

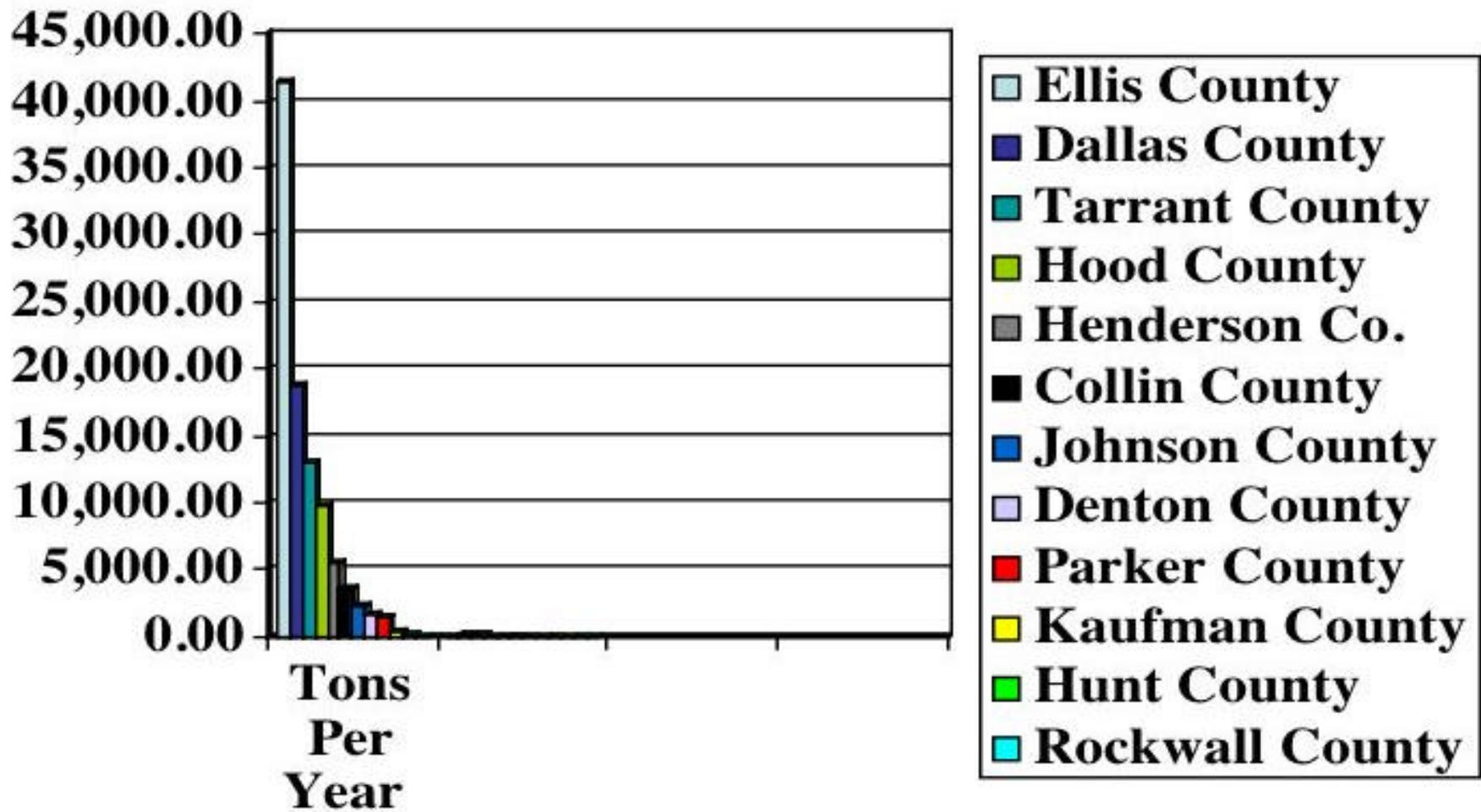
I. How Ellis County Cement Plants Adversely Affect DFW Air Quality:

1) Volume of NO_x emissions coming from the plants

2) Location of cement plants on south/southeastern side of DFW

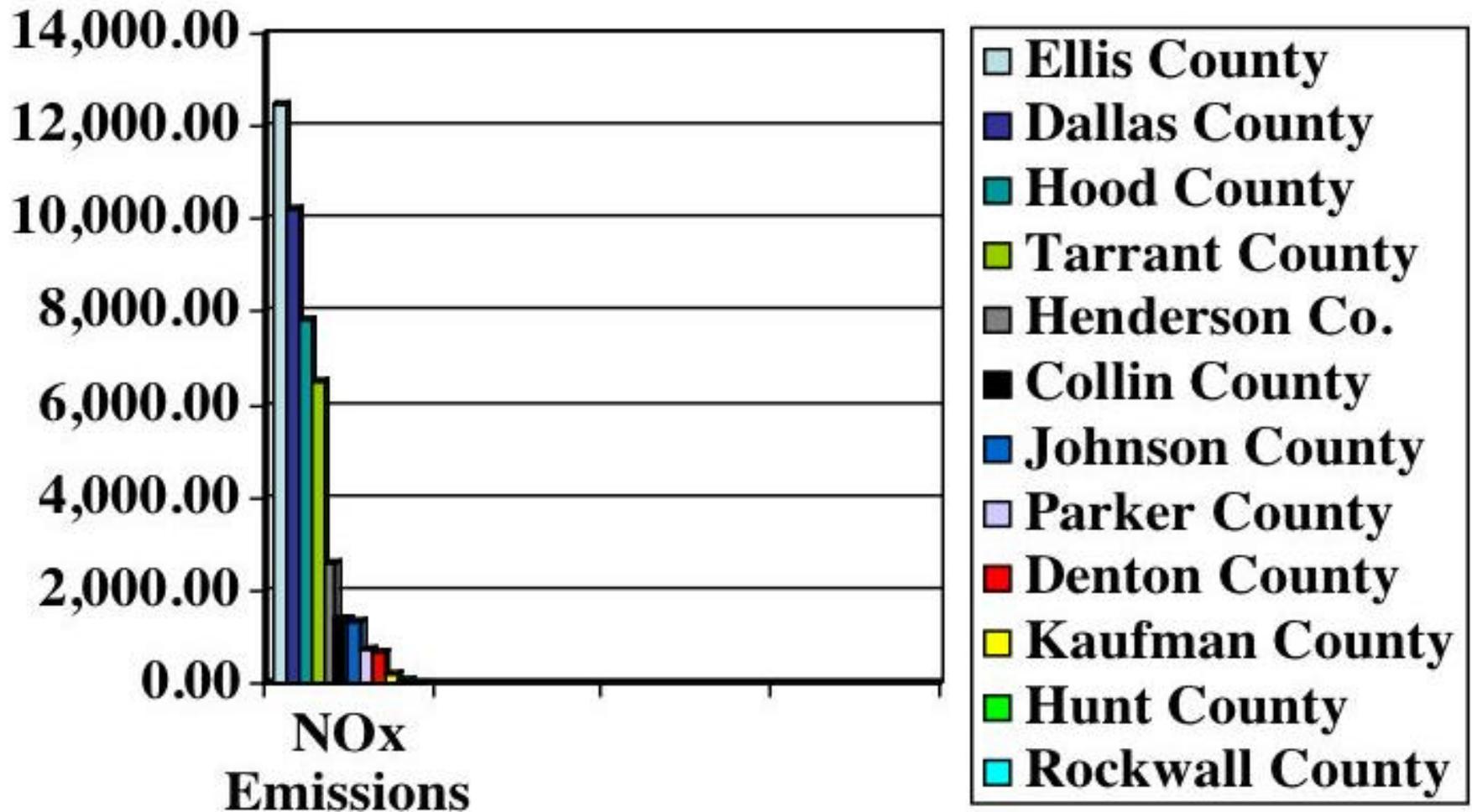
Volume of Emissions:

Industrial pollution from all 248 reporting point sources in the 12 County area for 2000:



Volume of Emissions:

Industrial emissions of NOx in 12 County Area in 2000:



Volume of Emissions:

Ten Largest Industrial Nox Polluters in 12 County area in 2000

1.	TXU Decordova Bend Plant	7,780.06	(Hood Co.)
2.	TXI Midlothian Plant	4,515.42	(Ellis Co.)
3.	TXU Handley Plant	3,690.54	(Tarrant Co.)
4.	Holcim Mildothian Plant	3,474.71	(Ellis Co.)
5.	TXU Mnt. Creek Plant	2,905.36	(Dallas Co.)
6.	NTCC Midlothian Plant	2,904.90	(Ellis Co.)
7.	TXU N. Lake Plant	2,676.48	(Dallas Co.)
8.	TXU Lake R. Hubbard Plant	2,339.15	(Dallas Co.)
9.	TXU Eagle Mtn Lake Plant	1,336.45	(Tarrant Co.)
10.	Hunt Oil Plant	1,278.53	(Henderson Co.)

Ellis County Cement Plants: 10,895.03 tons

Volume of Emissions:

Cement Plant NO_x Emissions in 2000 =

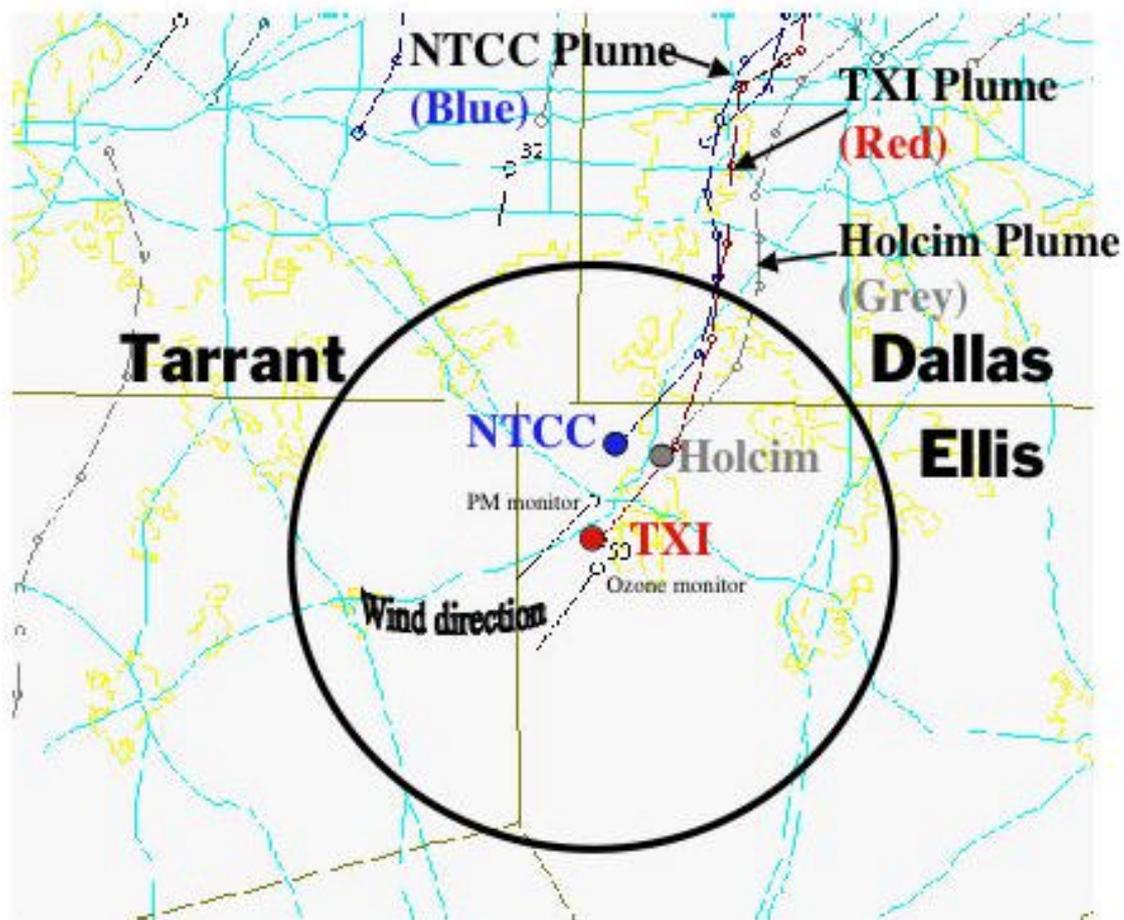
The Annual NO_x Emissions of **544,751** Average Cars



(Source: Texas Dept of Transportation, 2002 County Auto Registration spreadsheet)

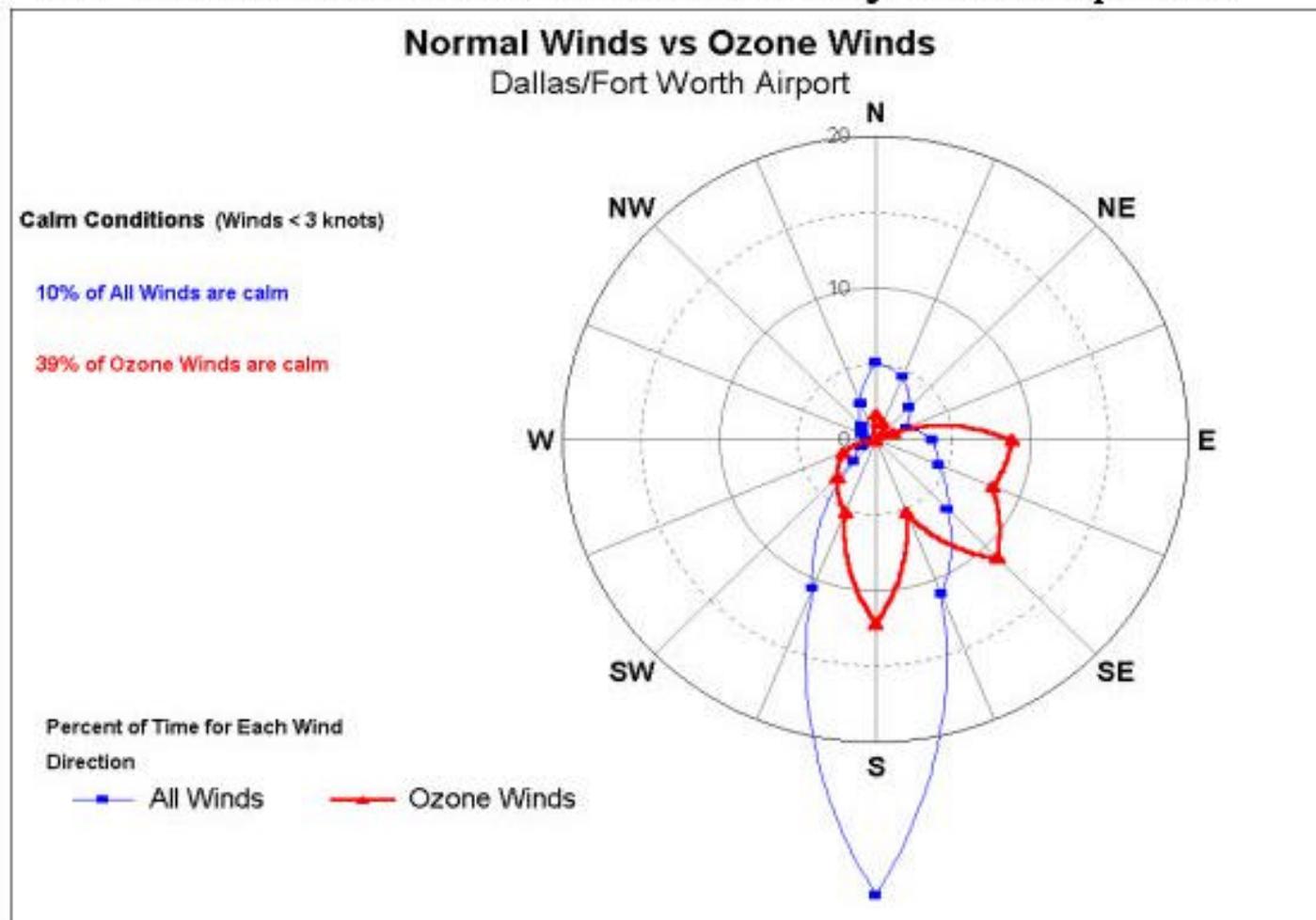
Location of Cement Plants:

Three of the largest industrial NO_x polluters in north Texas are all located within a few square miles of each other. This has the effect of concentrating the pollution from the plants into a kind of collective “super plume” that can blow into DFW much like a weather front.



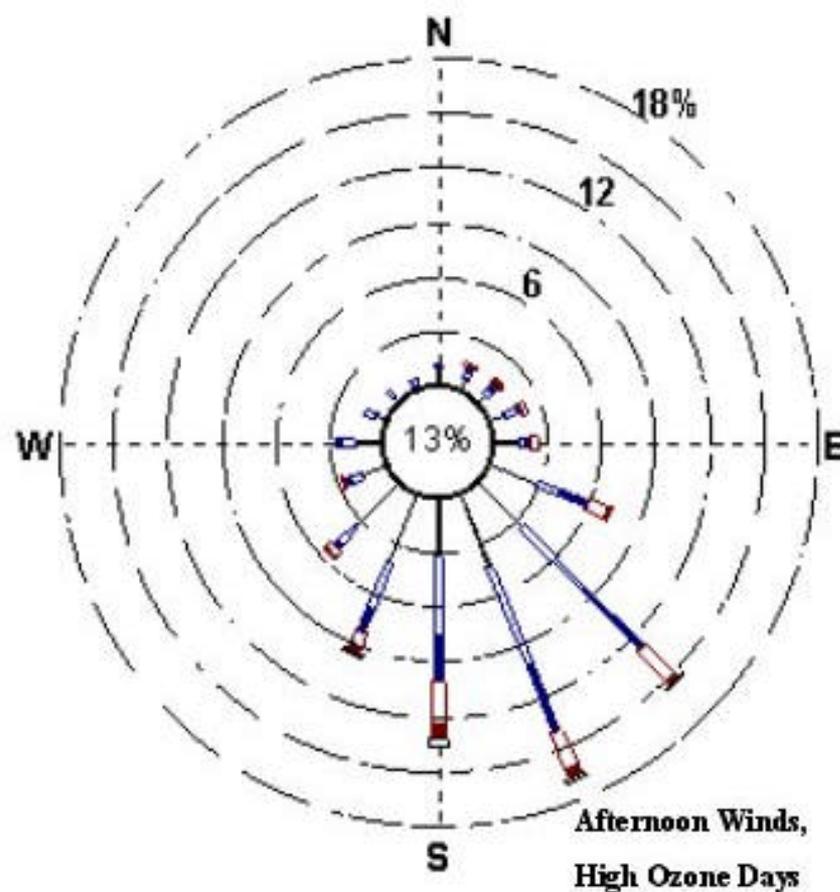
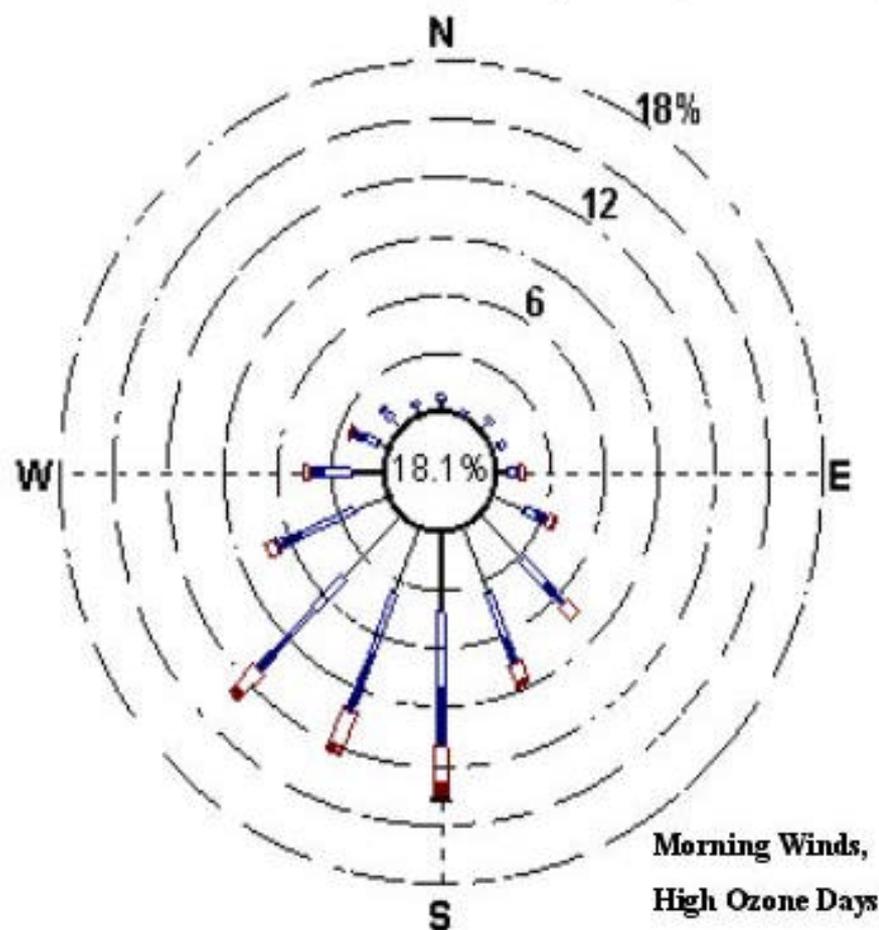
Location of Cement Plants:

The TCEQ has found that on “high ozone days” the winds enter the DFW area from its south-southeast edge - the exact location of the Ellis County cement plants.



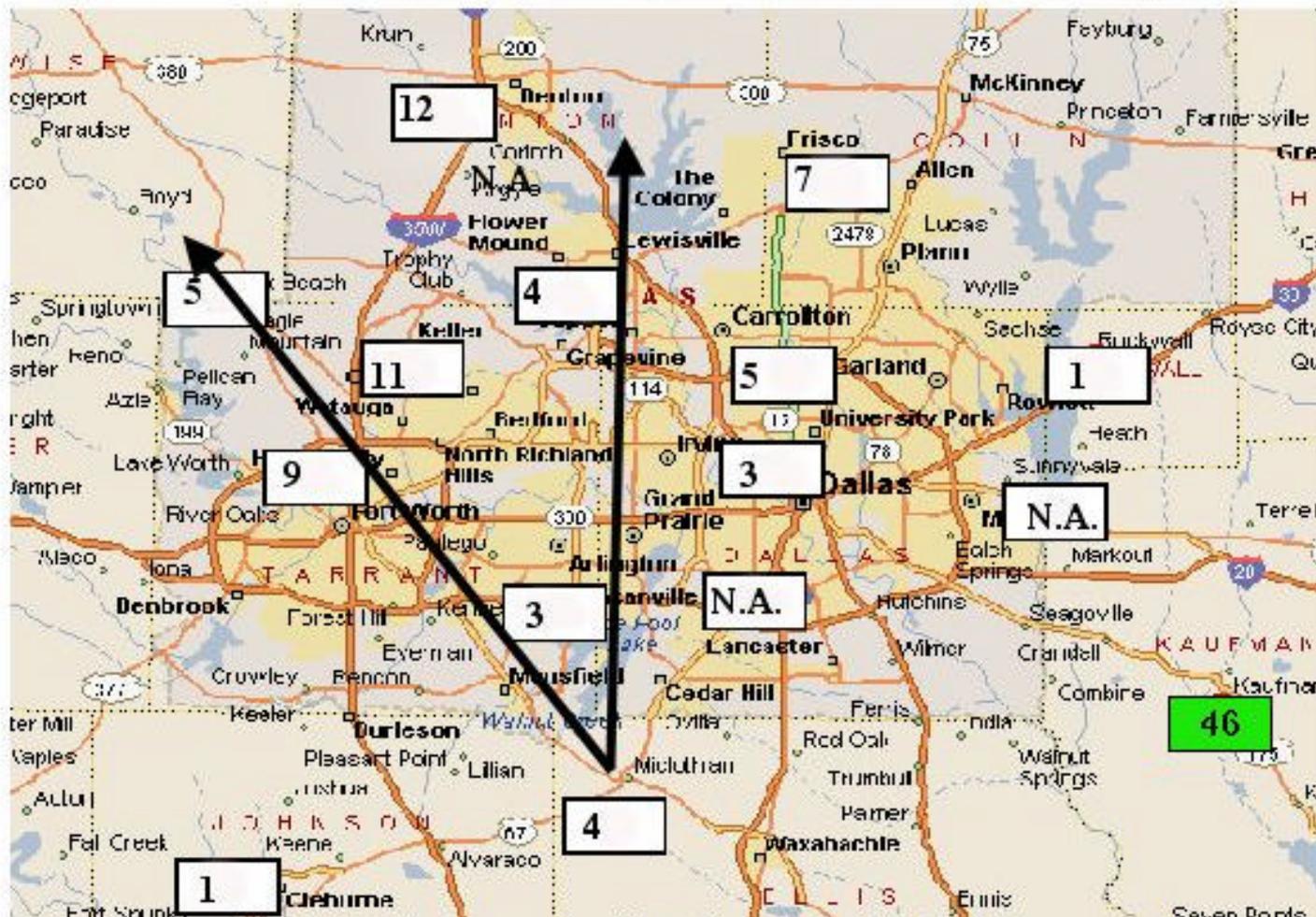
Location of Cement Plants:

Two more TCEQ-generated wind roses showing how the Ellis County cement plants are uniquely situated to cause harm to DFW air quality on “high ozone days”



Location of Cement Plants:

Directly north and northwest of the Ellis County cement plants are the DFW area ozone monitoring sites which account for most of the region's ozone violations (1 hr violations '97-02)



Conclusions:

- 1) The three Ellis County cement plants are among the largest industrial sources of NO_x in north Texas, equaling the emissions of over half a million cars daily.**
- 2) These three large plants are clustered together in close proximity to one another, allowing their pollution to overlap into a “superplume.”**
- 3) The cement plants’ location on the south-southeastern side of DFW puts them directly in line for prevailing ozone season winds to carry their pollution into the heart of the Metroplex.**

**II. Proving Impact:
Some Existing TCEQ
Technical Evidence
Showing Ellis County
Cement Plants
Contributing to DFW
Ozone Violations**

**1999 TCEQ SIP
Sensitivity Study of
50% Reduction in
Ellis County
NO_x Emissions**



1999 Ellis County Sensitivity Test

(Photochemical Modeling Exercise)

- **Ellis County Point Source Sensitivity Test**
 - ▶ 50% NO_x reduction
 - ▶ Applied to all elevated points in Ellis County
- **Results:**
 - ▶ Ozone Reductions 1 - 4 ppb in 4-county area
 - ▶ (Up to 9-12 ppb within 4-county area)

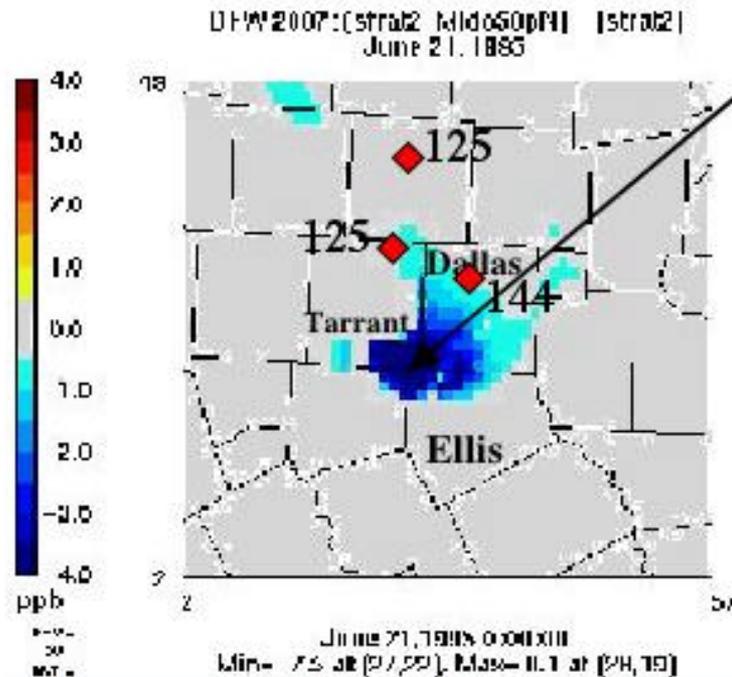


(Results of a 50% Cut in Ellis County Point Source NOx Emissions)

