the sym. tet. process unit of the Dow, Pittsburg, facility. The current information does not locate the plant near Pittsburg. The latitude and longitude provided for the sym. tet. unit were verified on the U.S.G.S. map as the more reasonable coordinates. The STAR site had previously been verified for the Dow, Pittsburg, plant.

It is recommended that the HEM be re-run with the verified latitude and longitude for this source.



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: DuPont

Location: Beaumont, Texas (hypalon®)

Source Category: Other chemical plants

Compound: Carbon tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 00 44	30 00 44	3
Longitude:	94 01 37	94 01 37	3
STAR Site:	# 12917	# 12917	
Location:	Port Arthur, TX	Port Arthur, TX	
Distance from source:	6.99 km	6.99 km	
Bearing from source:	172	172	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat, lowland area on the Gulf coast. Large areas of wetlands. Rural.

Population density: 48 persons/km²

Population of Beaumont: 118,102 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.8×10^{-3}

Predicted maximum concentration of compound: 121.61 ug/m³

Location of predicted maximum concentration: 0.2 km N of source; at a building within the plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 10%

Description of nonhabitable areas: Settling basin

Location of nonhabitable areas relative to source: Settling basin is 0.2 km NE of source.

Location of nonhabitable areas relative to predicted maximum concentration: Settling basin is 0.1 km NE of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude locate this plant in a large industrial complex near Beaumont, Texas. The current information appears to be reasonable from the U.S.G.S. map. The Port Arthur STAR site is the most representative site for Beaumont.



UTM GRID AND 1980 MAGNETIC NORTH

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: DuPont

Location: Beaumont, Texas (hypalon®)

Source Category: Other Chemical Plants

Compound: Chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 01 23	30 00 44	3, 7
Longitude:	93 37 12	94 01 37	3, 7
STAR Site:	# 12917	# 12917	
Location:	Port Arthur, TX	Port Arthur, TX	
Distance from source:	39.04 km	6.99 km	
Bearing from source:	258	172	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat, lowland area on Gulf Coast. Large areas of wetlands. Rural.

Population density: 48 persons/km²

Population of Beaumont: 118,102 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 5.3×10^{-7}

Predicted maximum concentration of compound: 10.254 ug/m³

Location of predicted maximum concentration: 0.2 km N of source; at a building in the plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 10%

Description of nonhabitable areas: Settling basin

Location of nonhabitable areas relative to source: Settling basin is 0.2 km NE of source.

Location of nonhabitable areas relative to predicted maximum concentration: Settling basin is 0.1 km NE of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The latitude and longitude currently being used to model carbon tetrachloride emissions from this facility differs significantly from the current information. The carbon tetrachloride modeling information was verified on the U.S.G.S. map as being more reasonable. The current information did not locate the source near Beaumont. It is recommended that the HEM inputs be checked and updated to reflect the verified latitude and longitude, if necessary.



UTM GRID AND 1980 MAGNETIC NORTH

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: DuPont

Location: Louisville, Kentucky

Source Category: Other chemical plants

Compound: Chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	38 12 57	38 12 56	8, 9
Longitude:	85 50 33	85 50 26	8, 9
STAR Site:	# 93821	# 93821	
Location:	Louisville, KY	Louisville, KY	
Distance from source:	10.20 km	10.20 km	
Bearing from source:	111	111	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Mountainous region in north-central Kentucky. Ohio River is about 1 km NW of source. Rural.

Population density: 128 persons/km²

Population of Louisville: 298,451 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.9×10^{-4}

Predicted maximum concentration of compound: 10.616 ug/m³

Location of predicted maximum concentration: 0.2 km N of source

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 10-15%

Description of nonhabitable areas: Two tailings ponds and one large stream.

Location of nonhabitable areas relative to source: Tailings pond #1 is 0.3 km SE, Tailings pond #2 is 0.4 km E, and the large stream is 0.4 km N of the source.

Location of nonhabitable areas relative to predicted maximum concentration: Tailings pond #1 is 0.4 km SSE, Tailings Pond #2 is 0.5 km SE, and the large stream is 0.2 km N of the predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The latitude and longitude provided by the Kentucky Department of Environmental Protection agree closely with the current information. However, the coordinates provided by Kentucky agree more closely with the location of the nearest industrial plant on the U.S.G.S. map, and therefore they were selected as the verified coordinates. The STAR site shown by the HEM is located in Louisville and is considered the most representative site for this source.

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: General Electric

Location: Mount Vernon, Indiana

Source Category: Other chemical plants

Compound: Methylene chloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	37 56 42	37 56 42	13
Longitude:	87 54 25	87 54 25	13
STAR Site:	# 93817	# 93817	
Location:	Evansville, IN	Evansville, IN	
Distance from source:	37.74 km	37.74 km	
Bearing from source:	70	70	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Ranges from relatively flat to rolling hills in southwest Indiana. Rural.

Population density: 44 persons/km²

Population of Mount Vernon: 7,656 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 2.8×10^{-3}

Predicted maximum concentration of compound: 692.99 ug/m³

Location of predicted maximum concentration: 0.2 km SE of source

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 1-5%

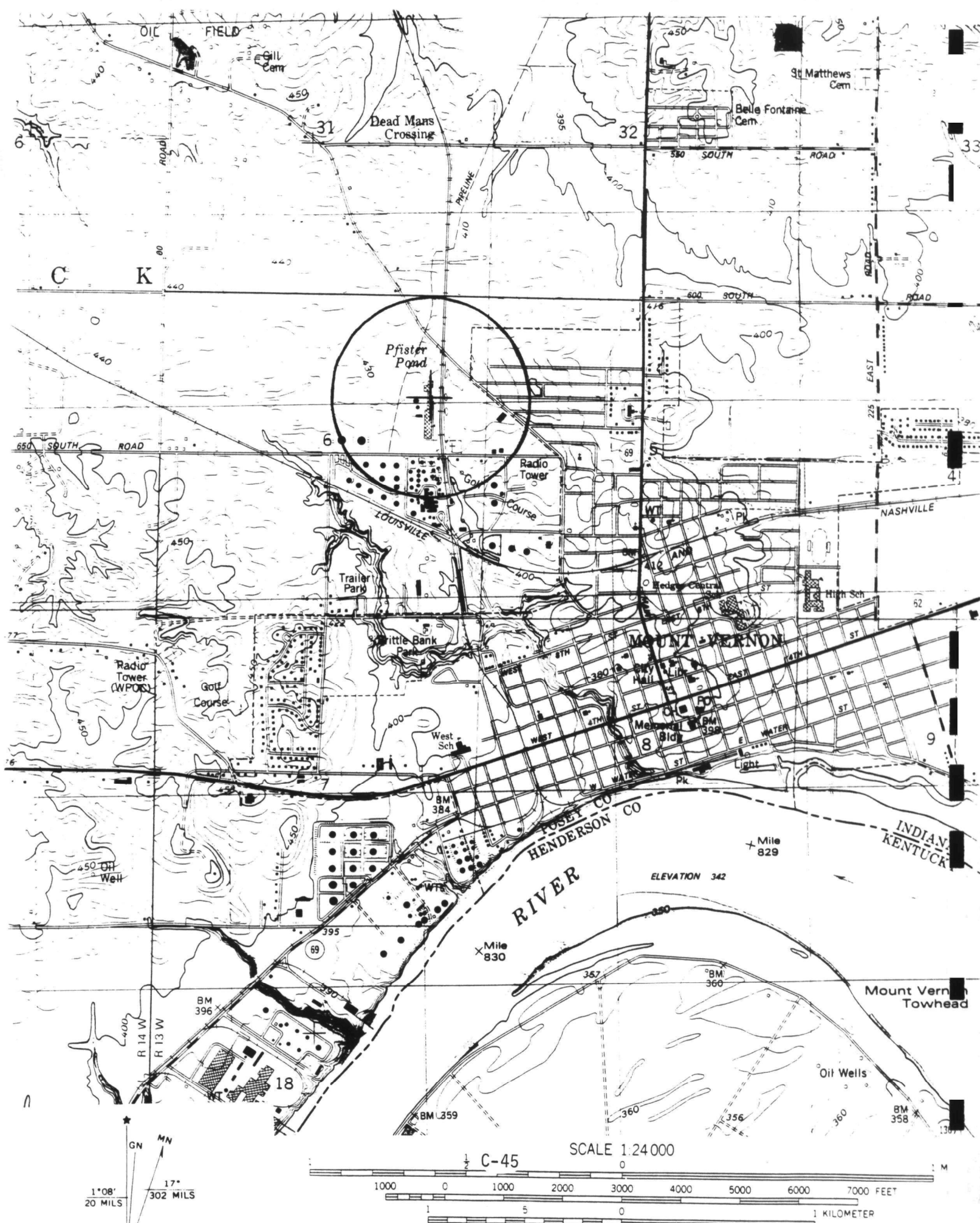
Description of nonhabitable areas: Pond.

Location of nonhabitable areas relative to source: Pond is 0.2 km N of source.

Location of nonhabitable areas relative to predicted maximum concentration: Pond is 0.4 km NW of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify a large structure in Mount Vernon as the location of this plant. The current information appears reasonable from the U.S.G.S. map. The STAR site chosen by the HEM is the most representative site for this source. Evansville and Mount Vernon are both located on the Ohio River in southwestern Indiana.



UTM GRID AND 1980 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: General Electric

Location: Pittsfield, Massachusetts

Source Category: Other chemical plants.

Compound: Methylene chloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	42 27 30	42 27 30	14
Longitude:	73 13 10	73 13 10	14
STAR Site:	# 14763	# 14763	
Location:	Pittsfield, MA	Pittsfield, MA	
Distance from source:	7.17 km	7.17 km	
Bearing from source:	247	247	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Mountainous area in western Massachusetts. Numerous small lakes within 50 km. Rural.

Population density: 113 persons/km²

Population of Pittsfield: 51,974 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 3.9×10^{-4}

Predicted maximum concentration of compound: 94.888 ug/m³

Location of predicted maximum concentration: 0.2 km SE of source; within the plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude locate this plant in an industrial complex in Pittsfield. These coordinates were verified on the U.S.G.S. map as the likely location of this source. The STAR site chosen by the HEM is in Pittsfield and is the most representative site for the source.



MN
GN
13 1/2°
240 MILS
1° 13'
22 MILS

C-48
SCALE 1:25 000
1 1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0.5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

REFERENCES

1. U.S. Geological Survey. 1962. Midland South, Michigan. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1973.
2. U.S. Geological Survey. 1978. Antioch North, California. 7.5 Minute series topographic map, 1:24000 scale.
3. U.S. Geological Survey. 1960. Beaumont East, Texas. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1970 and 1974.
4. U.S. Geological Survey. 1967. Buffalo Creek, California. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1980.
5. U.S. Geological Survey. 1967. Elizabeth, New Jersey-New York. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1981.
6. New Jersey Bureau of Air Pollution Control, Division of Environmental Quality, Department of Environmental Protection, CN027, Trenton, New Jersey 08625. (609) 795-7390.
7. Letter and attachments from McClure, R.L., E.I. du Pont de Nemours and Company, to Farmer, J., EPA: ESED. March 15, 1985. Response to carbon tetrachloride Section 114 questionnaire.
8. U.S. Geological Survey. 1983. Louisville West, Kentucky-Indiana. 7.5 Minute series topographic map, 1:24000 scale.
9. Kentucky Department of Environmental Protection, Division of Air Pollution Control, 18 Reilly Road, Frankfort, Kentucky 40601. (502) 564-3382.
10. U.S. Geological Survey. 1963. Avon, Ohio. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1979.
11. Letter and attachments from Holbrook, W.C., B.F. Goodrich Company, to Farmer, J., EPA: ESED. February 5, 1985. Response to methylene chloride Section 114 questionnaire.
12. U.S. Geological Survey. 1968. Rock Hill East, South Carolina. 7.5 Minute series topographic map, 1:24000 scale.
13. U.S. Geological Survey. 1981. Mount Vernon, Indiana-Kentucky. 7.5 Minute series topographic map, 1:24000 scale.
14. U.S. Geological Survey. 1973. Pittsfield East, Massachusetts. 1:25000 scale topographic map.

APPENDIX D:

CHLORINATED ORGANICS PRODUCTION CATEGORY

SOURCE SUMMARY SHEETS FOR CHLORINATED ORGANICS PRODUCTION
TABLE OF CONTENTS

<u>Facility/Location/Compounds Emitted</u>	<u>Page</u>
Table D-1. Sources of Current Modeling Information	D-3
1. Diamond Shamrock/Deer Park, TX (perc) Perchloroethylene	D-4
2. Diamond Shamrock/Belle, WV Carbon tetrachloride and methylene chloride Chloroform	D-7 D-10
3. Du Pont/Ingleside, TX Carbon tetrachloride	D-13
4. Dow Chemical/Freeport, TX (chloromethanes) Carbon tetrachloride and methylene chloride	D-16
5. Dow Chemical/Freeport, TX (perc/tet) Carbon tetrachloride	D-19
6. Dow Chemical 1/Freeport, TX Chloroform, perchloroethylene, and trichloroethylene	D-22
7. Dow Chemical/Pittsburg, CA (perc/tet) Carbon tetrachloride and perchloroethylene	D-25
8. Dow Chemical/Plaquemine, LA (chloromethanes) Chloroform Carbon tetrachloride and methylene chloride	D-28 D-31
9. Dow Chemical/Plaquemine, LA (perc/tet) Carbon tetrachloride	D-34
10. Linden Chemical Products/Moundsville, WV Carbon tetrachloride and methylene chloride Chloroform	D-37 D-40
11. Stauffer Chemical/Axis, AL Carbon tetrachloride	D-43
12. Vulcan Chemicals/Geismar, LA (chloromethanes) Carbon tetrachloride and methylene chloride	D-46
13. Vulcan Chemicals/Geismar, LA (perc/tet) Carbon tetrachloride, perchloroethylene, and trichloroethylene Chloroform	D-49 D-52
14. Vulcan Chemicals/Wichita, KS Carbon tetrachloride, perchloroethylene, trichloroethylene and methylene chloride Chloroform	D-55 D-58
References	D-61

TABLE D-1. SOURCES OF CURRENT MODELING INFORMATION

Maximum Individual Risk Values

1. Memorandum from Zaragoza, L.D., EPA: SASD, to the Files. Carbon Tetrachloride Exposure and Risk Analysis. August 6, 1985.
2. Memorandum from Mohin, T.J., EPA: SASD, to the Files. Chloroform Exposure and Risk Assessment. June 10, 1985.
3. Excerpts from Human Exposure Model Printout for Methylene Chloride. Phase I data. Received from Larry Zaragoza EPA:SASD. Undated.
4. Memorandum from Vandenberg, J.J., EPA: SASD, to the Files. Perchloroethylene Exposure and Cancer Risk Analysis. November 15, 1985.
5. Memorandum from Vandenberg, J.J., EPA:SASD, to the Files. Trichloroethylene Exposure and Cancer Risk Analysis. October 11, 1985.

Latitude & Longitude, STAR Site, and Predicted Maximum Concentration

6. Human Exposure Model Printout for Carbon Tetrachloride. March 4, 1986.
7. Human Exposure Model Printout for Chloroform Emissions from Chloroform Production. December 12, 1984.
8. Human Exposure Model Printout for Methylene Chloride. July 1, 1985.
9. Excerpts from Human Exposure Model Printout for Perchloroethylene Production. Phase I data. Received from John Vandenberg, EPA: SASD March 28, 1986.
10. Excerpts from Human Exposure Model Printout for Trichloroethylene Production. Phase I data. Received from John Vandenberg, EPA:SASD March 28, 1986.

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Diamond Shamrock

Location: Deer Park, Texas (perc)

Source Category: Chlorinated Organics Production

Compound: Perchloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	29 43 56	29 43 56	1
Longitude:	95 06 43	95 06 43	1
STAR Site:	# 12906	# 12906	
Location:	Houston, TX	Houston, TX	
Distance from source:	13.89 km	13.89 km	
Bearing from source:	202	202	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain in Gulf Coast region of southeast Texas. Plant is approximately 0.6 km S of Buffalo Bayou and 2.5 km N of the city of Deer Park. Urban.

Population density: 249 persons/km²

Population of Deer Park: 22,648 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 7.4×10^{-6}

Predicted maximum concentration of compound: 95.215 ug/m³

Location of predicted maximum concentration: 0.2 km N of source; within plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 25-30%

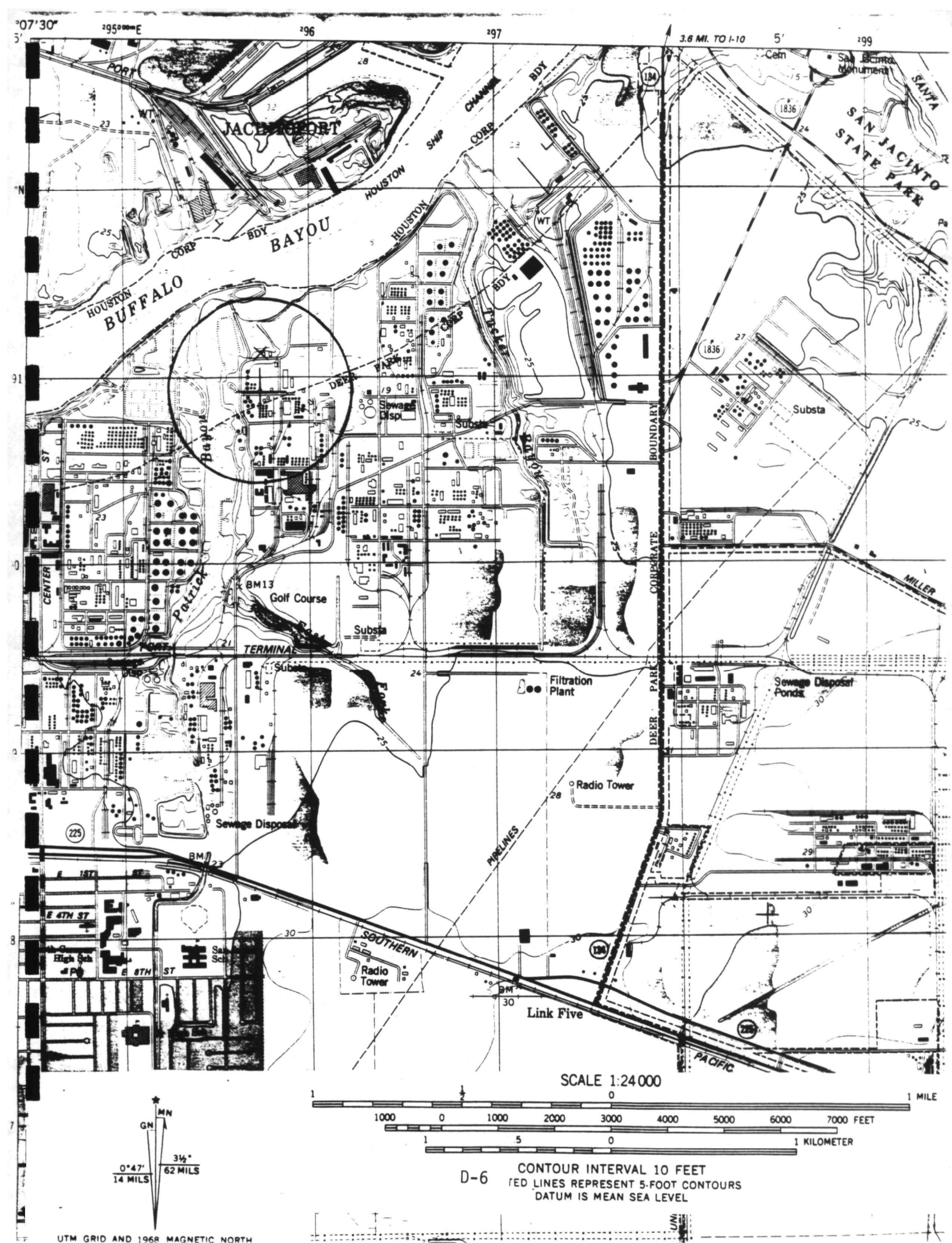
Description of nonhabitable areas: Bayou and ponds

Location of nonhabitable areas relative to source: Bayou is 0.2 km W and 0.35 km N of source; ponds are 0.2 km NW, 0.2 km N, 0.3 km NE, and 0.4 km SE of source.

Location of nonhabitable areas relative to predicted maximum concentration: Bayou is 0.2 km W, 0.3 km NW, and 0.3 km N of predicted maximum concentration. Predicted maximum concentration is located in or on border of a pond. Other ponds are 0.15 km NW, 0.3 km NE, and 0.2 km E of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude locate this source in a large industrial complex in Deer Park. These coordinates are reasonable. The STAR site chosen by the HEM is the most representative site. This STAR site has been previously verified for Diamond Shamrock/Deer Park.



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Diamond Shamrock

Location: Belle, West Virginia

Source Category: Chlorinated Organics Production

Compounds: Carbon Tetrachloride and Methylene Chloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	38 14 00	38 14 00	2
Longitude:	80 32 49	81 32 49	2,3
STAR Site:	# 03872	# 13866	
Location:	Beckley, WV	Charleston, WV	
Distance from source:	70.64 km	12 km	
Bearing from source:	225	315	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Mountainous region of southwestern West Virginia.

Kanawha River runs northwest-southeast through region. Plant is in flat area on north shore of Kanawha River. Rural.

Population density: 45 persons/km²

Population of Belle: 1,621 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.4×10^{-4} for carbon tetrachloride and 6.12×10^{-4} for methylene chloride.

Predicted maximum concentration of compound: 9.4059 ug/m³ of carbon tetrachloride and 167.09 ug/m³ of methylene chloride.

Location of predicted maximum concentration: 0.2 km N of source; within plant complex. The location is expected to change when the HEM is re-run with the verified longitude to 0.2 km SW of source.

Topography: Same as above; in river valley.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 40%

Description of nonhabitable areas: River

Location of nonhabitable areas relative to source: River is 0.1 km SW of source.

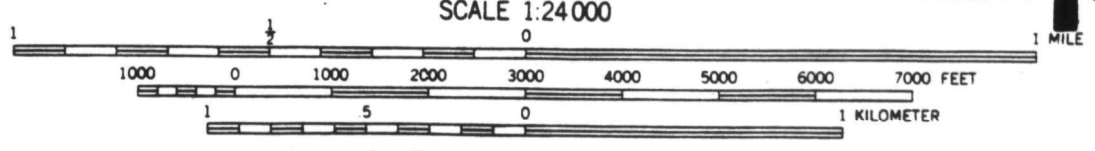
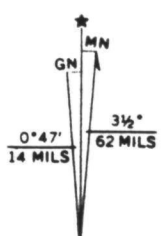
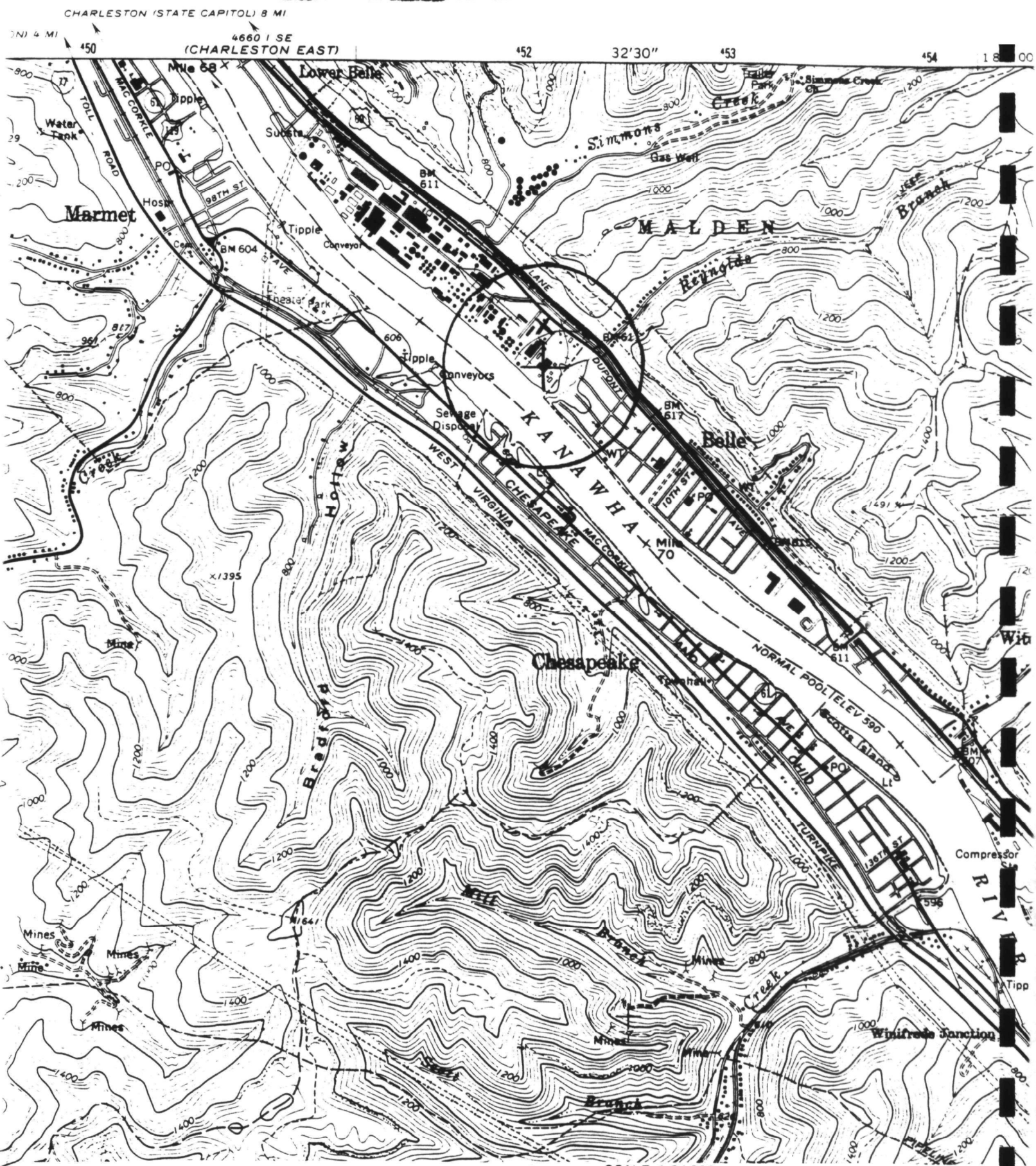
Location of nonhabitable areas relative to predicted maximum concentration: River is 0.25 km SW of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current longitude is incorrect. It does not identify a plant near Belle, West Virginia. The longitude submitted on the Section 114 questionnaire for carbon tetrachloride was incorrect. The longitude currently used to model methylene chloride emissions from this source was verified on the U.S.G.S. map as being the correct longitude for this source.

The STAR site chosen by the HEM corresponds to the incorrect latitude and longitude. The verified latitude and longitude will make the Charleston STAR site the closest and most representative site.

The location of the predicted maximum concentration is expected to change when the HEM is re-run with the verified longitude to 0.2 km SW of source. This new location is in a nonhabitable area -- the Kanawha River.



D-9
CONTOUR INTERVAL 10 FEET
TED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Diamond Shamrock

Location: Belle, West Virginia

Source Category: Chlorinated Organics Production

Compounds: Chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	38 14 09	38 14 00	2
Longitude:	81 32 38	81 32 38	2
STAR Site:	# 13866	# 13866	
Location:	Charleston, WV	Charleston, WV	
Distance from source:	15.34 km	15.34 km	
Bearing from source:	341	341	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Mountainous region of southwestern West Virginia.

Kanawha River runs northwest-southeast through region. Plant is in flat area on north shore of Kanawha River. Rural.