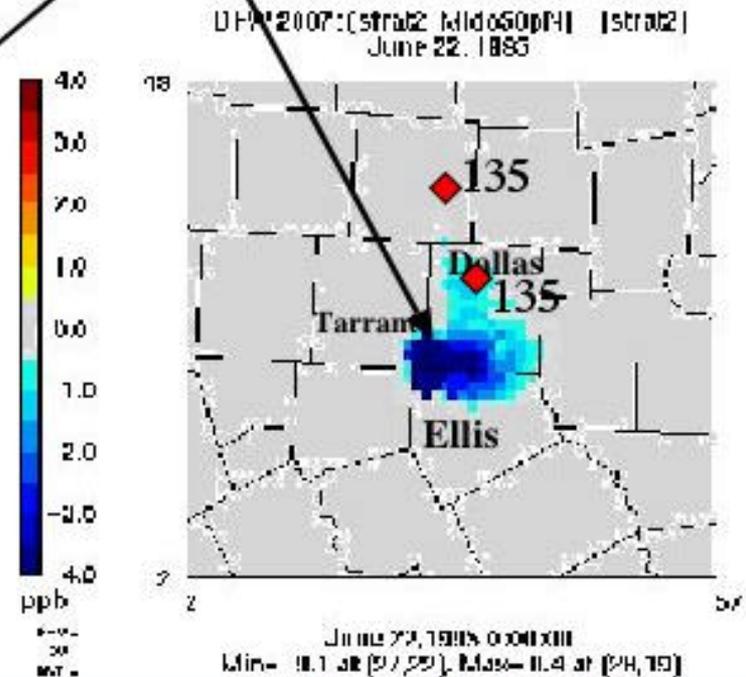


The darker the blue, the larger the drop in ozone levels

Difference of Layer One Max Ozone



Difference of Layer One Max Ozone



June 21, 1996 Modeling Run

June 22, 1996 Modeling Run

Air Quality Planning and Assessment Division

Breitenbach

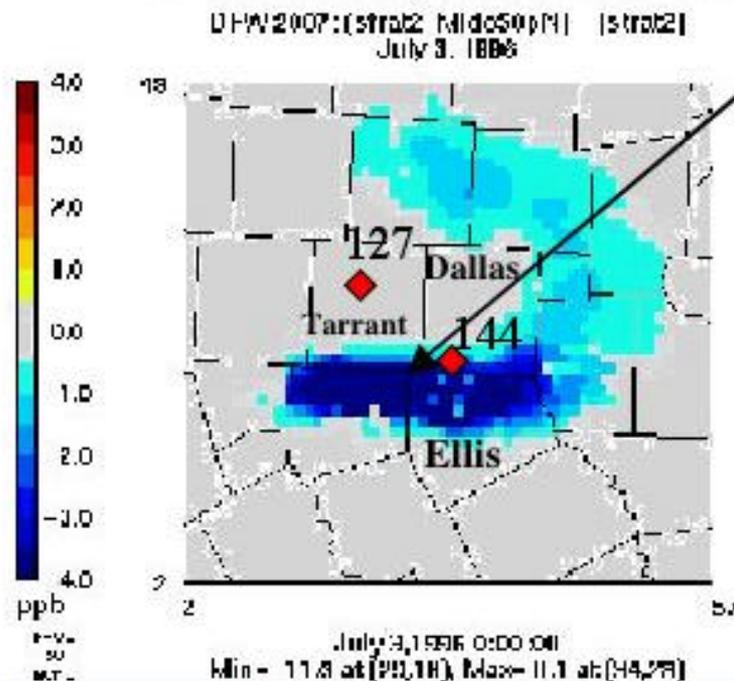


(Results of a 50% Cut in Ellis County Point Source NOx Emissions)



A drop of 9-12 ppb in ambient ozone levels

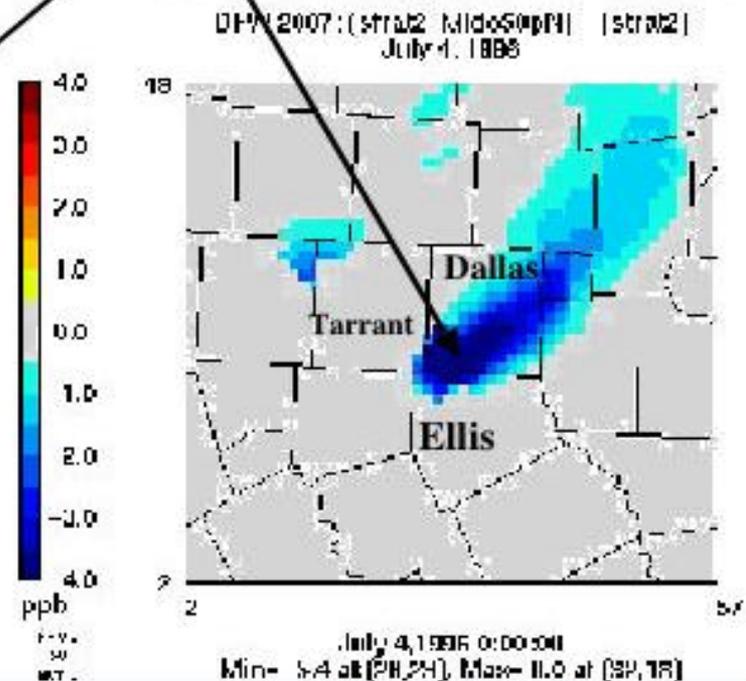
Difference of Layer One Max Ozone



July 3, 1996 Modeling Run

Air Quality Planning and Assessment Division

Difference of Layer One Max Ozone



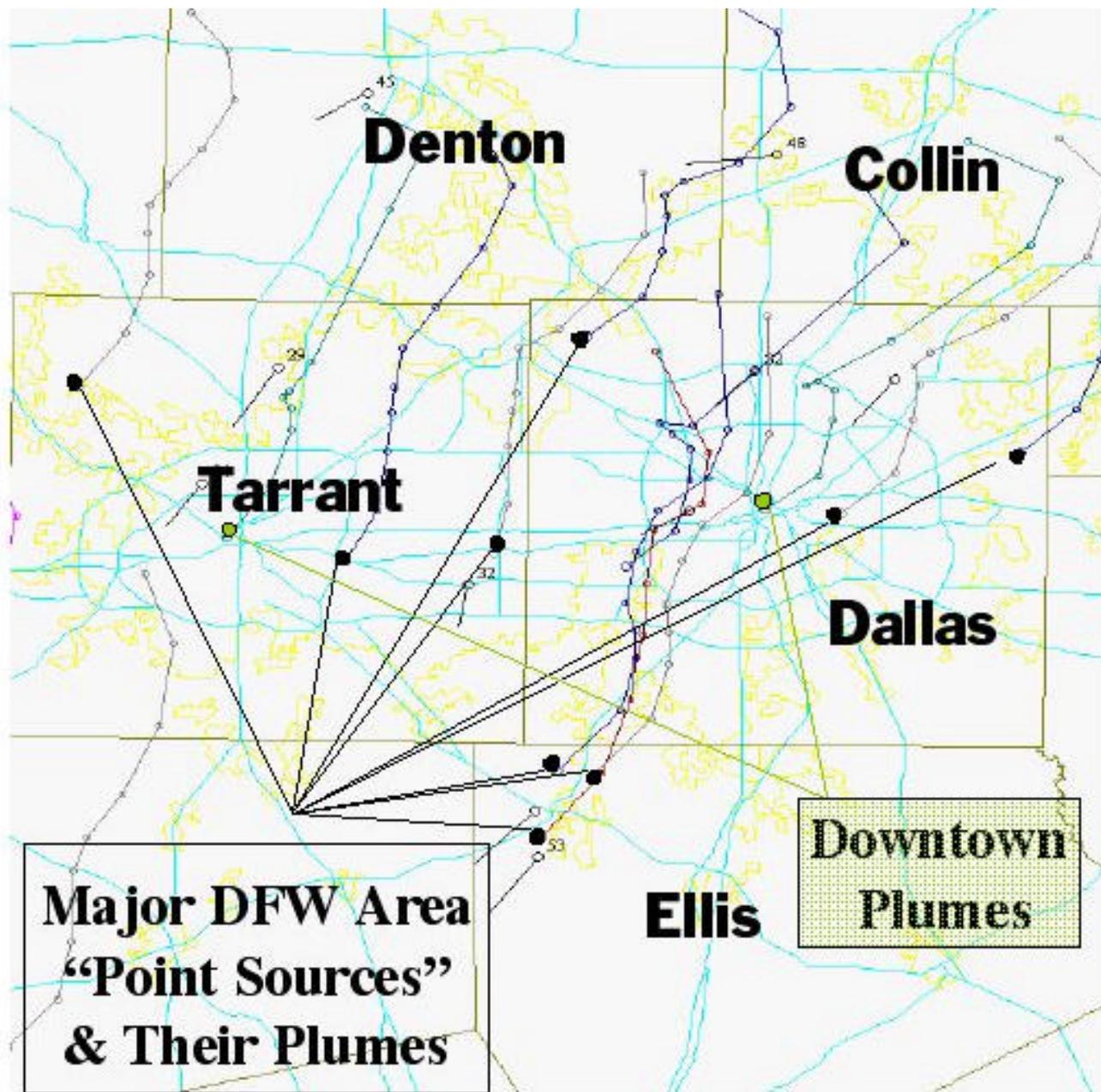
July 4, 1996 Modeling Run

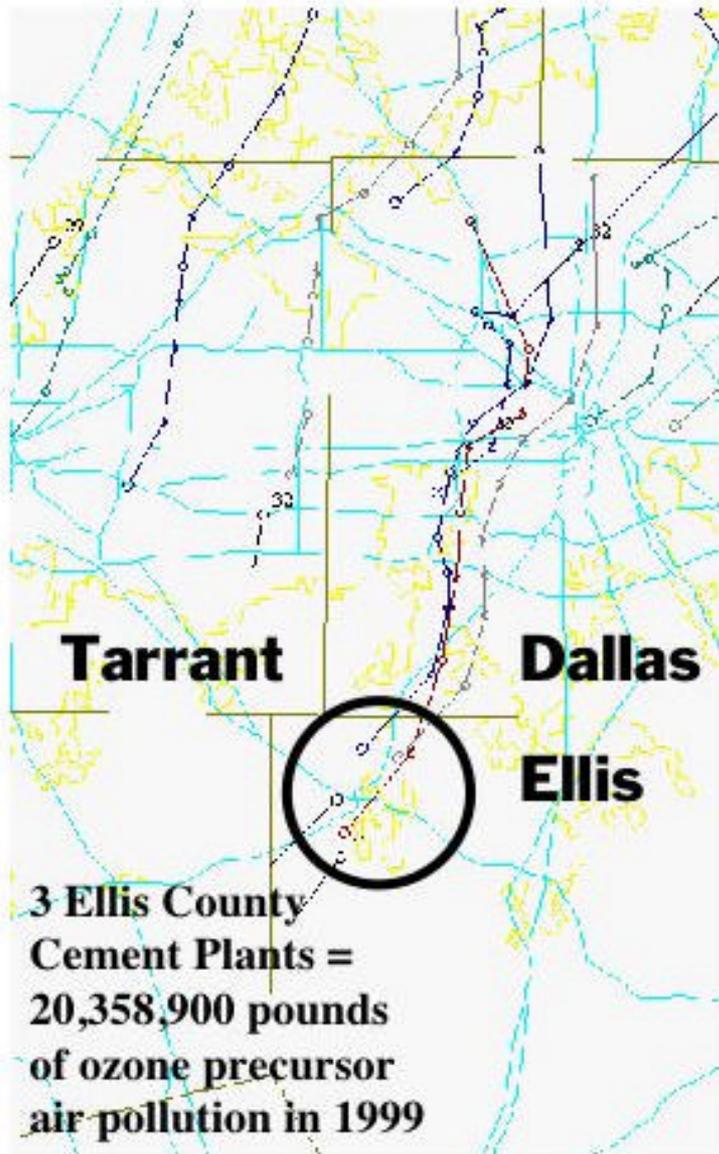
Breitenbach

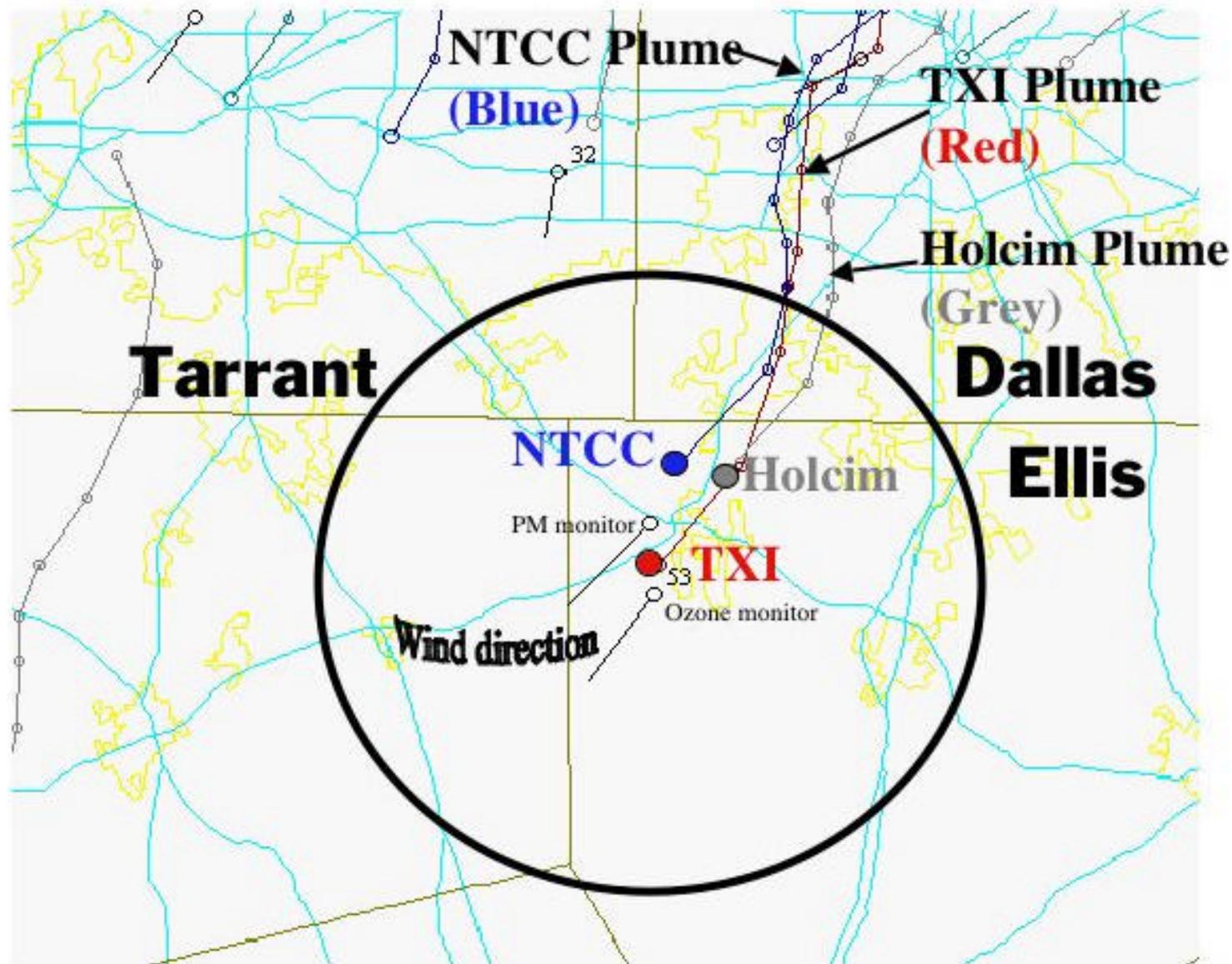


This sensitivity study, along with other facts, convinced the North Texas Clean Air Steering Committee in 1999 to vote for a 50% reduction in NOx emissions Ellis County cement plants in the DFW SIP. The then TNRCC later reduced this to 30%.

**TCEQ DFW
Point Source
Plume Maps**







**TCEQ DFW Point
Source Plume Maps
August 16-19, 1999:
The Week TCEQ is
Using for DFW SIP
Baseline Modeling**

**TCEQ DFW
Point Source
Plume Map
For August 16th,
1999**

8/16/99 1600 CDT Plumes 0100 CDT

Underlined Monitor
Number =
1 Hour Ozone
Violation

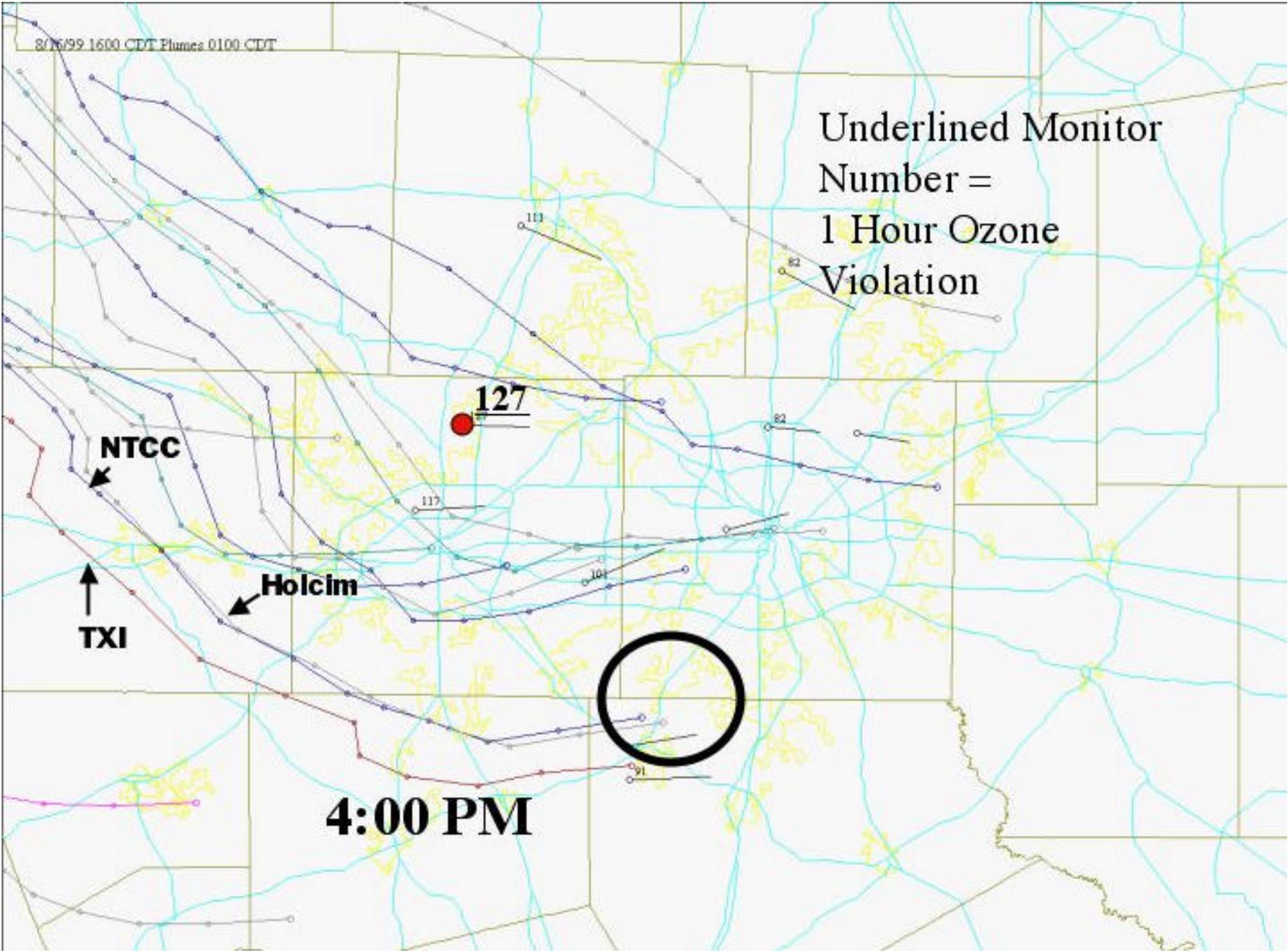
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NTCC