Population density: 45 persons/km²

Population of Belle: 1,621 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 9.4×10^{-4}

Predicted maximum concentration of compound: 93.589 ug/m³

Location of predicted maximum concentration: 0.2 km SW of source

Topography: Same as above; in river valley.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 40%

Description of nonhabitable areas: River

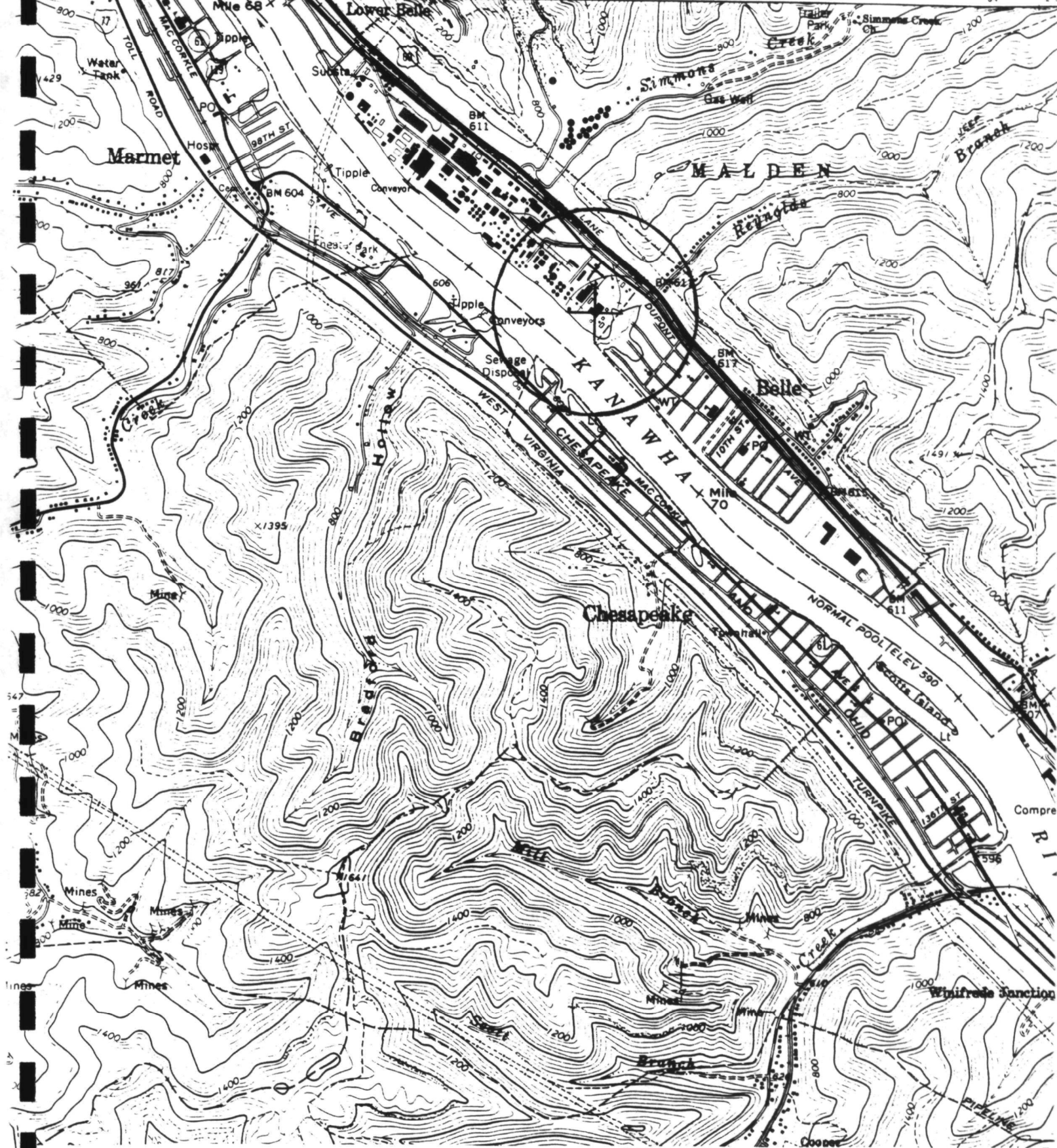
Location of nonhabitable areas relative to source: River is 0.1 km SW of source.

Location of nonhabitable areas relative to predicted maximum concentration: Predicted maximum concentration is located in the river.

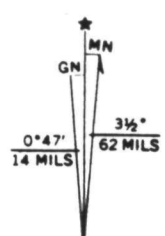
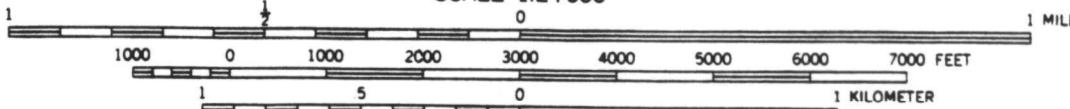
VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude agree closely with the coordinates of this source verified for carbon tetrachloride and methylene chloride emissions. The verified latitude is only 9 seconds different and therefore it is not recommended that the HEM be re-run. The current STAR site is the appropriate site for this location.

The predicted maximum concentration is currently located in a nonhabitable area -- the Kanawha River, 0.2 km SW of the source.



SCALE 1:24000



D-12 CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Du Pont

Location: Ingleside, Texas

Source Category: Chlorinated Organics Production

Compound: Carbon Tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	27 52 29	27 52 29	4,5,6
Longitude:	97 14 35	97 14 35	4,5,6
STAR Site:	# 12925	# 12925	
Location:	Beeville, TX	Beeville, TX	
Distance from source:	70.13 km	70.13 km	
Bearing from source:	324	324	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain in Gulf Coast region. Plant is about 0.7 km NW of Corpus Christi Bay. Rural.

Population density: 24 persons/km²

Population of Ingleside: 5,436 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.6×10^{-3}

Predicted maximum concentration of compound: 108.43 ug/m³

Location of predicted maximum concentration: 0.2 km NE of source

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

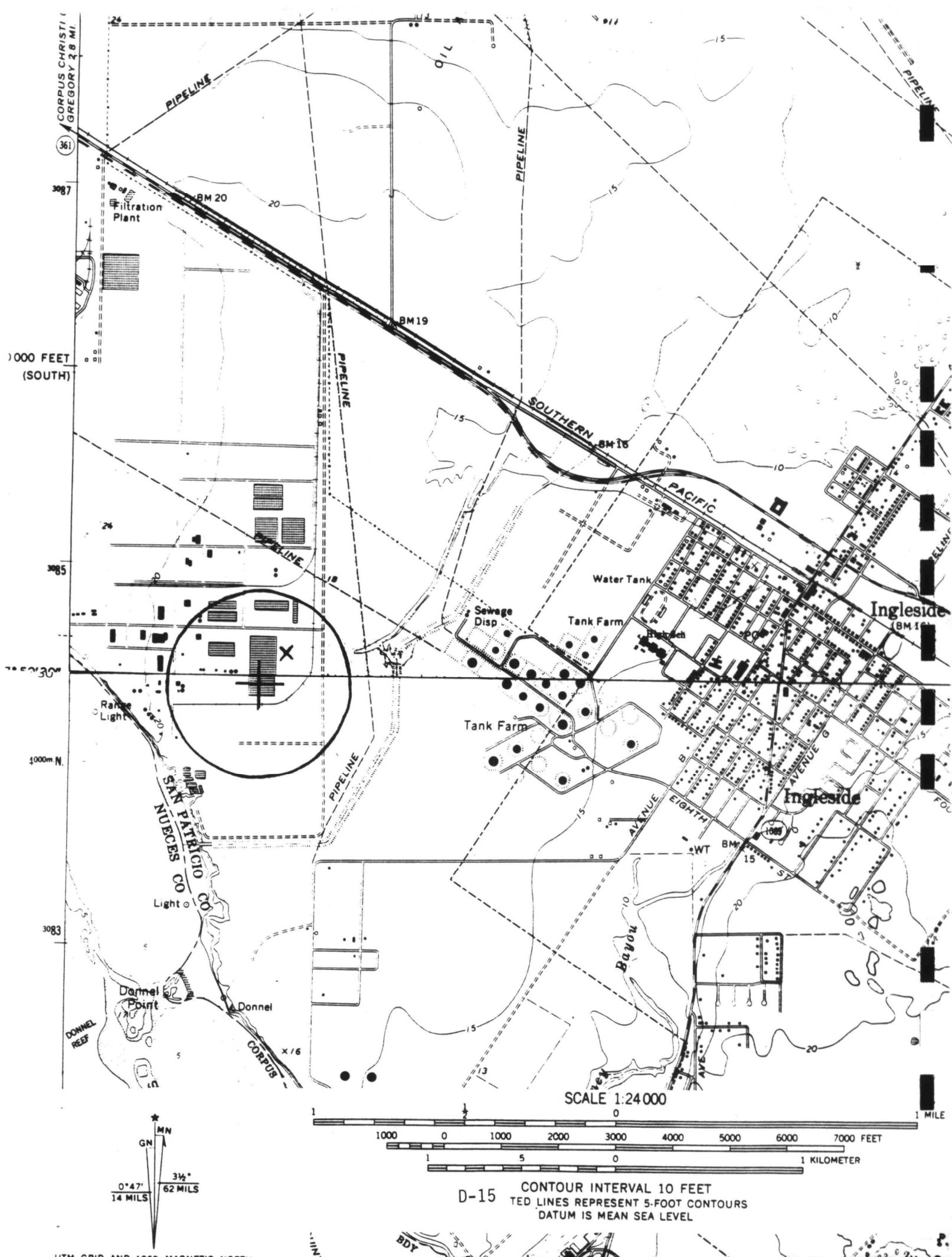
Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify a building in a large industrial complex as the location of this plant. These coordinates are reasonable. They also agree with the coordinates provided by the Texas Air Control Board.

The current STAR site is more representative of regional meteorology than the Galveston or Houston sites, the two next closest STAR sites. However, Ingleside is located on the coast near Corpus Christi and would be better represented by a Corpus Christi STAR site, if it was included in the STAR data set. Corpus Christi should be added to the HEM STAR data set.



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical

Location: Freeport, Texas (chloromethanes)

Source Category: Chlorinated Organics Production

Compound: Carbon Tetrachloride and Methylene Chloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	28 57 00	28 57 00	7
Longitude:	95 19 00	95 19 00	7
STAR Site:	# 12923	# 12923	
Location:	Galveston, TX	Galveston, TX	
Distance from source:	56.10 km	56.10 km	
Bearing from source:	51	51	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain on the Gulf of Mexico. Many rivers, lakes, and marshes. Plant is on an island surrounded by Dow Barge Canal, Old Brazos R., and Intracoastal Waterway. Rural.

Population density: 31 persons/km²

Population of Freeport: 13,444 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 6.4×10^{-6} for carbon tetrachloride and 3.73×10^{-5} for methylene chloride.

Predicted maximum concentration of compound: 3.2785 ug/m³ of carbon tetrachloride and 83.425 ug/m³ of methylene chloride.

Location of predicted maximum concentration: 0.2 km N of source; within chemical plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 1-5%

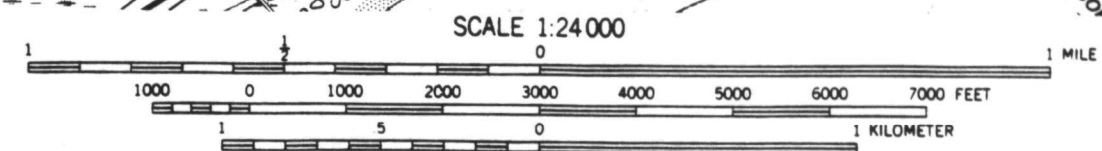
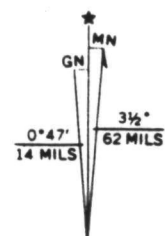
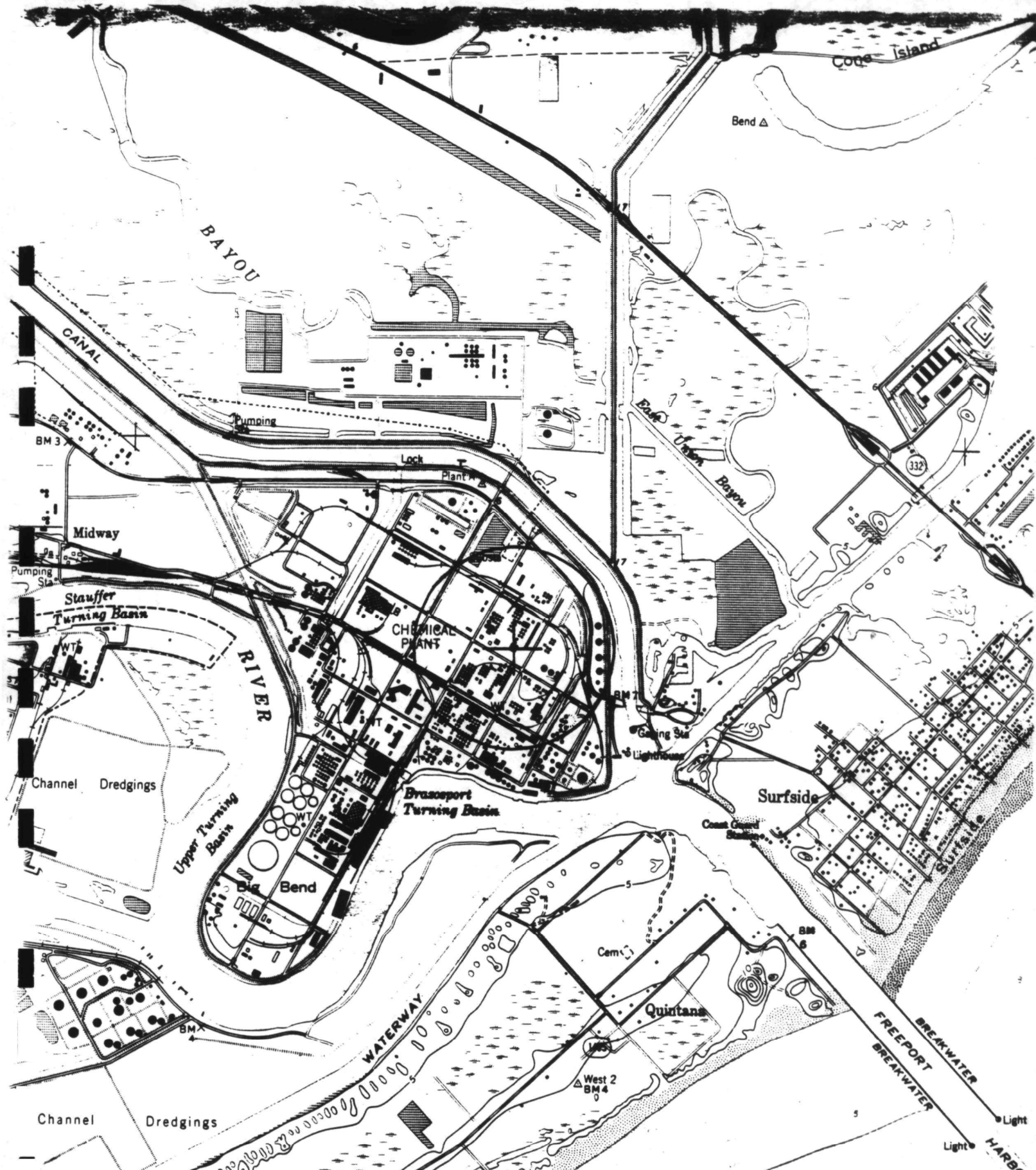
Description of nonhabitable areas: Canal

Location of nonhabitable areas relative to source: Canal is 0.45 km E of source.

Location of nonhabitable areas relative to predicted maximum concentration. Canal is 0.5 km SE of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude locate this source at a building in Dow's large industrial complex in Freeport. These coordinates are reasonable. The STAR site chosen by the HEM is also located on the Gulf Coast and is representative of conditions in Freeport.



D-18 CONTOUR INTERVAL 10 FEET
 RED LINES REPRESENT 5-FOOT CONTOURS
 DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical

Location: Freeport, Texas (perc/tet)

Source Category: Chlorinated Organics Production

Compound: Carbon Tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	28 56 43	28 56 43	7
Longitude:	95 18 59	95 18 59	7
STAR Site:	# 12923	# 12923	
Location:	Galveston, TX	Galveston, TX	
Distance from source:	56.41 km	56.41 km	
Bearing from source:	51	51	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain on Gulf of Mexico. Plant is approximately 1.5 km NW of the Gulf on an island in Freeport Harbor. Rural.

Population density: 31 persons/km²

Population of Freeport: 13,444 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 5.5×10^{-4}

Predicted maximum concentration of compound: 59.679 ug/m³

Location of predicted maximum concentration: 0.2 km N of source

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 15-20%

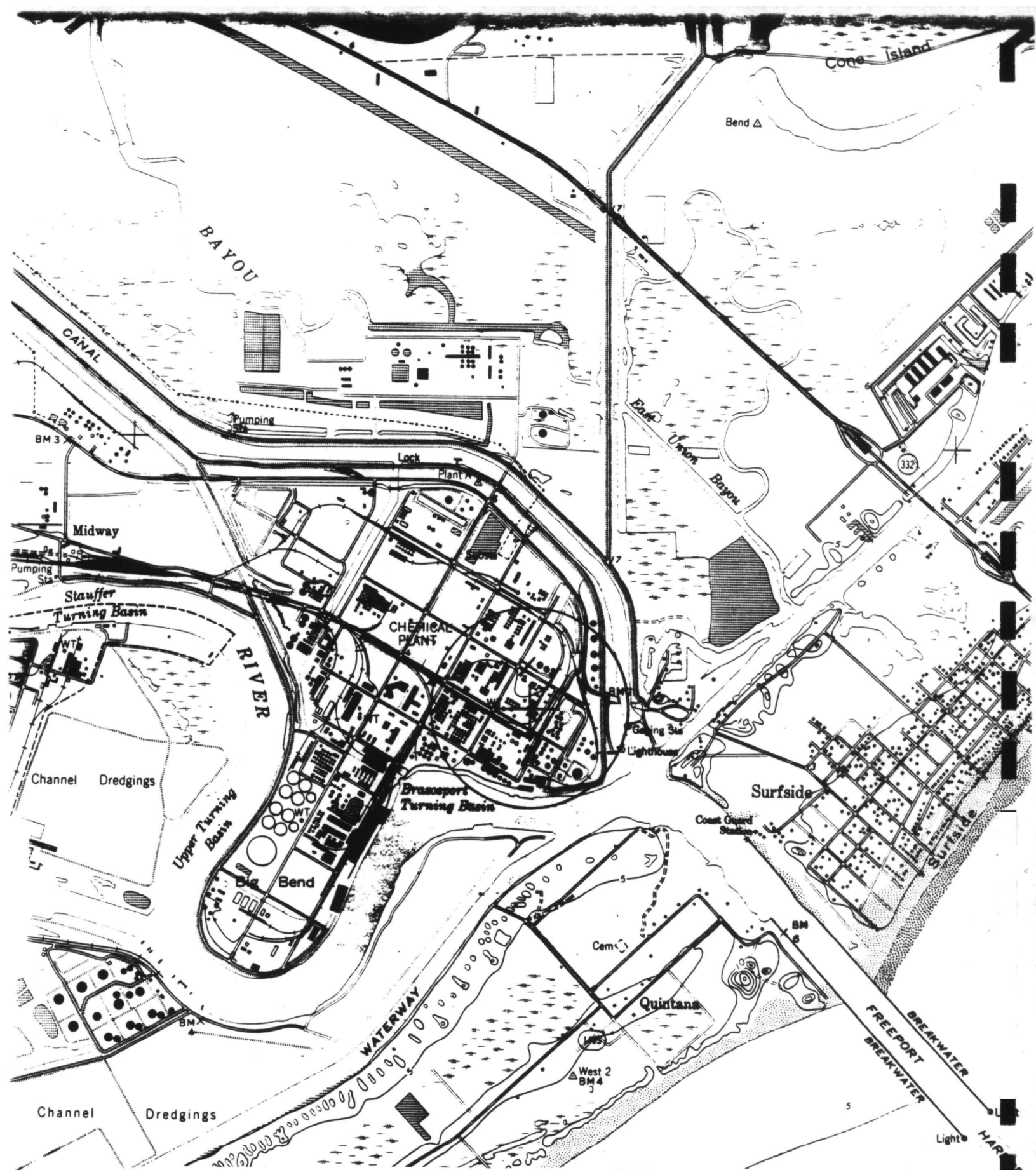
Description of nonhabitable areas: Estuary (Brazosport Turning Basin) and canal.

Location of nonhabitable areas relative to source: Estuary is 0.4 km S of source; canal is 0.3 km E of source.

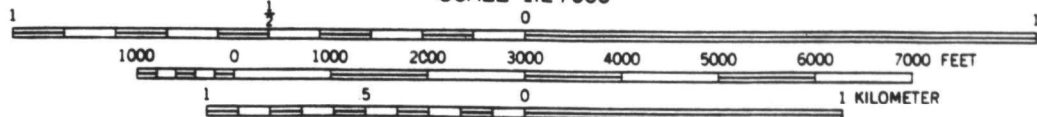
Location of nonhabitable areas relative to predicted maximum concentration: Estuary is 0.7 km S; canal is 0.3 km E of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

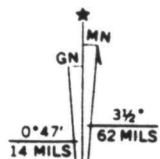
The current latitude and longitude identify a building in Dow's large chemical plant complex in Freeport. This chemical plant complex was verified as Dow/Freeport in previous validation tasks. The STAR site chosen by the HEM is the most representative site for Dow/Freeport. This STAR site was verified in previous verification tasks.



SCALE 1:24 000



D-21
 CONTOUR INTERVAL 10 FEET
 DOTTED LINES REPRESENT 5-FOOT CONTOURS
 DATUM IS MEAN SEA LEVEL



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical 1

Location: Freeport, Texas

Source Category: Chlorinated Organics Production

Compound: Chloroform, Perchloroethylene, and Trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	28 59 30	28 59 30	16
Longitude:	95 23 35	95 23 35	16
STAR Site:	# 12923	# 12923	
Location:	Galveston, TX	Galveston, TX	
Distance from source:	59.54 km	59.54 km	
Bearing from source:	59	59	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain on the Gulf of Mexico. Many rivers, lakes, and marshes. Plant is 1 km N of the Brazos River. Rural.

Population density: 31 persons/km²

Population of Freeport: 13,444 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 9.7×10^{-4} for chloroform, not available for perchloroethylene, and 4.2×10^{-5} for trichloroethylene.

Predicted maximum concentration of compound: 96.735 ug/m³ of chloroform, 18.864 ug/m³ of perchloroethylene, and 6.3290 ug/m³ of trichloroethylene.

Location of predicted maximum concentration: 0.2 km N of source; within chemical plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 5-10%

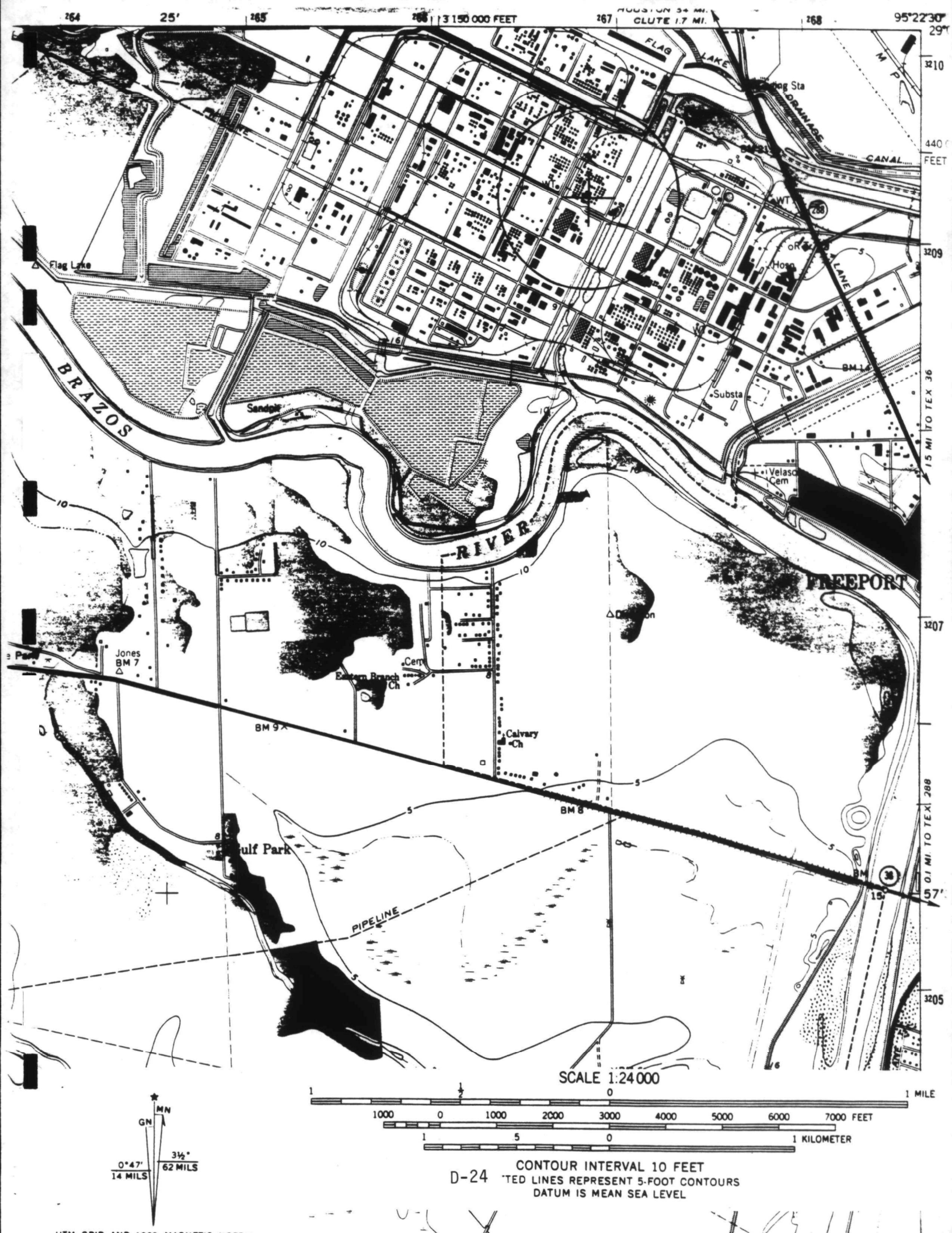
Description of nonhabitable areas: Canal

Location of nonhabitable areas relative to source: Canal is 0.2 km SE and 0.4 km NE of source.

Location of nonhabitable areas relative to predicted maximum concentration: Canal is 0.2 km NE and 0.3 km SE of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude appear to be reasonable. They identify a building in a large industrial complex in Freeport. The current STAR site is the most appropriate site for Dow/Freeport and has been verified in previous validation tasks.



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical

Location: Pittsburg, California (perc/tet)

Source Category: Chlorinated Organics Production

Compound: Carbon Tetrachloride and Perchloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	38 01 30	38 01 30	8
Longitude:	121 51 15	121 51 15	8
STAR Site:	# 23202	# 23202	
Location:	Fairfield, CA	Fairfield, CA	
Distance from source:	27.73 km	27.73 km	
Bearing from source:	346	346	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Relatively flat area in coastal region (Pittsburg is approximately 50 km from coast) on Suisan Bay. Rural.

Population density: 176 persons/km²

Population of Pittsburg: 33,034 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 4.0×10^{-4} for carbon tetrachloride and 6.5×10^{-5} for perchloroethylene.

Predicted maximum concentration of compound: 26.756 ug/m³ of carbon tetrachloride and 25.381 ug/m³ of perchloroethylene.