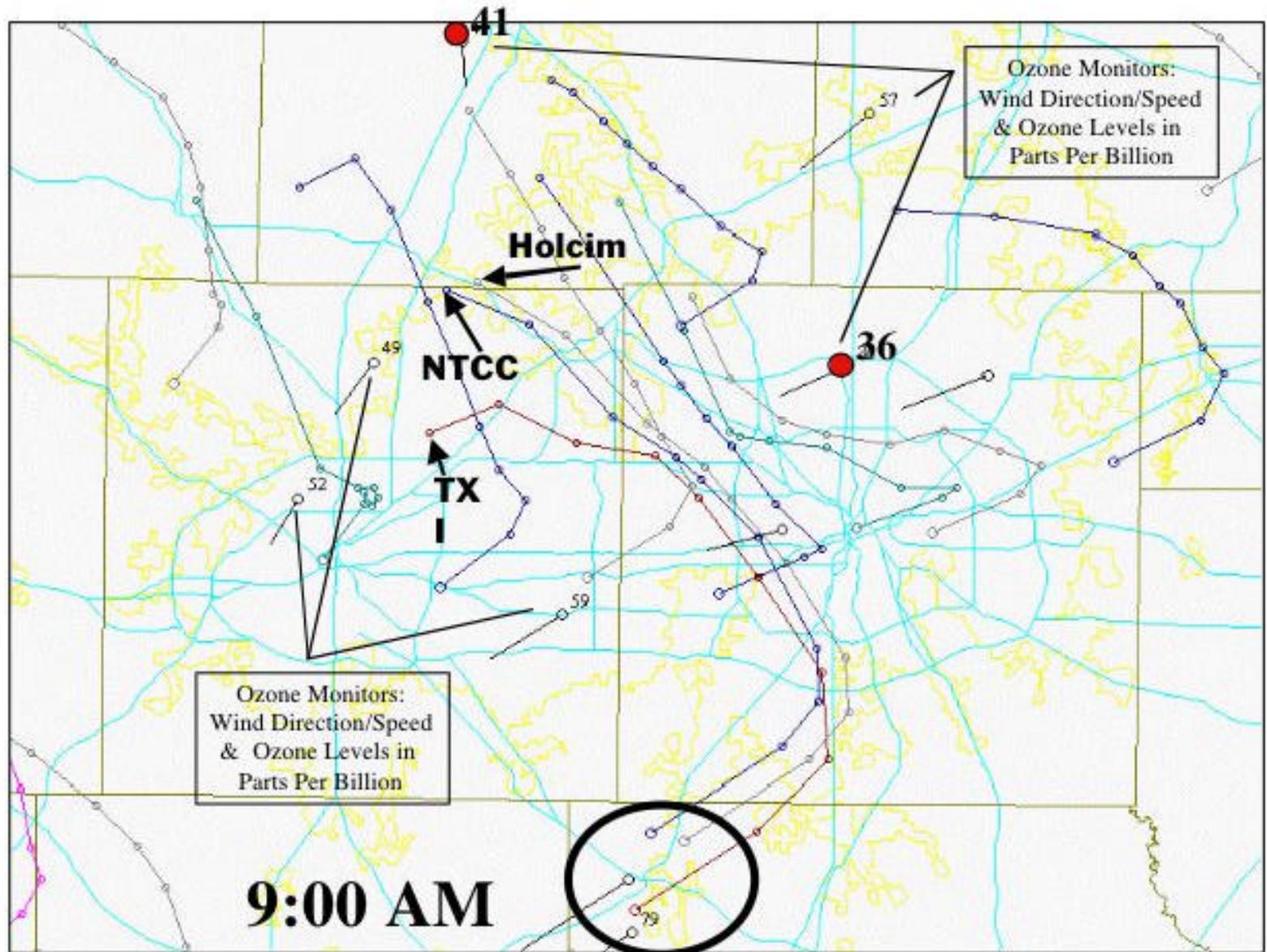
Holcim

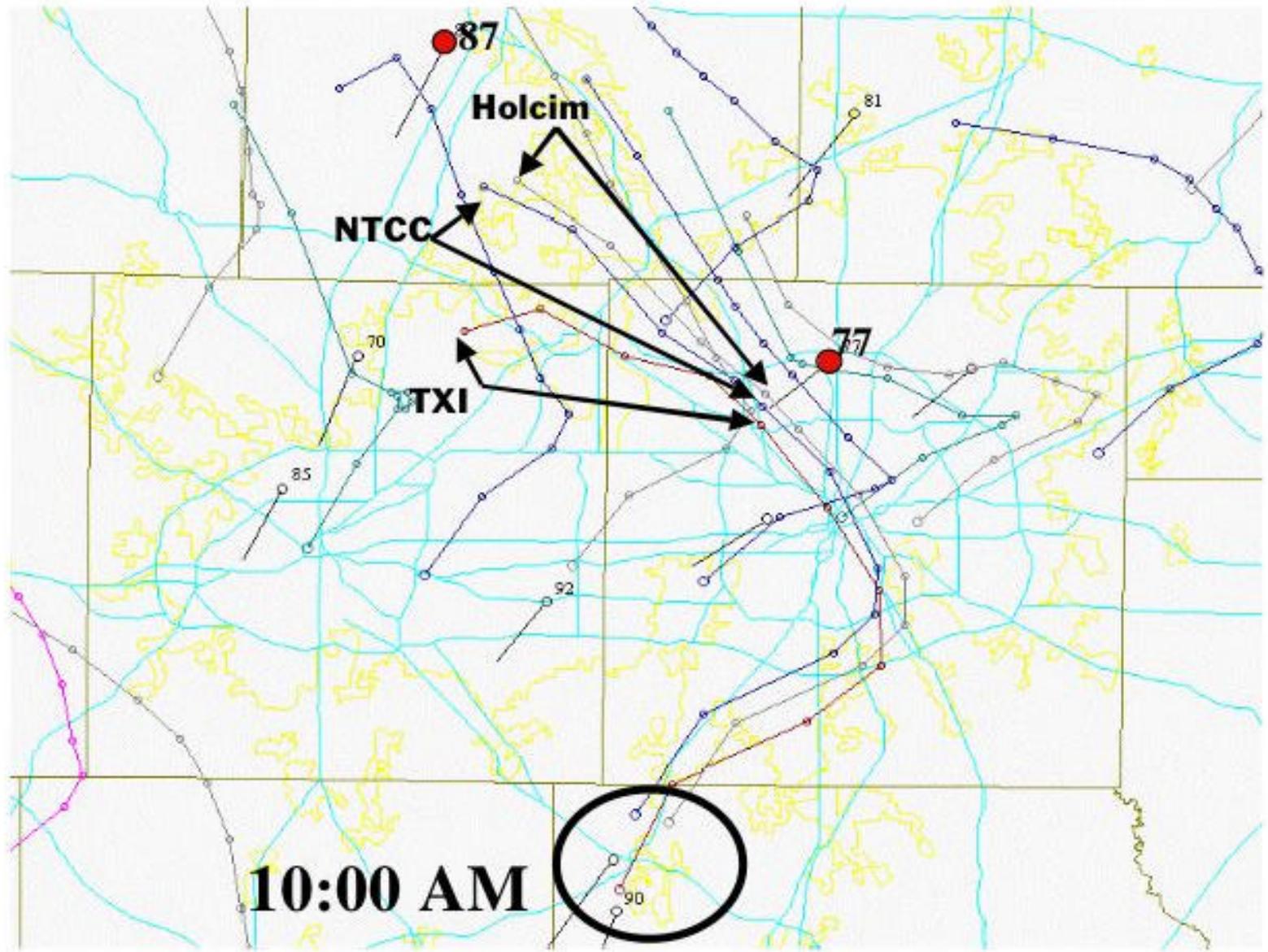
TXI

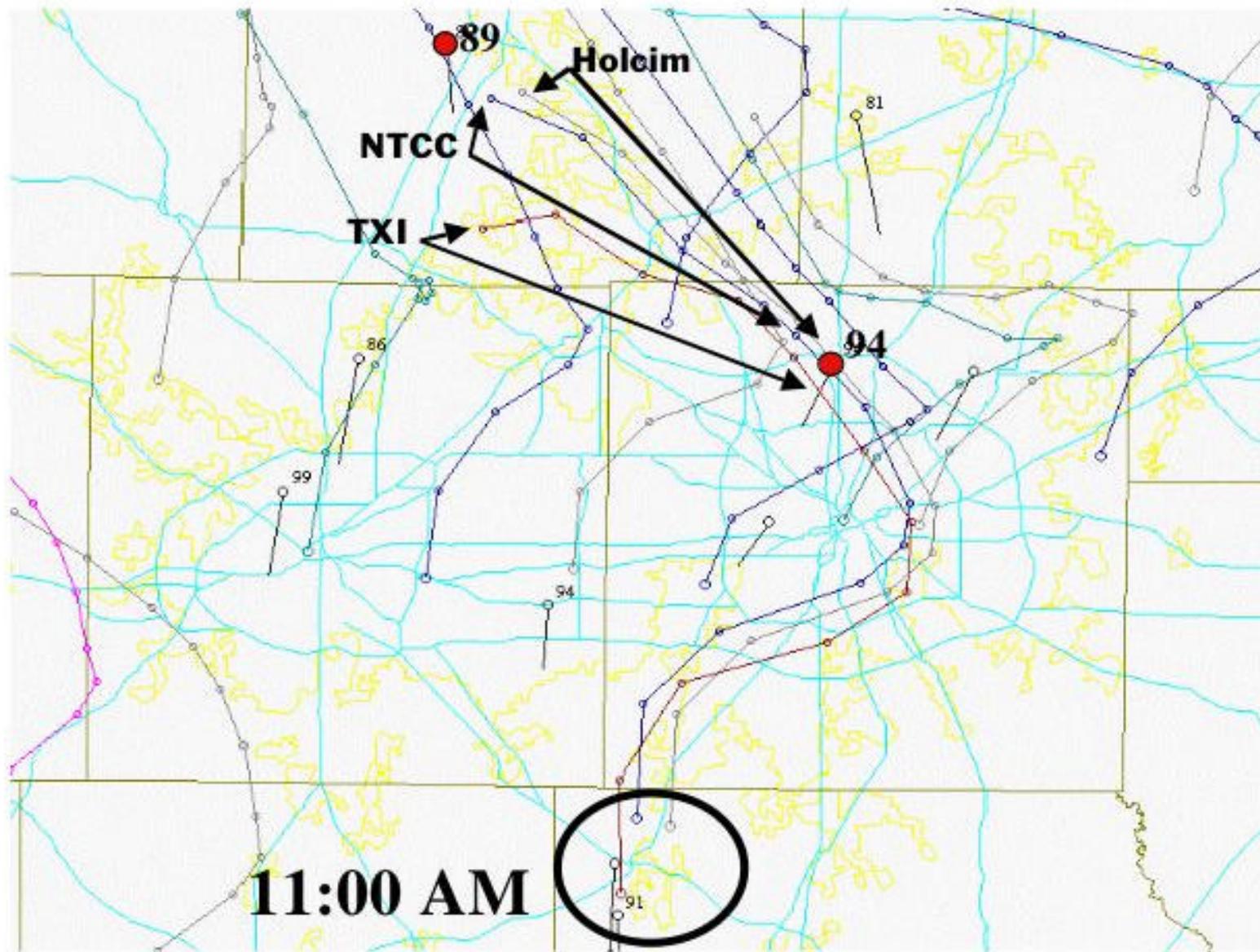
4:00 PM

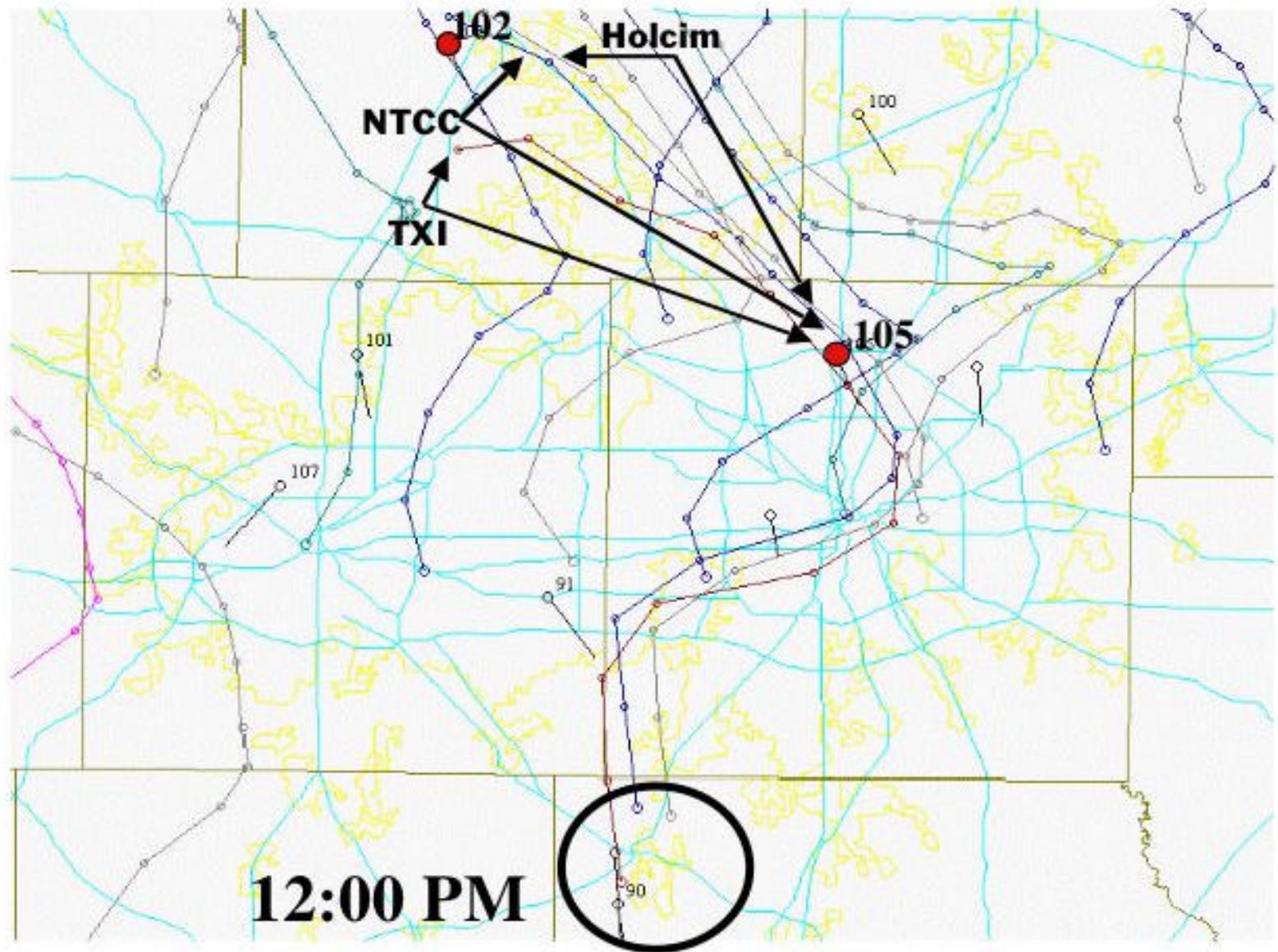


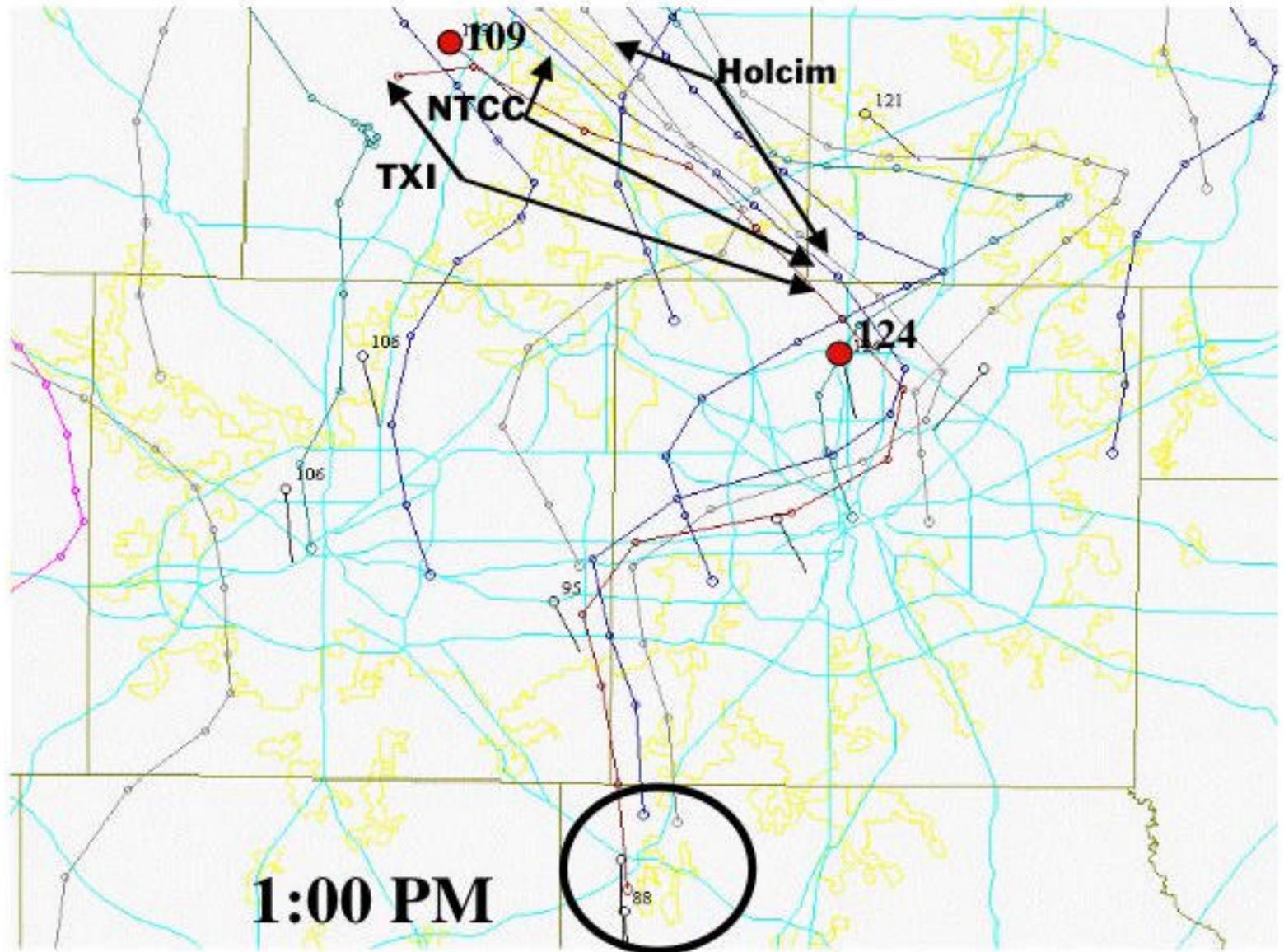
**TCEQ DFW
Point Source
Plume Map
For August 17th,
1999**



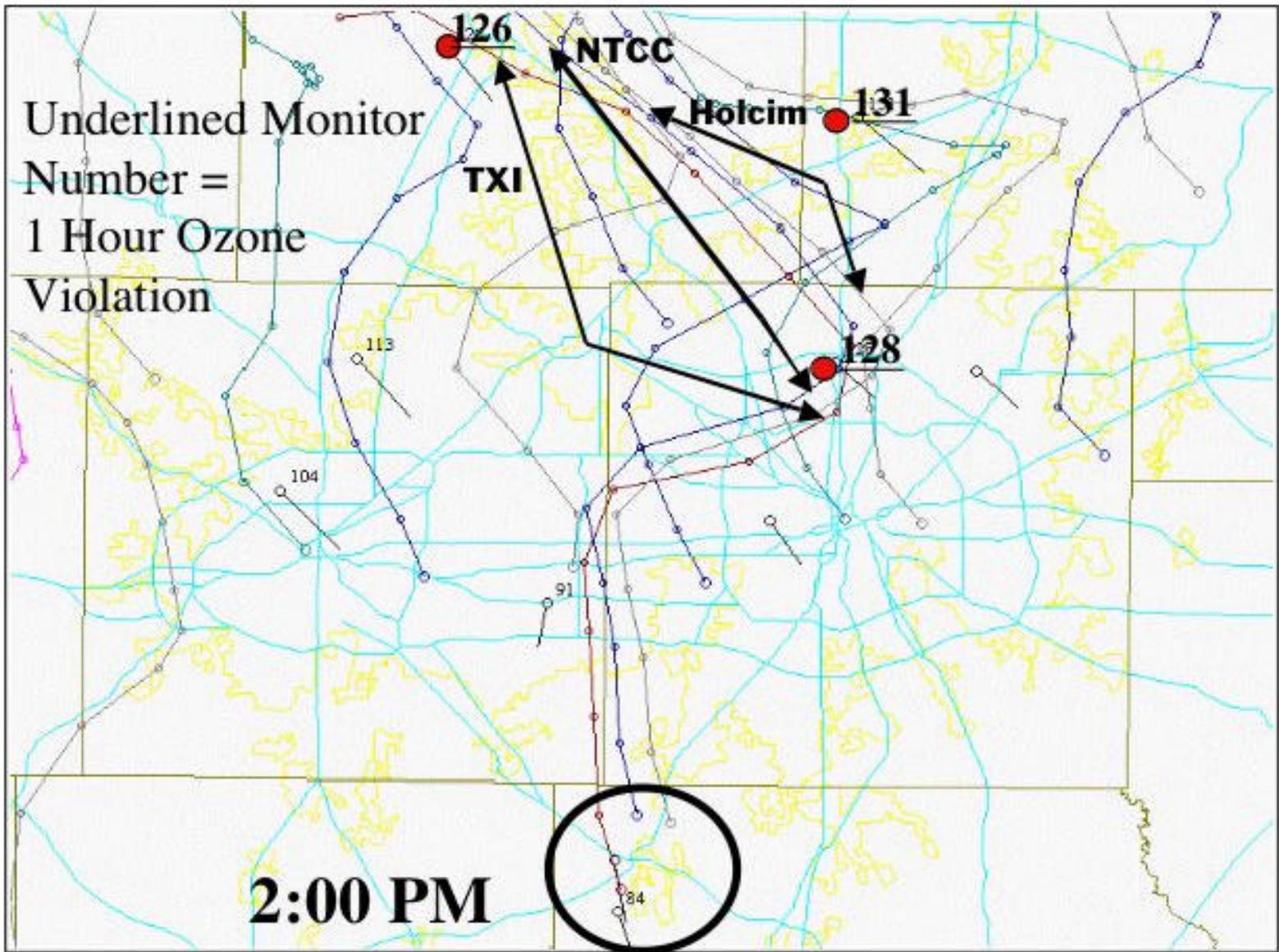






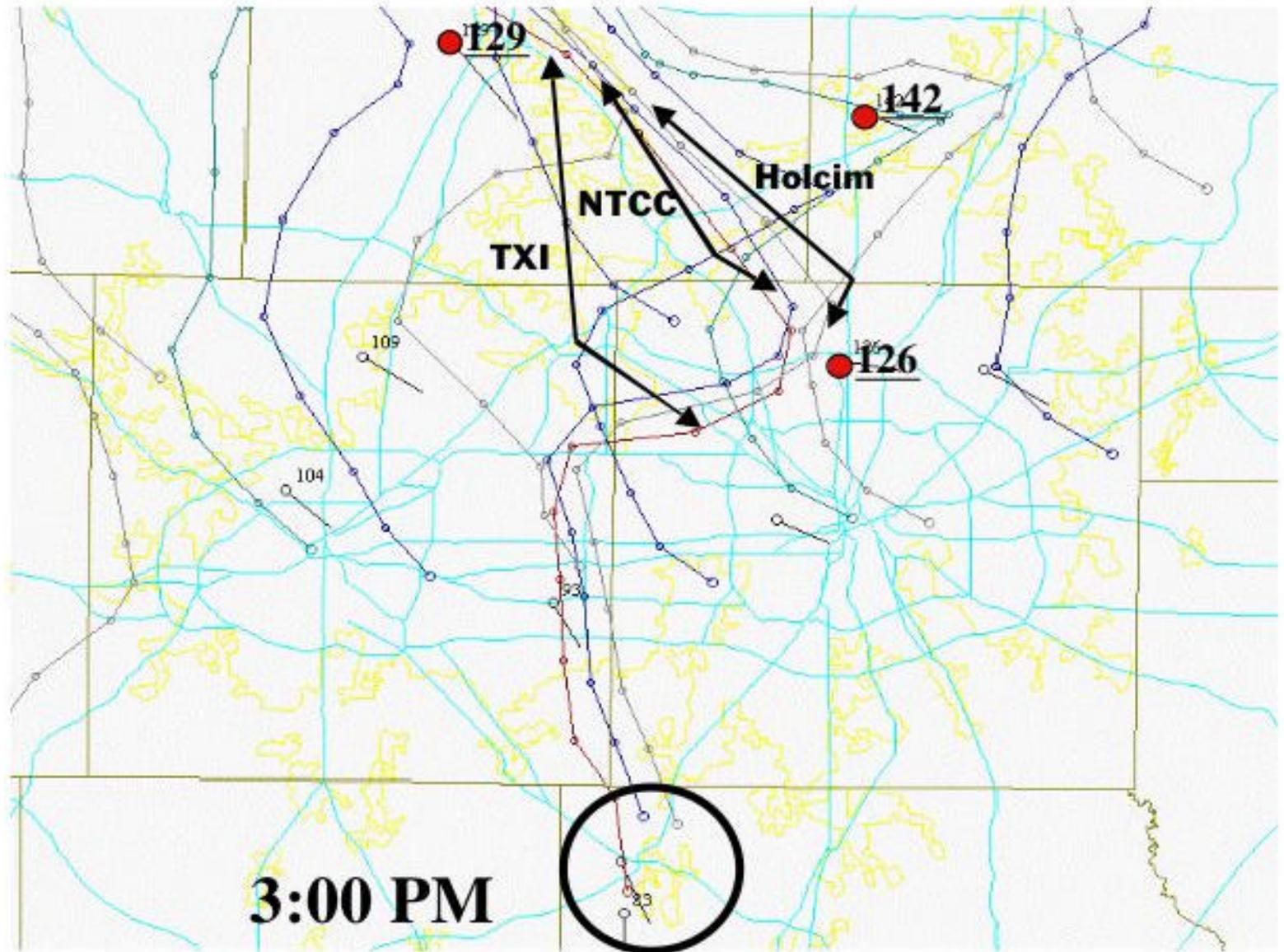


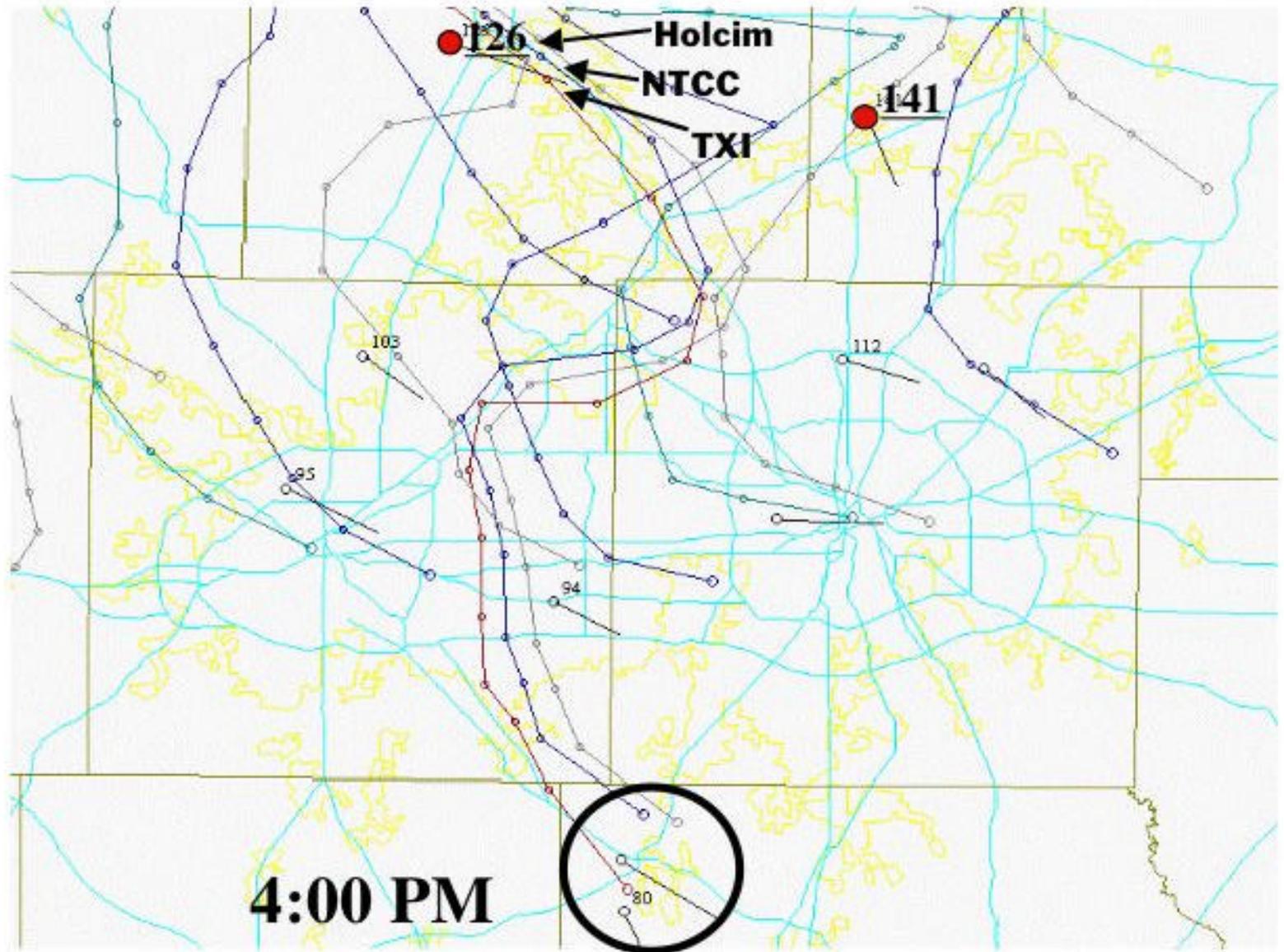
Underlined Monitor
Number =
1 Hour Ozone
Violation



2:00 PM

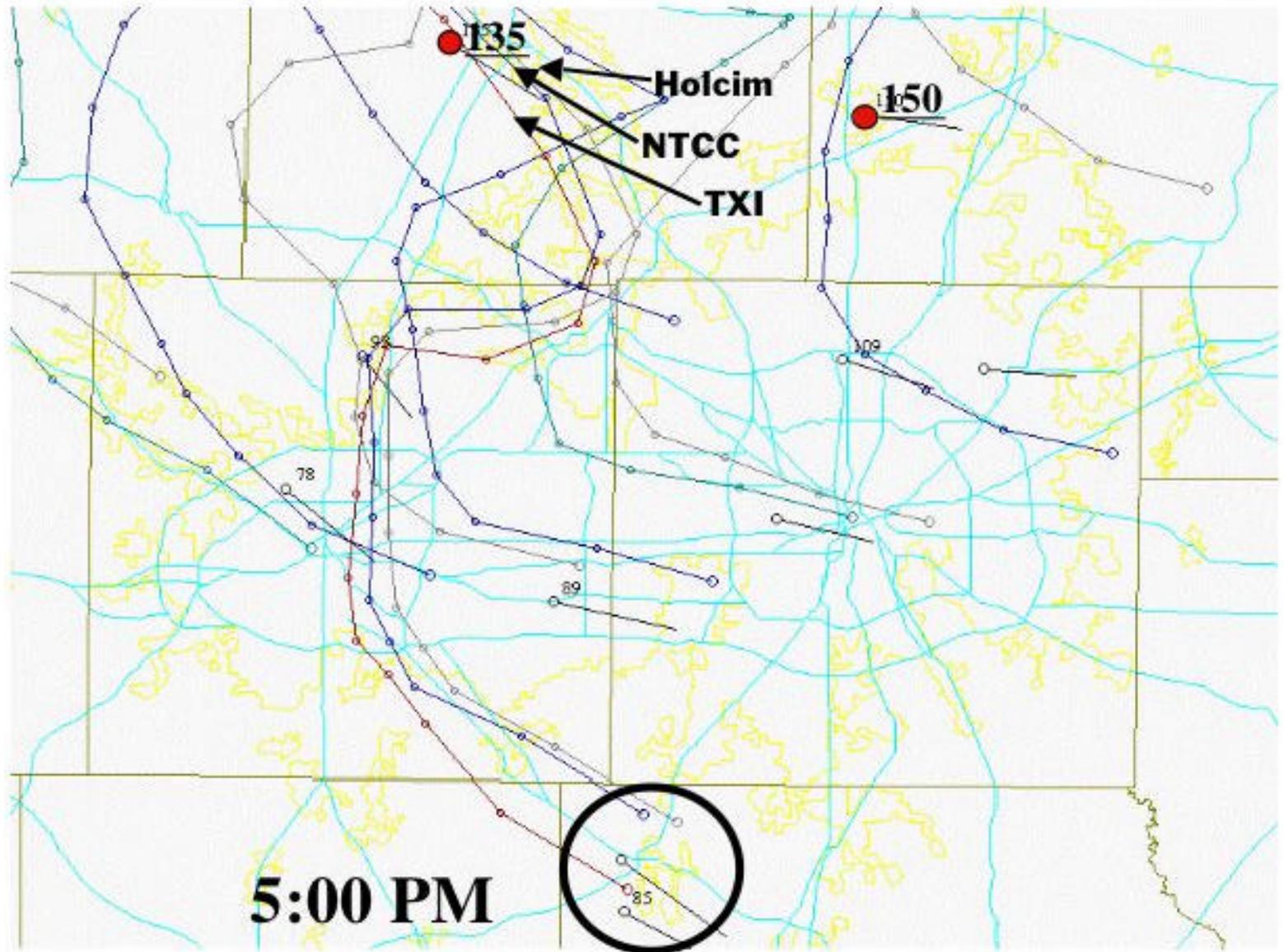


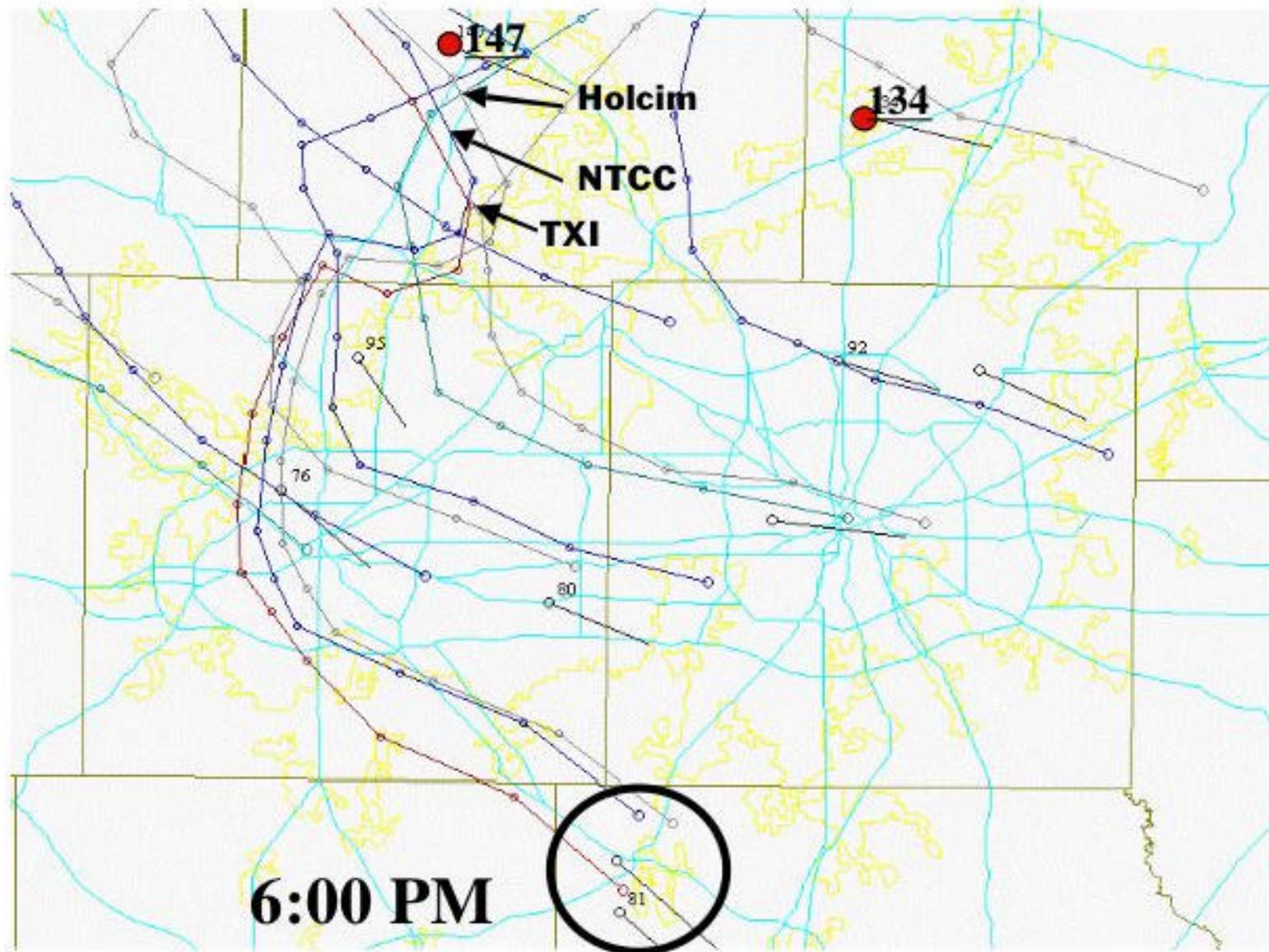




4:00 PM

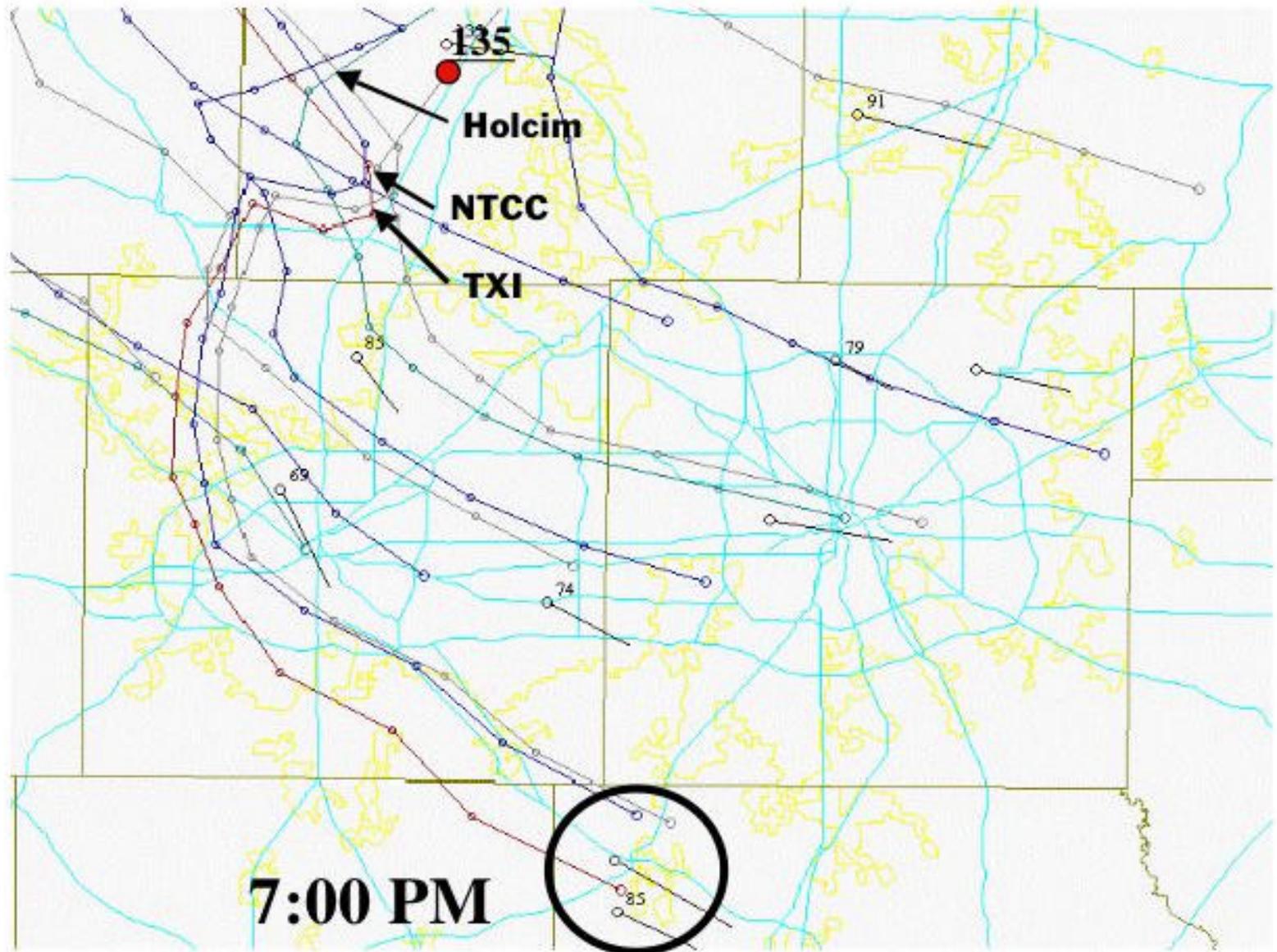


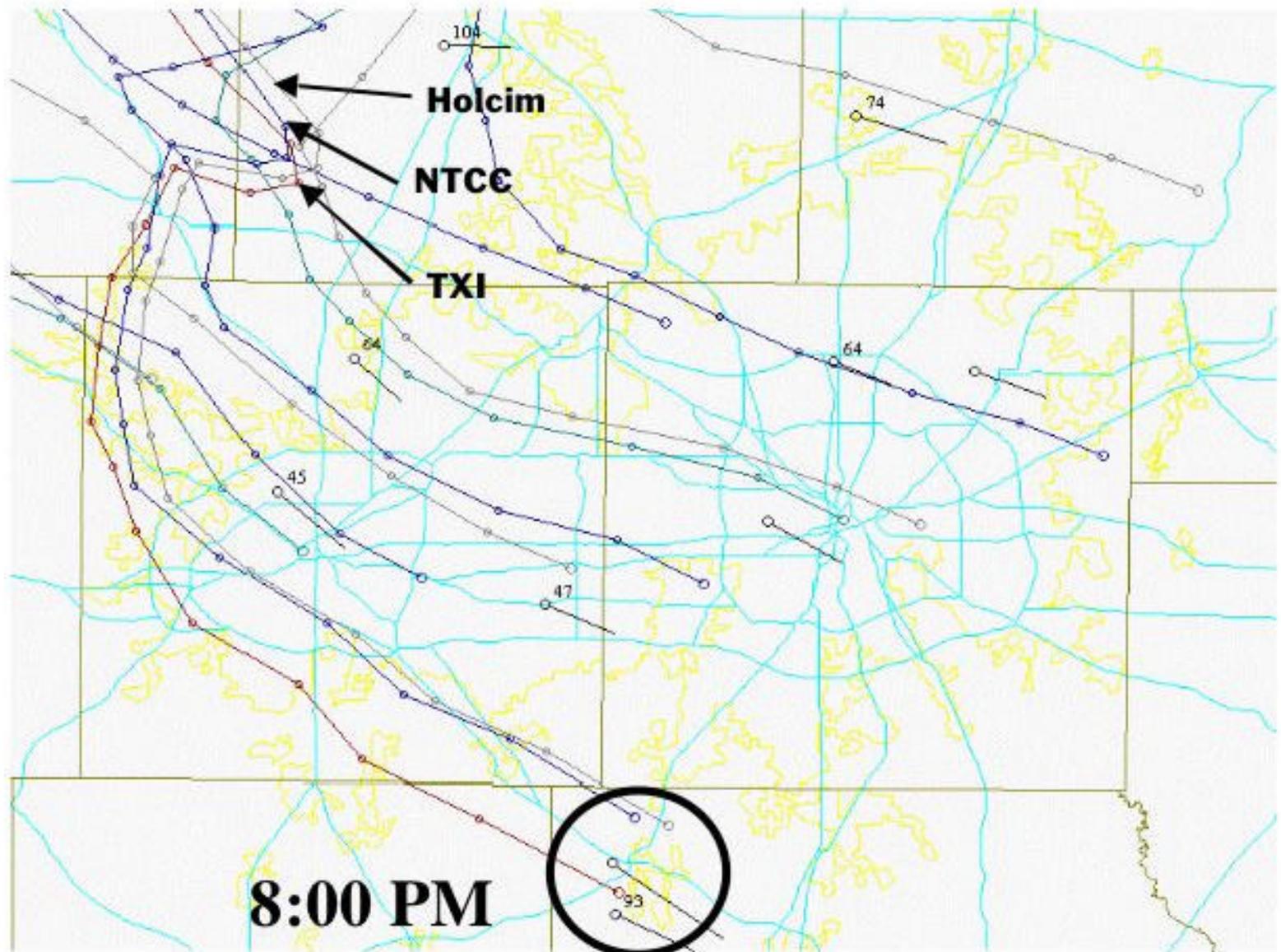


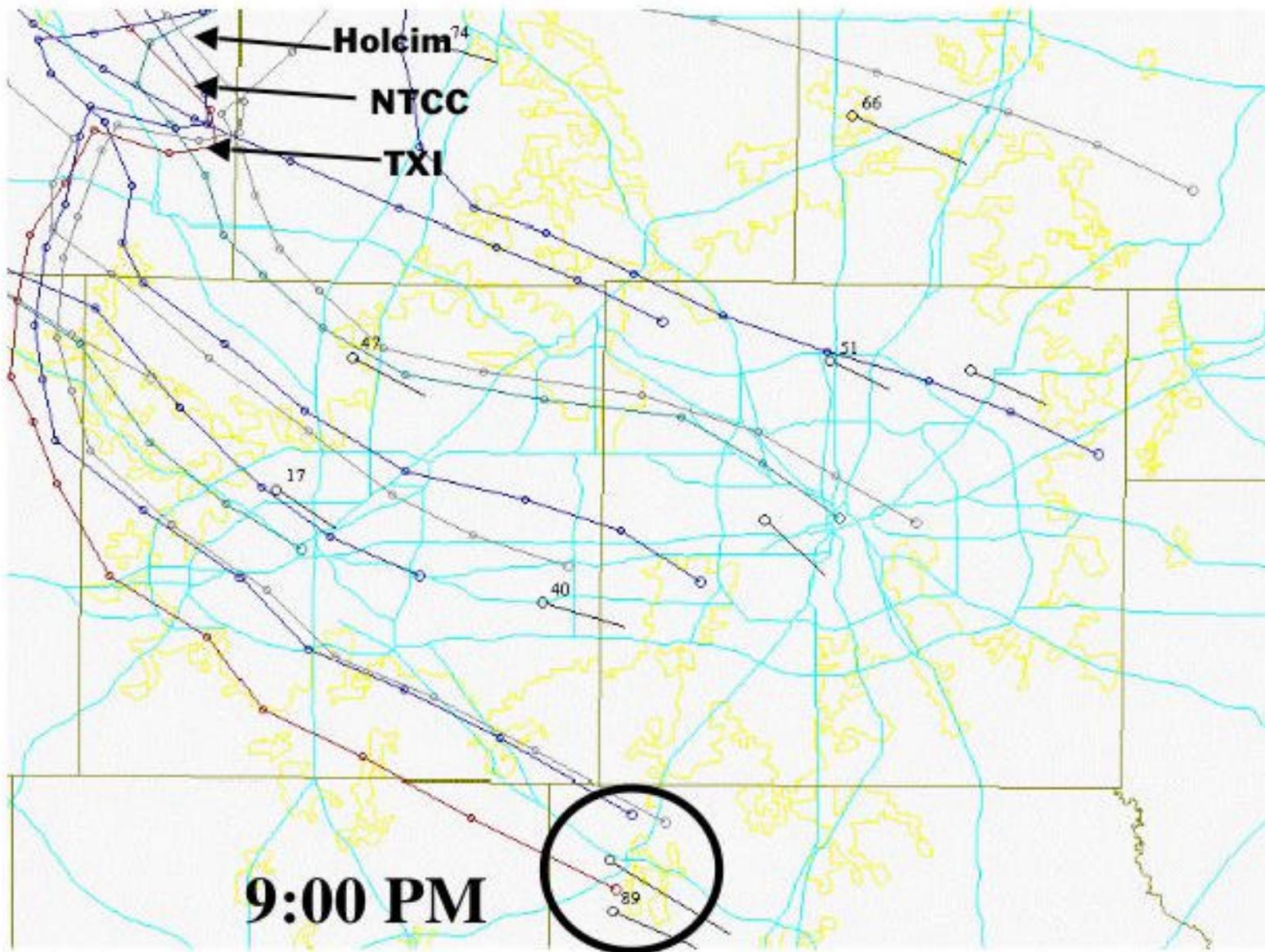


6:00 PM

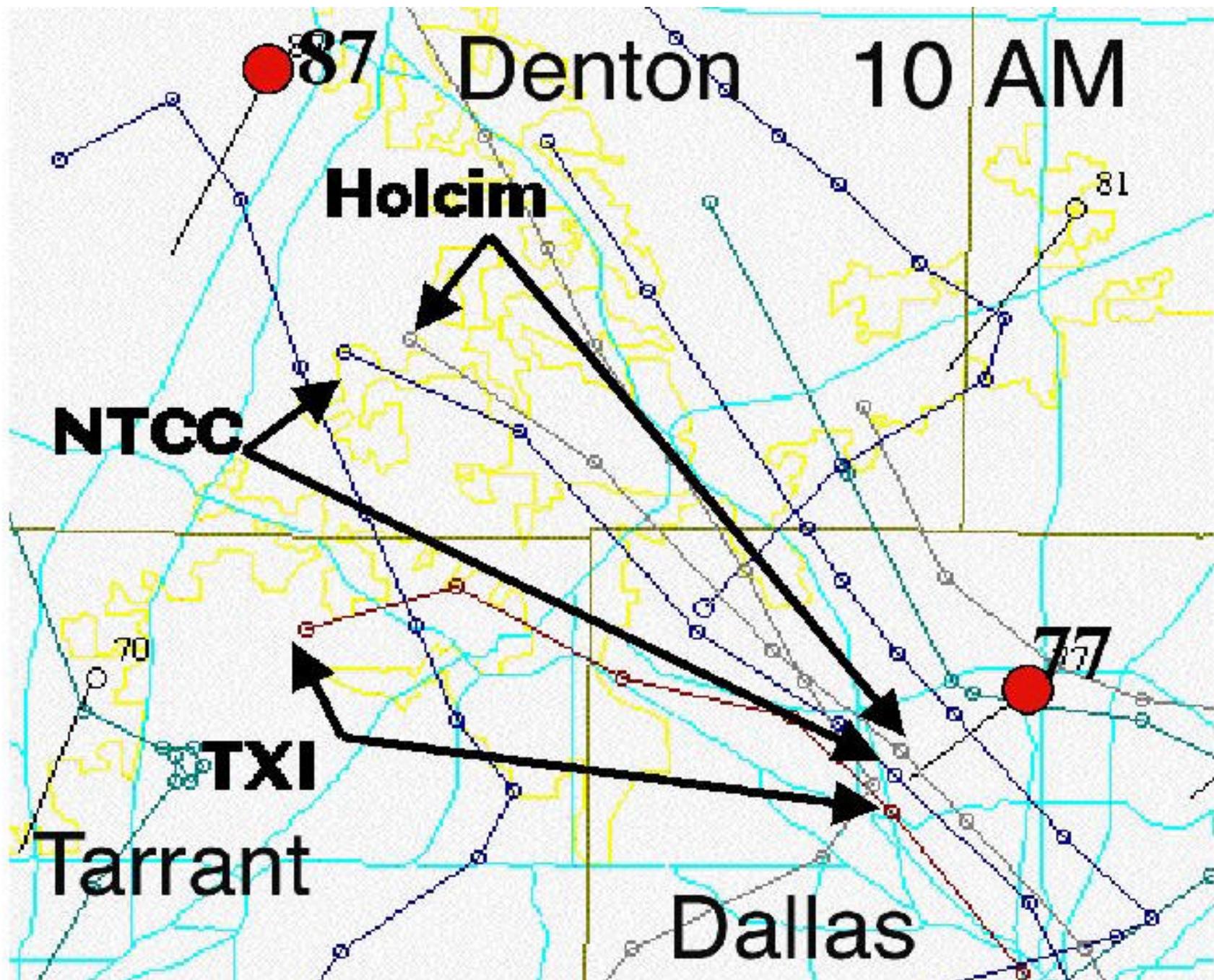


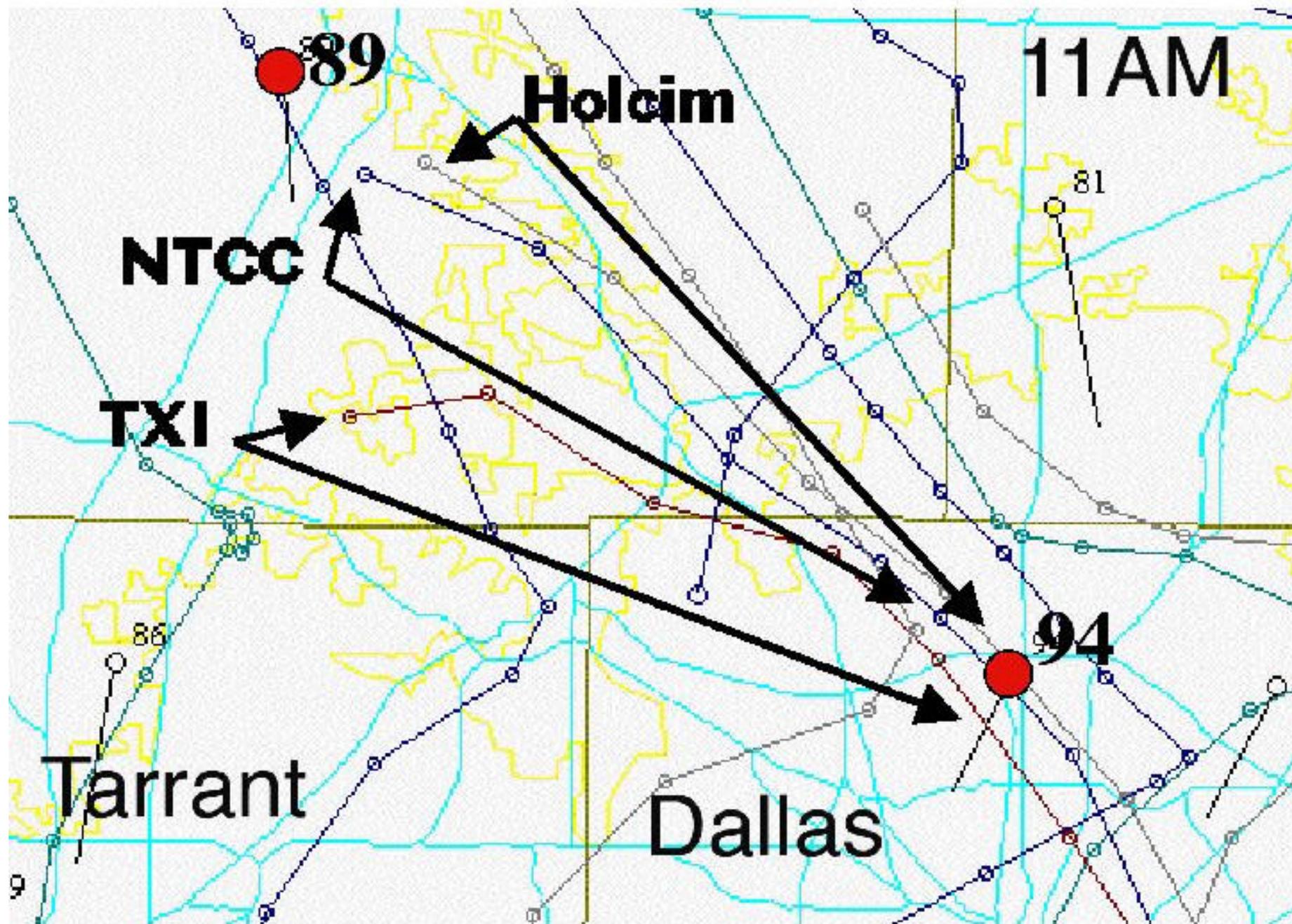


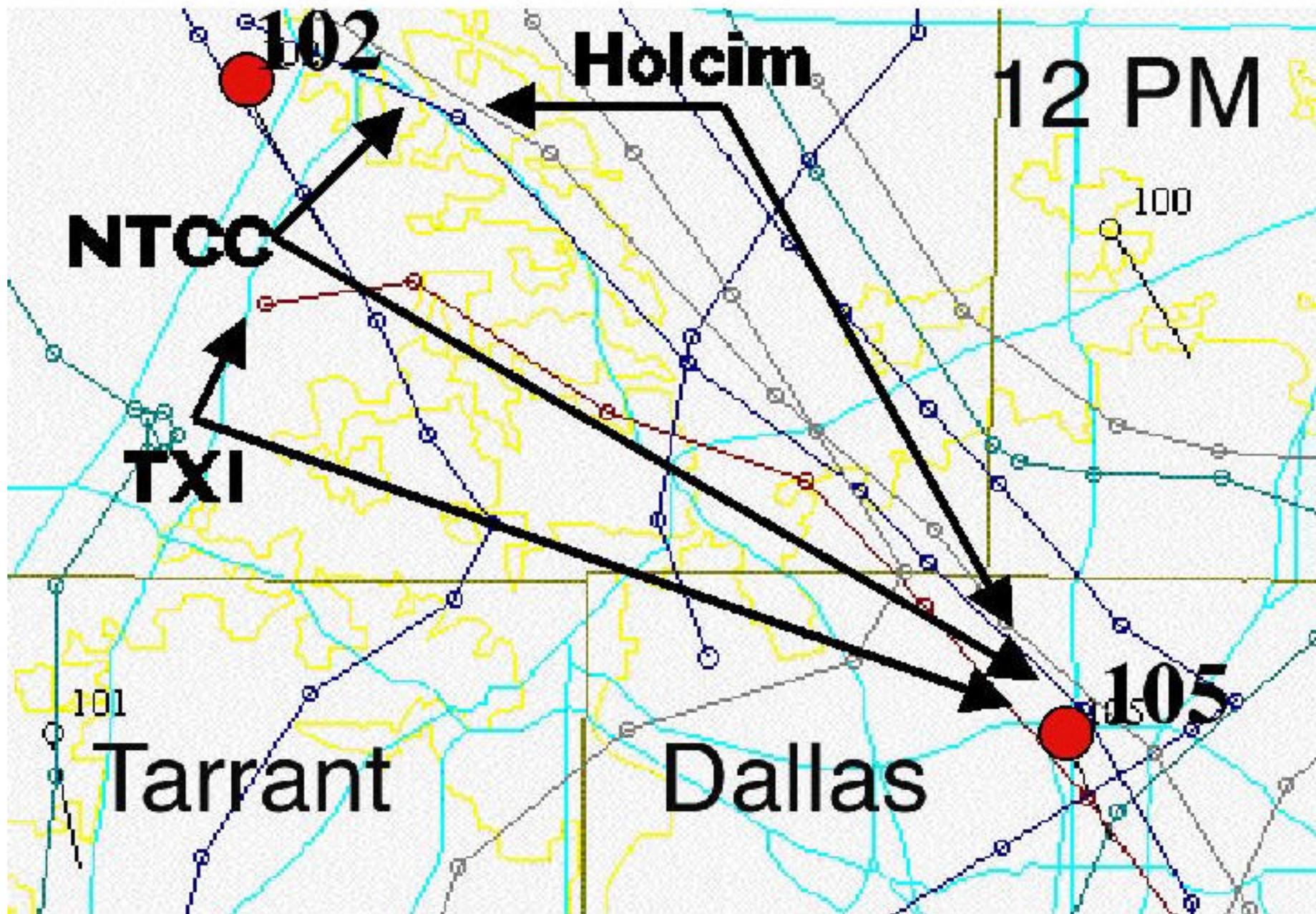


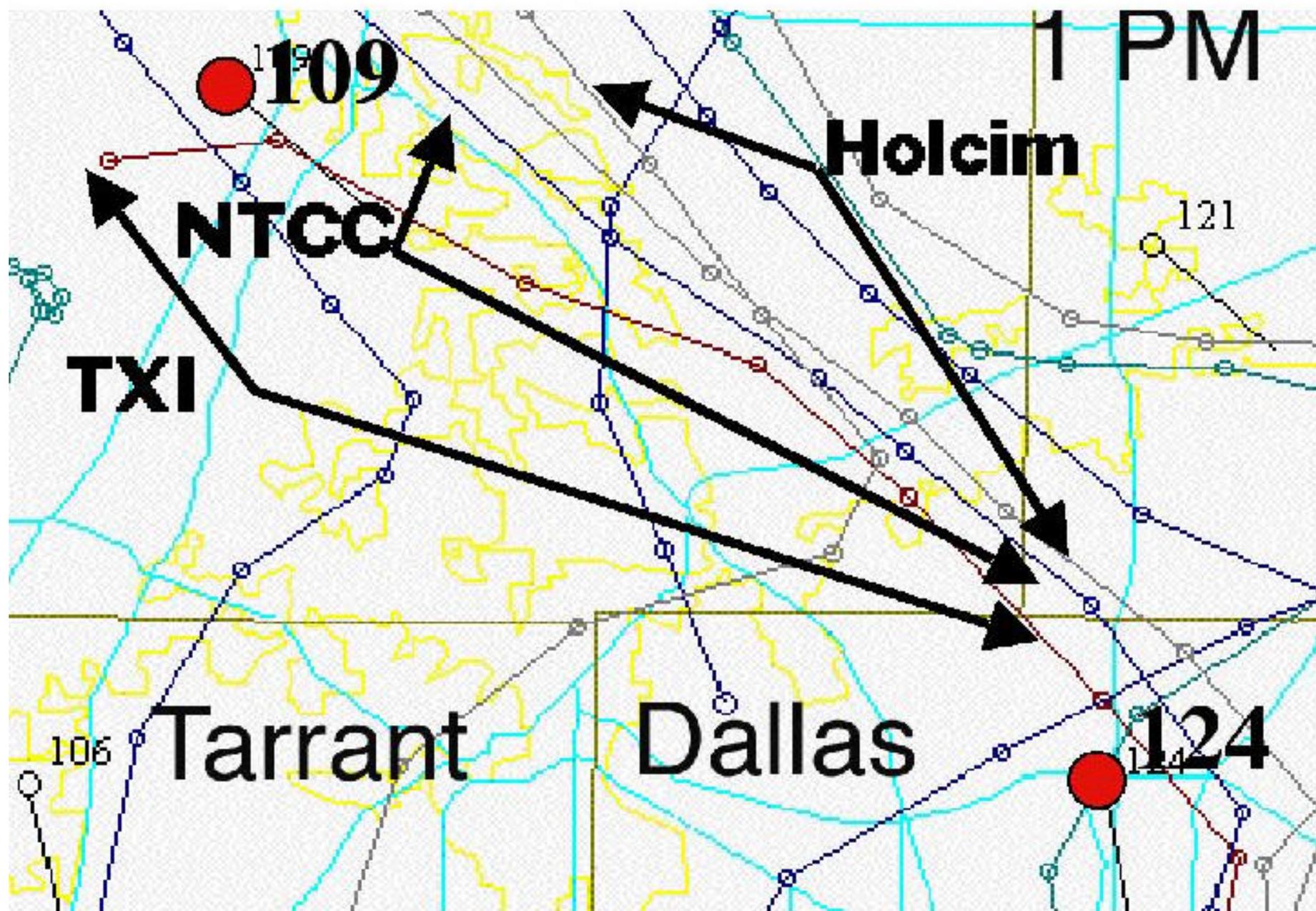


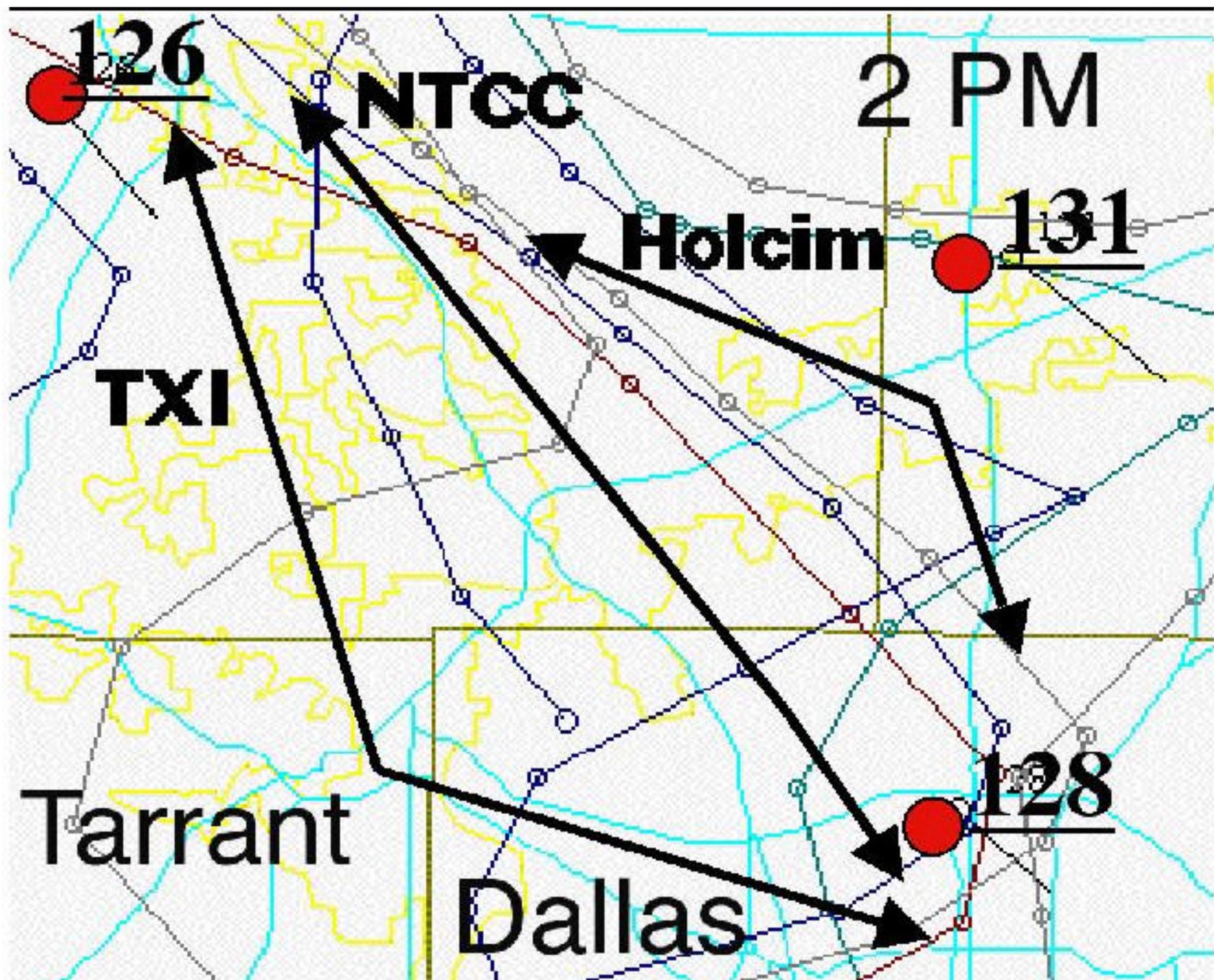
August 17th
Close-Up:
Cement Plant Plumes
And Monitored
Ozone Violations