Location of predicted maximum concentration: 0.2 km ENE of source; within plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 20%

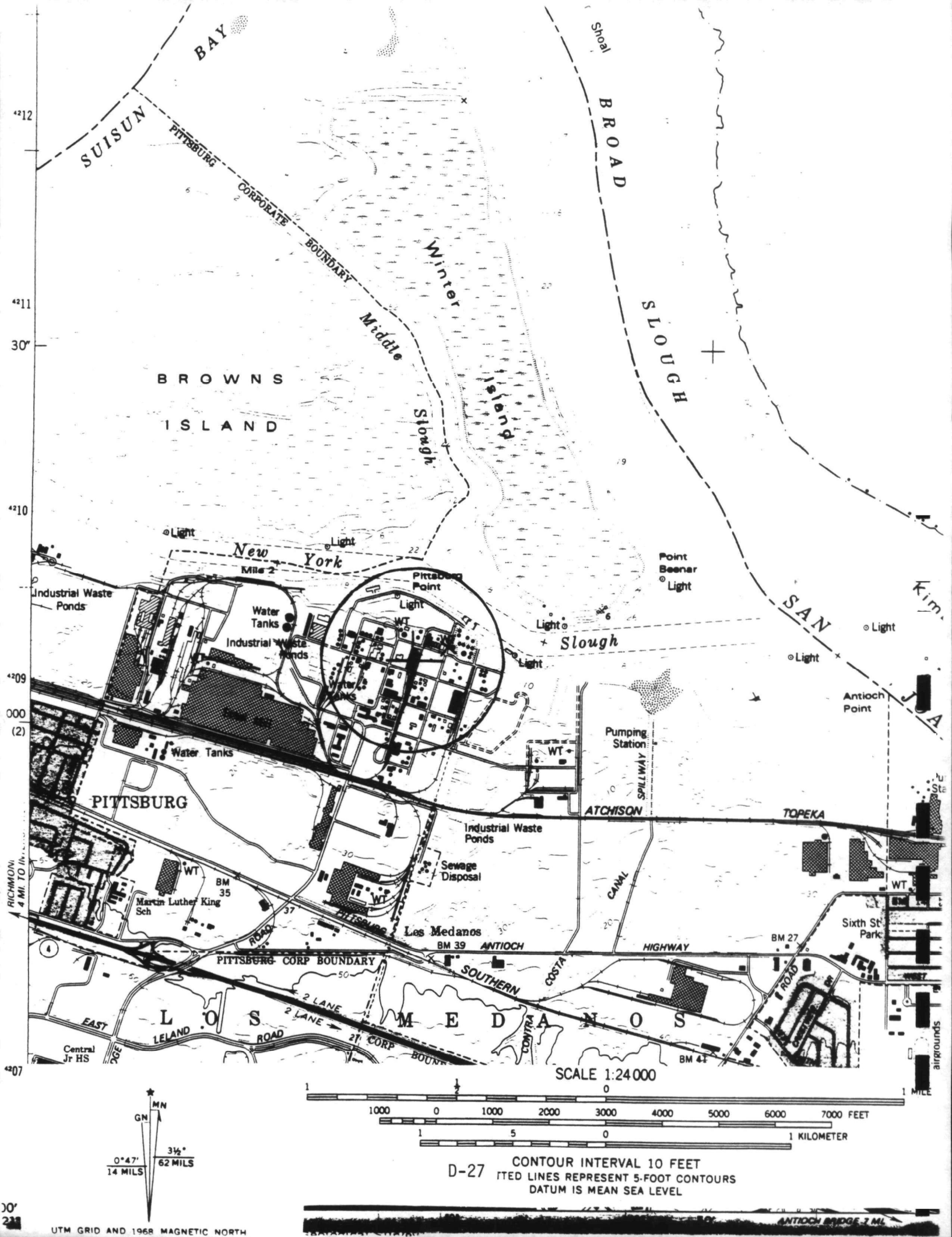
Description of nonhabitable areas: Slough, pond, and waste ponds.

Location of nonhabitable areas relative to source: Slough is 0.3 km NE, pond is 0.3 km NW, and waste ponds are 0.4 km W of source.

Location of nonhabitable areas relative to predicted maximum concentration: Slough is 0.2 km NE, pond is 0.3 km NW, and waste ponds are 0.6 km W of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify a building in Dow's industrial complex in Pittsburg. These coordinates are reasonable. The STAR site chosen by the HEM is the most representative site for Pittsfield. This STAR site was verified in previous validation tasks for Dow/Pittsburg.



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical

Location: Plaquemine, Louisiana (Chloromethanes)

Source Category: Chlorinated Organics Production

Compound: Chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 19 00	30 19 12	9
Longitude:	91 15 00	91 14 24	9
STAR Site:	# 13970	# 13970	
Location:	Baton Rouge, LA	Baton Rouge, LA	
Distance from source:	25.92 km	25.23 km	
Bearing from source:	22	20	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat lowland in the Mississippi River Valley. Rural.

Population density: 74 persons/km²

Population of Plaquemine: 7,521 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 3.3×10^{-4}

Predicted maximum concentration of compound: 32.552 ug/m³

Location of predicted maximum concentration: 0.2 km W of source;
within chemical plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 1-5%

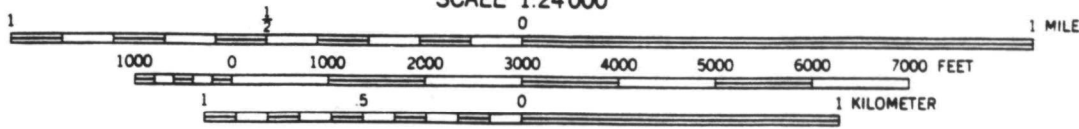
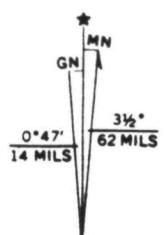
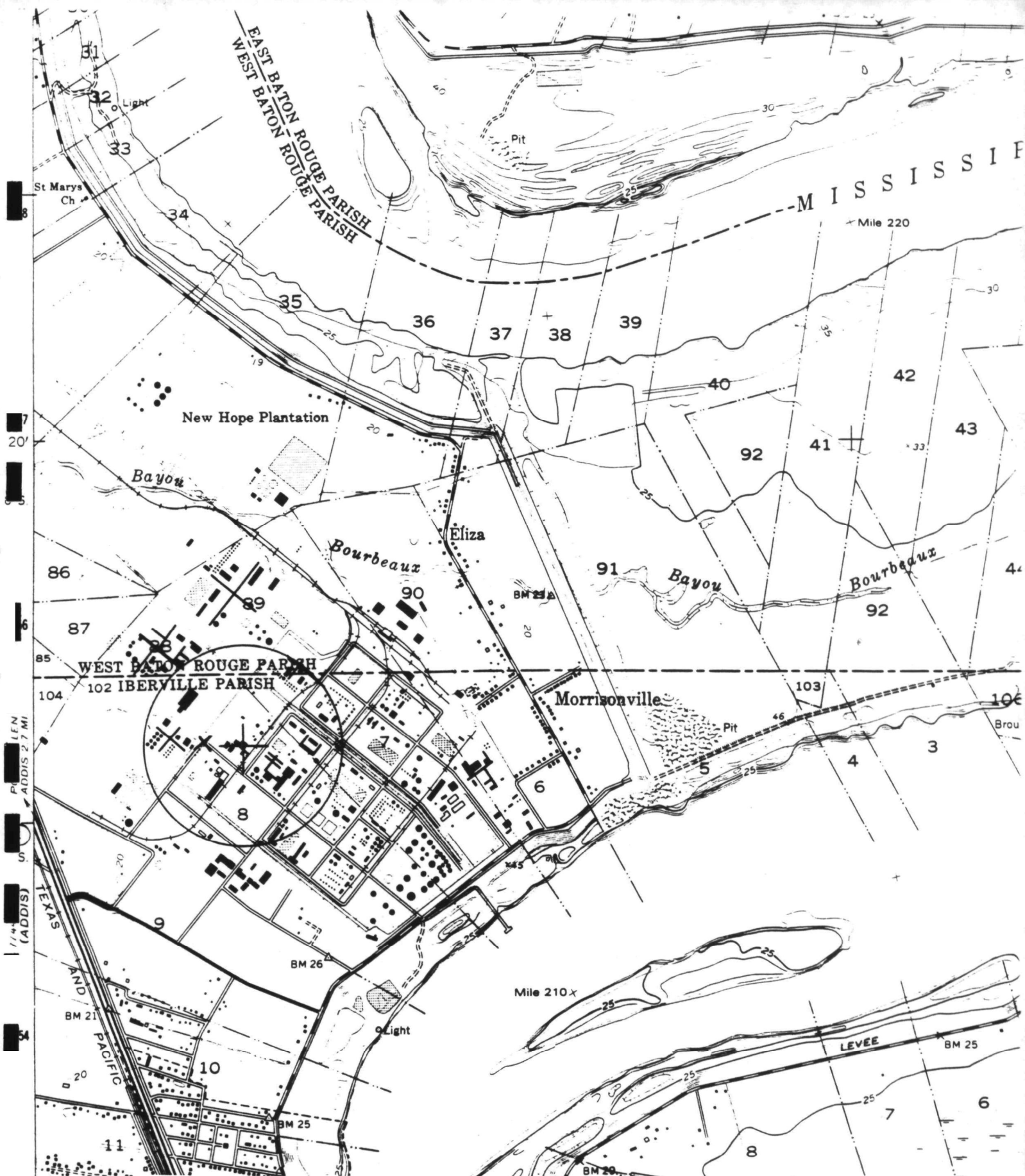
Description of nonhabitable areas: Settling ponds

Location of nonhabitable areas relative to source: Settling ponds
are 0.4 km SE of source.

Location of nonhabitable areas relative to predicted maximum
concentration: Settling ponds are 0.5 km SE of predicted maximum
concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude are similar to the coordinates verified for carbon tetrachloride and methylene chloride emissions from this source. No change in the HEM inputs is therefore recommended. The current STAR site is the most appropriate site for this location.



D-30 CONTOUR INTERVAL 10 FEET
THIN LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical

Location: Plaquemine, Louisiana (Chloromethanes)

Source Category: Chlorinated Organics Production

Compound: Carbon Tetrachloride and Methylene Chloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 19 12	30 19 12	9
Longitude:	91 14 24	91 14 24	9
STAR Site:	# 13970	# 13970	
Location:	Baton Rouge, LA	Baton Rouge, LA	
Distance from source:	25.23 km	25.23 km	
Bearing from source:	20	20	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat lowland in the Mississippi River Valley. Rural.

Population density: 74 persons/km²

Population of Plaquemine: 7,521 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 6.9×10^{-5} for carbon tetrachloride and 1.3×10^{-4} for methylene chloride.

Predicted maximum concentration of compound: 4.5703 ug/m³ of carbon tetrachloride and 351.51 ug/m³ of methylene chloride.

Location of predicted maximum concentration: 0.2 km W of source; within chemical plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 1-5%

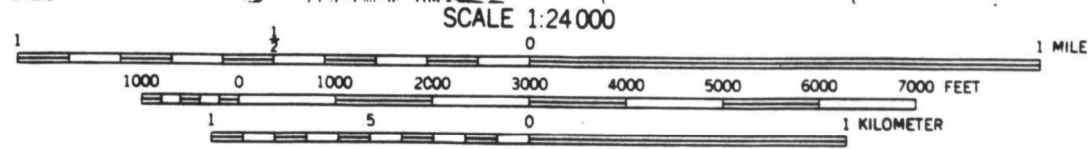
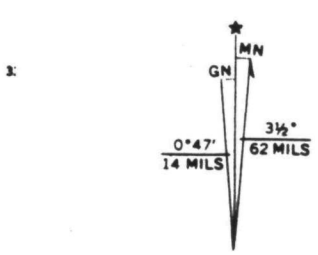
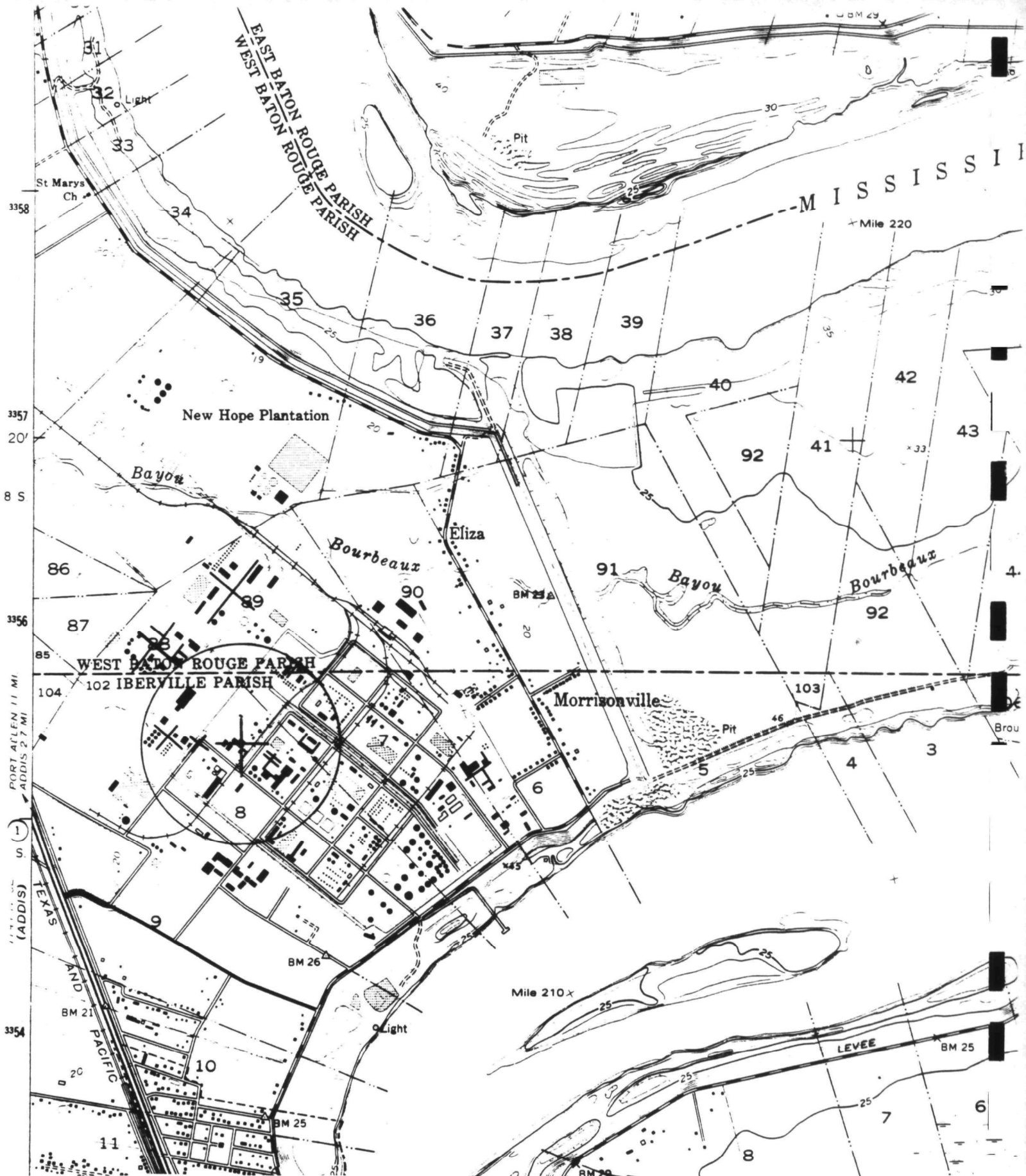
Description of nonhabitable areas: Settling ponds

Location of nonhabitable areas relative to source: Settling ponds are 0.4 km SE of source.

Location of nonhabitable areas relative to predicted maximum concentration: Settling ponds are 0.5 km SE of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify a group of buildings in a large industrial complex near Plaquemine as the location of this source. These coordinates are reasonable. The STAR site chosen by the HEM is the most representative site for Plaquemine. This STAR site has been verified for Dow/Plaquemine in previous validation tasks.



D-33 CONTOUR INTERVAL 10 FEET
 DOTTED LINES REPRESENT 5-FOOT CONTOURS
 DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical

Location: Plaquemine, Louisiana (perc/tet)

Source Category: Chlorinated Organics Production

Compound: Carbon Tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 18 56	30 18 56	9
Longitude:	91 14 04	91 14 04	9
STAR Site:	#13970	#13970	
Location:	Baton Rouge, LA	Baton Rouge, LA	
Distance from source:	25.32 km	25.32 km	
Bearing from source:	18	18	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat lowland in the Mississippi River Valley. Rural.

Population density: 74 persons/km²

Population of Plaquemine: 7,521 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.3×10^{-3}

Predicted maximum concentration of compound: 88.378 ug/m³

Location of predicted maximum concentration: 0.2 km W of source;
within chemical plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 5%

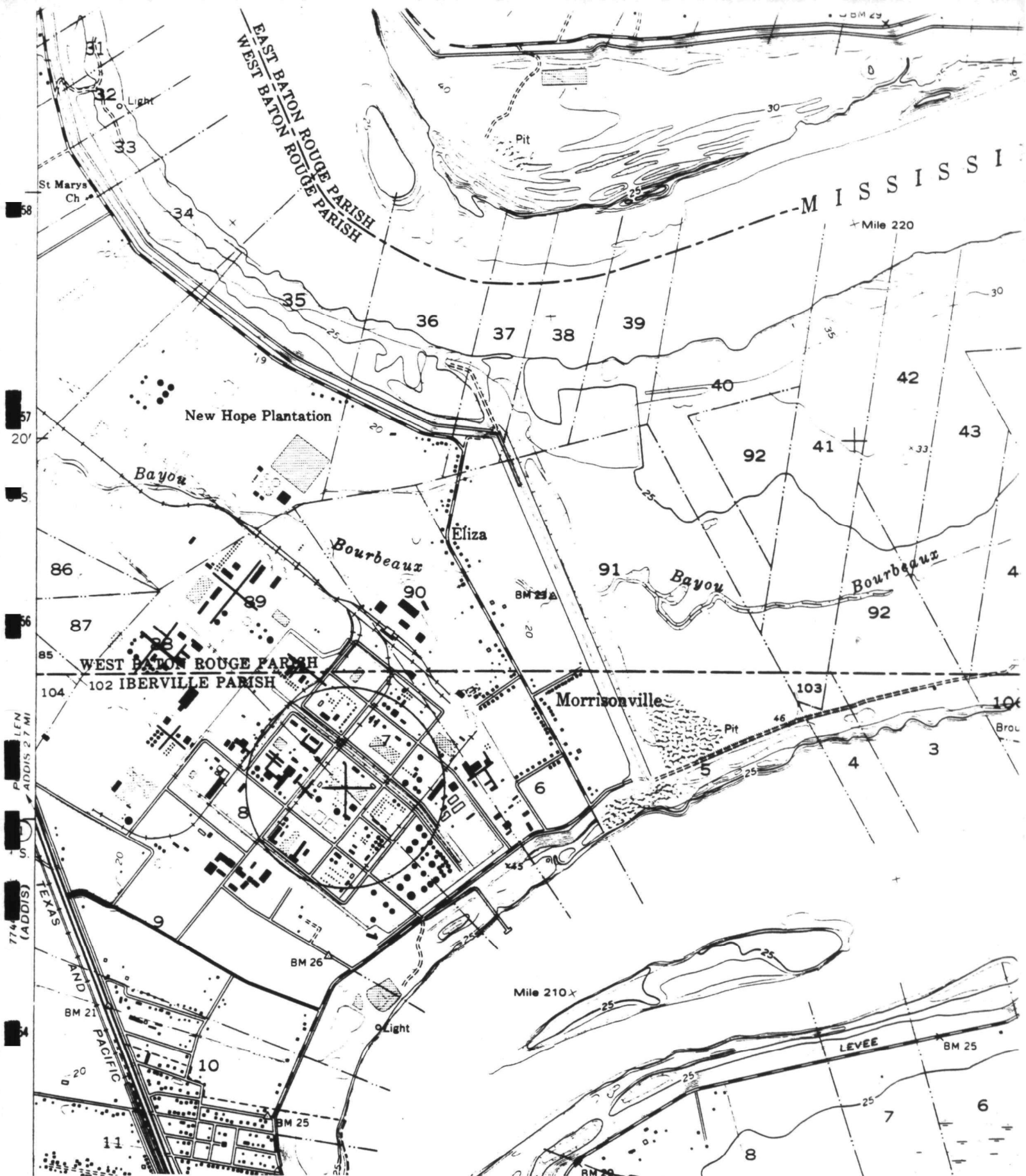
Description of nonhabitable areas: 3 settling ponds associated
with the facility.

Location of nonhabitable areas relative to source: Settling
ponds are 0.2 km SW of source.

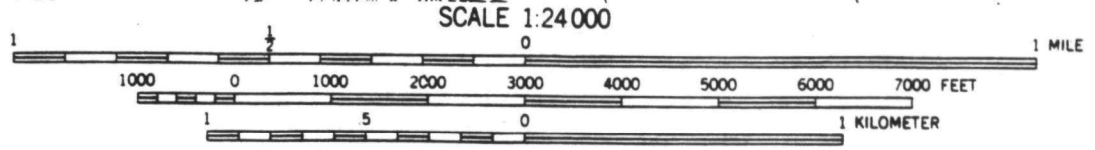
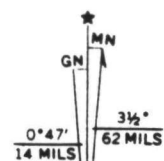
Location of nonhabitable areas relative to predicted maximum concentration: Settling ponds are 0.1 km S of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify a building in a large industrial complex near Plaquemine as the location of this source. These coordinates are reasonable. The STAR site chosen by the HEM is the most representative site for Plaquemine. This STAR site has been verified for Dow/Plaquemine in previous validation tasks.



774' LEN
(ADDS) 2.7 MI



D-36 CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Linden Chemical Products (LCP Chemicals)

Location: Moundsville, West Virginia

Source Category: Chlorinated Organics Production

Compound: Carbon Tetrachloride and Methylene Chloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	39 50 20	39 50 40	11
Longitude:	80 48 10	80 48 10	11
STAR Site:	# 13736	# 13736	
Location:	Morgantown, WV	Morgantown, WV	
Distance from source:	78.57 km	78.57 km	
Bearing from source:	105	105	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Mountainous region. Ohio River runs north-south through area. Source is on the shore of the Ohio River. Rural.

Population density: 36 persons/km²

Population of Moundsville: 12,419 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 4.3×10^{-3} for carbon tetrachloride and 1.11×10^{-3} for methylene chloride.

Predicted maximum concentration of compound: 283.91 ug/m³ of carbon tetrachloride and 214.93 ug/m³ of methylene chloride.

Location of predicted maximum concentration: 0.2 km NE of source.

Topography: Same as above; 0.15 km E of Ohio River.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 40-50%

Description of nonhabitable areas: River

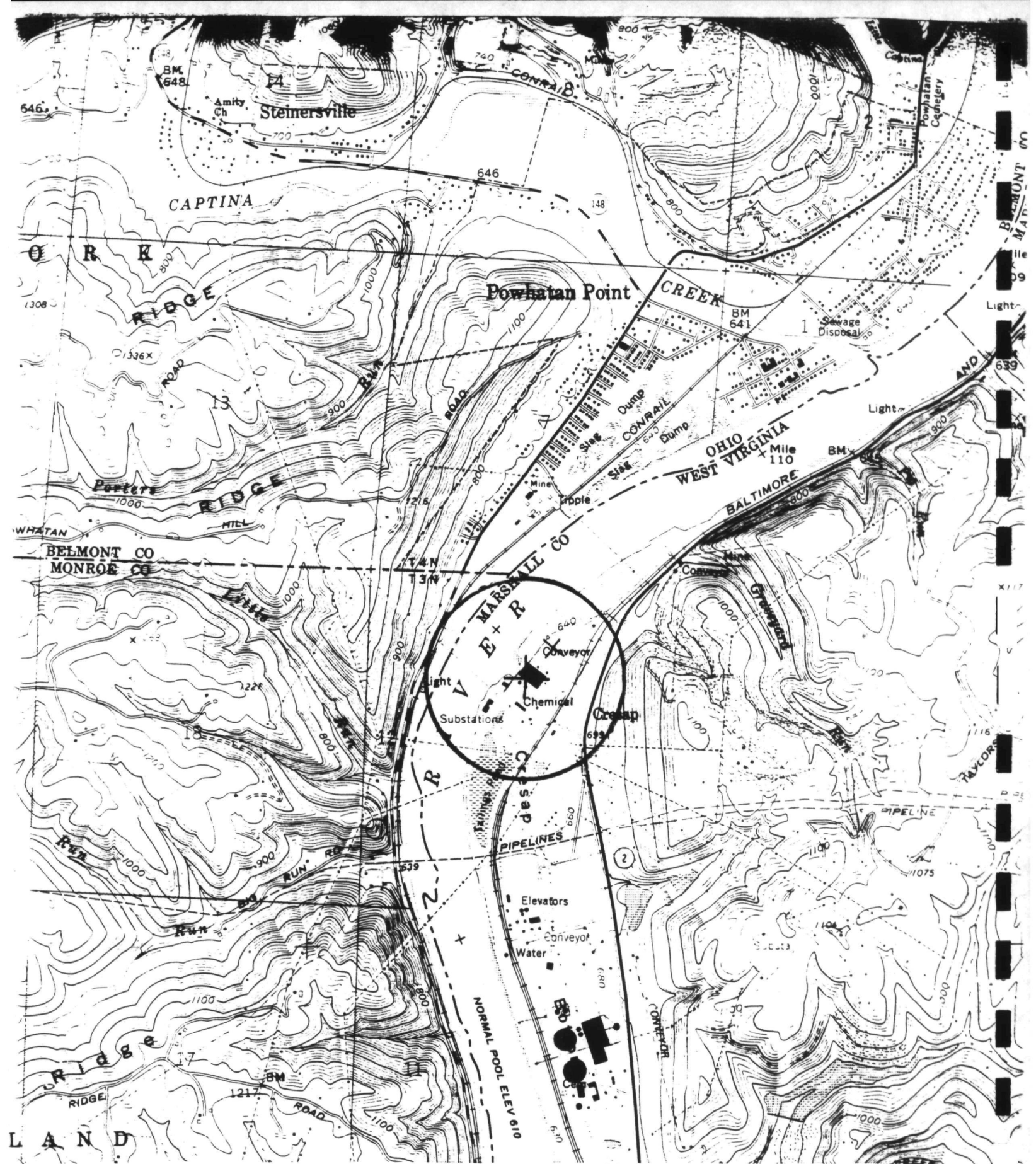
Location of nonhabitable areas relative to source: River is 0.05 km NW of source.

Location of nonhabitable areas relative to predicted maximum concentration: River is 0.15 km NW of predicted maximum concentration.

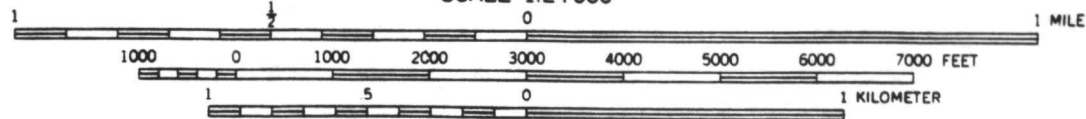
VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identified an area very close to a chemical plant on the U.S.G.S. map. The latitude differed by 20 seconds from the latitude of the chemical plant. This difference is so small that it is not recommended that the HEM inputs be changed.

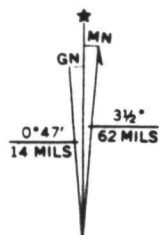
The current STAR site is the most representative station for this source. Although the hills surrounding this source may cause slight variations in wind movement, the Morgantown STAR site is still more representative than the next closest STAR site in Pittsburgh.



SCALE 1:24000



CONTOUR INTERVAL 10 FEET
D-39 ED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Linden Chemical Products (LCP Chemicals)
Location: Moundsville, West Virginia
Source Category: Chlorinated Organics Production
Compound: Chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	39 54 24	39 50 40	11
Longitude:	80 47 51	80 48 10	11
STAR Site:	# 13736	# 13736	
Location:	Morgantown, WV	Morgantown, WV	
Distance from source:	80.45 km	78.57 km	
Bearing from source:	110	105	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Mountainous region. Ohio River runs north-south through area. Source is on the shore of the Ohio River. Rural.

Population density: 36 persons/km²

Population of Moundsville: 12,419 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 9.2×10^{-6}

Predicted maximum concentration of compound: 147.17 ug/m³

Location of predicted maximum concentration: 0.2 km NE of source

Topography: Same as above; 0.15 km E of Ohio River.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 40-50%

Description of nonhabitable areas: River

Location of nonhabitable areas relative to source: River is 0.05 km NW of source.

Location of nonhabitable areas relative to predicted maximum concentration: River is 0.15 km NW of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude are very near to those verified for carbon tetrachloride and methylene chloride emissions from this source. No change in the coordinates is therefore recommended. The current STAR site is the most appropriate site for this location.

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Stauffer Chemical

Location: Axis, Alabama

Source Category: Chlorinated Organics Production

Compound: Carbon Tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 58 17	30 58 17	12
Longitude:	88 01 30	88 01 30	12
STAR Site:	# 03855	# 93841	
Location:	Pensacola, FL	Milton, FL	
Distance from source:	96.71 km	100 km	
Bearing from source:	135	110	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain in the Gulf Coast region of southwest Alabama. Source is 8 to 10 km N of Mobile Bay. Rural.

Population density: 51 persons/km²

Population of Axis: ---^a;

Creola: 1,652 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 2.3×10^{-3}

Predicted maximum concentration of compound: 152.19 ug/m³

Location of predicted maximum concentration: 0.2 km S of source

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 1-5%

Description of nonhabitable areas: Scattered ponds.

Location of nonhabitable areas relative to source: 3 ponds

located 0.2, 0.25, and 0.3 km E of source; 1 pond located 0.3 km NNE of source.

^aNot a census-designated town.

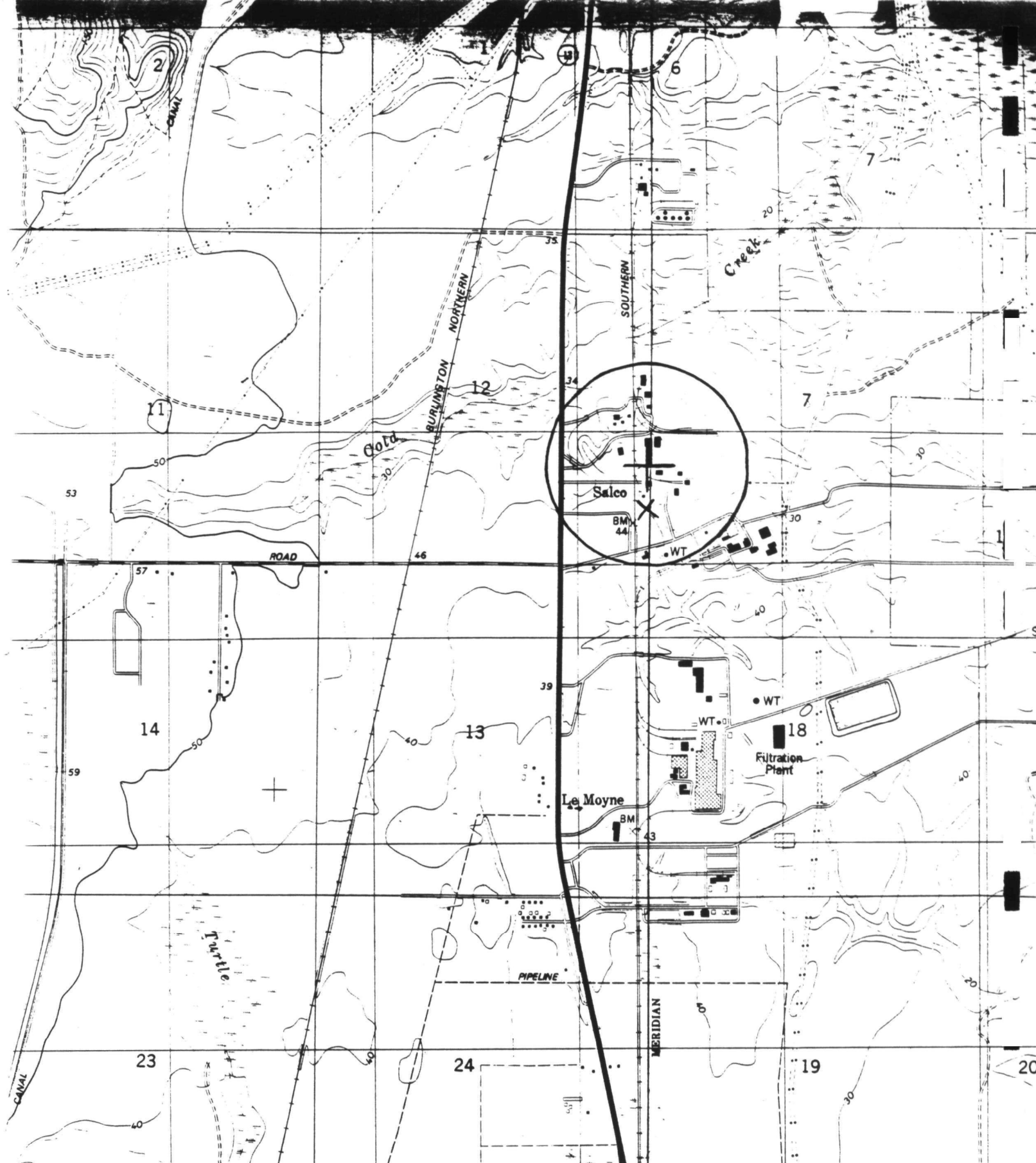
Location of nonhabitable areas relative to predicted maximum concentration: 3 ponds located 0.3, 0.35, and 0.4 km NE of predicted maximum concentration; 1 pond located 0.5 km NNE of predicted maximum concentration. The predicted maximum concentration is very near or in a nonhabitable area (pond 0.5 km NNE).

VI. DISCUSSION OF VERIFICATION RESULTS

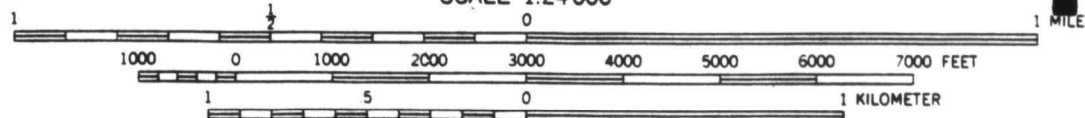
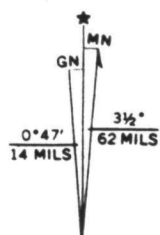
The current latitude and longitude identifies a small complex of buildings 4-5 km north of Axis as the location of this plant. These coordinates appear reasonable on the U.S.G.S map.

The STAR site chosen by the HEM, however, is not considered the most appropriate site for Axis. Axis is located approximately 25 km inland from Mobile Bay, while the current STAR site, at Pensacola, is located on the coast. Although wind flow in Axis is influenced by the Bay, Axis is not a true coastal site. The Milton/Whiting STAR site is located about 50 km NE of the Pensacola STAR site, at the northern end of East Pensacola Bay. The Milton STAR site is considered more representative of wind flow patterns in Axis. Therefore, it is recommended that the HEM be re-run with the Milton STAR site.

The predicted maximum concentration is currently very near or in a nonhabitable area (pond). When the STAR site is changed, the predicted maximum concentration may be located in a nonhabitable area.



SCALE 1:24 000



CONTOUR INTERVAL 10 FEET
D-45 TED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Vulcan Chemicals

Location: Geismar, Louisiana (Chloromethanes)

Source Category: Chlorinated Organics Production

Compound: Carbon Tetrachloride and Methylene Chloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 10 23	30 11 28	13,14
Longitude:	90 57 58	90 58 43	13,14
STAR Site:	# 13970	# 13970	
Location:	Baton Rouge, LA	Baton Rouge, LA	
Distance from source:	43.75 km	44 km	
Bearing from source:	336	336	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain region along the Mississippi River in southeast Louisiana. Rural.

Population density: 60 persons/km²

Population of Geismar: ---^a

Gonzales: 7,287 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.9×10^{-6} for carbon tetrachloride and 4.4×10^{-6} for methylene chloride.

Predicted maximum concentration of compound: 7.8591 ug/m³ of carbon tetrachloride and 90.733 ug/m³ of methylene chloride.

Location of predicted maximum concentration: 0.2 km W of source

Topography: Flat

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 1%

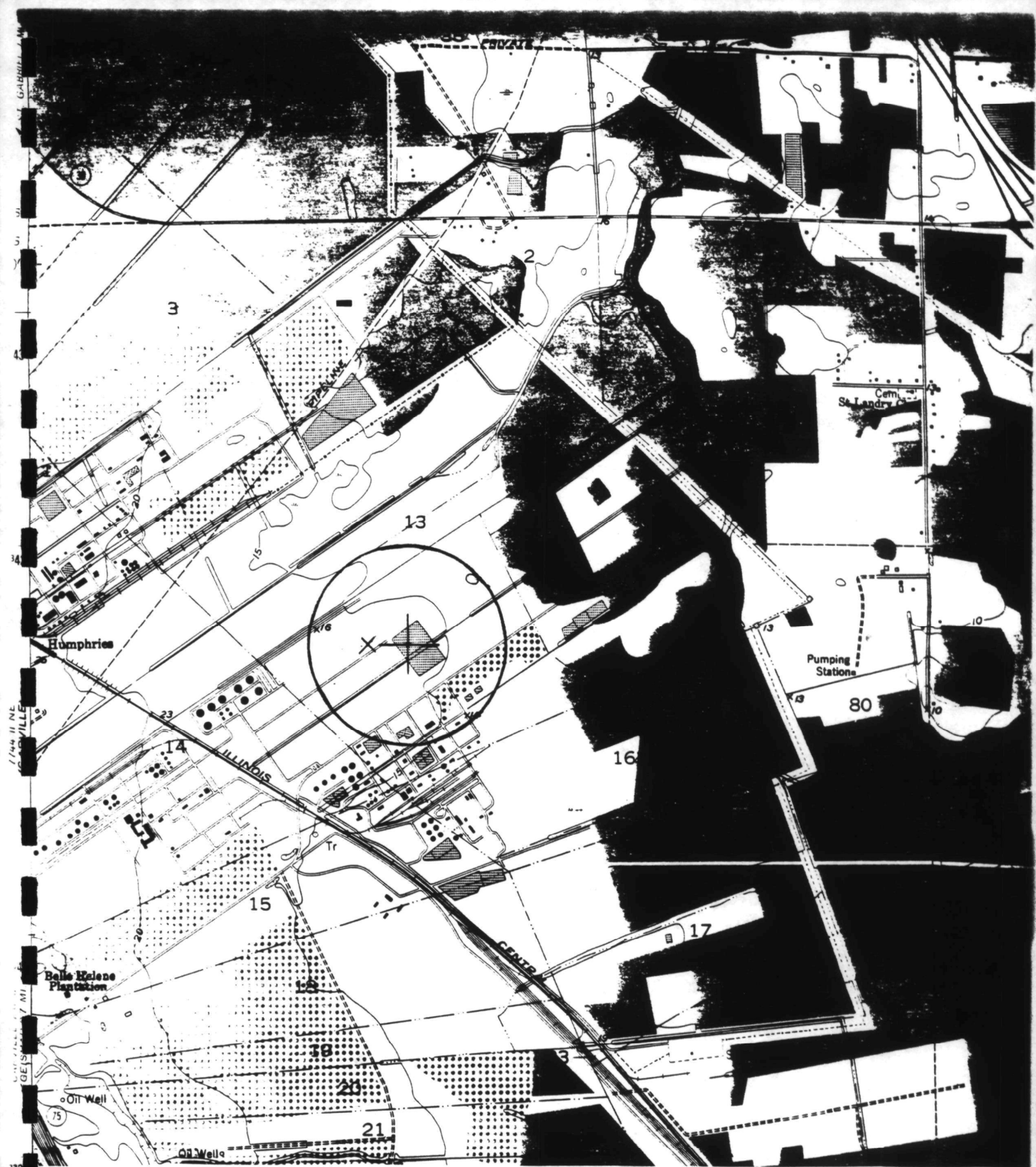
Description of nonhabitable areas: Very small pond.

^aNot a census-designated place.

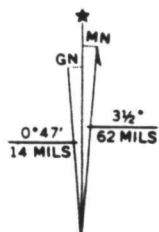
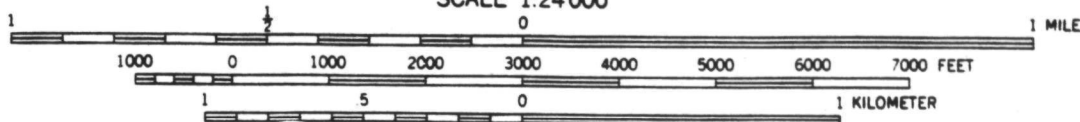
Location of nonhabitable areas relative to predicted maximum concentration: Pond is 0.6 km NE of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude differ from the latitude and longitude submitted in the Section 114 questionnaire and the estimated location of the plant on the U.S.G.S. map. However, the verified latitude and longitude are less than 1 minute and 30 seconds different from the current coordinates. Therefore, no change in the HEM inputs is recommended. In addition, the difference between the current and verified coordinates is not expected to affect habitability of the area within 0.5 kilometers. The current STAR site is the most representative site for this source.



SCALE 1:24 000



D-48 CONTOUR INTERVAL 10 FEET
 DOTTED LINES REPRESENT 5-FOOT CONTOURS
 DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Vulcan Chemicals

Location: Geismar, Louisiana (perc/tet)

Source Category: Chlorinated Organics Production

Compound: Carbon Tetrachloride, Perchloroethylene, and
Trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 10 23	30 11 28	13,14
Longitude:	90 57 58	90 58 43	13,14
STAR Site:	# 13970	# 13970	
Location:	Baton Rouge, LA	Baton Rouge, LA	
Distance from source:	43.75 km	44 km	
Bearing from source:	336	336	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain region along the Mississippi River
in southeast Louisiana. Rural.

Population density: 60 persons/km²

Population of Geismar: ---^a

Gonzales: 7,287 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.6×10^{-5} for
carbon tetrachloride, 6.3×10^{-7} for perchloroethylene, and not
available for trichloroethylene.

Predicted maximum concentration of compound: 65.691 ug/m³ for
carbon tetrachloride, 30.452 ug/m³ for perchloroethylene, and
1.5495 ug/m³ for trichloroethylene.

Location of predicted maximum concentration: 0.2 km W of source

Topography: Flat

^aNot a census-designated place.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 1%

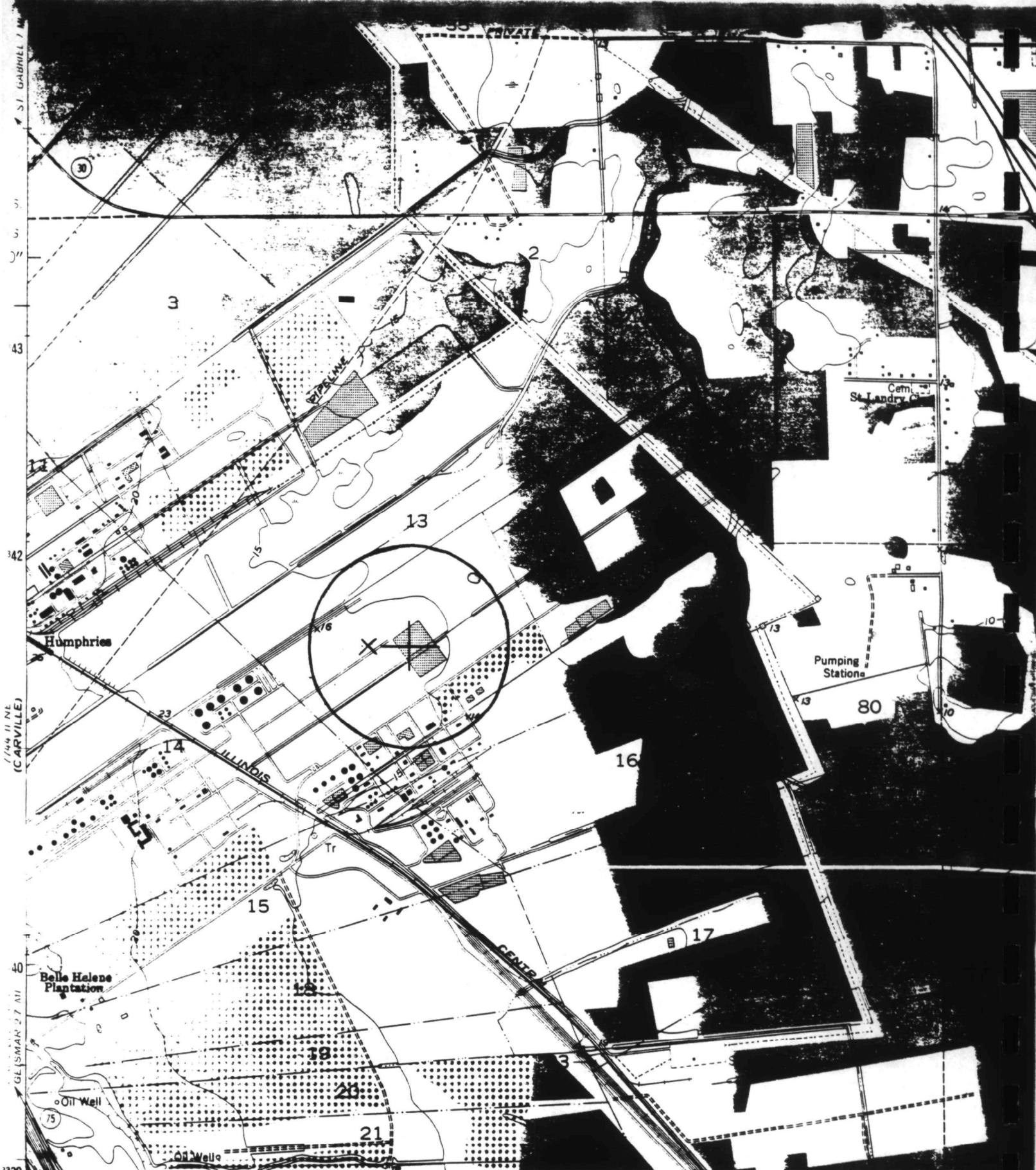
Description of nonhabitable areas: Very small pond.

Location of nonhabitable areas relative to source: Pond is 0.4 km NE of source.

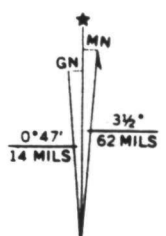
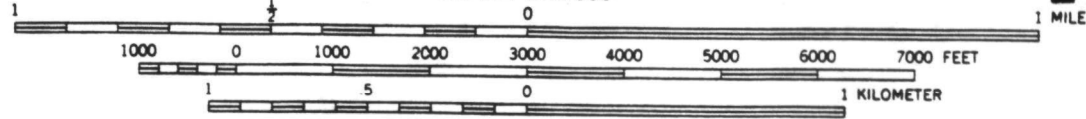
Location of nonhabitable areas relative to predicted maximum concentration: Pond is 0.6 km NE of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude differ from the latitude and longitude submitted in the Section 114 questionnaire and the estimated location of the plant on the U.S.G.S. map. However, the verified latitude and longitude are less than 1 minute and 30 seconds different from the current coordinates. Therefore, no change in the HEM inputs is recommended. In addition, the difference between the current and verified coordinates is not expected to affect habitability of the area within 0.5 kilometers. The current STAR site is the most representative site for this source.



SCALE 1:24 000



D-51 CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Vulcan Chemicals

Location: Geismar, Louisiana

Source Category: Chlorinated Organics Production

Compound: Chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 10 00	30 11 28	13,14
Longitude:	90 59 00	90 58 43	13,14
STAR Site:	# 13970	# 13970	
Location:	Baton Rouge, LA	Baton Rouge, LA	
Distance from source:	43.77 km	44 km	
Bearing from source:	339	339	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain region along the Mississippi River in southeast Louisiana. Rural.

Population density: 60 persons/km²

Population of Geismar: ---^a

Gonzales: 7,287 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 5.1×10^{-5}

Predicted maximum concentration of compound: 67.260 ug/m³

Location of predicted maximum concentration: 0.2 km W of source

Topography: Flat

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 1%

Description of nonhabitable areas: Very small pond.

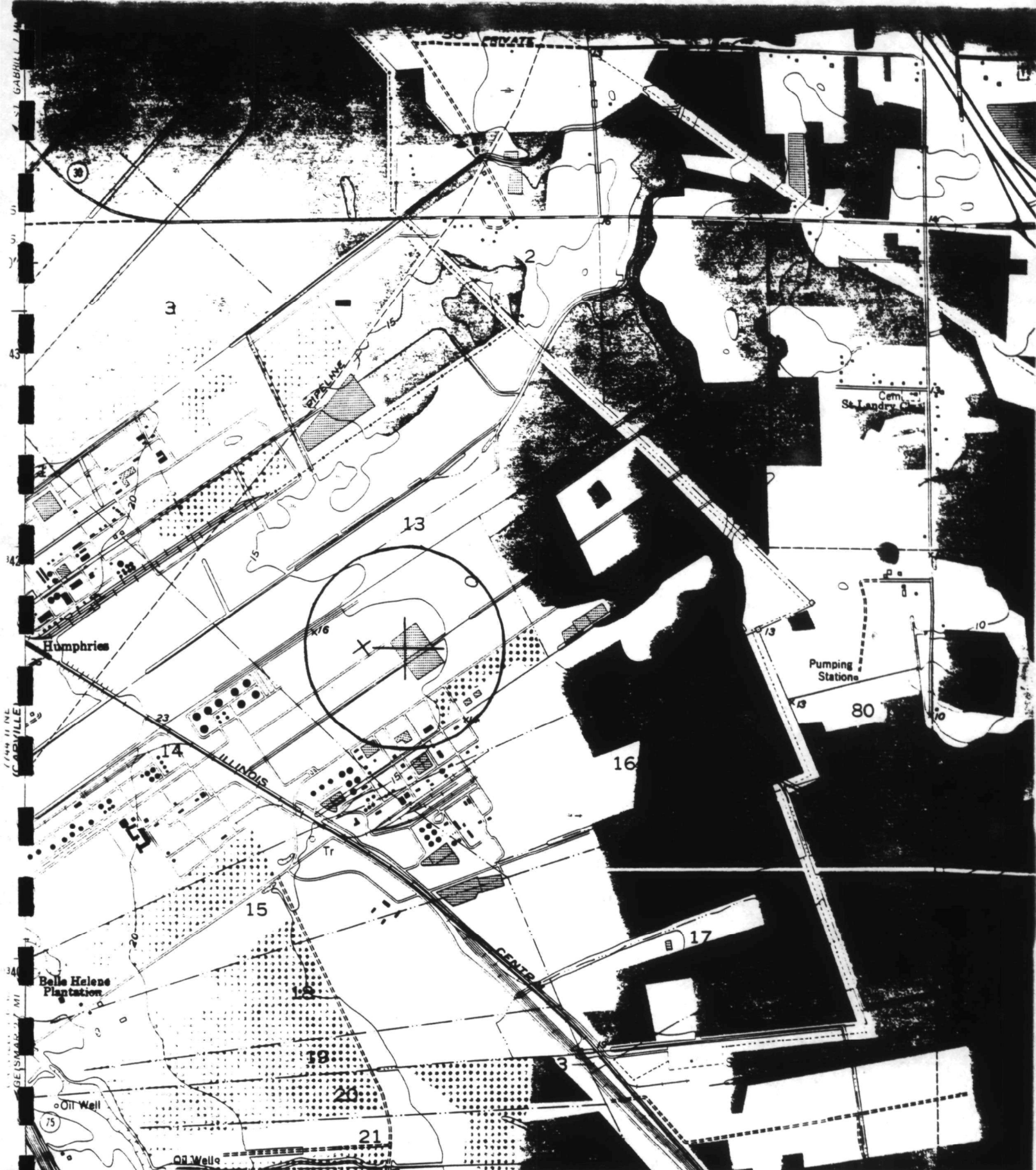
Location of nonhabitable areas relative to source: Pond is 0.4 km NE of source.

^aNot a census-designated place.

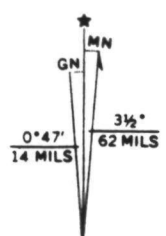
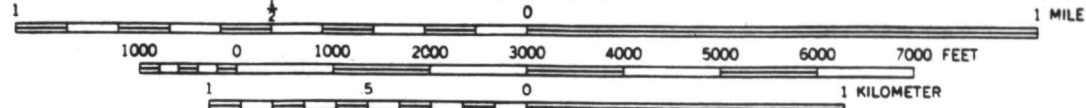
Location of nonhabitable areas relative to predicted maximum concentration: Pond is 0.6 km NE of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude differ from the latitude and longitude submitted in the Section 114 questionnaire and the estimated location of the plant on the U.S.G.S. map. However, the verified latitude and longitude are less than 1 minute and 30 seconds different from the current coordinates. Therefore, no change in the HEM inputs is recommended. In addition, the difference between the current and verified coordinates is not expected to affect habitability of the area within 0.5 kilometers. The current STAR site is the most representative site for this source.



SCALE 1:24 000



D-54
CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Vulcan Chemicals

Location: Wichita, Kansas

Source Category: Chlorinated Organics Production

Compound: Carbon Tetrachloride, Perchloroethylene, Trichloroethylene, and Methylene Chloride.

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	37 35 00	37 35 00	15
Longitude:	97 25 00	97 25 10	15
STAR Site:	# 13969	# 13969	
Location:	Ponca City, OK	Ponca City, OK	
Distance from source:	98.86 km	98.86 km	
Bearing from source:	163	163	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Rolling to mountainous terrain in south-central Kansas. The plant is in a flat area in the Wichita Valley. Rural.

Population density: 54 persons/km²

Population of Wichita: 279,272 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.1×10^{-3} for carbon tetrachloride, 2.4×10^{-5} for perchloroethylene, was not available for trichloroethylene, and 2.4×10^{-4} for methylene chloride.

Predicted maximum concentration of compound: 71.471 ug/m³ of carbon tetrachloride, 13.309 ug/m³ of perchloroethylene, 0.86293 ug/m³ of trichloroethylene, and 58.435 ug/m³ of methylene chloride.

Location of predicted maximum concentration: 0.2 km N of source; in flat area in Wichita Valley.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 10%

Description of nonhabitable areas: Intermittent ponds

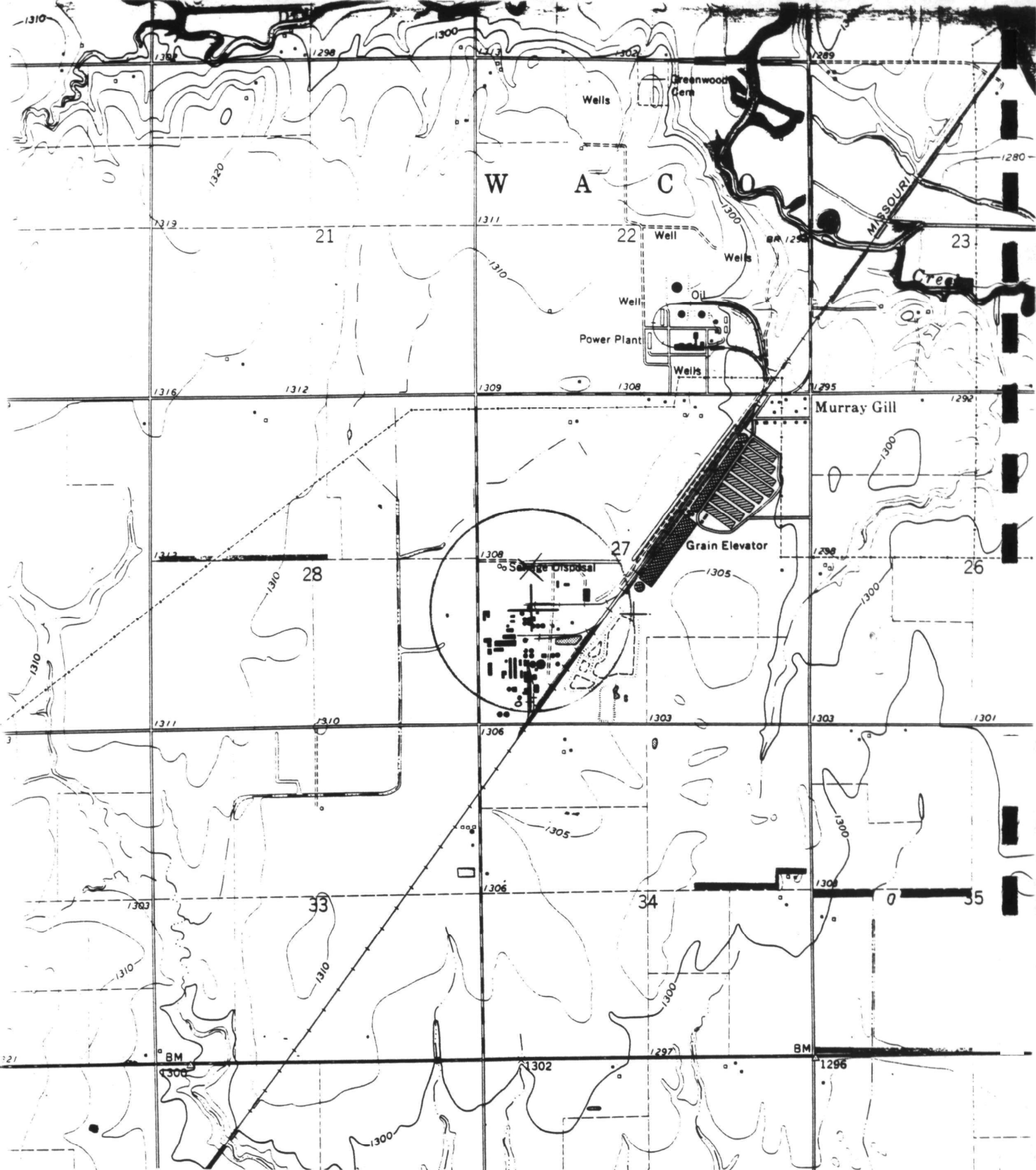
Location of nonhabitable areas relative to source: Intermittent ponds are 0.35 km SW of source. Extend from 0.4 km W to 0.4 km SSW of source.