3 PM

129

142

NTCC

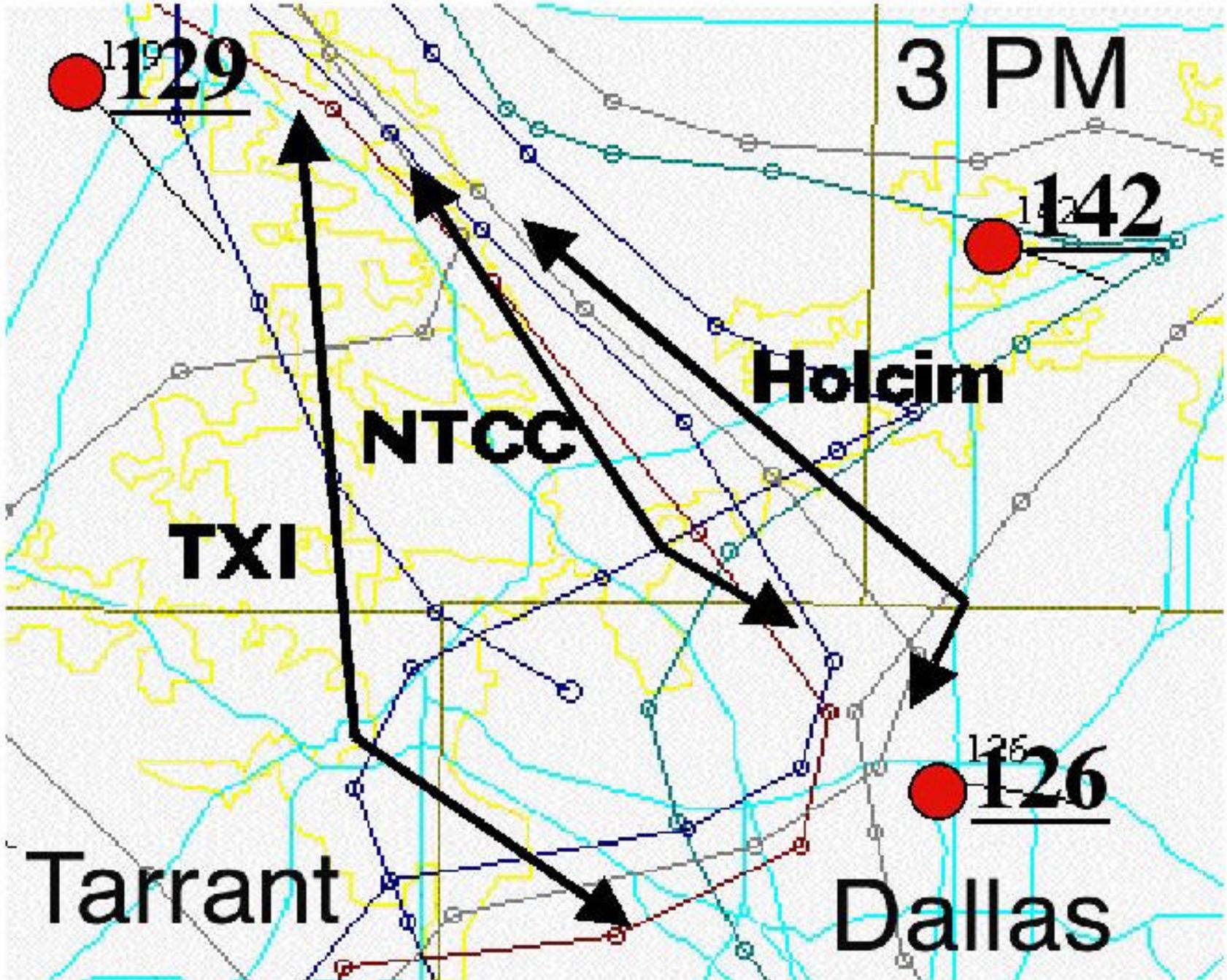
Holcim

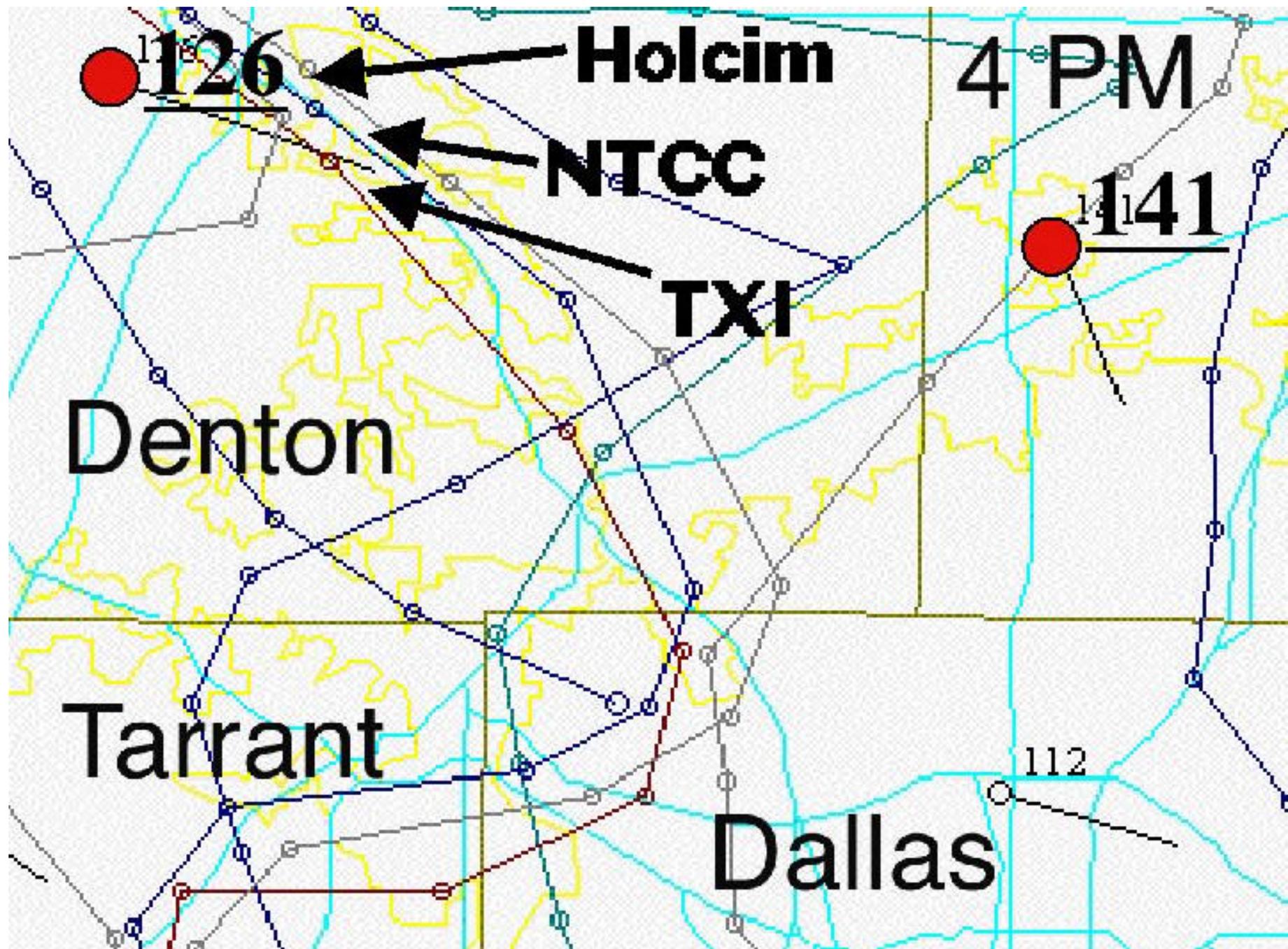
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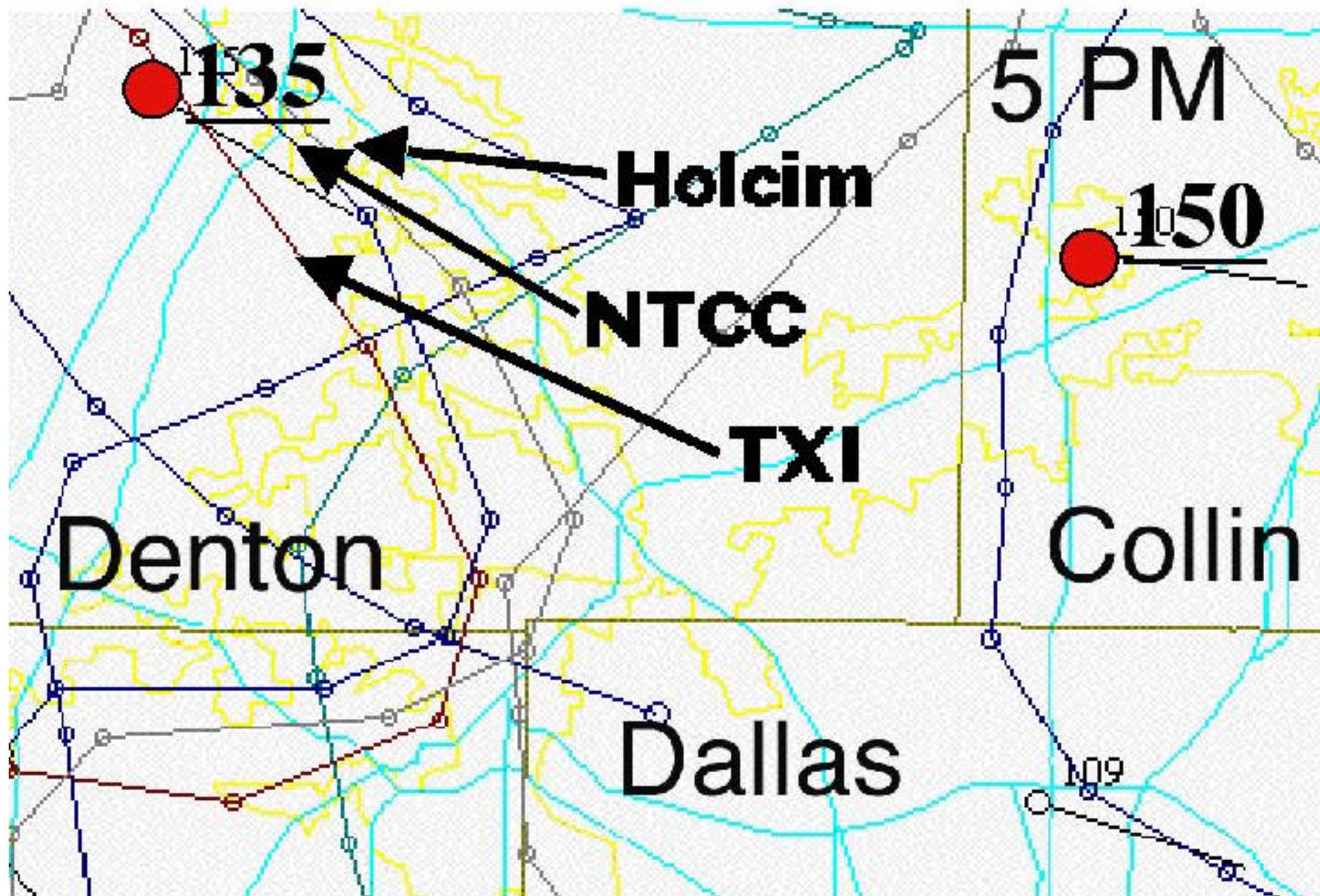
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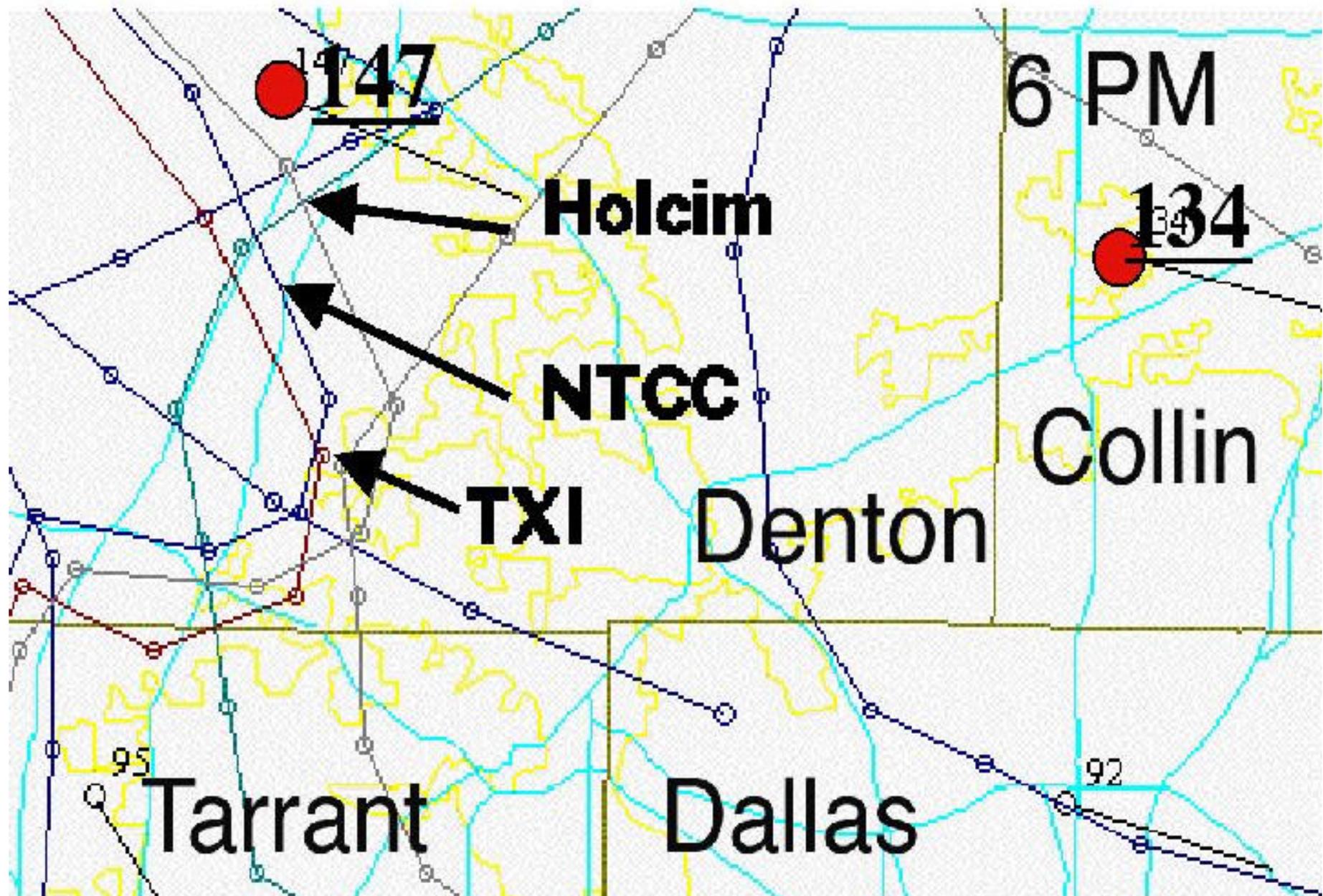
Tarrant

Dallas









147

6 PM

Holcim

134

NTCC

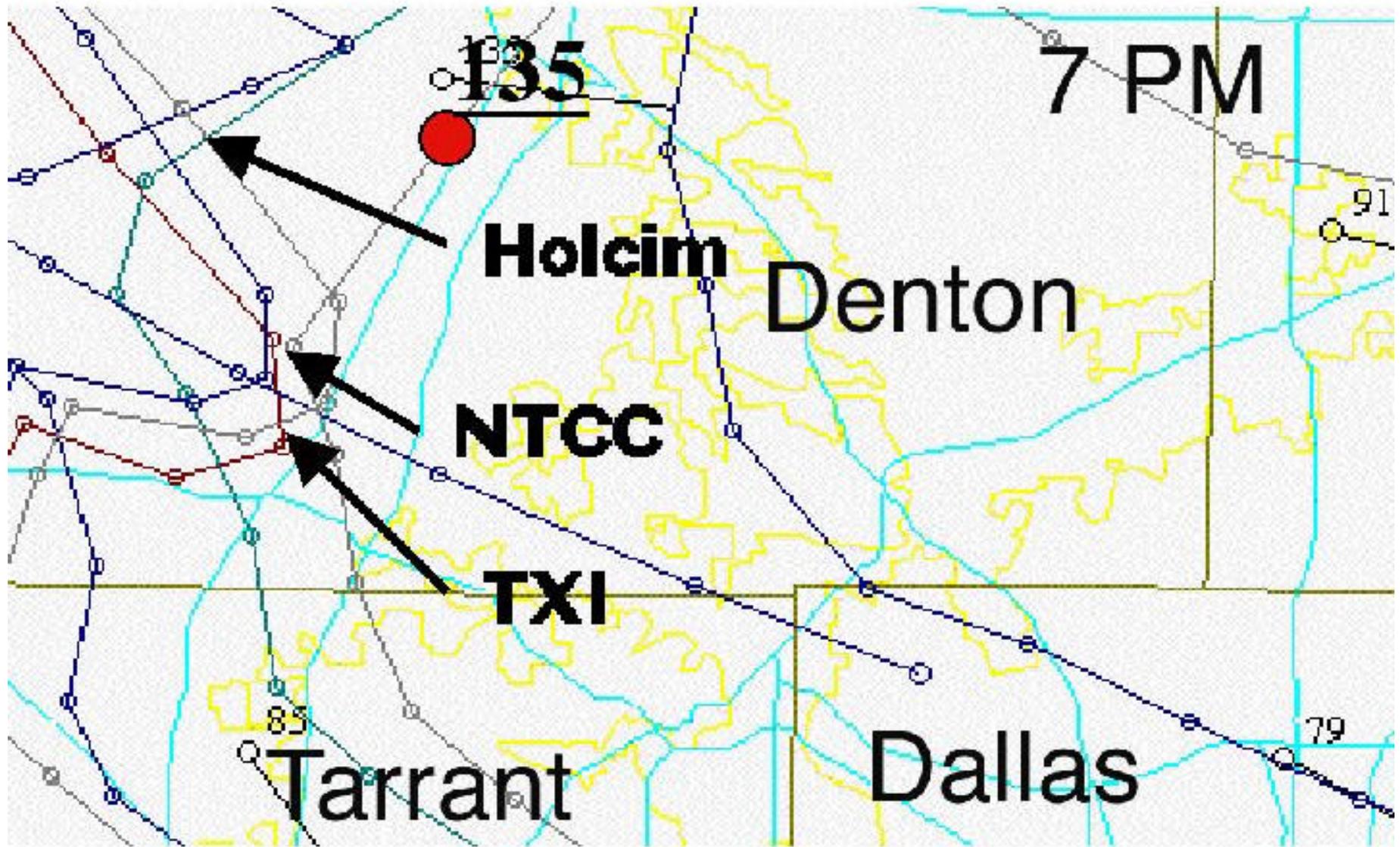
Collin

TXI

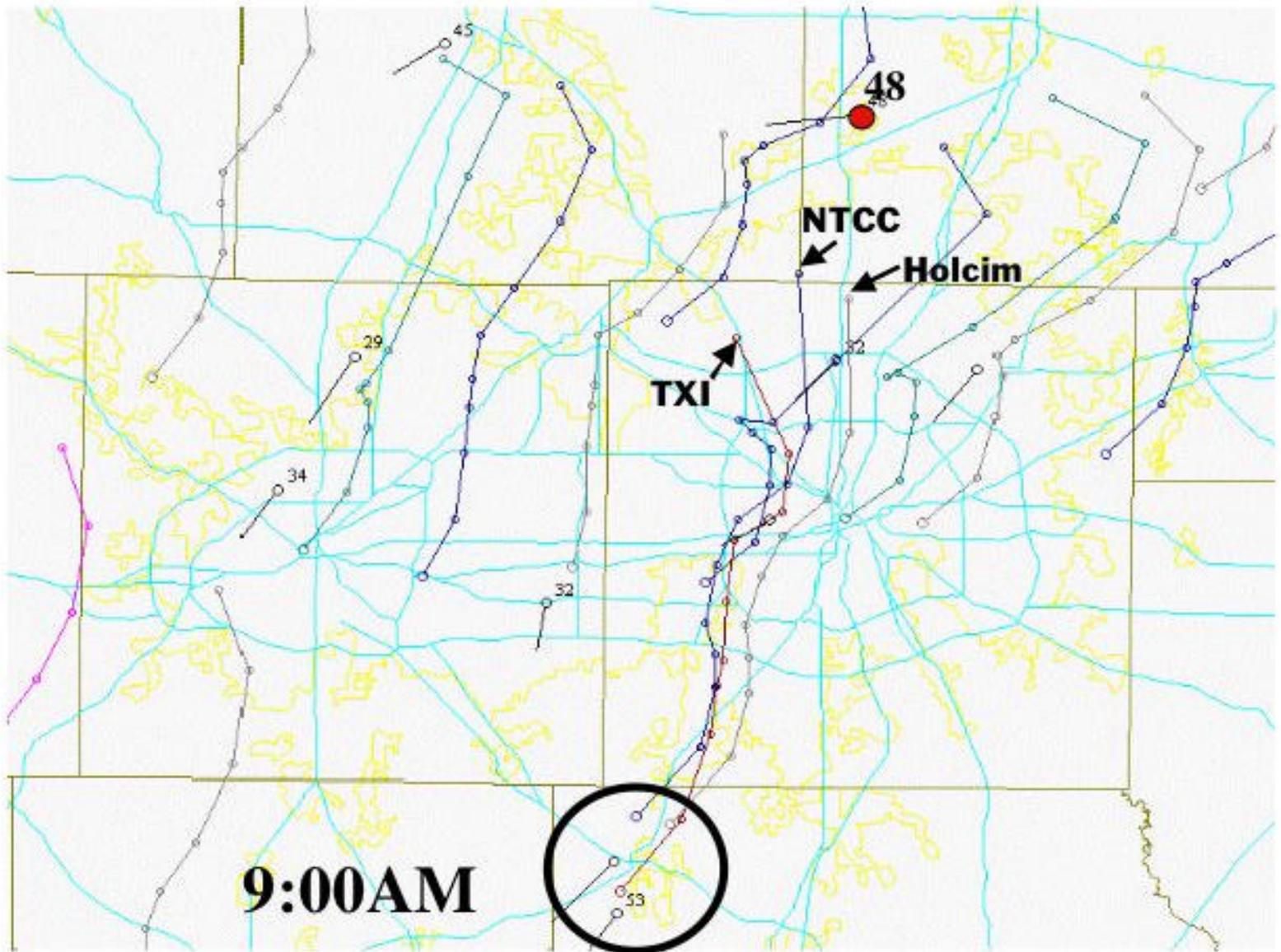
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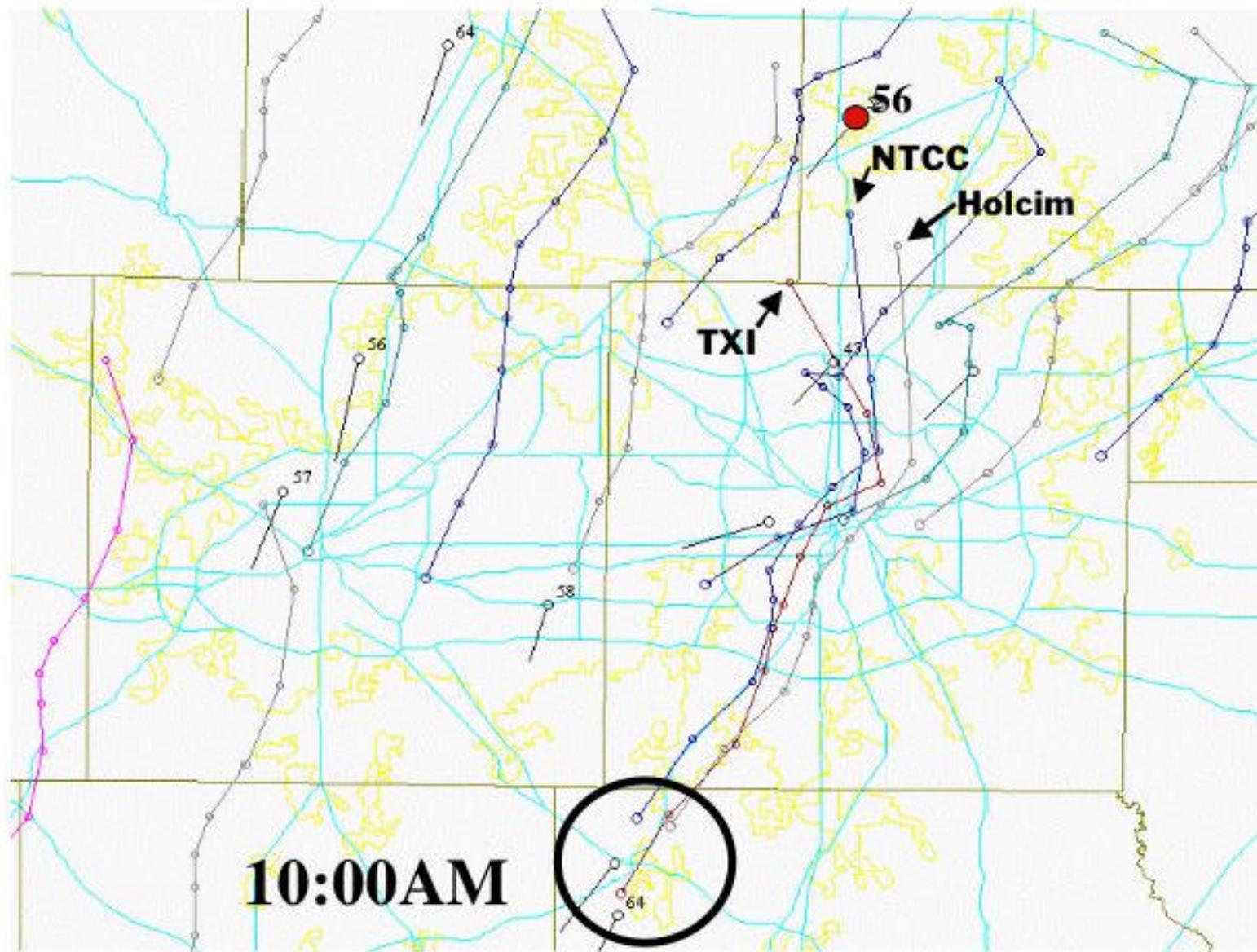
Tarrant