Location of nonhabitable areas relative to predicted maximum concentration: Intermittent ponds are 0.5 km SW of predicted maximum concentration. Extend to 0.6 km SSW of predicted maximum concentration.

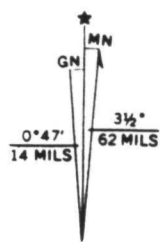
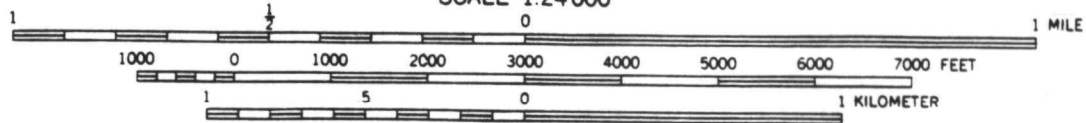
VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude agree closely with the latitude and longitude of the nearest building in an industrial complex near Wichita. The location of the plant was estimated from the U.S.G.S. to be approximately 10 seconds longitude different from the current longitude. No change in the HEM inputs is recommended for this small difference in longitude.

The current STAR site has been verified for Wichita, Kansas in a previous validation task. The next nearest STAR site is Kansas City, which is over 200 km from Wichita.



SCALE 1:24 000



D-57 CONTOUR INTERVAL 10 FEET
 ED LINES REPRESENT 5-FOOT CONTOURS
 DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Vulcan Chemicals

Location: Wichita, Kansas

Source Category: Chlorinated Organics Production

Compound: Chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	37 36 55	37 35 00	15
Longitude:	97 18 30	97 25 10	15
STAR Site:	# 13969	# 13969	
Location:	Ponca City, OK	Ponca City, OK	
Distance from source:	99.73 km	98.86 km	
Bearing from source:	169	163	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Rolling to mountainous terrain in south-central Kansas.
The plant is in a flat area in the Wichita Valley. Rural.

Population density: 54 persons/km²

Population of Wichita: 279,272 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.1×10^{-3}

Predicted maximum concentration of compound: 111.23 ug/m³

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 10%

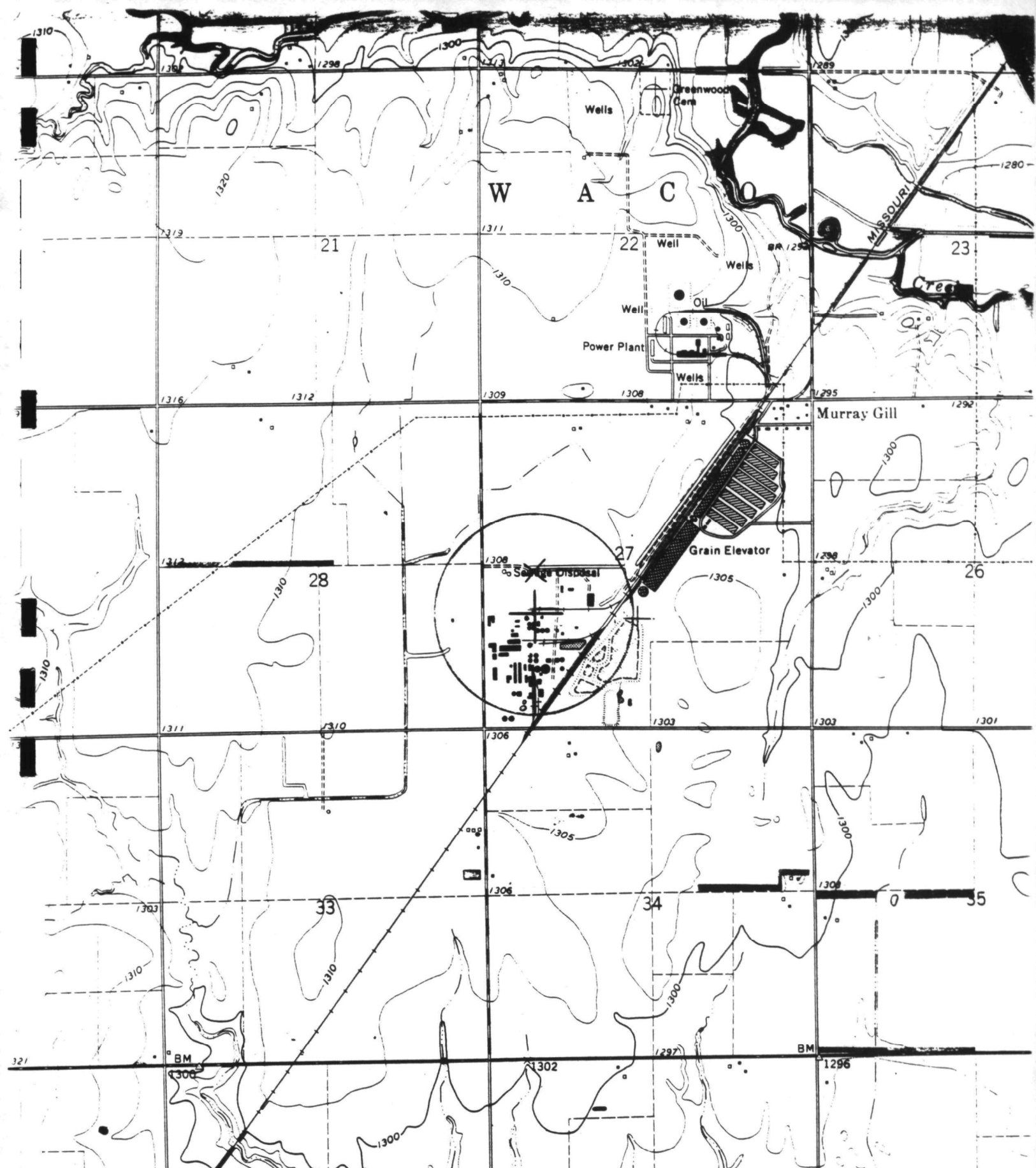
Description of nonhabitable areas: Intermittent ponds

Location of nonhabitable areas relative to source: Intermittent ponds are 0.35 km SW of source. Extend from 0.4 km W to 0.4 km SSW of source.

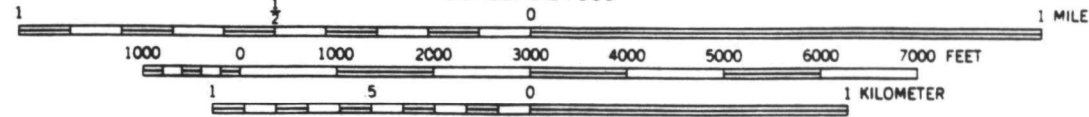
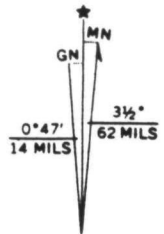
Location of nonhabitable areas relative to predicted maximum concentration: Intermittent ponds are 0.5 km SW of predicted maximum concentration. Extend to 0.6 km SSW of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude differ significantly from the coordinates verified for carbon tetrachloride, perchloroethylene, trichloroethylene, and methylene chloride emissions from this source. It is recommended that the HEM be re-run with the verified latitude and longitude. The current STAR site is the most appropriate site for this location.



SCALE 1:24 000



D-60 CONTOUR INTERVAL 10 FEET
 ED LINES REPRESENT 5-FOOT CONTOURS
 DATUM IS MEAN SEA LEVEL

REFERENCES

1. U. S. Geological Survey. 1982. La Porte, Texas. 7.5 Minute series topographic map, 1:24,000 scale.
2. U. S. Geological Survey. 1965. Belle, West Virginia. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1971 and 1977.
3. Letter and attachments from Christensen, B. H., Diamond Shamrock Chemicals Company, to Farmer, J. R., EPA:ESED. January 31, 1985. Response to Section 114 questionnaire concerning emissions of carbon tetrachloride, perchloroethylene, trichloroethylene, and methylene chloride.
4. U. S. Geological Survey. 1971. Aransas Pass, Texas. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1975.
5. U. S. Geological Survey. 1968. Port Ingleside, Texas. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1975.
6. Texas Air Control Board. 6330 Highway 290 East, Austin, Texas 78723. (512) 451-5711.
7. U. S. Geological Survey. 1964. Freeport, Texas. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1974.
8. U. S. Geological Survey. 1978. Antioch North, California. 7.5 Minute series topographic map, 1:24,000 scale.
9. U. S. Geological Survey. 1963. Plaquemine, Louisiana. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1971 and 1980.
10. U. S. Geological Survey. 1982. Jacinto City, Texas. 7.5 Minute series topographic map, 1:24,000 scale.
11. U. S. Geological Survey. 1960. Powhatan Point, Ohio-West Virginia. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1972 and 1976.
12. U. S. Geological Survey. 1982. Creola, Alabama. 7.5 Minute series topographic map, 1:24,000 scale.
13. U. S. Geological Survey. 1961. Gonzales, Louisiana. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1980.
14. Letter and attachments from Berg, R. E., Vulcan Chemicals, to Farmer, J. R., EPA:ESED. January 31, 1985. Response to Section 114 questionnaire concerning emissions of carbon tetrachloride, methylene chloride, perchloroethylene, and trichloroethylene.
15. U. S. Geological Survey. 1961. Bayneville, Kansas. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1970.
16. U. S. Geological Survey. 1963. Jones Creek, Texas. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1974.

APPENDIX E:
PESTICIDES PRODUCTION CATEGORY

SOURCE SUMMARY SHEETS FOR OTHER CHEMICAL PLANTS

TABLE OF CONTENTS

<u>Facility/Location/Compounds Emitted</u>	<u>Page</u>
Table E-1. Sources of Current Modeling Information	E-3
1. SDS Biotech/Greens Bayou, TX (daconil 1) Carbon tetrachloride	E-4
2. SDS Biotech/Greens Bayou, TX (daconil 2) Carbon tetrachloride	E-7
3. SDS Biotech/Greens Bayou, TX (dacthal) Carbon tetrachloride	E-10
References	E-13

TABLE E-1. SOURCES OF CURRENT MODELING INFORMATION

Maximum Individual Risk Values

1. Memorandum from Zaragoza, L.D., EPA: SASD, to the Files. Carbon Tetrachloride Exposure and Risk Analysis. August 6, 1985.
2. Memorandum from Mohin, T.J., EPA: SASD, to the Files. Chloroform Exposure and Risk Assessment. June 10, 1985.
3. Excerpts from Human Exposure Model Printout for Methylene Chloride. Phase I data. Received from Larry Zaragoza EPA:SASD. Undated.
4. Memorandum from Vandenberg, J.J., EPA: SASD, to the Files. Perchloroethylene Exposure and Cancer Risk Analysis. November 15, 1985.
5. Memorandum from Vandenberg, J.J., EPA:SASD, to the Files. Trichloroethylene Exposure and Cancer Risk Analysis. October 11, 1985.

Latitude & Longitude, STAR Site, and Predicted Maximum Concentration

6. Human Exposure Model Printout for Carbon Tetrachloride. March 4, 1986.
7. Human Exposure Model Printout for Chloroform Emissions from Chloroform Production. December 12, 1984.
8. Human Exposure Model Printout for Methylene Chloride. July 1, 1985.
9. Excerpts from Human Exposure Model Printout for Perchloroethylene Production. Phase I data. Received from John Vandenberg, EPA: SASD March 28, 1986.
10. Excerpts from Human Exposure Model Printout for Trichloroethylene Production. Phase I data. Received from John Vandenberg, EPA:SASD March 28, 1986.

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: SDS Biotech
Location: Greens Bayou, Texas (daconil 1)
Source Category: Pesticides Production
Compound: Carbon Tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	29 45 46	29 45 46	10
Longitude:	95 10 20	95 10 20	10
STAR Site:	# 12906	# 12906	
Location:	Houston, TX	Houston, TX	
Distance from source:	16.25 km	16.25 km	
Bearing from source:	178	178	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain in Gulf Coast region. Plant is approximately 8 km NE of Houston and 10 km NW of Deer Park. Urban.

Population density: 251 persons/km²

Population of Greens Bayou: ---^a;

Cloverleaf: 17,317 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 2.7×10^{-3}

Predicted maximum concentration of compound: 177.33 ug/m³

Location of predicted maximum concentration: 0.2 km N of source

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 10%

Description of nonhabitable areas: Settling ponds

Location of nonhabitable areas relative to source: Large settling pond is 0.3 km N and small settling pond is 0.1 km NW of source.

^aNot a census-designated place.

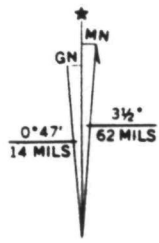
Location of nonhabitable areas relative to predicted maximum concentration: Large settling pond is <0.1 km N and small settling pond is 0.1 km SW of predicted maximum concentration. The predicted maximum concentration, therefore, is very near or in a nonhabitable area (large settling pond).

VI. DISCUSSION OF VERIFICATION RESULTS

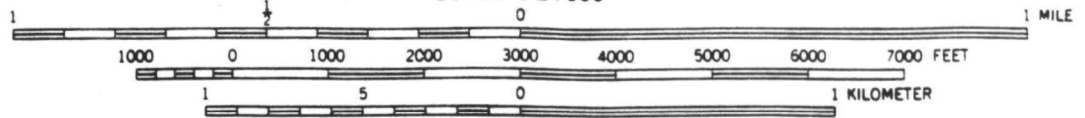
The current latitude and longitude identify a small complex of buildings north of the Greens Bayou as the location of this plant. These coordinates appear reasonable. Greens Bayou is not a census-designated town. The closest census-designated town is Cloverleaf, which is located 1-2 km north of the plant. The Houston STAR site is the closest and most representative meteorological station for Cloverleaf.

The predicted maximum concentration is very near or in a nonhabitable area.

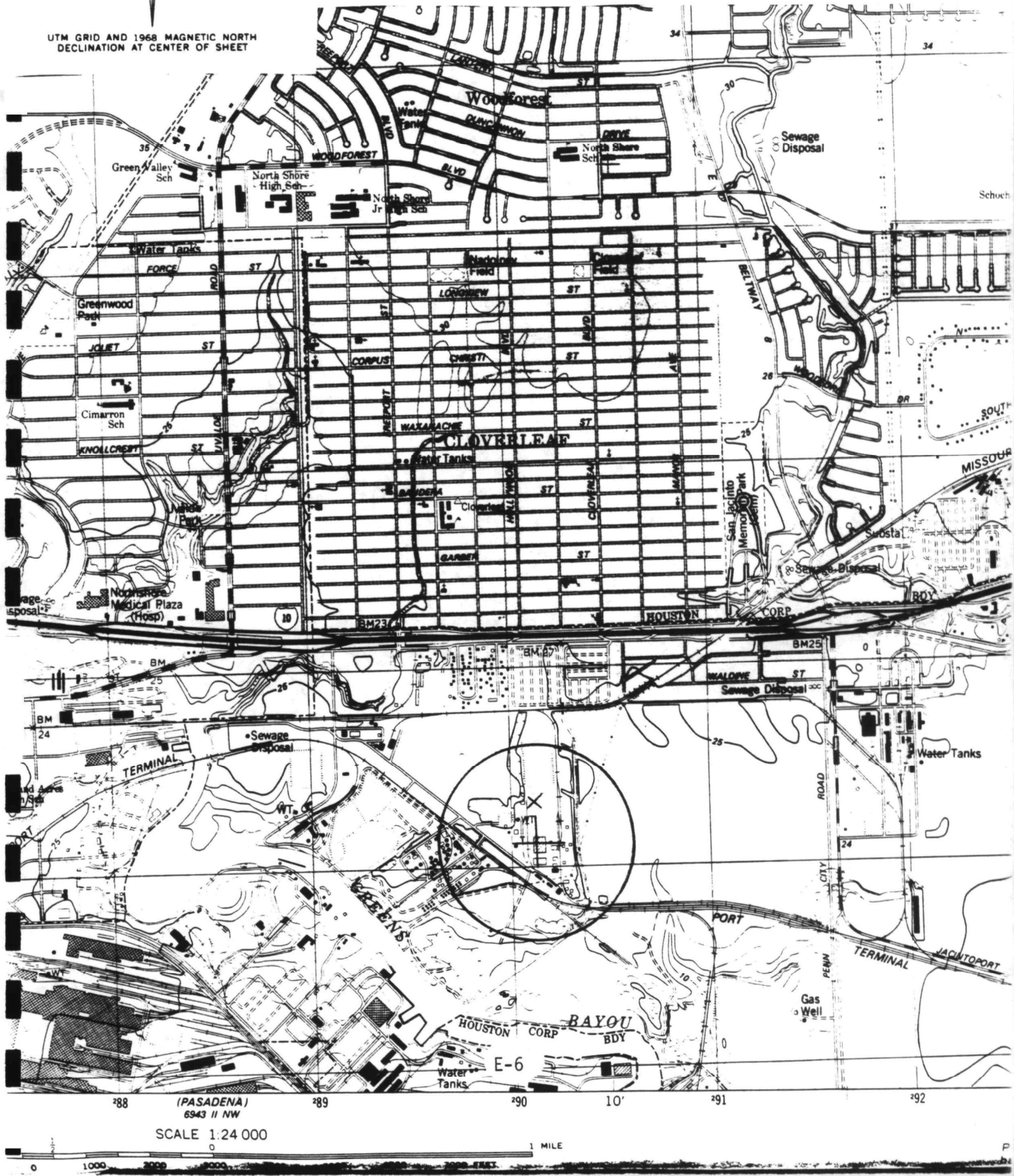
SCALE 1:24 000



UTM GRID AND 1968 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET



CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: SDS Biotech

Location: Greens Bayou, Texas (daconil 2)

Source Category: Pesticides Production

Compound: Carbon Tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	29 45 46	29 45 46	10
Longitude:	95 10 18	95 10 18	10
STAR Site:	# 12906	# 12906	
Location:	Houston, TX	Houston, TX	
Distance from source:	16.24 km	16.24 km	
Bearing from source:	178	178	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain in Gulf Coast region. Plant is approximately 8 km NE of Houston and 10 km NW of Deer Park. Urban.

Population density: 251 persons/km²

Population of Greens Bayou: ---^a;

Cloverleaf: 17,317 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 2.9×10^{-3}

Predicted maximum concentration of compound: 191.71 ug/m³

Location of predicted maximum concentration: 0.2 km N of source

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 10%

Description of nonhabitable areas: Settling ponds

Location of nonhabitable areas relative to source: Large settling pond is 0.3 km N and small settling pond is 0.2 km NW of source.

^aNot a census-designated place.

Location of nonhabitable areas relative to predicted maximum concentration: Large settling pond is <0.1 km N and small settling pond is 0.1 km SW of predicted maximum concentration. The predicted maximum concentration is very near or in a nonhabitable area (large settling pond).

VI. DISCUSSION OF VERIFICATION RESULTS

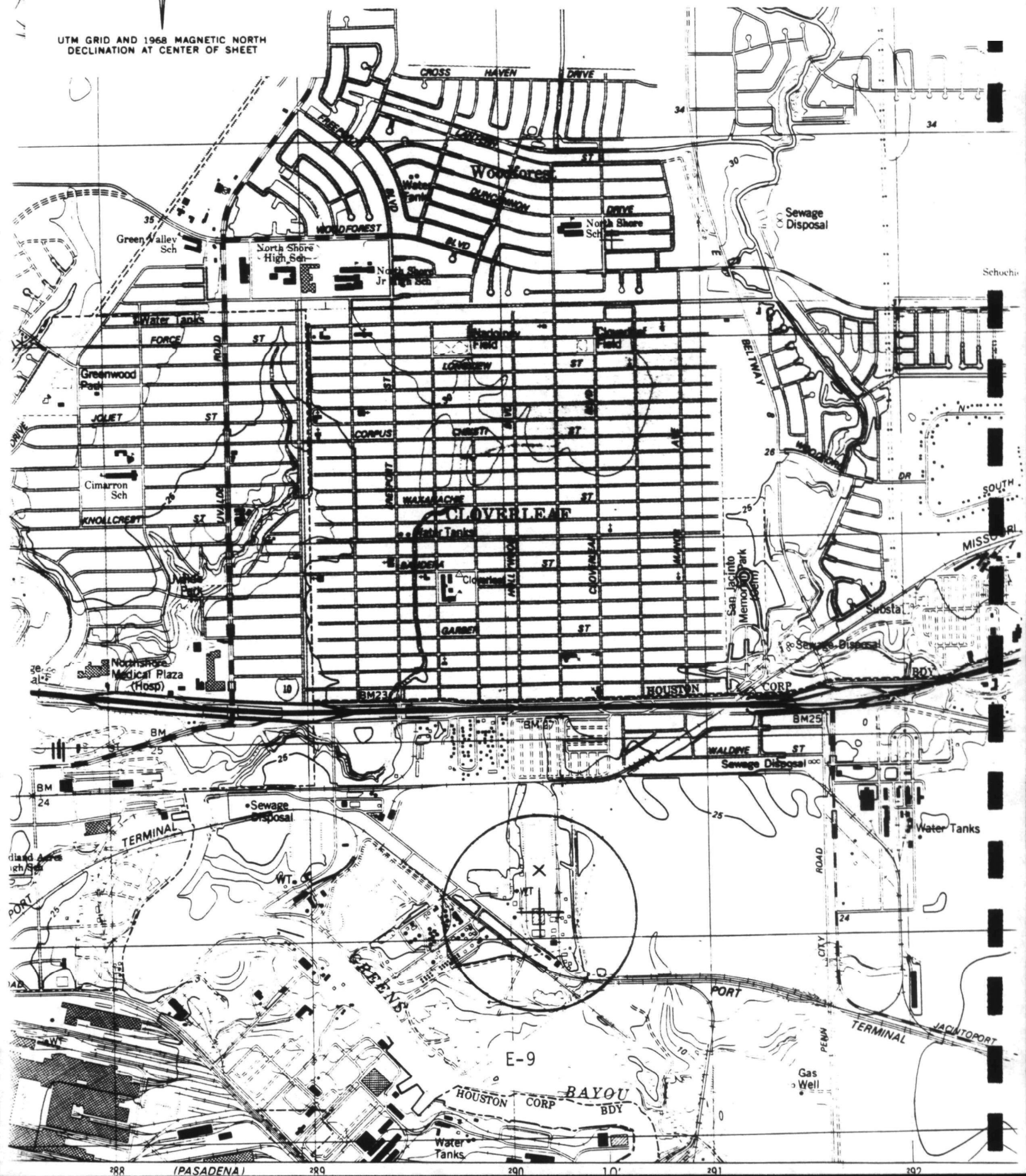
The current latitude and longitude identify a small complex of buildings north of the Greens Bayou as the location of this plant. These coordinates appear reasonable. Greens Bayou is not a census-designated town. The closest census-designated town is Cloverleaf, which is located 1-2 km north of the plant. The Houston STAR site is the closest and most representative meteorological station for Cloverleaf.

The predicted maximum concentration is very near or in a nonhabitable area.

Scale bar for Figure 1. The top scale is in feet, ranging from 0 to 7000 with major ticks every 1000 feet. The bottom scale is in kilometers, ranging from 0 to 1 with major ticks at 0, 0.5, and 1. A small vertical line marks the 0 point on both scales.

UTM GRID AND 1968 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: SDS Biotech

Location: Greens Bayou, Texas (dacthal)

Source Category: Pesticides Production

Compound: Carbon Tetrachloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	29 45 42	29 45 42	10
Longitude:	95 10 18	95 10 18	10
STAR Site:	# 12906	# 12906	
Location:	Houston, TX	Houston, TX	
Distance from source:	16.12 km	16.12 km	
Bearing from source:	178	178	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain in Gulf Coast region. Plant is approximately 8 km NE of Houston and 10 km NW of Deer Park. Urban.

Population density: 251 persons/km²

Population of Greens Bayou: ---^a;

Cloverleaf: 17,317 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 4.6×10^{-4}

Predicted maximum concentration of compound: 30.542 ug/m³

Location of predicted maximum concentration: 0.2 km N of source

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 5-10%

Description of nonhabitable areas: Settling ponds

Location of nonhabitable areas relative to source: Large settling pond is 0.4 km N and small settling pond is 0.2 km NW of source.

^aNot a census-designated place.

Location of nonhabitable areas relative to predicted maximum concentration: Large settling pond is 0.2 km N and small settling pond is 0.1 km W of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify a small complex of buildings north of the Greens Bayou as the location of this plant. These coordinates appear reasonable. Greens Bayou is not a census-designated town. The closest census-designated town is Cloverleaf, which is located 1-2 km north of the plant. The Houston STAR site is the closest and most representative meteorological station for Cloverleaf.



REFERENCES

1. U. S. Geological Survey. 1982. La Porte, Texas. 7.5 Minute series topographic map, 1:24,000 scale.
2. U. S. Geological Survey. 1965. Belle, West Virginia. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1971 and 1977.
3. Letter and attachments from Christensen, B. H., Diamond Shamrock Chemicals Company, to Farmer, J. R., EPA:ESED. January 31, 1985. Response to Section 114 questionnaire concerning emissions of carbon tetrachloride, perchloroethylene, trichloroethylene, and methylene chloride.
4. U. S. Geological Survey. 1971. Aransas Pass, Texas. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1975.
5. U. S. Geological Survey. 1968. Port Ingleside, Texas. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1975.
6. Texas Air Control Board. 6330 Highway 290 East, Austin, Texas 78723. (512) 451-5711.
7. U. S. Geological Survey. 1964. Freeport, Texas. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1974.
8. U. S. Geological Survey. 1978. Antioch North, California. 7.5 Minute series topographic map, 1:24,000 scale.
9. U. S. Geological Survey. 1963. Plaquemine, Louisiana. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1971 and 1980.
10. U. S. Geological Survey. 1982. Jacinto City, Texas. 7.5 Minute series topographic map, 1:24,000 scale.
11. U. S. Geological Survey. 1960. Powhatan Point, Ohio-West Virginia. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1972 and 1976.
12. U. S. Geological Survey. 1982. Creola, Alabama. 7.5 Minute series topographic map, 1:24,000 scale.
13. U. S. Geological Survey. 1961. Gonzales, Louisiana. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1980.
14. Letter and attachments from Berg, R. E., Vulcan Chemicals, to Farmer, J. R., EPA:ESED. January 31, 1985. Response to Section 114 questionnaire concerning emissions of carbon tetrachloride, methylene chloride, perchloroethylene, and trichloroethylene.
15. U. S. Geological Survey. 1961. Bayneville, Kansas. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1970.
16. U. S. Geological Survey. 1963. Jones Creek, Texas. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1974.

APPENDIX F:

ETHYLENE DICHLORIDE PRODUCTION CATEGORY

SOURCE SUMMARY SHEETS FOR EDC PRODUCTION

TABLE OF CONTENTS

<u>Facility/Location</u>	<u>Page</u>
Table F-2. Sources of Current Modeling Information	F-3
1. B.F. Goodrich/Calvert City, KY	F-4
2. B.F. Goodrich/La Porte, TX	F-7
3. Borden/Geismar, LA	F-10
4. Diamond Shamrock/Convent, LA	F-13
5. Diamond Shamrock/Deer Park, TX	F-16
6. Dow Chemical/Freeport, TX	F-19
7. Dow Chemical/Oyster Creek, TX	F-22
8. Dow Chemical I/Plaquemine, LA	F-25
9. Dow Chemical II/Plaquemine, LA	F-28
10. Formosa/Baton Rouge, LA	F-31
11. Formosa/Point Comfort, TX	F-34
12. Olin Corporation/Lake Charles, LA	F-37
13. PPG/Lake Charles, LA	F-40
14. Shell Chemical/Deer Park, TX	F-43
15. Vista/Westlake, LA	F-46
16. Vulcan Chemicals/Geismar, LA	F-49
References	F-51

TABLE F-1. SOURCES OF CURRENT MODELING INFORMATION

1. Excerpts from Human Exposure Model Printout for Ethylene Dichloride Baseline Emissions from Ethylene Dichloride Production. Phase I. April 10, 1986
2. Human Exposure Model Printout for Carbon Tetrachloride Baseline Emissions from Ethylene Dichloride Production. March 26, 1986.
3. Human Exposure Model Printout for Chloroform Baseline Emissions from Ethylene Dichloride Production. March 20, 1986.
4. Excerpts from Human Exposure Model Printout for Trichloroethylene Baseline Emissions from Ethylene Dichloride Production. Phase I. Received from John Vandenberg, EPA: SASD, March 28, 1986.

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: B.F. Goodrich

Location: Calvert City, Kentucky

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, chloroform, and trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	37 02 50	37 03 08	1,2
Longitude:	88 19 20	88 19 58	1,2
STAR Site:	# 03816	# 03816	
Location:	Paducah, KY	Paducah, KY	
Distance from source:	39.48 km	32 km	
Bearing from source:	273	350	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Rolling hills to mountainous terrain in southwest Kentucky. Source is <1 km S of Tennessee River and about 1 km N of Calvert City. Rural.

Population density: 19 persons/km²

Population of Calvert City: 2,388 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 2.3×10^{-3} for EDC, 5.9×10^{-5} for carbon tetrachloride, 4.1×10^{-6} for chloroform, and 2.8×10^{-8} for trichloroethylene.

Predicted maximum concentration of compound: 86.607 ug/m³ of EDC, 3.9448 ug/m³ of carbon tetrachloride, 0.17749 ug/m³ of chloroform, and 0.021524 ug/m³ of trichloroethylene.

Location of predicted maximum concentration: 0.2 km NNE of source for EDC and carbon tetrachloride; 0.5 km NNE for chloroform and trichloroethylene.

Topography: Flat area along river for EDC and carbon tetrachloride; in river for chloroform and trichloroethylene.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 5%

Description of nonhabitable areas: River

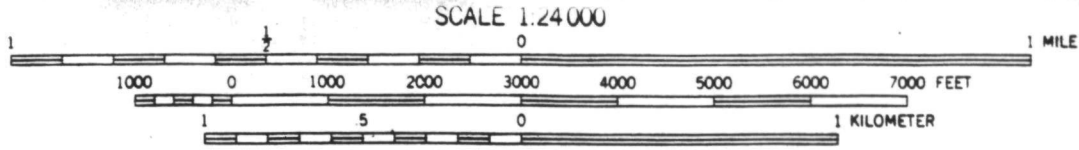
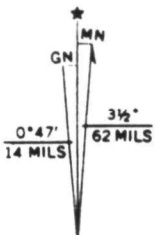
Location of nonhabitable areas relative to source: River is 0.4 km NNE of source.

Location of nonhabitable areas relative to predicted maximum concentration: The predicted maximum concentrations of EDC and carbon tetrachloride are 0.2 km S of river. The predicted maximum concentrations of chloroform and trichloroethylene are located in the river.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude differ slightly from the coordinates provided by the Kentucky Department of Environmental Protection. The coordinates provided by Kentucky were verified on the U.S.G.S. map as being more reasonable. The predicted maximum concentrations of chloroform and trichloroethylene (0.5 km NNE of source) will be located in the river when the verified source location is modeled. Because the verified latitude and longitude will affect habitability of the area within 0.5 km of the source, it is recommended that the latitude and longitude should be updated to reflect the verified coordinates.

The STAR site chosen by the HEM is the most appropriate site for this source location. The STAR site will not change when the verified latitude and longitude are used.



SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

UTM GRID AND 1968 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: B.F. Goodrich

Location: La Porte, Texas

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, chloroform, and trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	29 46 00	29 42 40	3,4,5
Longitude:	95 05 00	95 04 40	3,4,5
STAR Site:	# 12906	# 12906	
Location:	Houston, TX	Houston, TX	
Distance from source:	18.51 km	20 km	
Bearing from source:	206	200	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain in Gulf Coast region. Source is about 2 km W of Upper San Jacinto Bay. Urban.

Population density: 261 persons/km²

Population of La Porte: 14,062 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.0×10^{-4} for EDC, 1.5×10^{-6} for carbon tetrachloride, 2.4×10^{-7} for chloroform, and 3.0×10^{-8} for trichloroethylene.

Predicted maximum concentration of compound: 46.264 ug/m³ of EDC, 0.51339 ug/m³ of carbon tetrachloride, 0.029755 ug/m³ of chloroform and 0.067863 ug/m³ of trichloroethylene.

Location of predicted maximum concentration: 0.2 km N of source for EDC and carbon tetrachloride; 0.5 km N for chloroform and trichloroethylene.

Topography: Flat

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 1-5%

Description of nonhabitable areas: Small pond

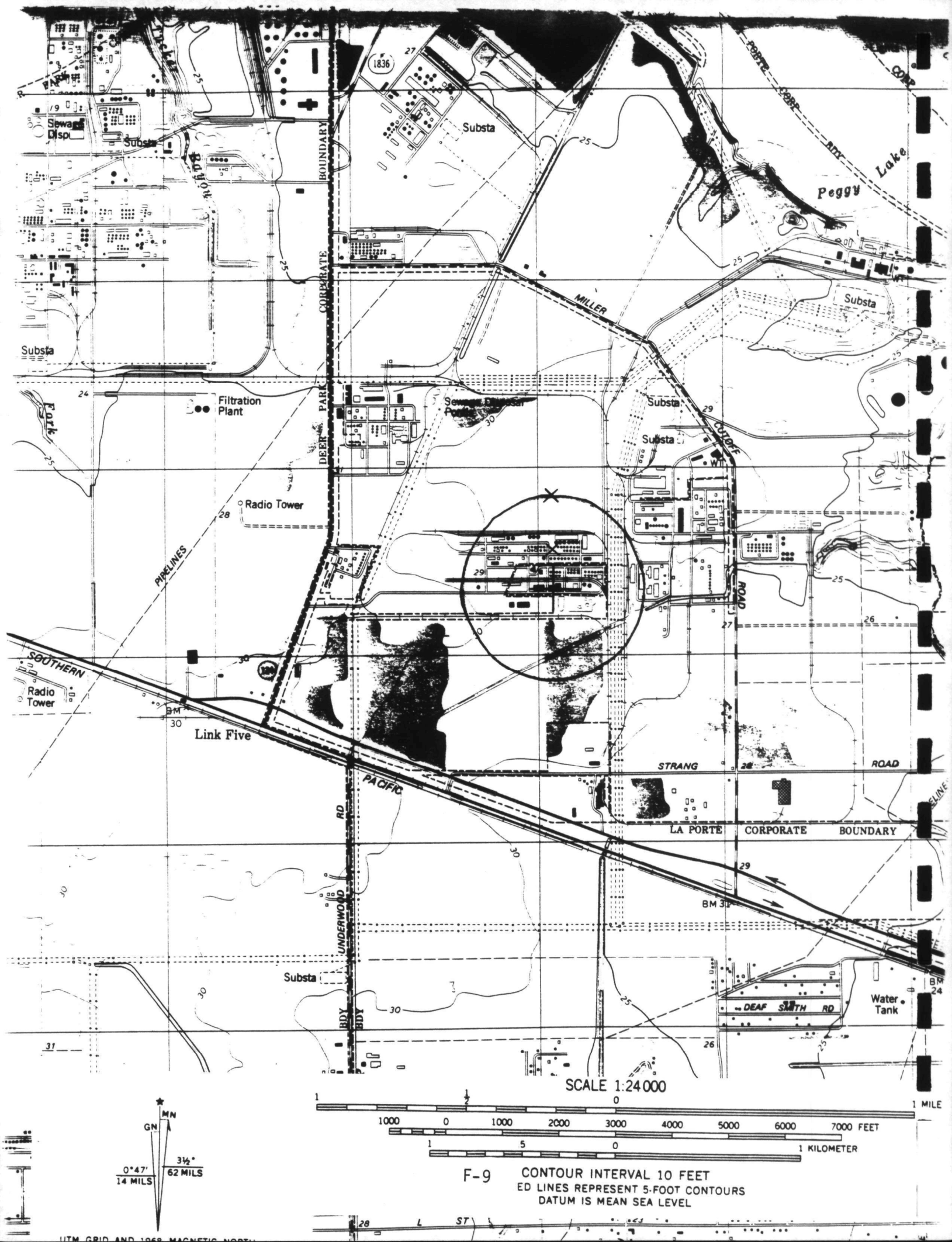
Location of nonhabitable areas relative to source: Small pond is 0.1 km SE of source.

Location of nonhabitable areas relative to predicted maximum concentration: Small pond is 0.3 km SSE of predicted maximum concentrations of EDC and carbon tetrachloride and 0.6 km SSE of predicted maximum concentrations of chloroform and trichloroethylene.

VI. DISCUSSION OF VERIFICATION RESULTS

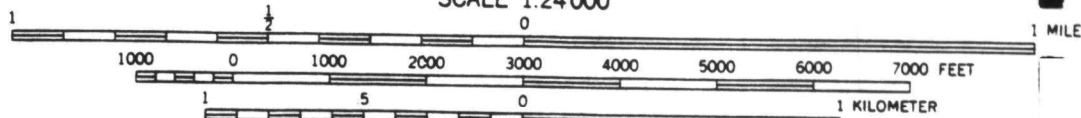
The current latitude and longitude are unreasonable because they do not identify a plant in La Porte. The coordinates provided by the Texas Air Control Board are similar to the coordinates of the nearest chemical plant. The verified latitude and longitude were estimated from the U.S.G.S. map using the coordinates provided by Texas. It is recommended that the latitude and longitude be updated to the verified coordinates.

The STAR site selected by the model is the most appropriate STAR site for La Porte. The STAR site will not change when the latitude and longitude are updated.



GN
MN
0°47'
14 MILS
3 1/2°
62 MILS

SCALE 1:24 000



F-9 CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Borden

Location: Geismar, Louisiana

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, chloroform, and trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 12 20	30 12 20	6
Longitude:	91 01 08	91 01 08	6
STAR Site:	# 13970	# 13970	
Location:	Baton Rouge, LA	Baton Rouge, LA	
Distance from source:	38.54 km	38 .54 km	
Bearing from source:	341	341	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat area along the Mississippi River in coastal plain region of southeast Louisiana. Rural.

Population density: 60 persons/km²

Population of La Porte: --^a

Gonzales: 7,287 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 3.4×10^{-3} for EDC, 2.8×10^{-9} for carbon tetrachloride, 1.9×10^{-6} for chloroform, and 5.1×10^{-8} for trichloroethylene.

Predicted maximum concentration of compound: 131.90 ug/m³ of EDC, 0.00018572 ug/m³ of carbon tetrachloride, 0.084148 ug/m³ of chloroform and 0.039069 ug/m³ of trichloroethylene.

^aNot a census-designated place.

Location of predicted maximum concentration: 0.2 km W for EDC and carbon tetrachloride; 0.5 km W for chloroform and trichloroethylene.

Topography: Flat

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 1-5%

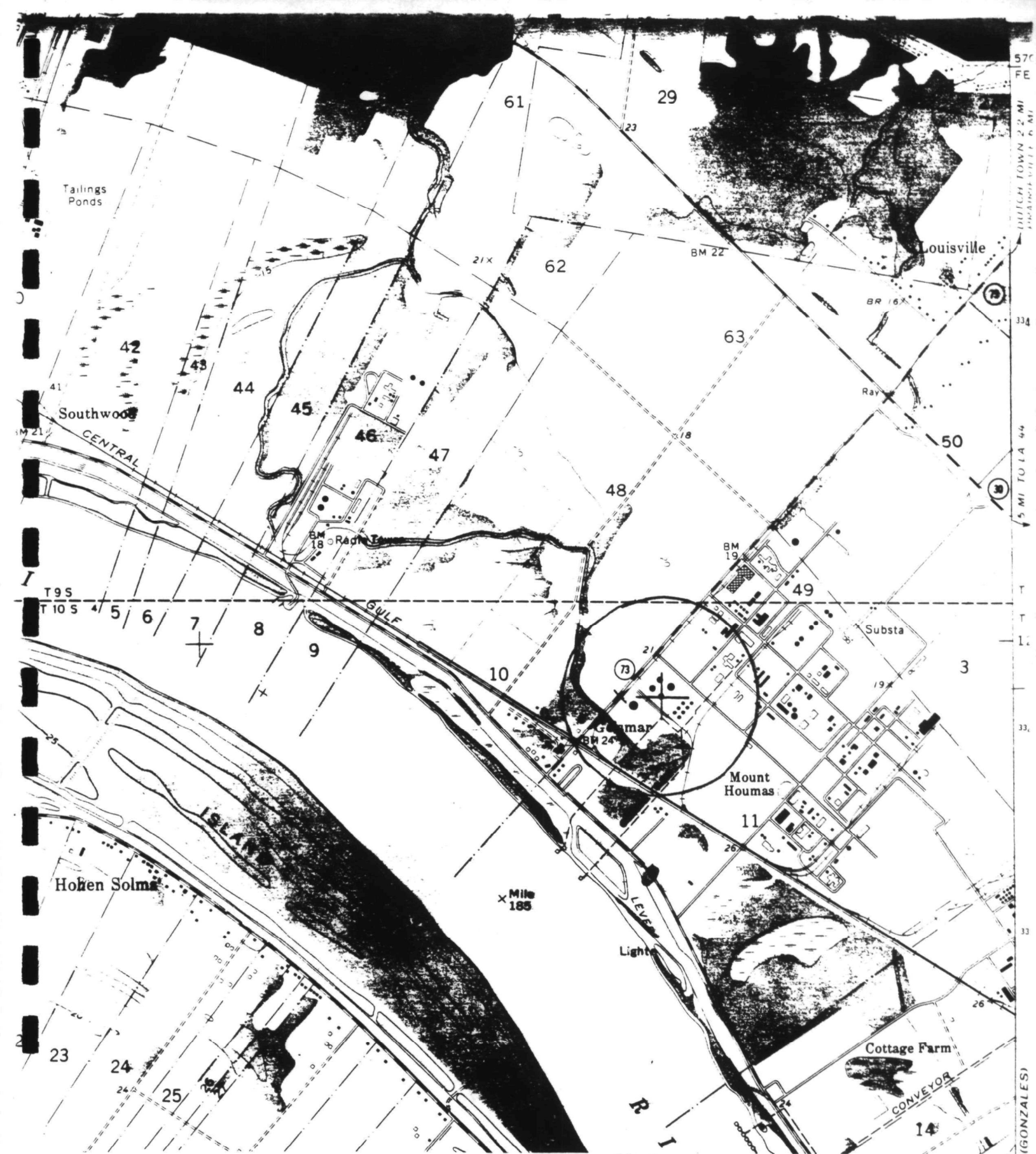
Description of nonhabitable areas: Small river (New River).

Location of nonhabitable areas relative to source: River is 0.3 km SW of source.

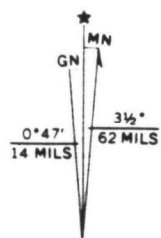
Location of nonhabitable areas relative to predicted maximum concentration: River is 0.1 km W of predicted maximum concentrations of EDC and carbon tetrachloride and 0.1 km E of predicted maximum concentrations of chloroform and trichloroethylene.

VI. DISCUSSION OF VERIFICATION RESULTS

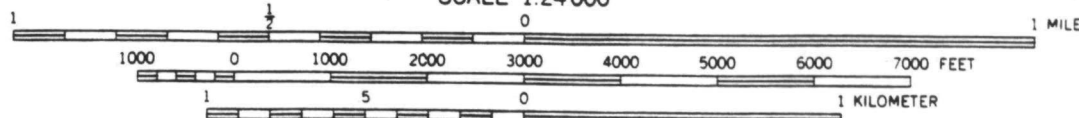
The current latitude and longitude identify a plant in Geismar. They were verified as being reasonable on the U.S.G.S. map. The STAR site selected by the model is the most representative site for this source. This STAR site has been verified in previous tasks.



SCALE 1:24 000



UTM GRID AND 1968 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET



F-12 CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

F-12

DATED LINES REPRESENT 5-FOOT CONTOURS
 DATUM IS MEAN SEA LEVEL

(GONZALEZ)

BM
24

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Diamond Shamrock

Location: Convent, Louisiana

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, and chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 03 44	30 03 44	5,7,8
Longitude:	90 49 55	90 49 55	5,7,8
STAR Site:	# 13970	# 13970	
Location:	Baton Rouge, LA	Baton Rouge, LA	
Distance from source:	60.60 km	60.60 km	
Bearing from source:	330	330	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain in Gulf Coast region of southeast Louisiana. Large areas of wetlands. Source is 1.3 km NE of Mississippi River and about 5 km N of the city of Convent. Rural.

Population density: 74 persons/km²

Population of Convent: --^a

Plaquemine: 7,521 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.0×10^{-3} for EDC, 4.7×10^{-6} for carbon tetrachloride, and 1.6×10^{-6} for chloroform.

Predicted maximum concentration of compound: 40.037 ug/m³ of EDC, 0.31147 ug/m³ of carbon tetrachloride, and 0.071176 ug/m³ of chloroform.

^aNot a census-designated place.

Location of predicted maximum concentration: 0.2 km W of source for EDC and carbon tetrachloride; 0.5 km W of source for chloroform.

Topography: Flat

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

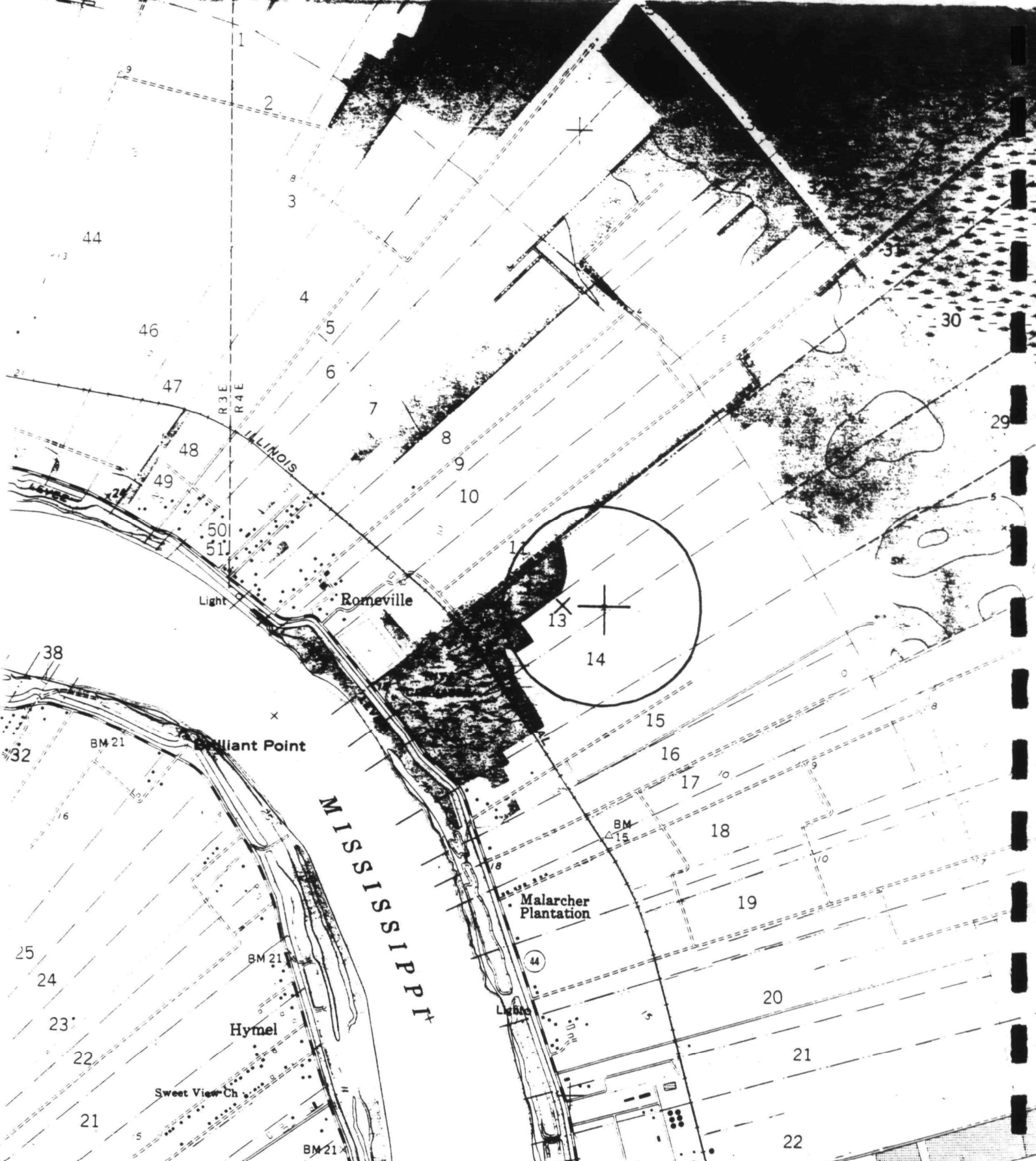
Description of nonhabitable areas:

Location of nonhabitable areas relative to source:

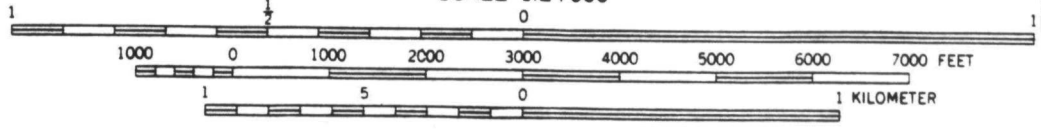
Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude are within several seconds of the coordinates provided by plant personnel. Latitude and longitude were not available from the Louisiana Department of Environmental Quality or the National Emissions Data System. No structures are apparent on the U.S.G.S. map at the location identified by the current coordinates because, according to plant personnel, the plant was built in 1981, after this map was last published. The current coordinates were therefore verified by consulting plant personnel. The STAR site selected by the model is the most representative site for Convent.

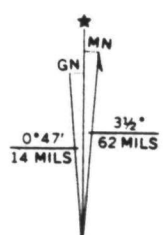


SCALE 1:24 000



CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

F-15



UTM GRID AND 1968 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Diamond Shamrock

Location: Deer Park, Texas

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, and chloroform

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	29 43 00	29 43 00	5,3,9
Longitude:	95 07 00	95 07 00	5,3,9
STAR Site:	# 12906	# 12906	
Location:	Houston, TX	Houston, TX	
Distance from source:	12.12 km	12.12 km	
Bearing from source:	203	203	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain in Gulf Coast region. Upper San Jacinto Bay is within 6 km E of source. Deer Park is 1 km S. Urban.

Population density: 249 persons/km²

Population of Deer Park: 22,648 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 5.7×10^{-3} for EDC, 1.4×10^{-5} for carbon tetrachloride, and 9.2×10^{-4} for chloroform.

Predicted maximum concentration of compound: 217.86 ug/m³ of EDC, 0.94844 ug/m³ of carbon tetrachloride, and 40.106 ug/m³ of chloroform.

Location of predicted maximum concentration: 0.2 km N of source; within plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 20%

Description of nonhabitable areas: Bayou and settling ponds

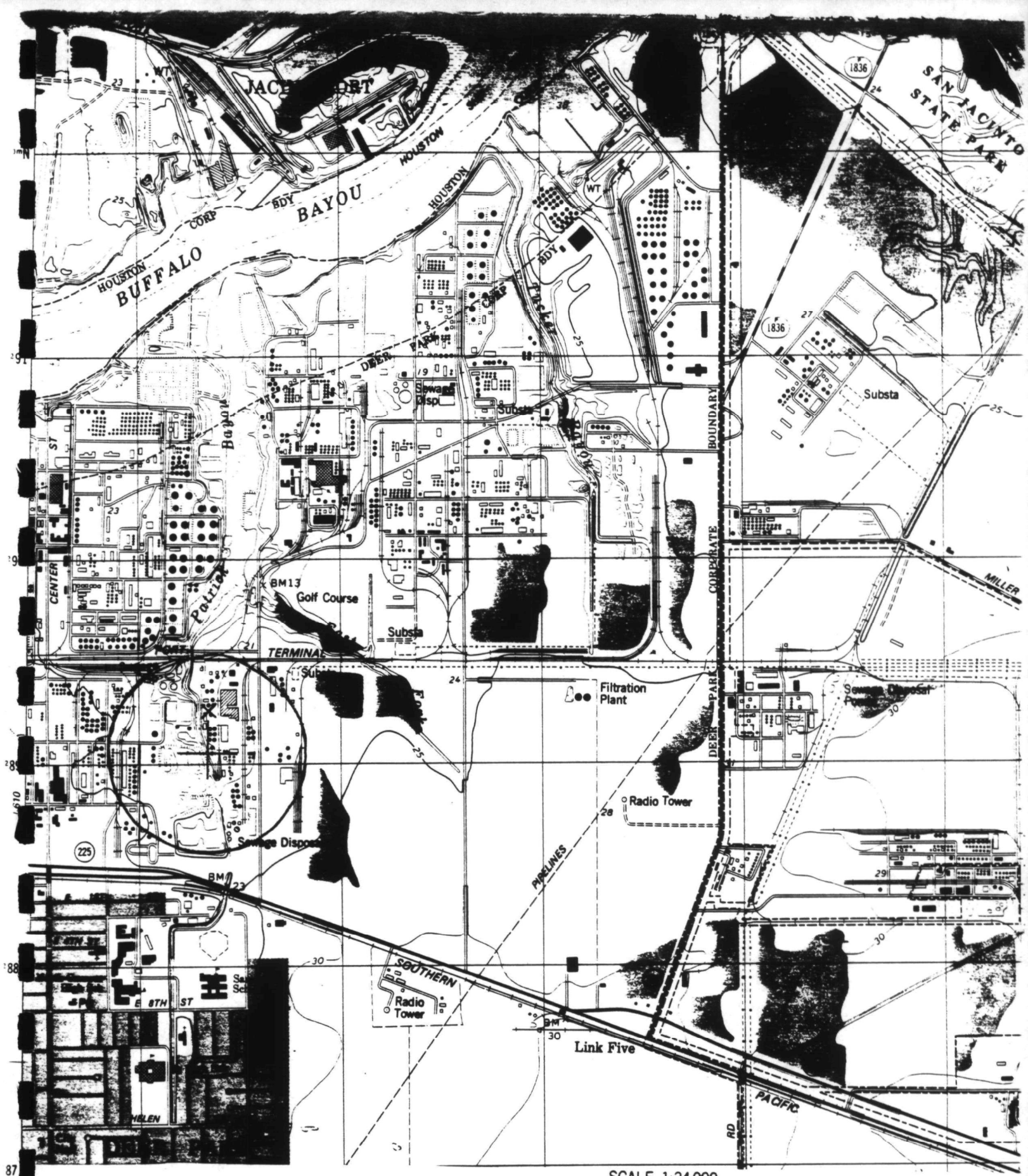
Location of nonhabitable areas relative to source: Bayou is <0.05 km W and settling ponds are 0.1 km NW and 0.05 km SW of source.

Location of nonhabitable areas relative to predicted maximum concentration: Bayou is 0.05 km W and settling ponds are 0.1 km W and 0.2 km SW of predicted maximum concentration.

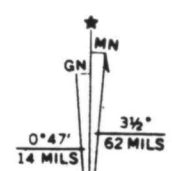
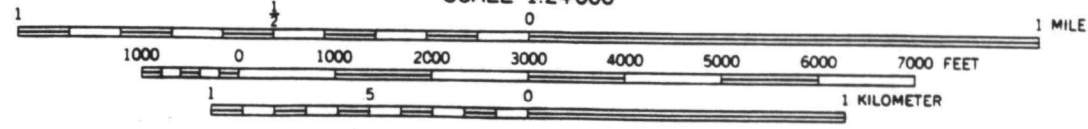
VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify a set of tanks or stacks in a plant in Deer Park. These coordinates are similar to those obtained from the National Emissions Data System (NEDS) for this plant. The current latitude and longitude were verified on the U.S.G.S. map as being reasonable.