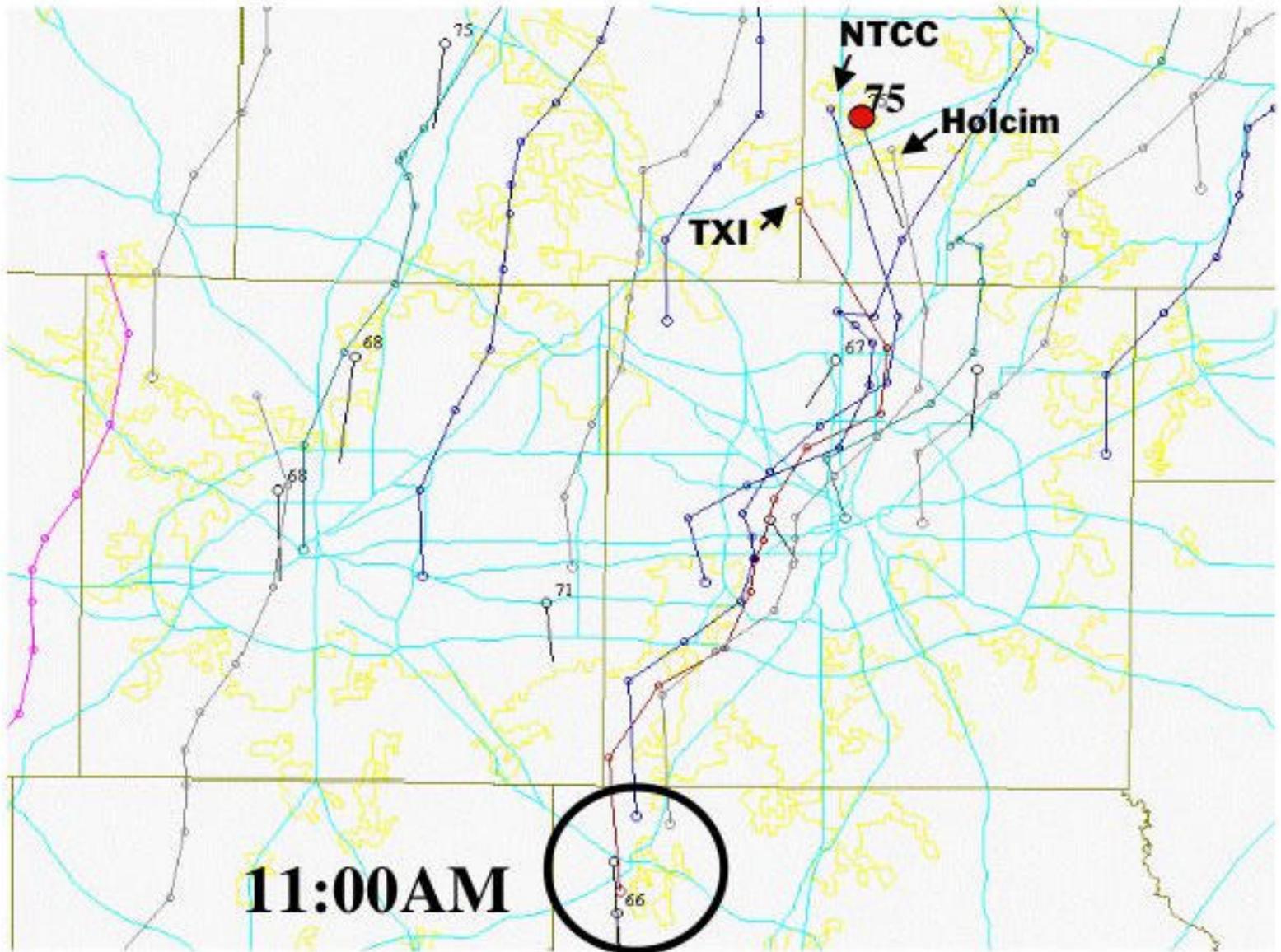
Dallas

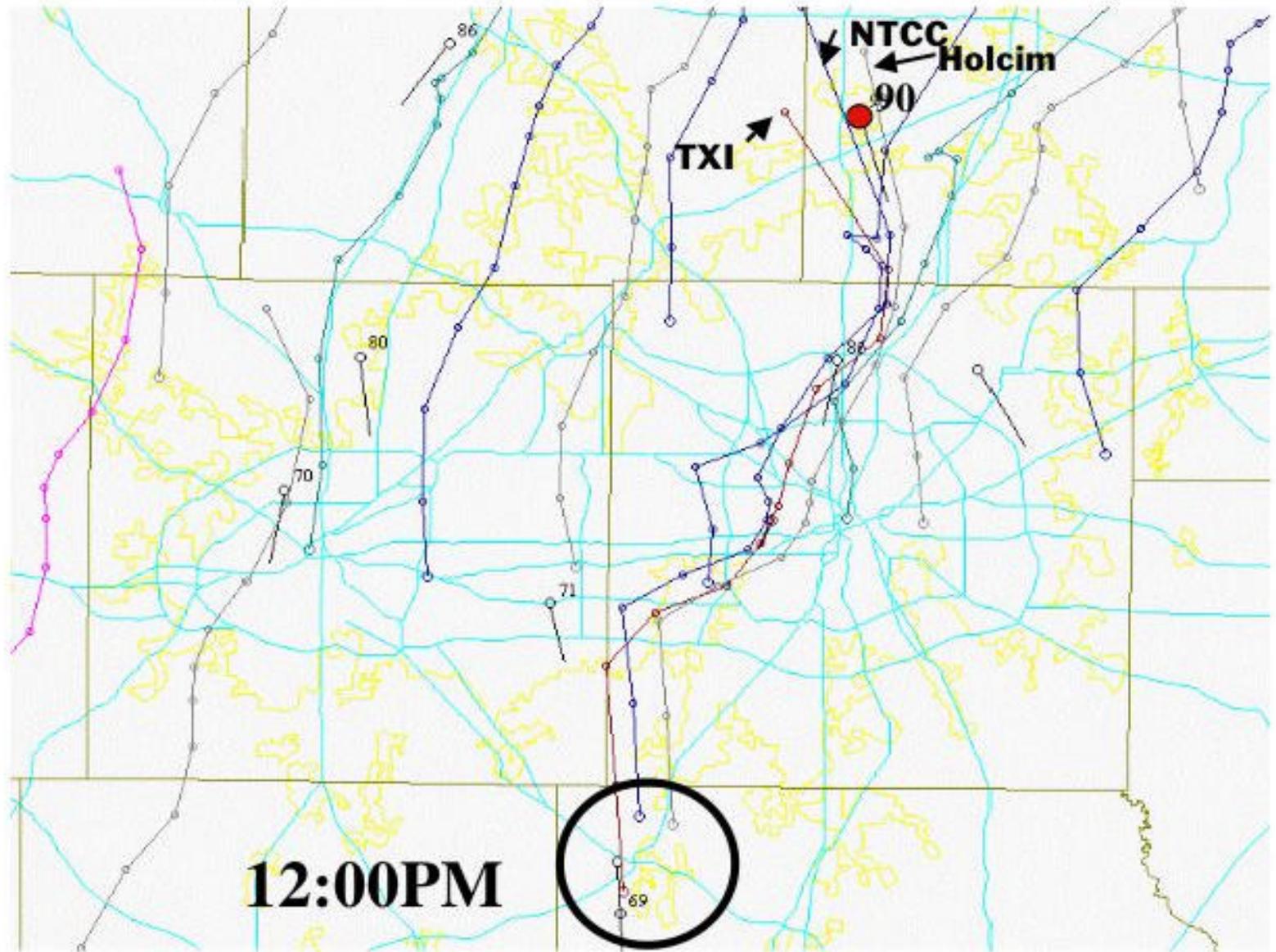


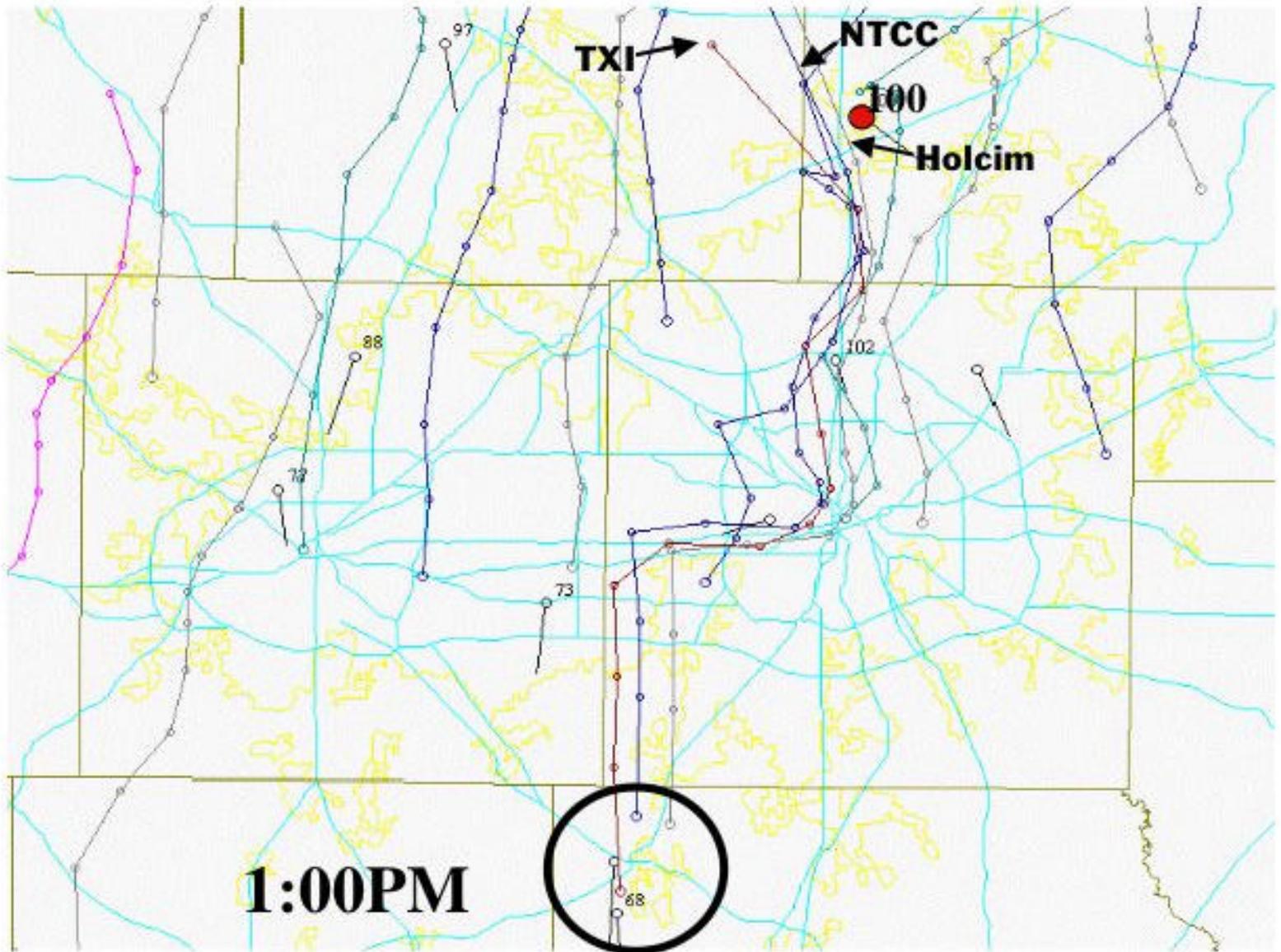
**TCEQ DFW
Point Source
Plume Map
For August 18th,
1999**