The STAR site selected by the model is the most representative site for Deer Park. This STAR site has been verified in previous validation tasks.



SCALE 1:24 000



F-18 CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical

Location: Freeport, Texas

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, and trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	28 57 40	28 57 40	10
Longitude:	95 19 24	95 19 24	10
STAR Site:	# 12923	# 12923	
Location:	Galveston, TX	Galveston, TX	
Distance from source:	55.87 km	55.87 km	
Bearing from source:	52	52	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain on the Gulf of Mexico. Many rivers, lakes and marshes. Rural.

Population density: 31 persons/km²

Population of Freeport: 13,444 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 4.0×10^{-4} for EDC, 1.2×10^{-5} for carbon tetrachloride, and 3.2×10^{-5} for trichloroethylene.

Predicted maximum concentration of compound: 15.237 ug/m³ of EDC, 0.76941 ug/m³ of carbon tetrachloride, and 0.24506 ug/m³ of trichloroethylene.

Location of predicted maximum concentration: 0.2 km N of source; within plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 10%

Description of nonhabitable areas: Bayou and settling ponds

Location of nonhabitable areas relative to source: Bayou is 0.4 km N and canal is 0.3 km S of source.

Location of nonhabitable areas relative to predicted maximum concentration: Bayou is 0.2 km N and canal is 0.5 km S of predicted maximum concentration.

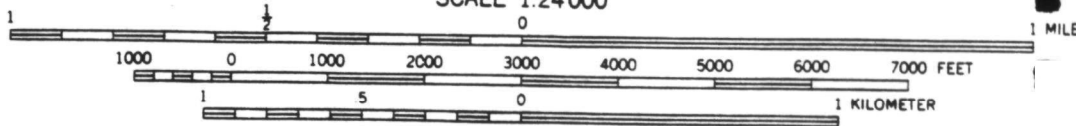
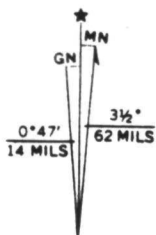
VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify structures in a plant near Freeport, Texas. This location is approximately 0.5 km north of the large chemical plant containing other chlorinated organics production units. Dow's Freeport plant is extremely large and spread out and therefore the current coordinates appear reasonable.

The STAR site selected by the HEM is the most representative site for Freeport. This STAR site has been verified in previous validation tasks.



SCALE 1:24 000



F-21 CONTOUR INTERVAL 10 FEET
THICK LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical

Location: Oyster Creek, Texas

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, chloroform, and trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	28 58 00	28 58 26	4,10
Longitude:	95 21 00	95 20 54	4,10
STAR Site:	# 12923	# 12923	
Location:	Galveston, TX	Galveston, TX	
Distance from source:	57.56 km	50 km	
Bearing from source:	54	50	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain in Gulf Coast region. Many rivers, lakes, and marshes. Rural.

Population density: 33 persons/km²

Population of Oyster Creek: 1,473 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 9.2×10^{-4} for EDC, 1.3×10^{-5} for carbon tetrachloride, 3.3×10^{-5} for chloroform, and 3.6×10^{-7} for trichloroethylene.

Predicted maximum concentration of compound: 35.436 ug/m³ of EDC, 0.84330 ug/m³ of carbon tetrachloride, 1.4391 ug/m³ of chloroform, and 0.27512 ug/m³ of trichloroethylene.

Location of predicted maximum concentration: 0.2 km N of source.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 10%

Description of nonhabitable areas: Canal

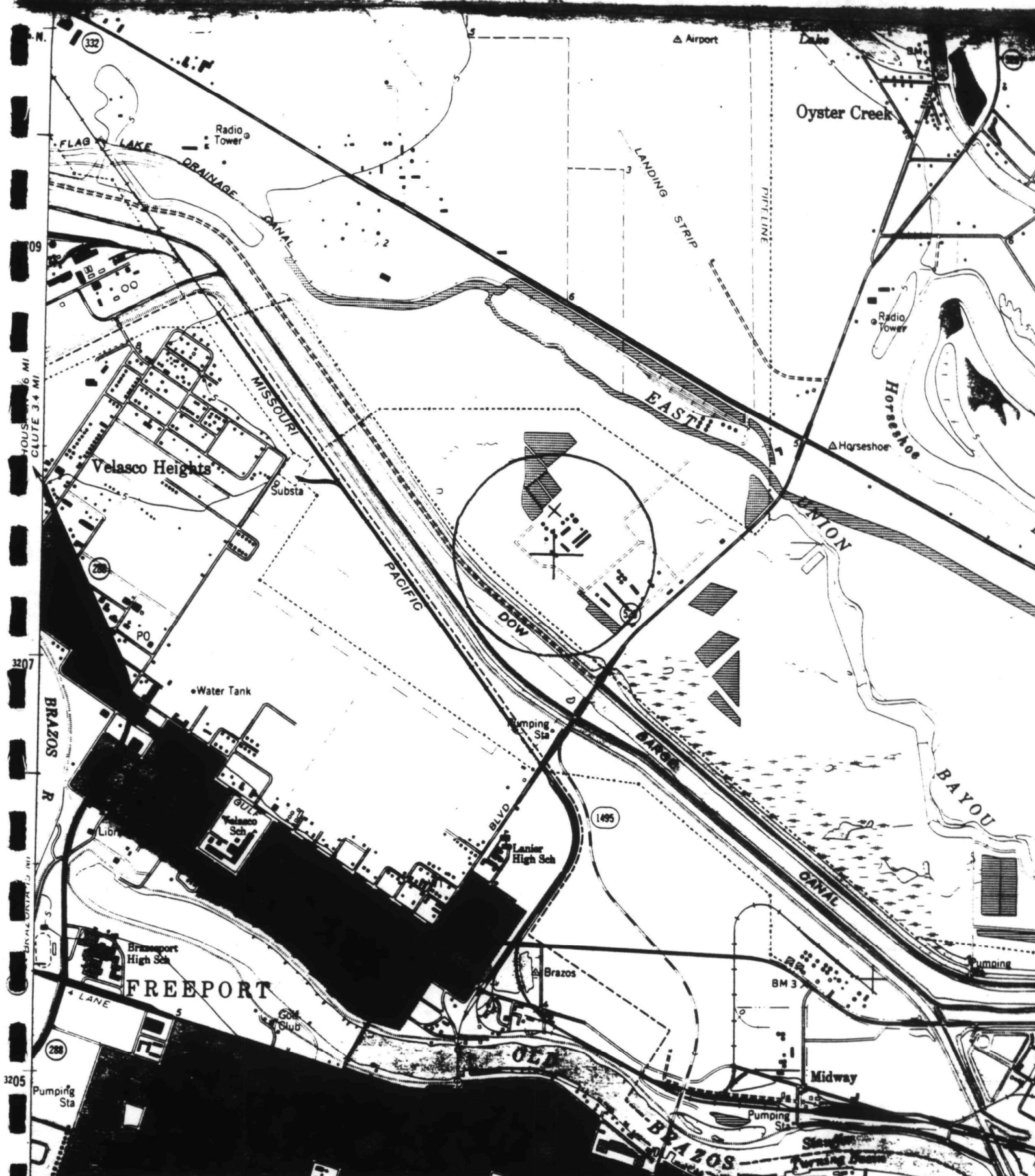
Location of nonhabitable areas relative to source: Canal is 0.3 km SW of source.

Location of nonhabitable areas relative to predicted maximum concentration: Canal is 0.4 km SW of predicted maximum concentration.

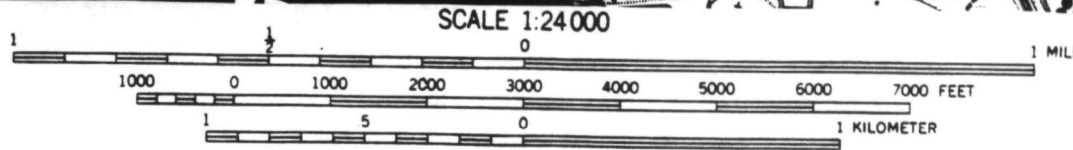
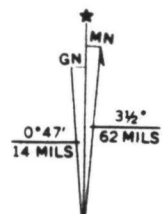
VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude do not identify a plant in Oyster Creek. The coordinates provided by the Texas Air Control Board identify a plant in Oyster Creek and they were verified on the U.S.G.S. map as being more reasonable. Although the verified coordinates differ from the current coordinates by less than one minute thirty seconds, habitability of the area within 0.5 km of the source will change significantly if the verified coordinates are used. Therefore it is recommended that the latitude and longitude be updated to the verified coordinates.

The STAR site selected by the model is the most representative site for this source. The STAR site will not change when the latitude and longitude are updated.



3207
3205
3204



F-24 CONTOUR INTERVAL 10 FEET
TTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical I

Location: Plaquemine, Louisiana

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, chloroform, and trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 19 46	30 19 46	11,12
Longitude:	91 14 21	91 14 21	11,12
STAR Site:	# 13970	# 13970	
Location:	Baton Rouge, LA	Baton Rouge, LA	
Distance from source:	24.22 km	24.22 km	
Bearing from source:	21	21	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain in Gulf Coast region. Source is about 1 km S of Mississippi River. Rural.

Population density: 74 persons/km²

Population of Plaquemine: 7,521 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.8×10^{-3} for EDC, 9.4×10^{-6} for carbon tetrachloride, 2.3×10^{-5} for chloroform, and 1.4×10^{-7} for trichloroethylene.

Predicted maximum concentration of compound: 70.754 ug/m³ of EDC, 0.62718 ug/m³ of carbon tetrachloride, 0.98567 ug/m³ of chloroform, and 0.11046 ug/m³ of trichloroethylene.

Location of predicted maximum concentration: 0.2 km W for EDC and carbon tetrachloride; 0.2 km N for chloroform and trichloroethylene.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 5%

Description of nonhabitable areas: Intermittent stream.

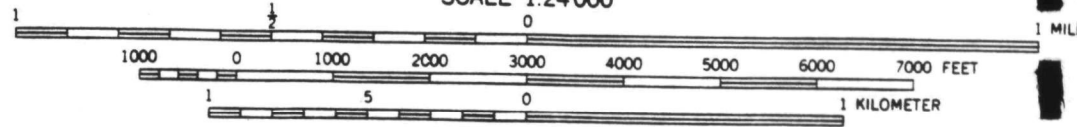
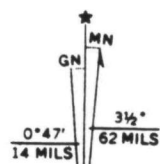
Location of nonhabitable areas relative to source: Stream is 0.15 km N of source.

Location of nonhabitable areas relative to predicted maximum concentration: Stream is 0.15 km N of predicted maximum concentrations of EDC and carbon tetrachloride; stream is 0.05 km S of predicted maximum concentrations of chloroform and trichloroethylene.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify a set of stacks and tanks within Dow's large plant in Plaquemine. These coordinates were verified on the U.S.G.S. map as being reasonable. The coordinates provided by the Louisiana Department of Environmental Quality identified the center of Plaquemine and were not considered reasonable.

The STAR site selected by the model is the most representative site for Plaquemine. This STAR site has been verified in a previous validation task.



F-27 CONTOUR INTERVAL 10 FEET
THICK LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Dow Chemical II

Location: Plaquemine, Louisiana

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, chloroform, and trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 19 46	30 19 46	11,12
Longitude:	91 14 21	91 14 21	11,12
STAR Site:	# 13970	# 13970	
Location:	Baton Rouge, LA	Baton Rouge, LA	
Distance from source:	24.22 km	24.22 km	
Bearing from source:	21	21	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain in Gulf Coast region. Source is about 1 km S of Mississippi River. Rural.

Population density: 74 persons/km²

Population of Plaquemine: 7,521 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 7.7×10^{-4} for EDC, 1.0×10^{-5} for carbon tetrachloride, 2.5×10^{-5} for chloroform, and 1.6×10^{-7} for trichloroethylene.

Predicted maximum concentration of compound: 29.539 ug/m³ of EDC, 0.67943 ug/m³ of carbon tetrachloride, 0.98567 ug/m³ of chloroform, and 0.11937 ug/m³ of trichloroethylene.

Location of predicted maximum concentration: 0.2 km W of source.

Topography: Same as above.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 5%

Description of nonhabitable areas: Intermittent stream.

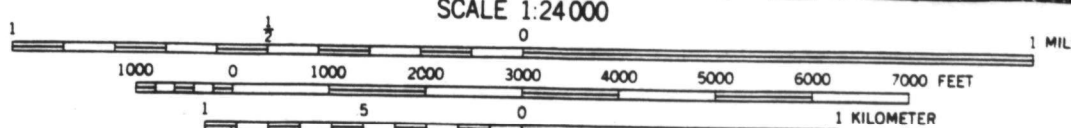
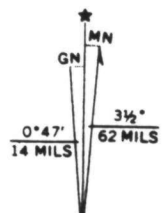
Location of nonhabitable areas relative to source: Stream is 0.15 km N of source.

Location of nonhabitable areas relative to predicted maximum concentration: Stream is 0.15 km N of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify a set of stacks and tanks within Dow's large plant in Plaquemine. These coordinates were verified on the U.S.G.S. map as being reasonable.

The STAR site selected by the model is the most representative site for Plaquemine. This STAR site has been verified in a previous validation task.



F-30 CONTOUR INTERVAL 10 FEET
THICK LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Formosa

Location: Baton Rouge, Louisiana

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, chloroform, and trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 30 00	30 30 00	12,13,14
Longitude:	91 11 00	91 11 00	12,13,14
STAR Site:	# 13970	# 13970	
Location:	Baton Rouge, LA	Baton Rouge, LA	
Distance from source:	4.89 km	4.89 km	
Bearing from source:	41	41	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal region of the Gulf coast. Large areas of wetlands. Source is about 1 km E of Mississippi River. Rural.

Population density: 62 persons/km²

Population of Baton Rouge: 219,419 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.2×10^{-2} for EDC, 1.2×10^{-5} for carbon tetrachloride, 3.6×10^{-6} for chloroform, and 8.6×10^{-8} for trichloroethylene.

Predicted maximum concentration of compound: 441.84 ug/m³ of EDC, 0.79087 ug/m³ of carbon tetrachloride, 0.15829 ug/m³ of chloroform, and 0.066378 ug/m³ of trichloroethylene.

Location of predicted maximum concentration: 0.2 km W of source for EDC and carbon tetrachloride; 0.2 km N of source for chloroform and trichloroethylene.

Topography: Same as above.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 10%

Description of nonhabitable areas: Numerous settling beds associated with the facility.

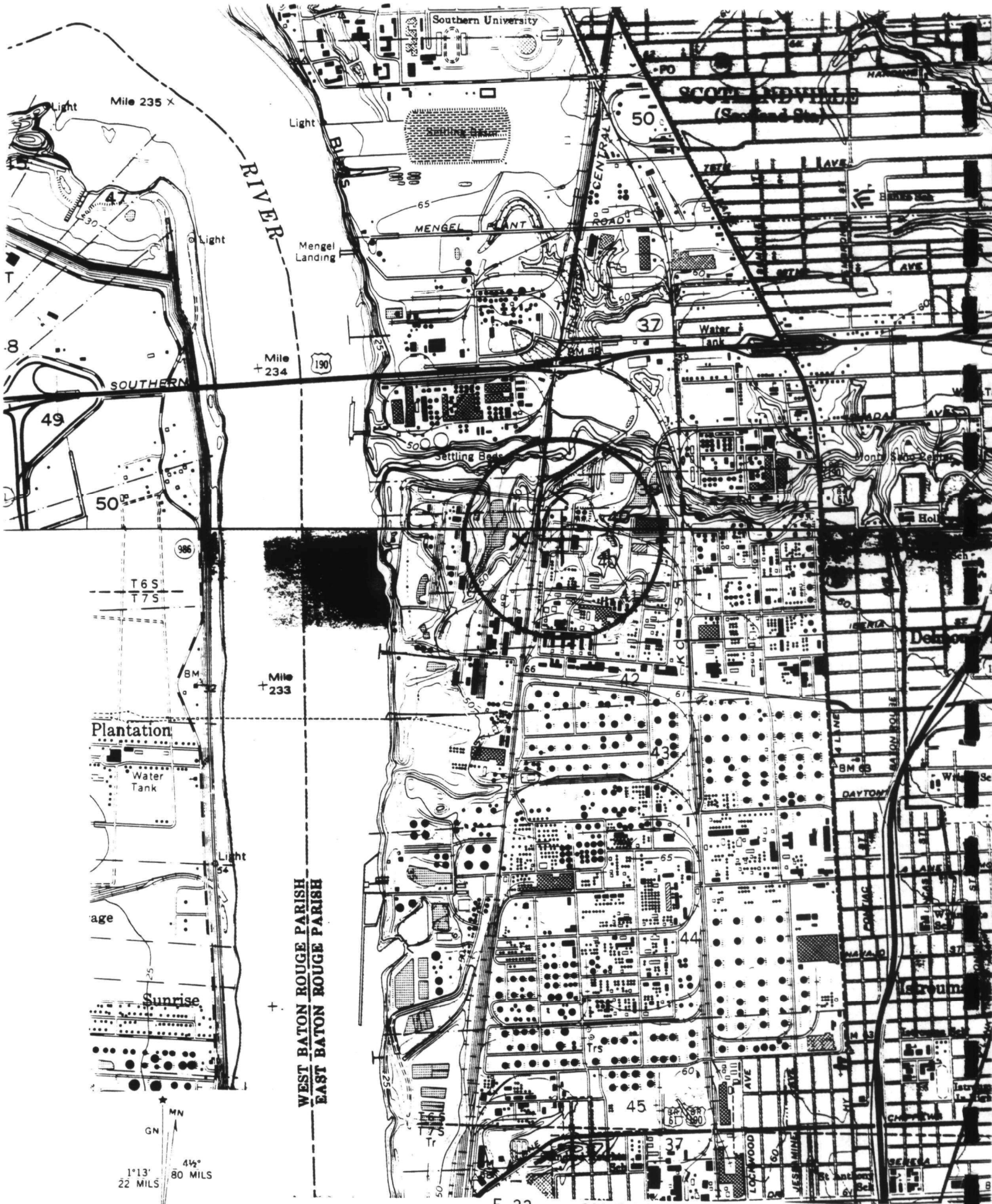
Location of nonhabitable areas relative to source: Settling beds are 0.4 km N, 0.4 km NE, 0.3 km ENE, 0.2 km SE, and 0.3 km W of source.

Location of nonhabitable areas relative to predicted maximum concentration: Predicted maximum concentrations of EDC and carbon tetrachloride occur in settling pond located 0.2 km W of source.

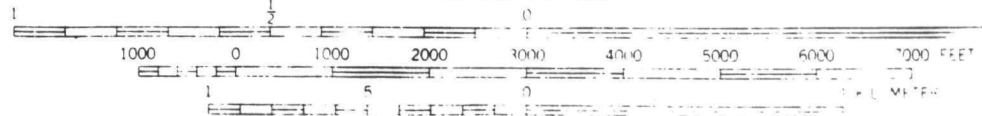
Settling beds are 0.2 km N, 0.3 km NE, 0.3 km ESE, 0.3 km SE, and 0.3 km WSW of predicted maximum concentrations of chloroform and trichloroethylene.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify a structure in a very large industrial complex east of the Mississippi River in Baton Rouge. These coordinates were verified as being reasonable on the U.S.G.S. map. The STAR site selected by the model is located in Baton Rouge and is the most representative site for this source.



UTM GRID AND 1981 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Formosa

Location: Point Comfort, Texas

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, chloroform, and trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	28 41 04	28 39 15	4,5,15
Longitude:	96 32 12	96 33 40	4,5,15
STAR Site:	# 12925	# 12925	
Location:	Beeville, TX	Beeville, TX	
Distance from source:	115.29 km	110 km	
Bearing from source:	253	230	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat to gentle slopes in Gulf coast region of southeast Texas. Source is about 0.3 km NE of Lavaca Bay. Rural.

Population density: 9.2 persons/km²

Population of Point Comfort: 1,125 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.6×10^{-3} for EDC, 6.7×10^{-6} for carbon tetrachloride, 2.8×10^{-6} for chloroform, and 4.4×10^{-8} for trichloroethylene.

Predicted maximum concentration of compound: 61.475 ug/m³ of EDC, 0.44956 ug/m³ of carbon tetrachloride, 0.12217 ug/m³ of chloroform, and 0.033576 ug/m³ of trichloroethylene.

Location of predicted maximum concentration: 0.2 km NW for EDC and carbon tetrachloride; 0.5 km NNW for chloroform and trichloroethylene.

Topography: Same as above.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 10%

Description of nonhabitable areas: Bay (Lavaca Bay)

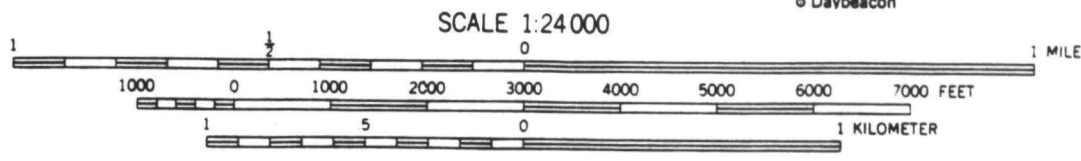
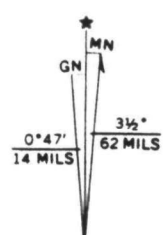
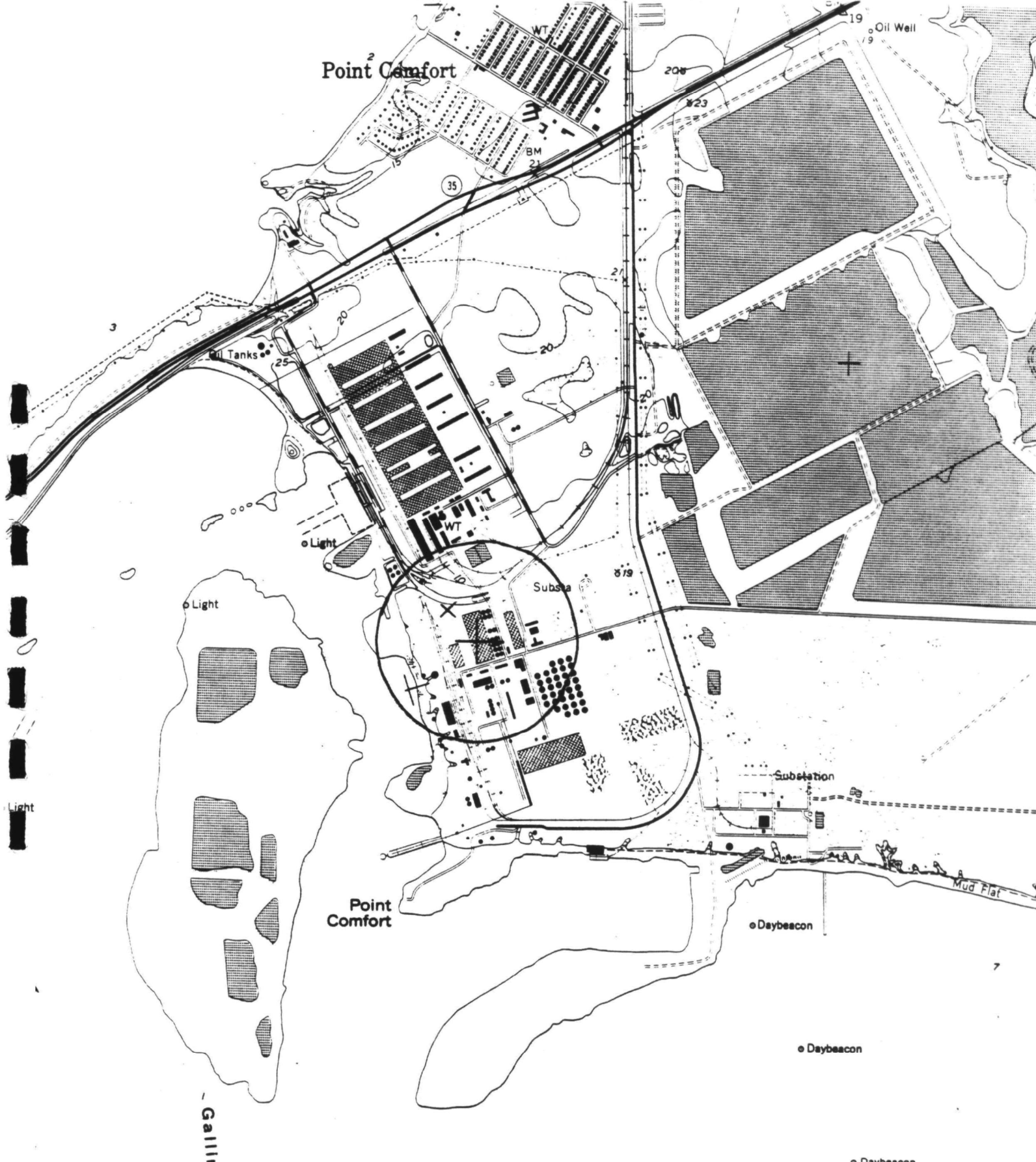
Location of nonhabitable areas relative to source: Bay is 0.3 km SW of source.

Location of nonhabitable areas relative to predicted maximum concentration: Bay is 0.3 km W of predicted maximum concentrations of EDC and carbon tetrachloride; bay is 0.35 km SW of predicted maximum concentrations of chloroform and trichloroethylene.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude are not reasonable because they do not identify a plant in or near Point Comfort. The coordinates provided by the Texas Air Control Board are near a large plant in Point Comfort. The verified coordinates were estimated from the U.S.G.S. map by using the coordinates provided by Texas. These coordinates differ by more than one minute thirty seconds from the current latitude and longitude. Therefore, it is recommended that the latitude and longitude be updated and the model re-run for this source.

The STAR site selected by the model is the most appropriate site for this source. The next nearest STAR site is Galveston, which is approximately 190 km northeast of Point Comfort. The Beeville site is more representative than Galveston because Beeville is nearer to the source. The STAR site will not change when the latitude and longitude are updated.



CONTOUR INTERVAL 10 FEET
 DASHED LINES REPRESENT 5-FOOT CONTOURS
 DATUM IS MEAN SEA LEVEL

F-36

(PORT LAVACA EAST)
 6641 11 SE

739 740 32°30' 741

UTM GRID AND 1968 MAGNETIC NORTH
 DECLINATION AT CENTER OF SHEET

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Olin Corporation
Location: Lake Charles, Louisiana
Source Category: EDC Production
Compounds: Ethylene dichloride

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 14 00	30 14 00	16
Longitude:	93 16 00	93 16 00	16
STAR Site:	# 13941	# 13941	
Location:	Lake Charles, LA	Lake Charles, LA	
Distance from source:	9.78 km	9.78 km	
Bearing from source:	101	101	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain to rolling hills in southwest Louisiana. Source is approximately 6 km W of Lake Charles, on the Calcasieu River. Rural.