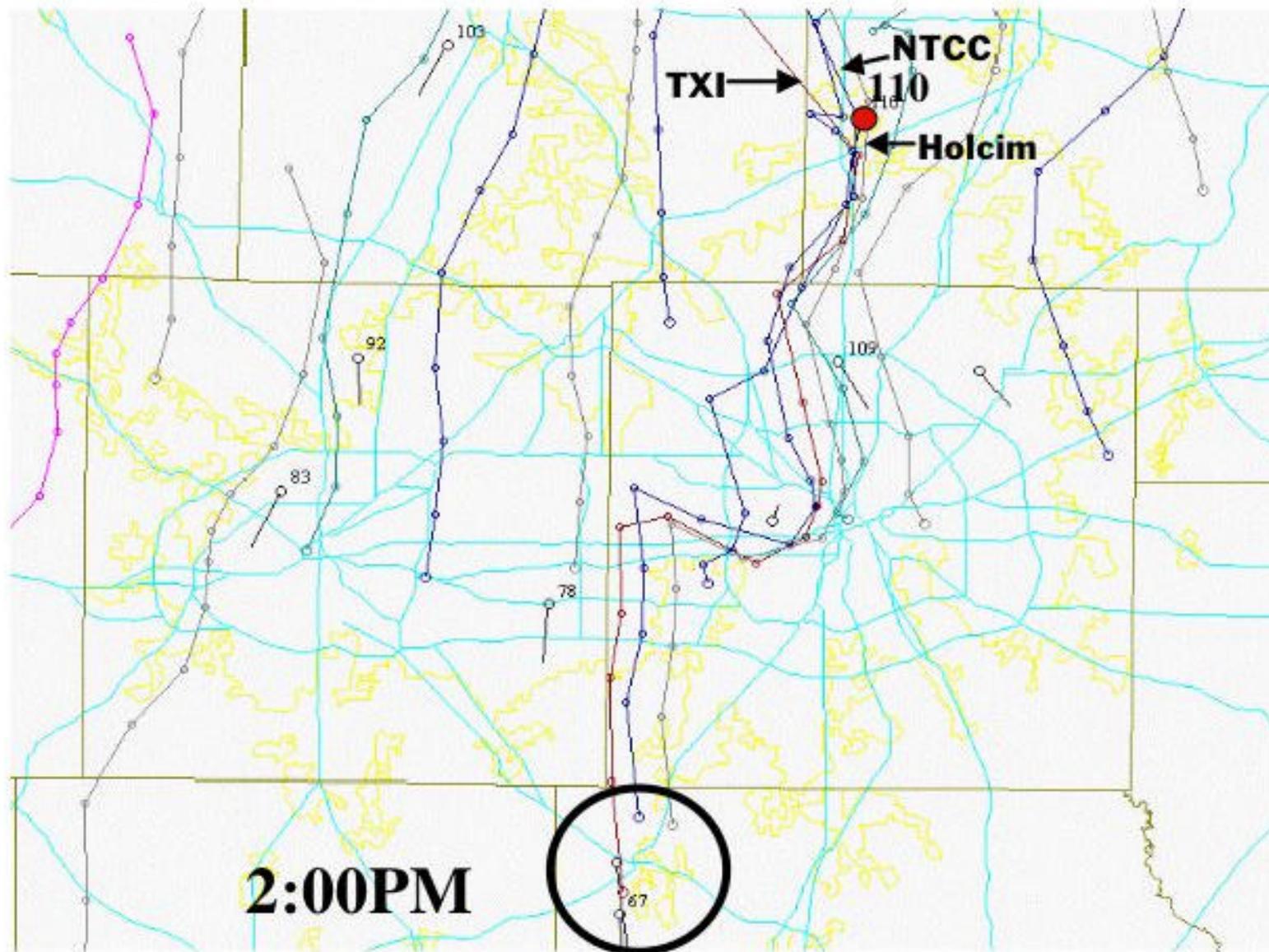


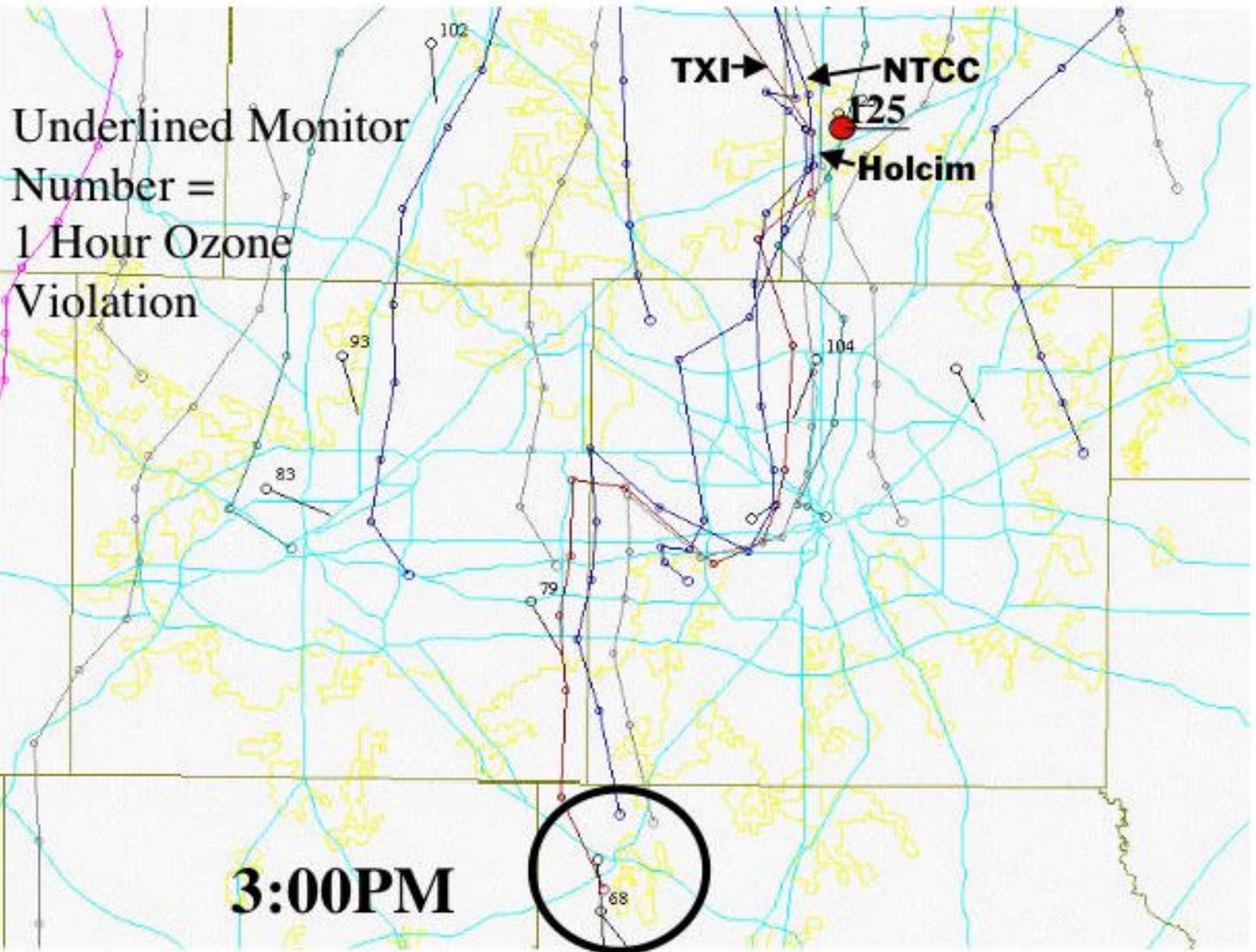


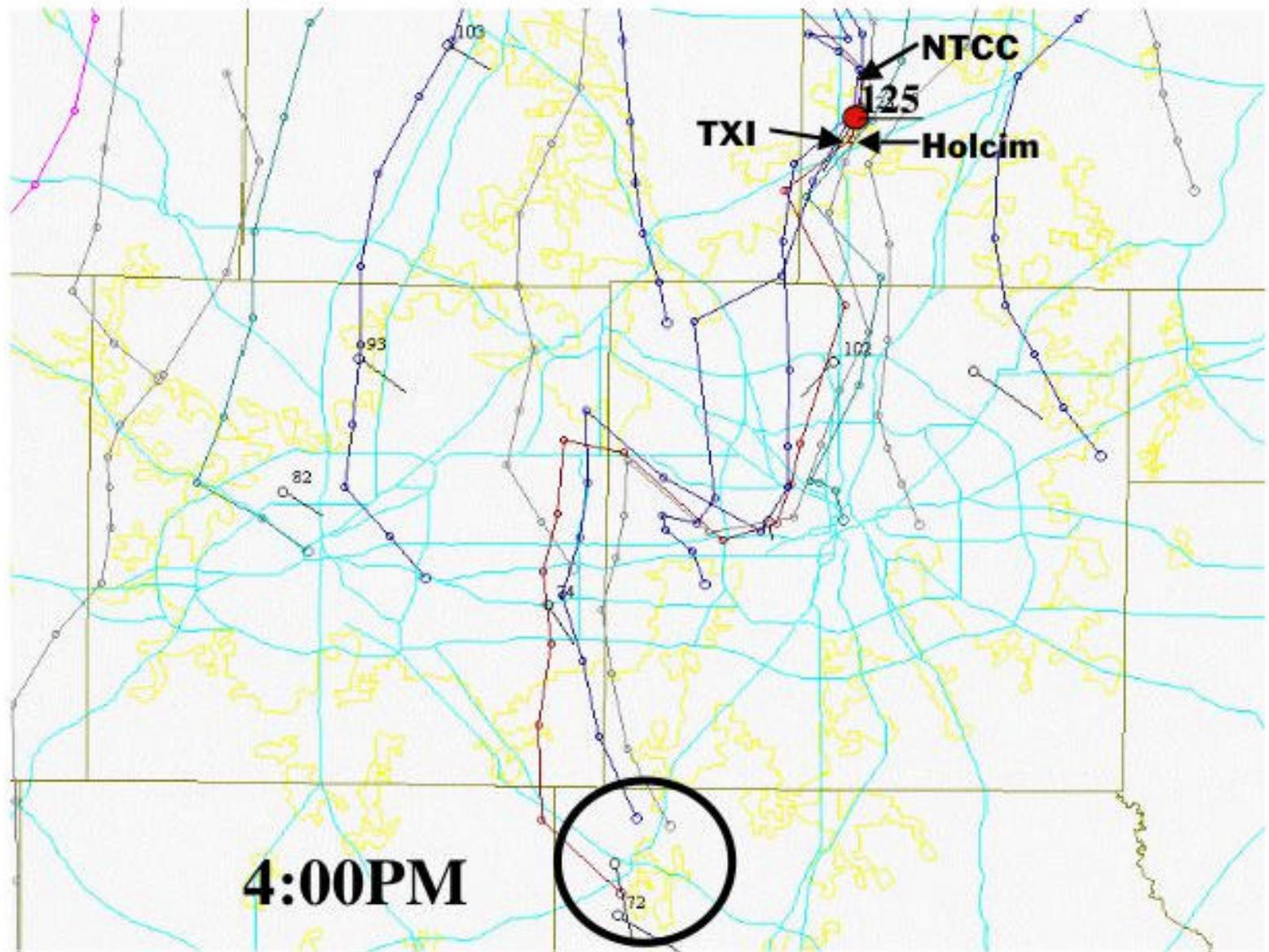






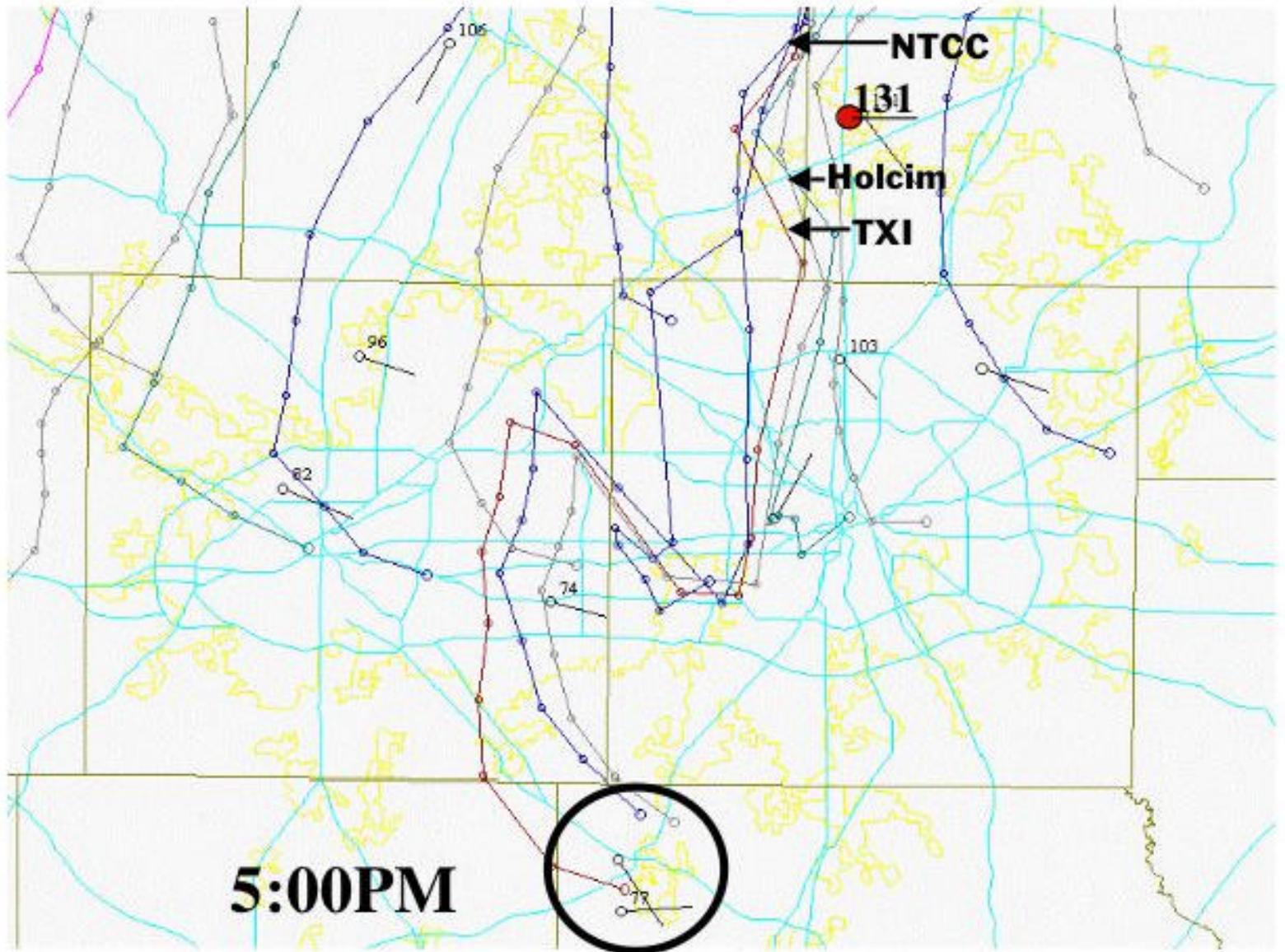


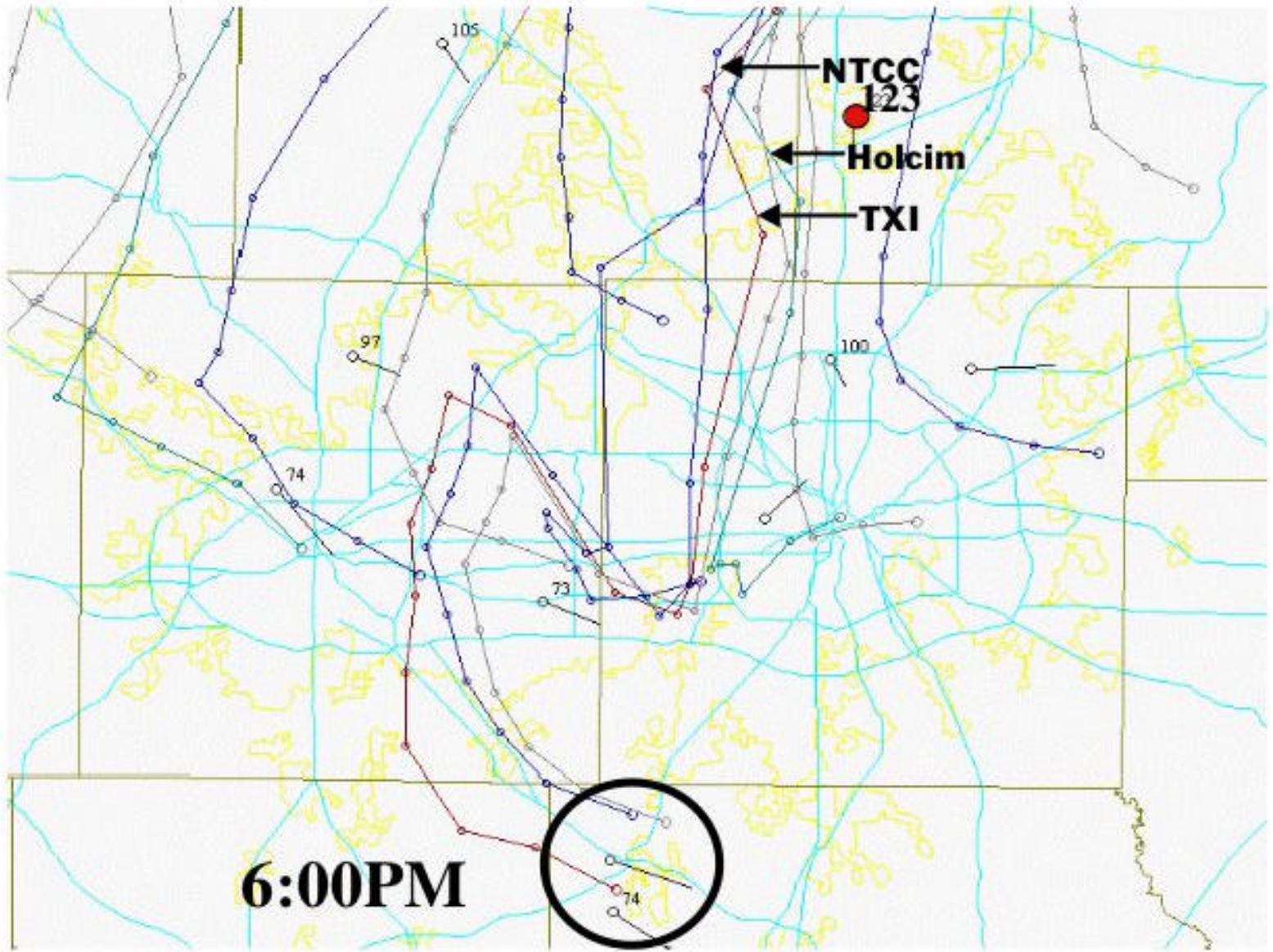


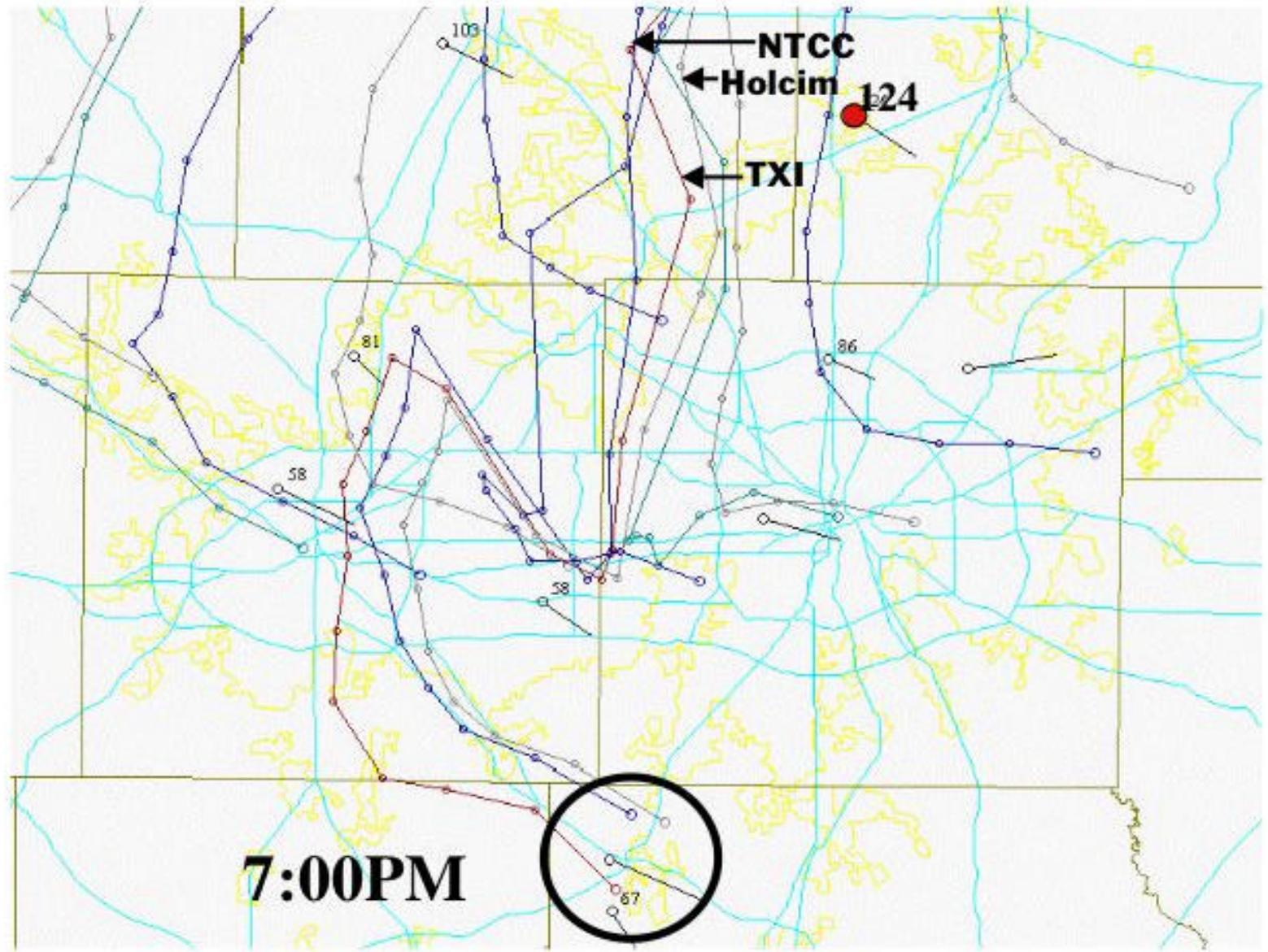


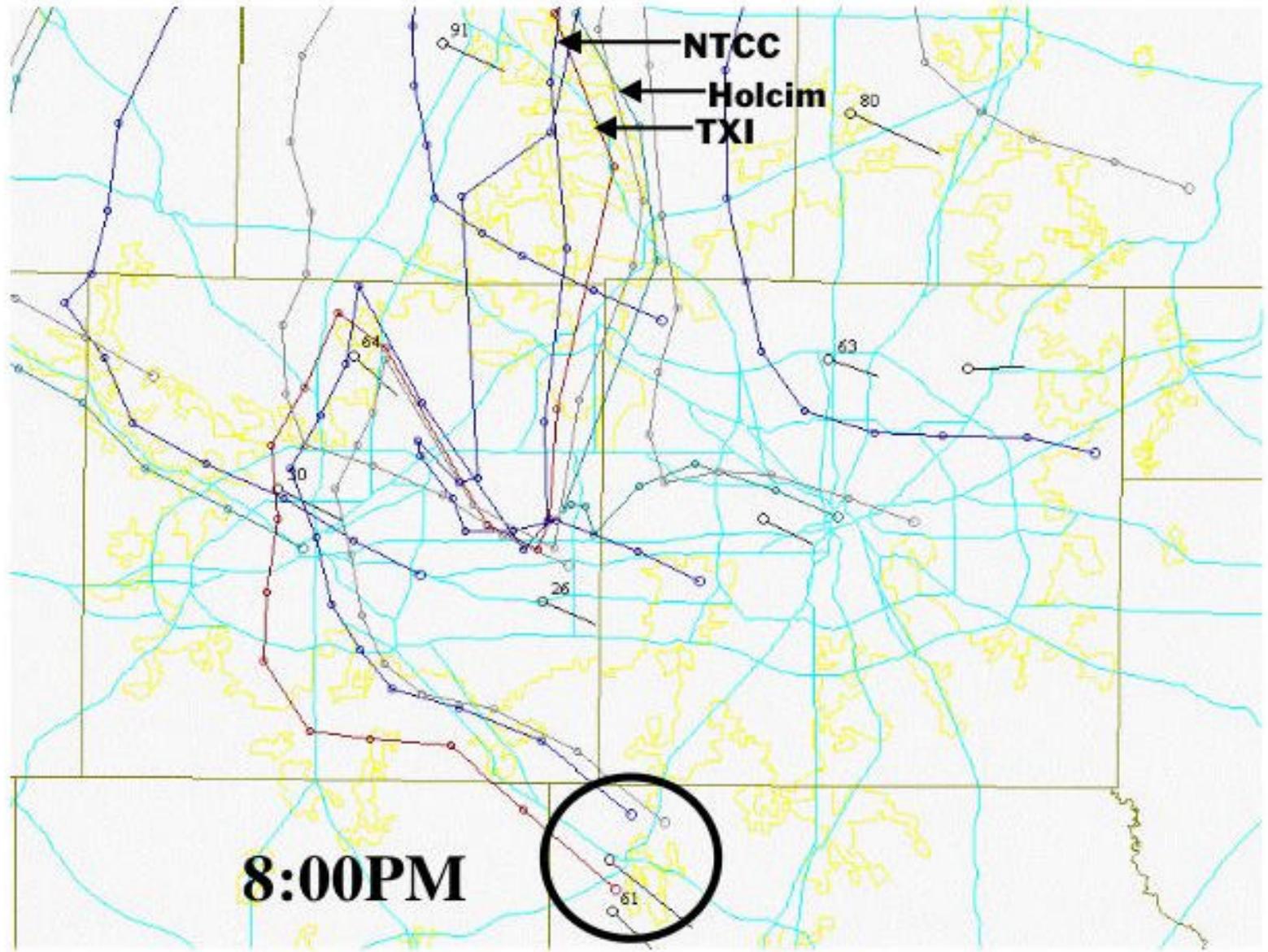
4:00PM



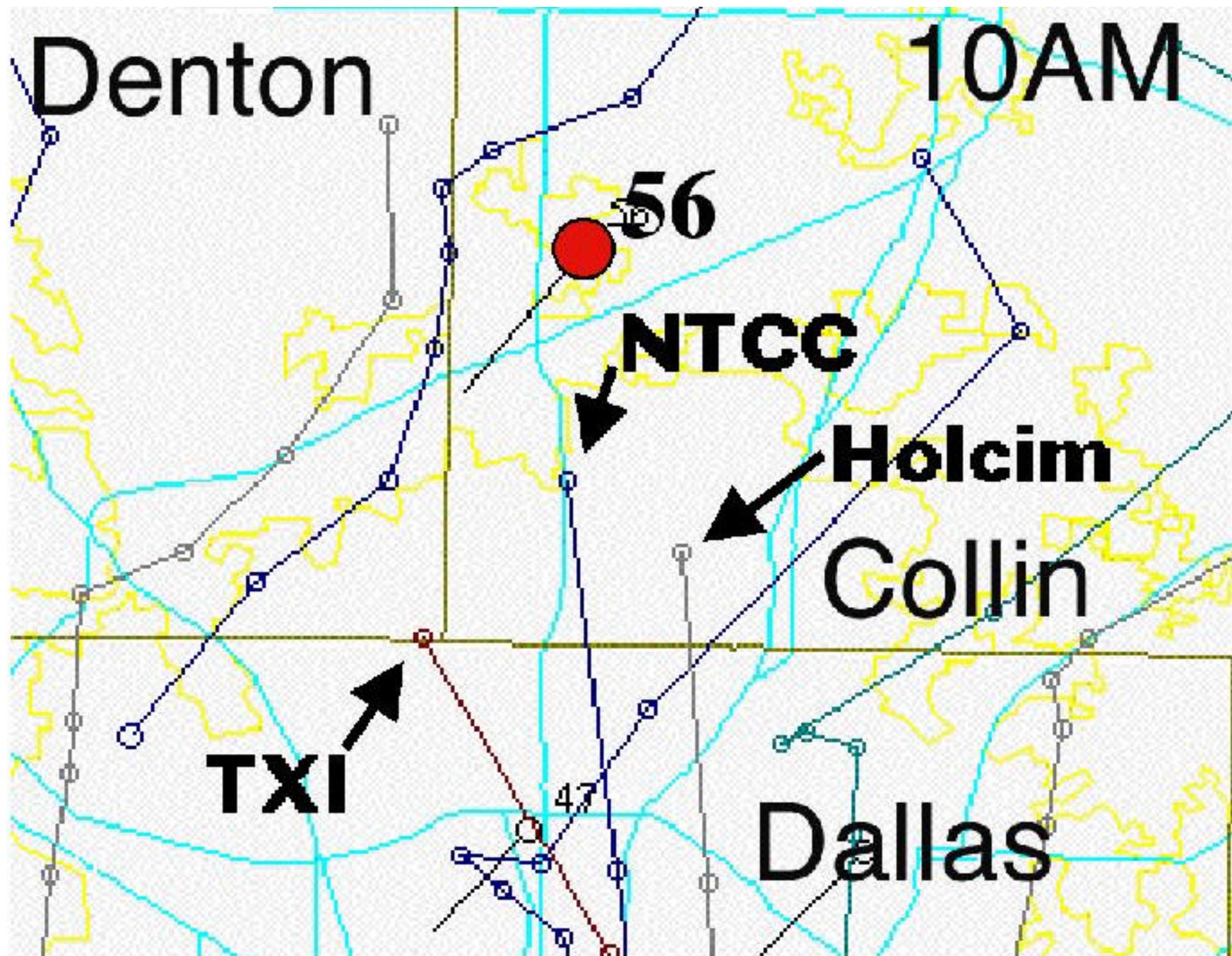


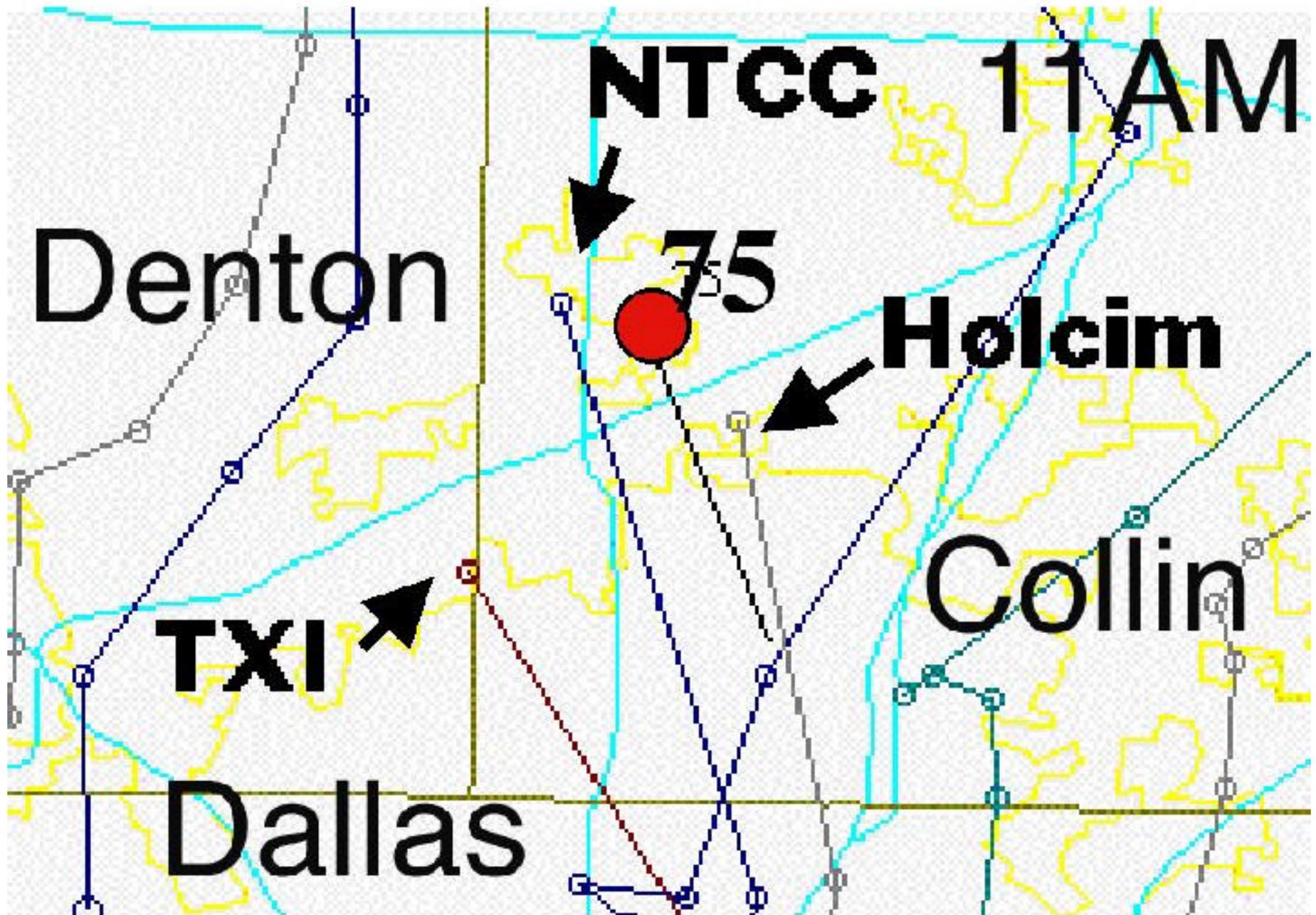


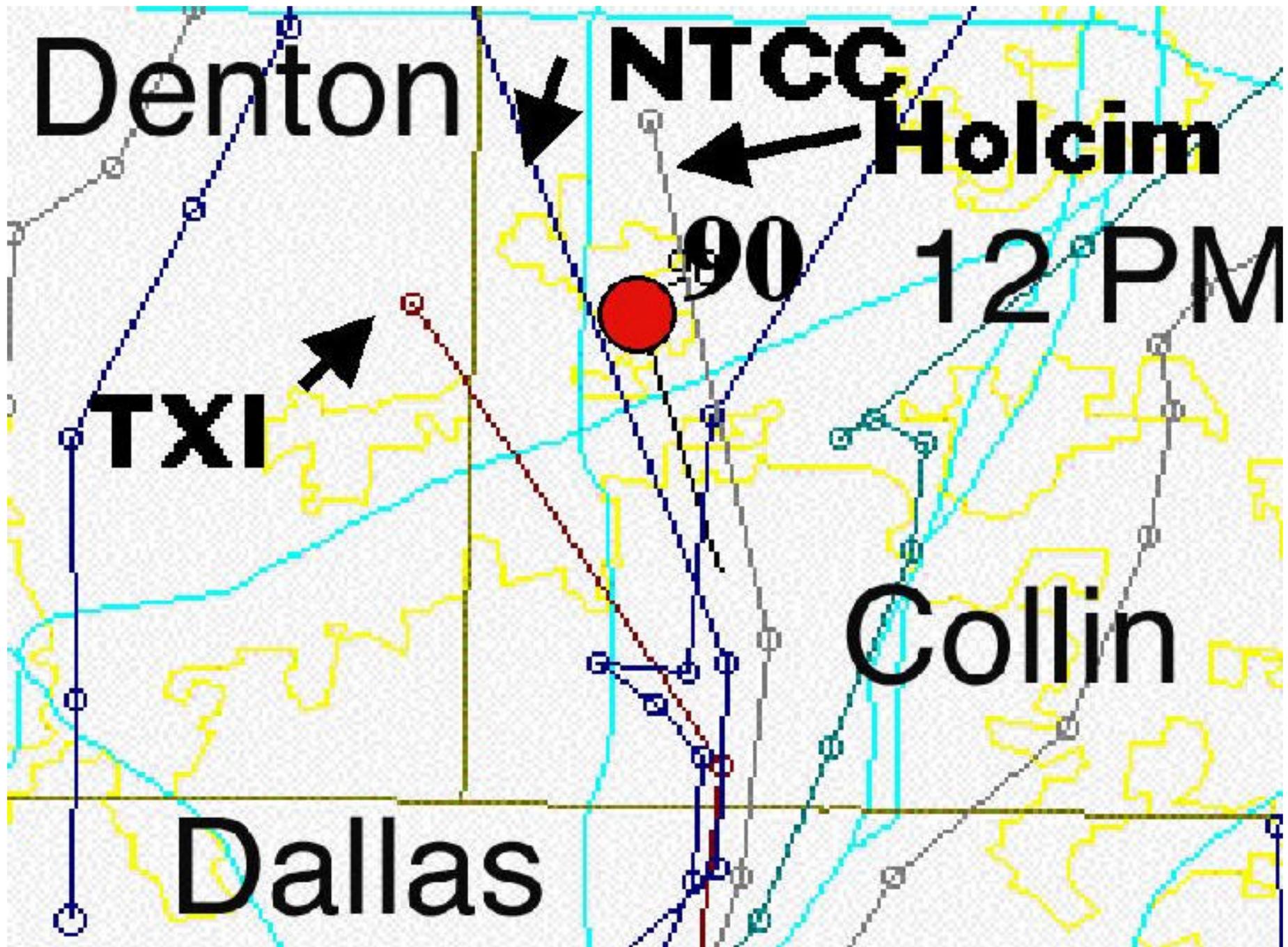


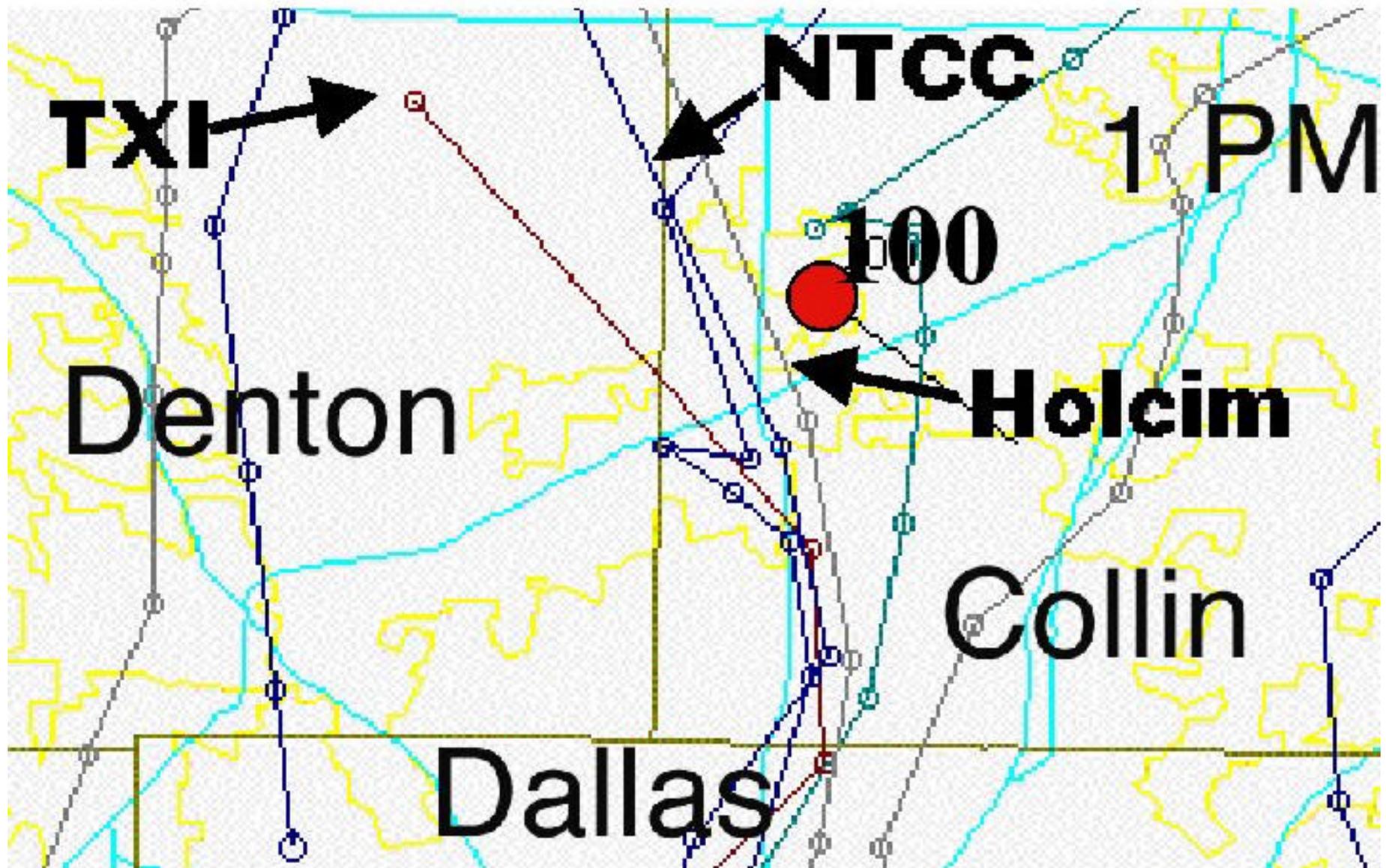


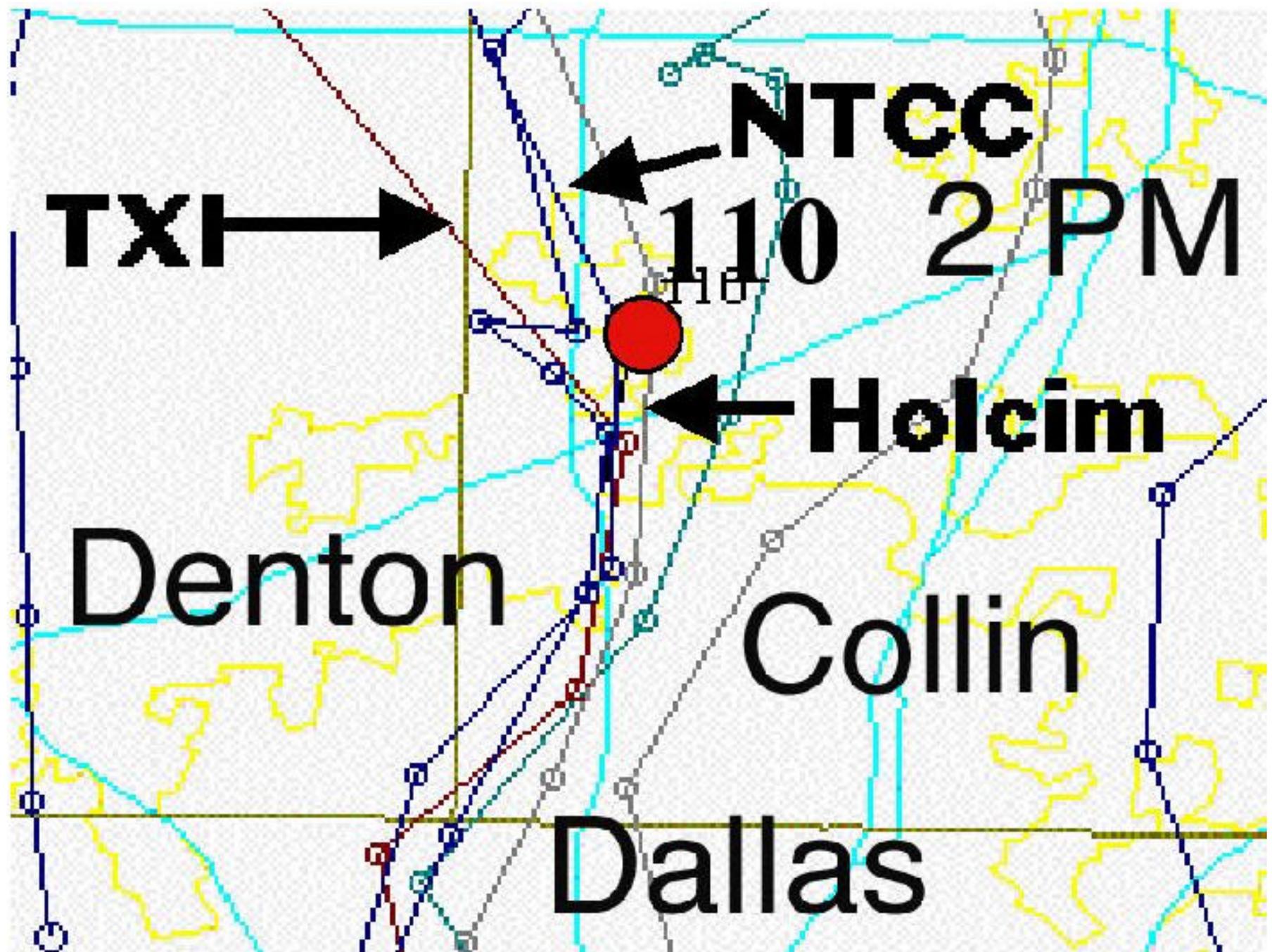
August 18th
Close-Up:
Cement Plant
Plumes
And
Monitored Violations