Population density: 28 persons/km²

Population of Lake Charles: 75,226 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 5.0×10^{-4}

Predicted maximum concentration of compound: 9.7860 ug/m³

Location of predicted maximum concentration: 0.2 km NNE of source

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 30 - 40%

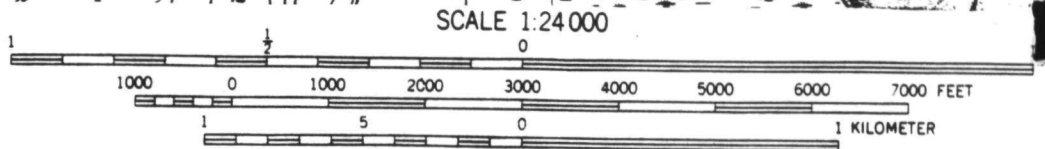
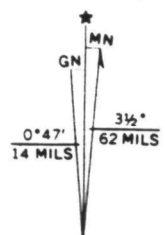
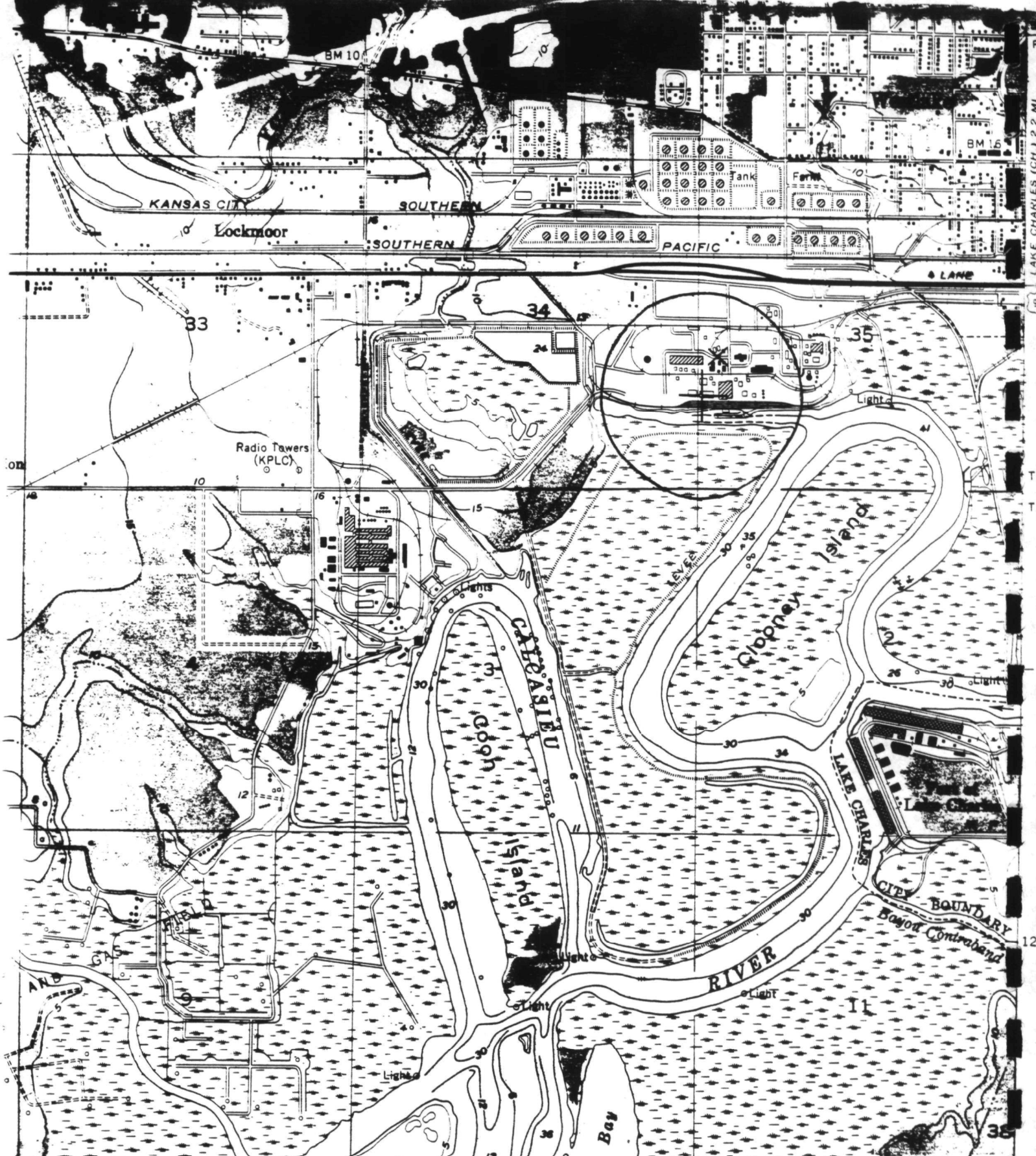
Description of nonhabitable areas: River and tailings pond

Location of nonhabitable areas relative to source: River is 0.05 km S and tailings pond is 0.2 km S of source.

Location of nonhabitable areas relative to predicted maximum concentration: River is 0.25 km S and tailings pond is 0.4 km S of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify a plant on the Calcasieu River in Lake Charles. These coordinates were verified on the U.S.G.S. map as being reasonable. The STAR site selected by the model is in Lake Charles and is the most representative site for this source.



SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
THIN LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

UTM GRID AND 1968 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: PPG

Location: Lake Charles, Louisiana

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, chloroform, and trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 13 27	30 13 27	16
Longitude:	93 16 59	93 16 59	16
STAR Site:	# 13941	# 13941	
Location:	Lake Charles, LA	Lake Charles, LA	
Distance from source:	11.21 km	11.21 km	
Bearing from source:	94	94	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coastal plain to rolling hills in southeast Louisiana. Source is approximately 6 km W of Lake Charles, on the Calcasieu River. Rural.

Population density: 28 persons/km²

Population of Lake Charles: 75,226 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 7.3×10^{-4} for EDC, 7.6×10^{-5} for carbon tetrachloride, 2.6×10^{-4} for chloroform, and 8.2×10^{-6} for trichloroethylene.

Predicted maximum concentration of compound: 28.012 ug/m³ of EDC, 5.0469 ug/m³ of carbon tetrachloride, 11.411 ug/m³ of chloroform, and 6.3000 ug/m³ of trichloroethylene.

Location of predicted maximum concentration: 0.2 km S of source; at a building in plant complex.

Topography: Same as above

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 10%

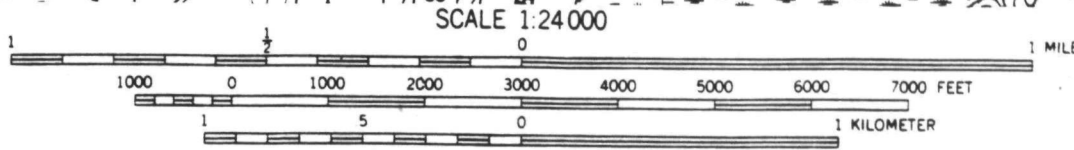
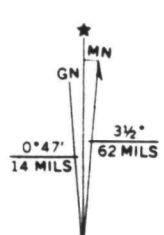
Description of nonhabitable areas: River and ponds.

Location of nonhabitable areas relative to source: River is 0.4 km SE and ponds are 0.4 km NE, 0.3 km SW, and 0.3 km W of source.

Location of nonhabitable areas relative to predicted maximum concentration: River is 0.3 km E and ponds are 0.5 km NE, 0.3 km W, and 0.3 km NW of predicted maximum concentration.

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify a structure in a plant in Lake Charles. These coordinates were verified on the U.S.G.S. map as being reasonable. The STAR site selected by the model is in Lake Charles and is the most representative site for this source.



SCALE 1:24000
CONTOUR INTERVAL 10 FEET
F-42^{TD} LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

UTM GRID AND 1968 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Shell Chemical

Location: Deer Park, Texas

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, chloroform, and trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	29 43 04	29 43 04	3,4,5,9,17
Longitude:	95 07 53	95 07 53	3,4,5,9,17
STAR Site:	# 12906	# 12906	
Location:	Houston, TX	Houston, TX	
Distance from source:	12.19 km	12.19 km	
Bearing from source:	203	203	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat coast plain in Gulf Coast region of Texas. Upper San Jacinto Bay within 6 km E of source. Urban.

Population density: 249 persons/km²

Population of Deer Park: 22,648 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 1.3×10^{-3} for EDC, 7.8×10^{-6} for carbon tetrachloride, 1.0×10^{-5} for chloroform, and 9.5×10^{-8} for trichloroethylene.

Predicted maximum concentration of compound: 51.678 ug/m³ of EDC, 0.51799 ug/m³ of carbon tetrachloride, 0.43722 ug/m³ of chloroform, and 0.072871 ug/m³ of trichloroethylene.

Location of predicted maximum concentration: 0.2 km N of source.

Topography: Same as above; occurs at a tank within plant complex.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

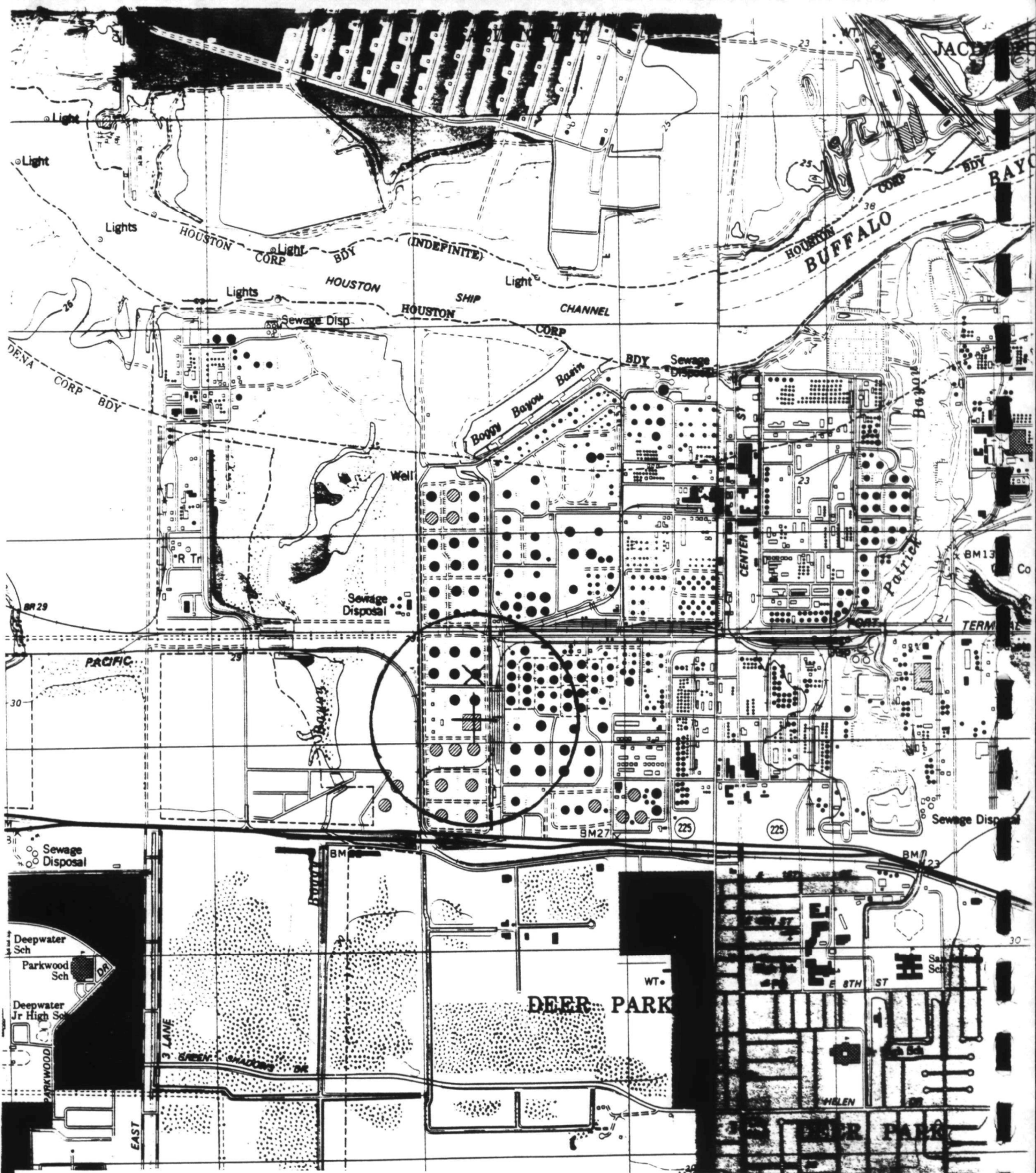
Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

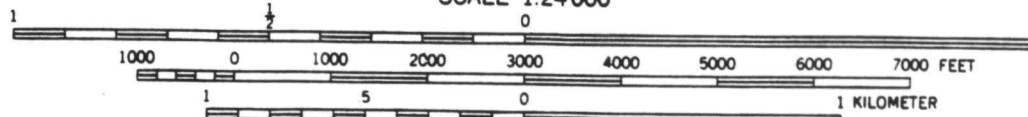
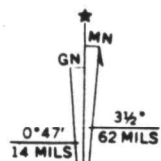
VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude differed from the coordinates provided by the Texas Air Control Board and the National Emissions Data System. The current coordinates were obtained from a Section 114 response. They were verified as being reasonable.

The STAR site selected by the model is the most appropriate site for this source. This STAR site has been verified in previous tasks.



SCALE 1:24 000



CONTOUR INTERVAL 10 FEET
F-45 THIN LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

UTM GRID AND 1968 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET



POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Vista

Location: Westlake, Louisiana

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, chloroform, and trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 15 04	30 15 04	16,18
Longitude:	93 17 00	93 17 00	16,18
STAR Site:	# 13941	# 13941	
Location:	Lake Charles, LA	Lake Charles, LA	
Distance from source:	11.84 km	11.84 km	
Bearing from source:	109	109	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat to rolling hills in Gulf coastal plain of southwestern Louisiana. Source is <1 km from the city of Westlake. Rural.

Population density: 28 persons/km²

Population of Westlake: 5,246 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 8.0×10^{-4} for EDC, 1.1×10^{-5} for carbon tetrachloride, 2.6×10^{-6} for chloroform, and 2.9×10^{-8} for trichloroethylene.

Predicted maximum concentration of compound: 30.888 ug/m³ of EDC, 0.70731 ug/m³ of carbon tetrachloride, 0.11300 ug/m³ of chloroform, and 0.0226 ug/m³ of trichloroethylene.

Location of predicted maximum concentration: 0.2 km S of source for EDC and carbon tetrachloride, 0.5 km W of source for chloroform and trichloroethylene.

Topography: Flat

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

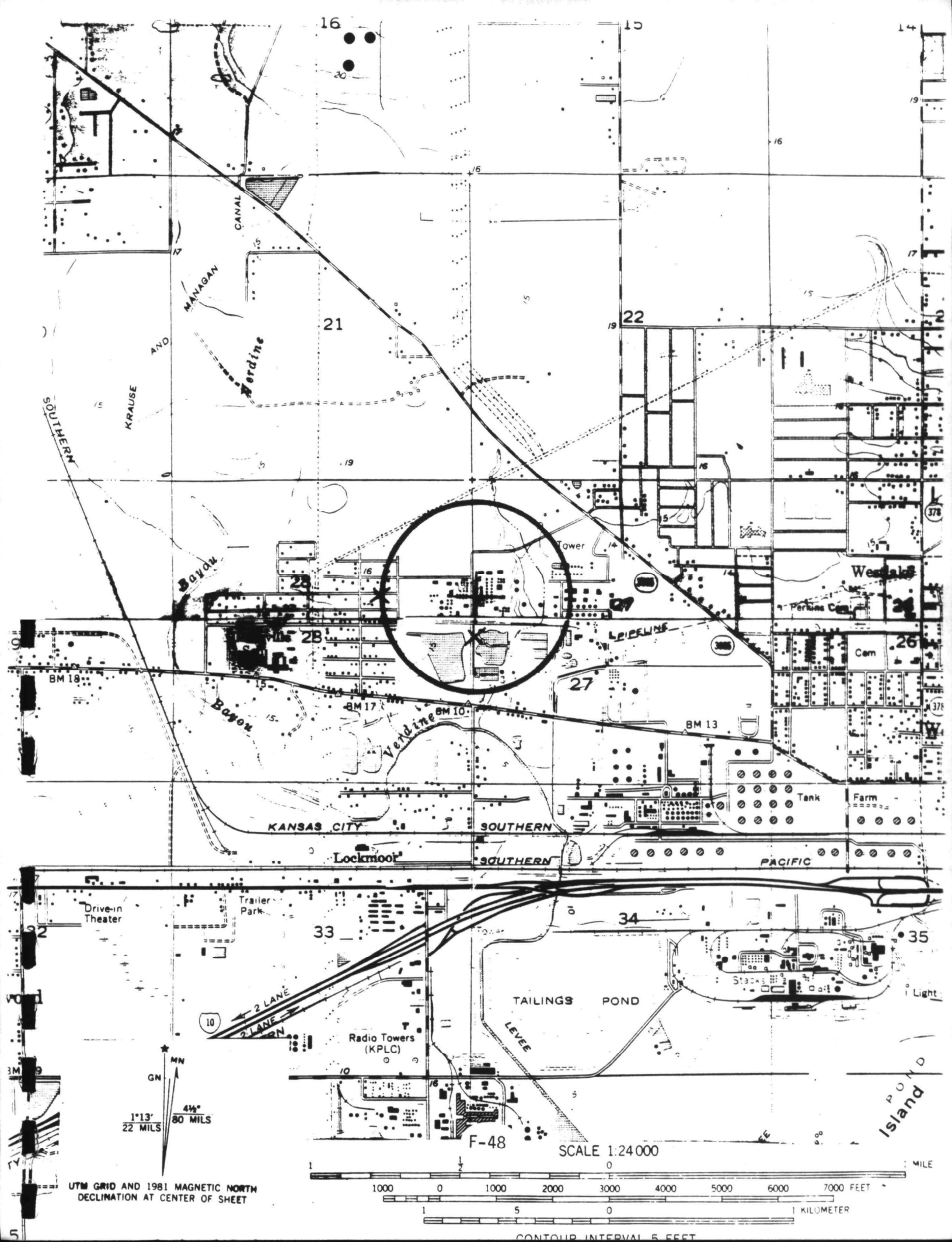
Description of nonhabitable areas:

Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude identify a group of structures, tanks, and stacks in Westlake. These coordinates were verified on the U.S.G.S. map as being reasonable. There does not appear to be any other chemical plant in the immediate area. The STAR site selected by the model is very near and is the most representative site for Westlake.



16

15

14

21

22

23

28

29

30

33

34

35

1°13' 22 MILS

4 1/4° 80 MILS

SCALE 1:24 000

UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

CONTOUR INTERVAL 5 FEET

POINT SOURCE SUMMARY SHEET

I. PLANT INFORMATION

Name: Vulcan Chemicals

Location: Geismar, Louisiana

Source Category: EDC Production

Compounds: Ethylene dichloride, carbon tetrachloride, chloroform, and trichloroethylene

II. MODELING INFORMATION

	<u>Current</u>	<u>Verified</u>	<u>Ref</u>
Latitude:	30 11 30	30 11 15	19
Longitude:	90 58 27	90 58 51	19
STAR Site:	# 13970	# 13970	
Location:	Baton Rouge, LA	Baton Rouge, LA	
Distance from source:	41.54 km	40 km	
Bearing from source:	336	330	

III. DESCRIPTION OF AREA WITHIN 50 KILOMETERS OF SOURCE

Topography: Flat area along the Mississippi River in Gulf coast region of southeast Louisiana. Rural.

Population density: 60 persons/km²

Population of Geismar: --^a

Gonzales: 7,287 persons

IV. DESCRIPTION OF THE AREA OF PREDICTED MAXIMUM CONCENTRATION

Predicted maximum individual lifetime risk: 6.9×10^{-4} for EDC, 1.3×10^{-5} for carbon tetrachloride, 8.2×10^{-5} for chloroform, and 3.1×10^{-7} for trichloroethylene.

Predicted maximum concentration of compound: 32.944 ug/m³ of EDC, 1.0031 ug/m³ of carbon tetrachloride, 3.6604 ug/m³ of chloroform, and 0.24009 ug/m³ of trichloroethylene.

Location of predicted maximum concentration: 0.2 km W of source.

Topography: Same as above.

V. HABITABILITY OF AREA WITHIN 0.5 KILOMETERS OF SOURCE

Percent nonhabitable area: 0%

Description of nonhabitable areas:

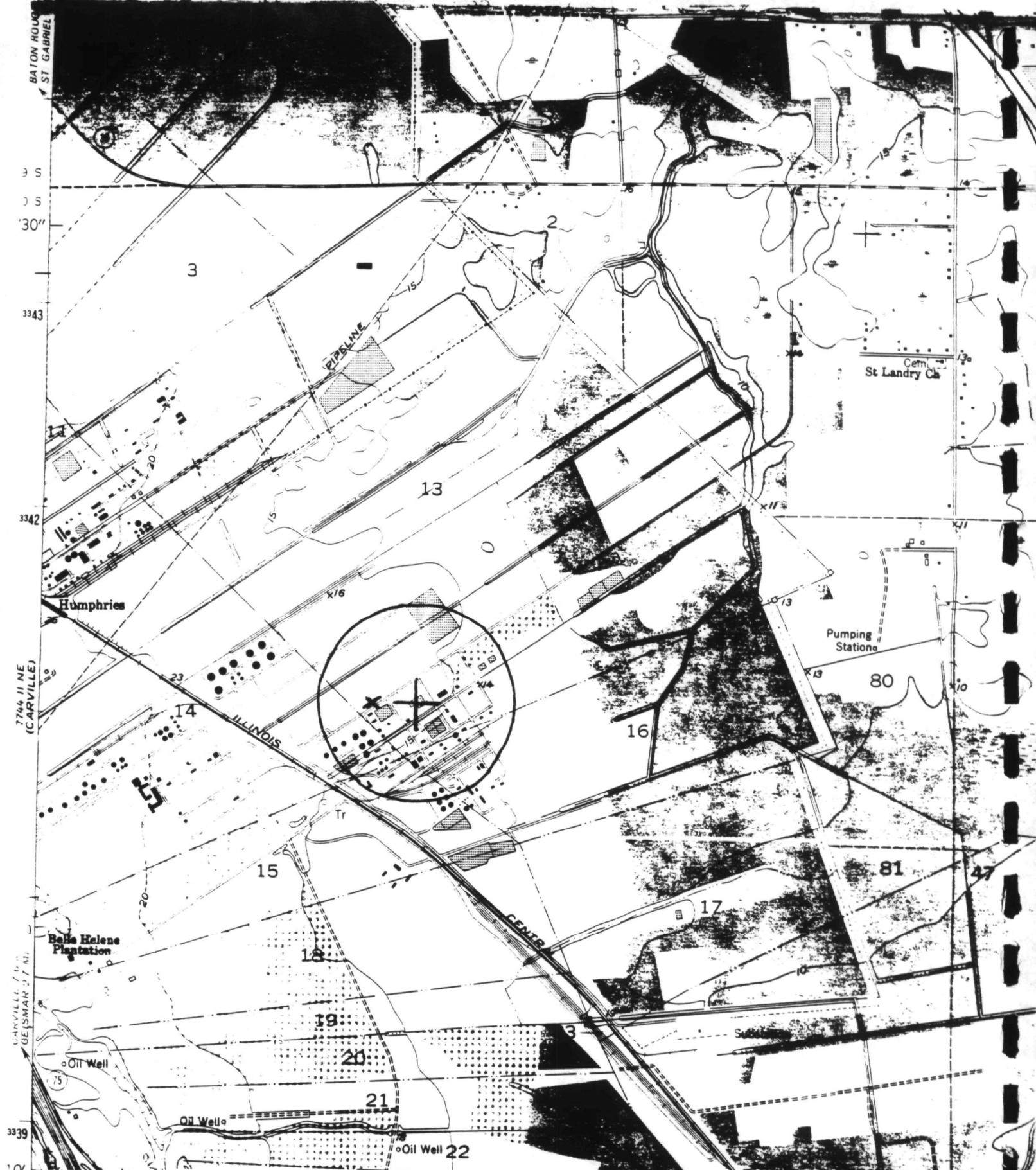
Location of nonhabitable areas relative to source:

Location of nonhabitable areas relative to predicted maximum concentration:

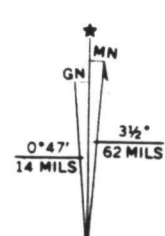
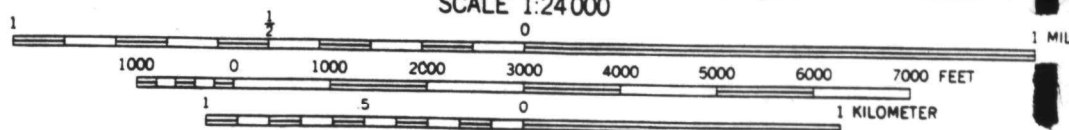
VI. DISCUSSION OF VERIFICATION RESULTS

The current latitude and longitude differed slightly from the coordinates provided by the Louisiana Department of Environmental Quality. The latitude and longitude provided by Louisiana were verified on the U.S.G.S. map as being reasonable. Since these coordinates differ by less than one minute thirty seconds from the current coordinates and habitability is not affected by the difference in coordinates, no change in the model inputs is recommended.

The STAR site selected by the model is the most representative site for this source. This STAR site has been verified in a previous validation task.



SCALE 1:24 000



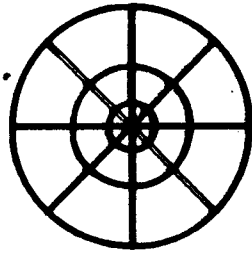
F-51 CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

UTM GRID AND 1968 MAGNETIC NORTH

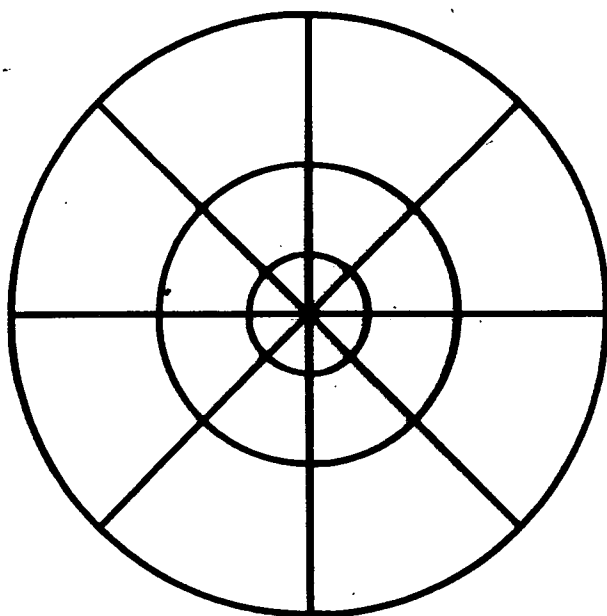
REFERENCES

1. U. S. Geological Survey. 1958. Calvert City, Kentucky. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1968.
2. Kentucky Department of Environmental Protection, Division of Air Pollution Control. 18 Reilly Road, Frankfurt, Kentucky 40601. (502) 564-3382.
3. U. S. Geological Survey. 1982. La Porte, Texas. 7.5 Minute series topographic map, 1:24,000 scale.
4. Texas Air Control Board. 6330 Highway 290 East, Austin, Texas 78723. (512) 451-5711.
5. Telecon. Kuhn, K.Q., Radian Corporation, with Glanville, J., Midwest Research Institute. June 4, 1986. Investigation of the Sources of latitude and longitude information for certain EDC production facilities.
6. U. S. Geological Survey. 1974. Carville, Louisiana. 7.5 Minute series topographic map, 1:24,000 scale.
7. U. S. Geological Survey. 1956. 1956. Convent, Louisiana. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1967 and 1975.
8. Telecon. Kuhn, K.Q., Radian Corporation, with Anderson, D., Diamond Shamrock, Convent, Louisiana.
9. U. S. Environmental Protection Agency. National Emissions Data System, National Air Data Branch, Research Triangle Park, North Carolina. 27711. Computer printout dated Dec. 11, 1984.
10. U. S. Geological Survey. 1964. Freeport, Texas. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1974.
11. U. S. Geological Survey. 1963. Plaquemine, Louisiana. 7.5 Minute series topographic map, 1:24,000 scale. Photorevised 1971 and 1980.
12. Louisiana Department of Environmental Quality, Air Quality Division. P.O. Box 44066, Baton Rouge, Louisiana 70804. (504) 342-1265
13. U.S. Geological Survey. 1963. Baton Rouge West, Louisiana. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1971 and 1980.
14. U.S. Geological Survey. 1963. Scotlandville, Louisiana. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1970 and 1980.

15. U.S. Geological Survey. 1952. Point Comfort, Texas. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1973.
16. U.S. Geological Survey. 1955. Westlake, Louisiana. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1967 and 1975.
17. U.S. Geological Survey. 1982. Pasadena, Texas. 7.5 Minute series topographic map, 1:24000 scale.
18. U.S. Geological Survey. 1956. Buhler, Louisiana. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1967 and 1975.
19. U.S. Geological Survey. 1961. Gonzales, Louisiana. 7.5 Minute series topographic map, 1:24000 scale. Photorevised 1980.



Scale 1:62,500
Grid With Radii 0.2, 0.5, and 1.0 Kilometer



Scale 1:25,000
Grid With Radii 0.2, 0.5, and 1.0 Kilometer