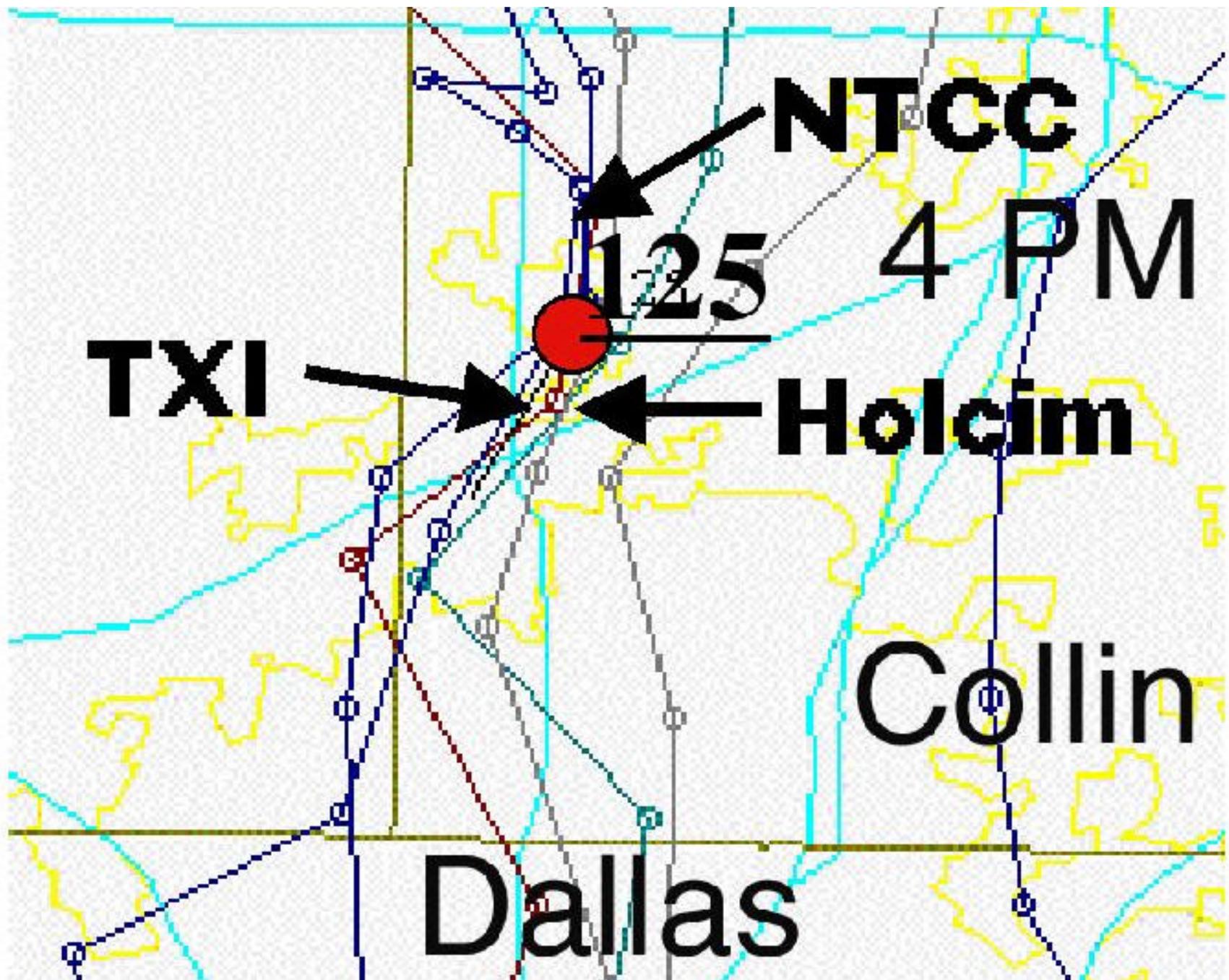












NTCC

4 PM

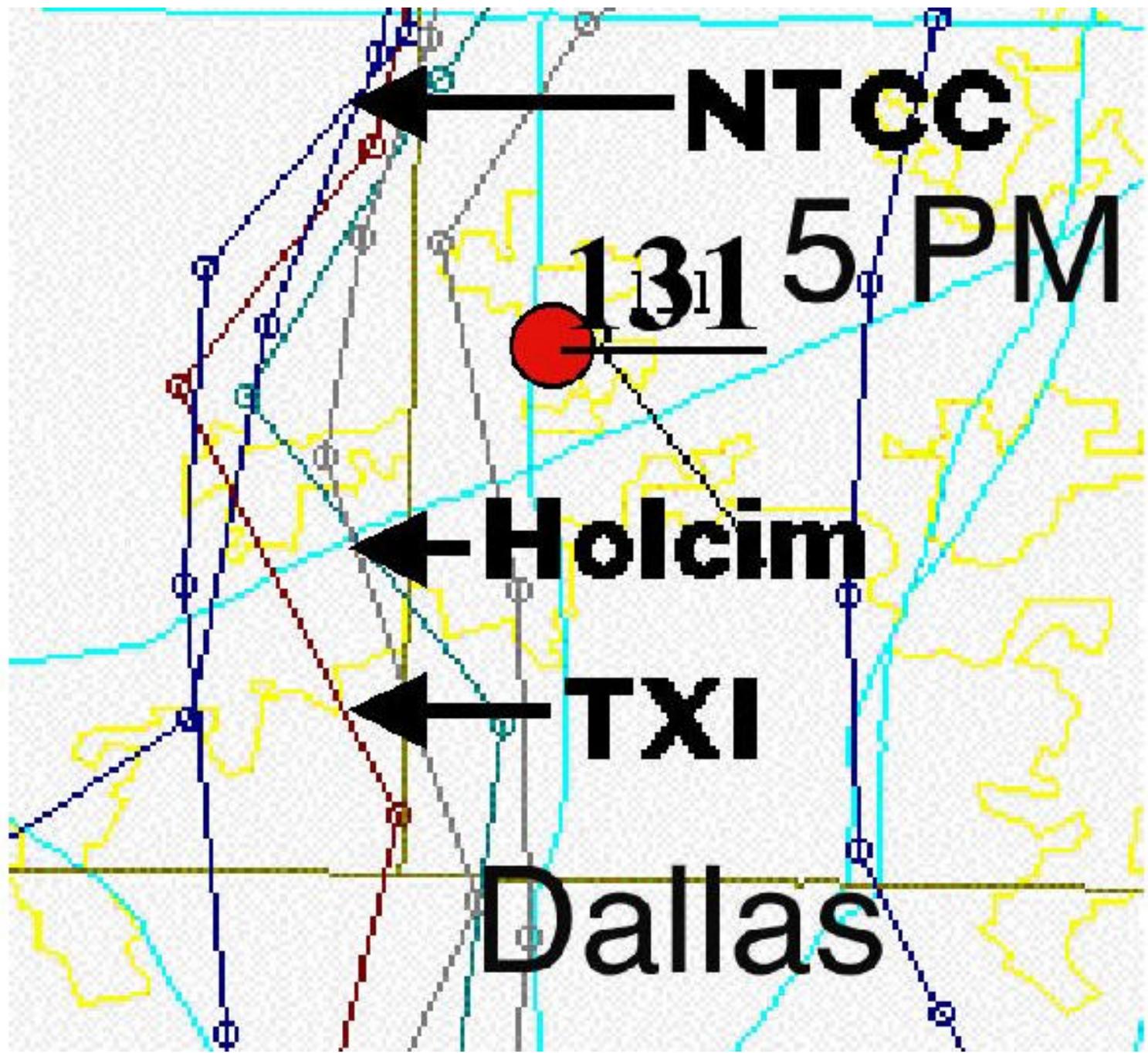
TX1

125

Holcim

Collin

Dallas



NTCC

1315 PM

Holcim

TXI

Dallas

6 PM

NTCC
123

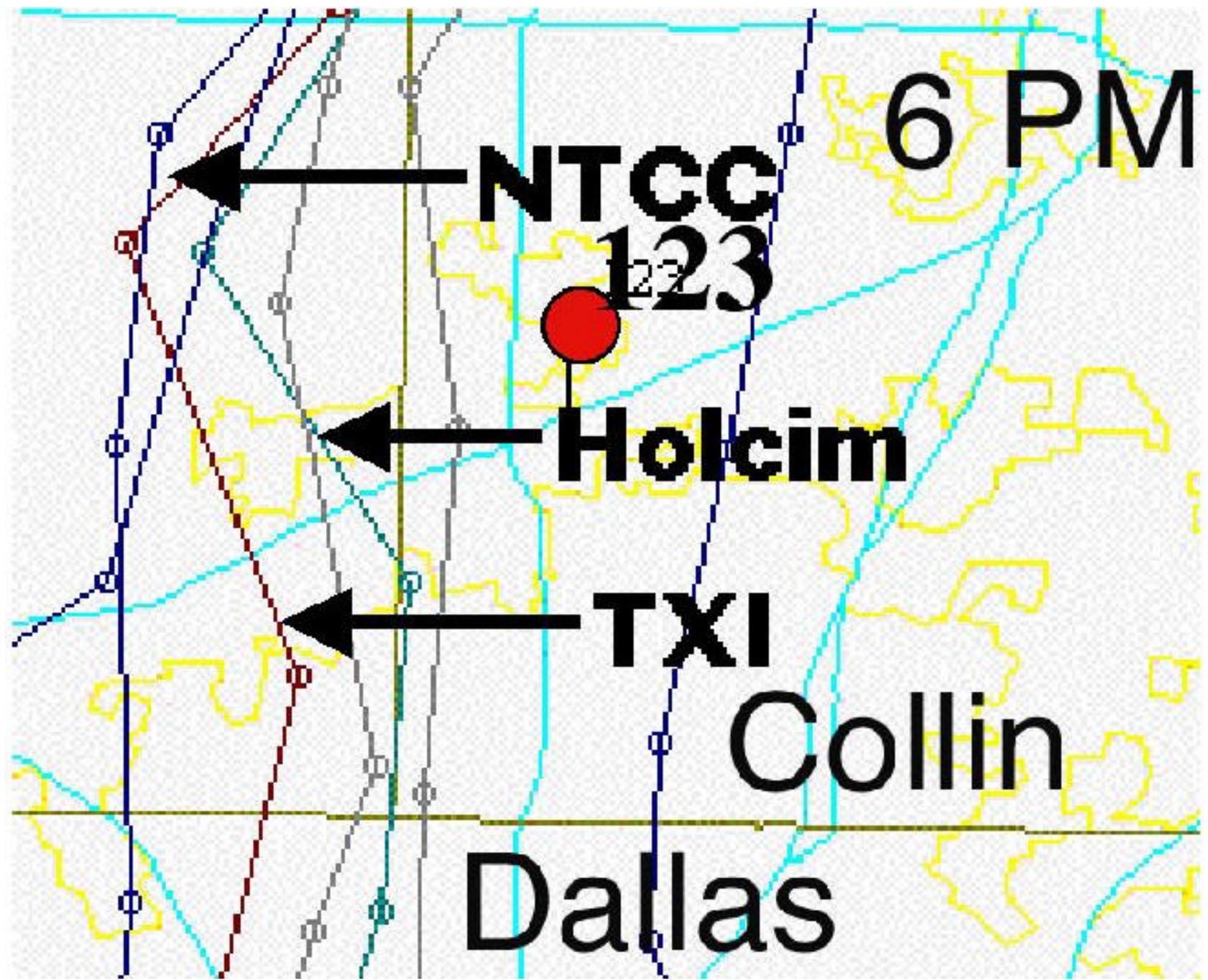


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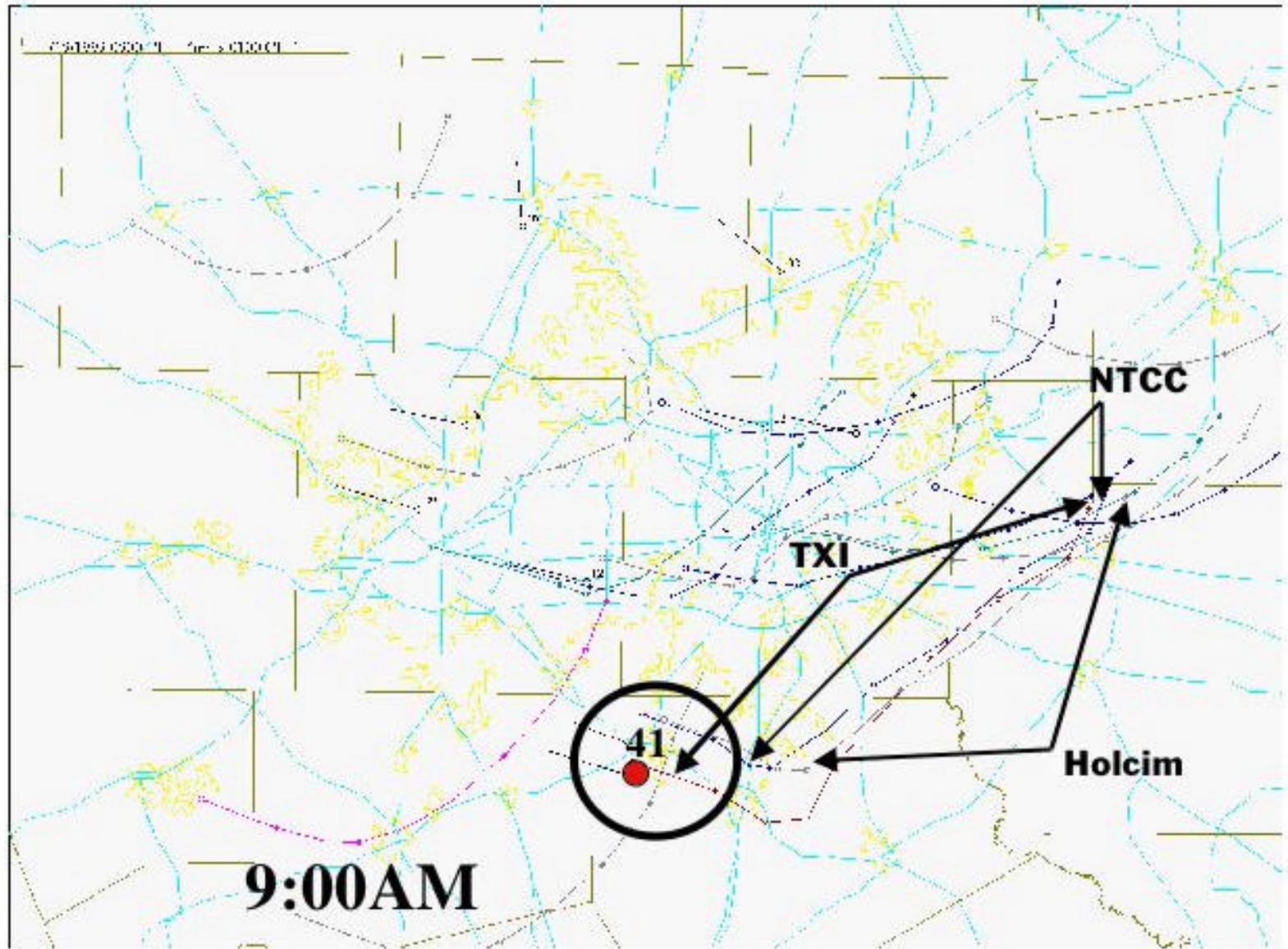
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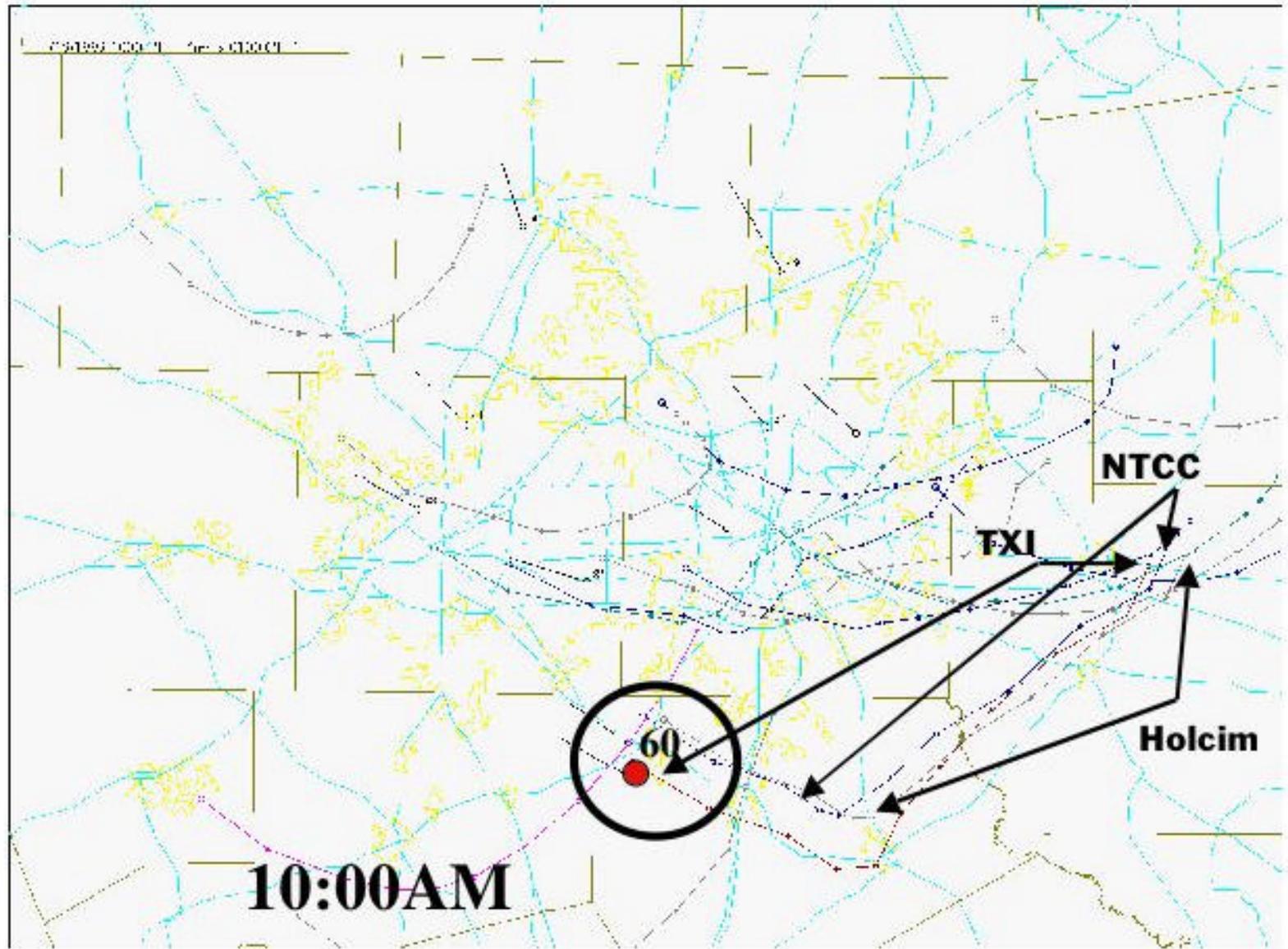
Collin

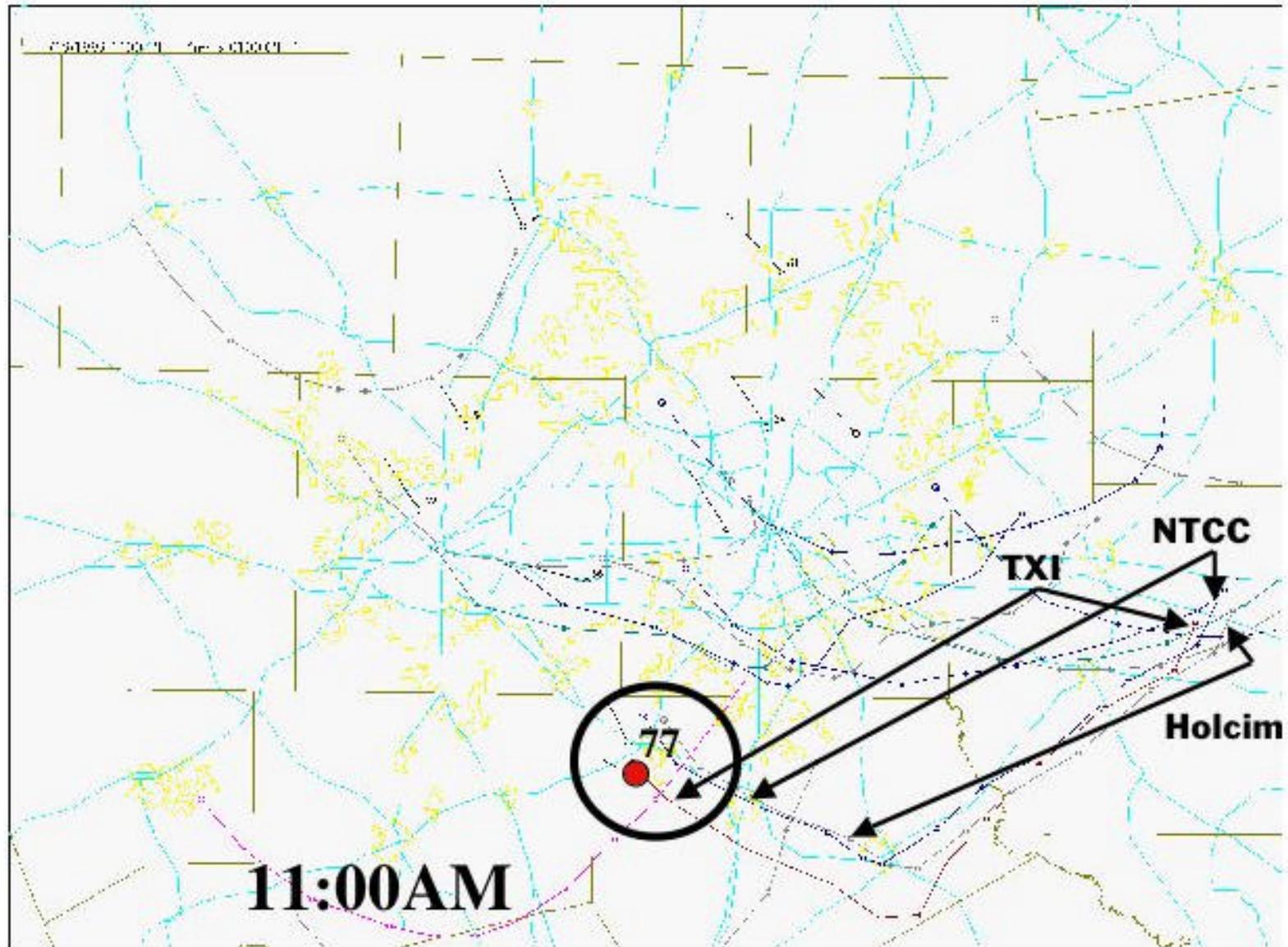
Dallas

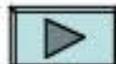
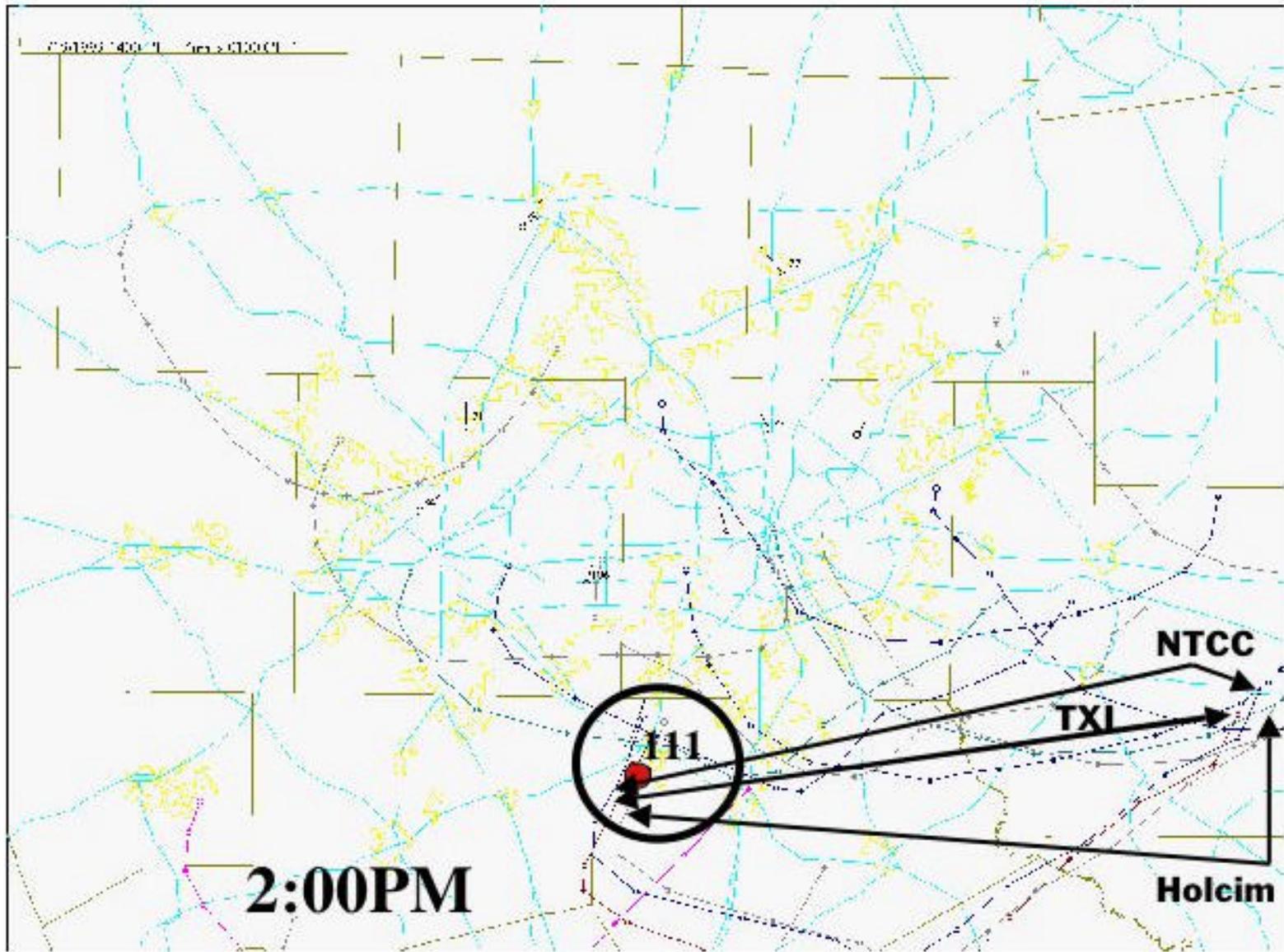


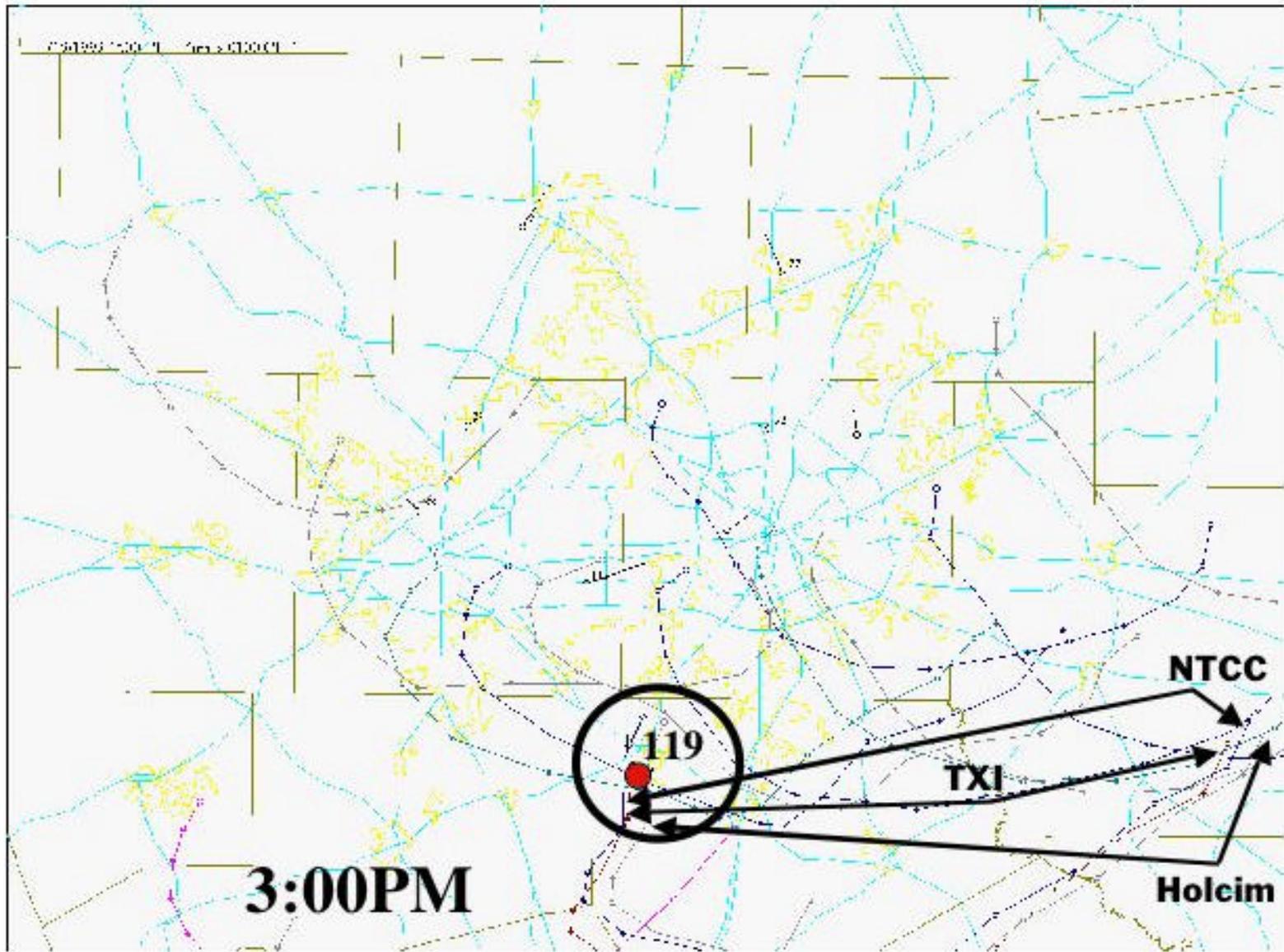
**TCEQ DFW
Point Source
Plume Map Of
August 19th,
1999**

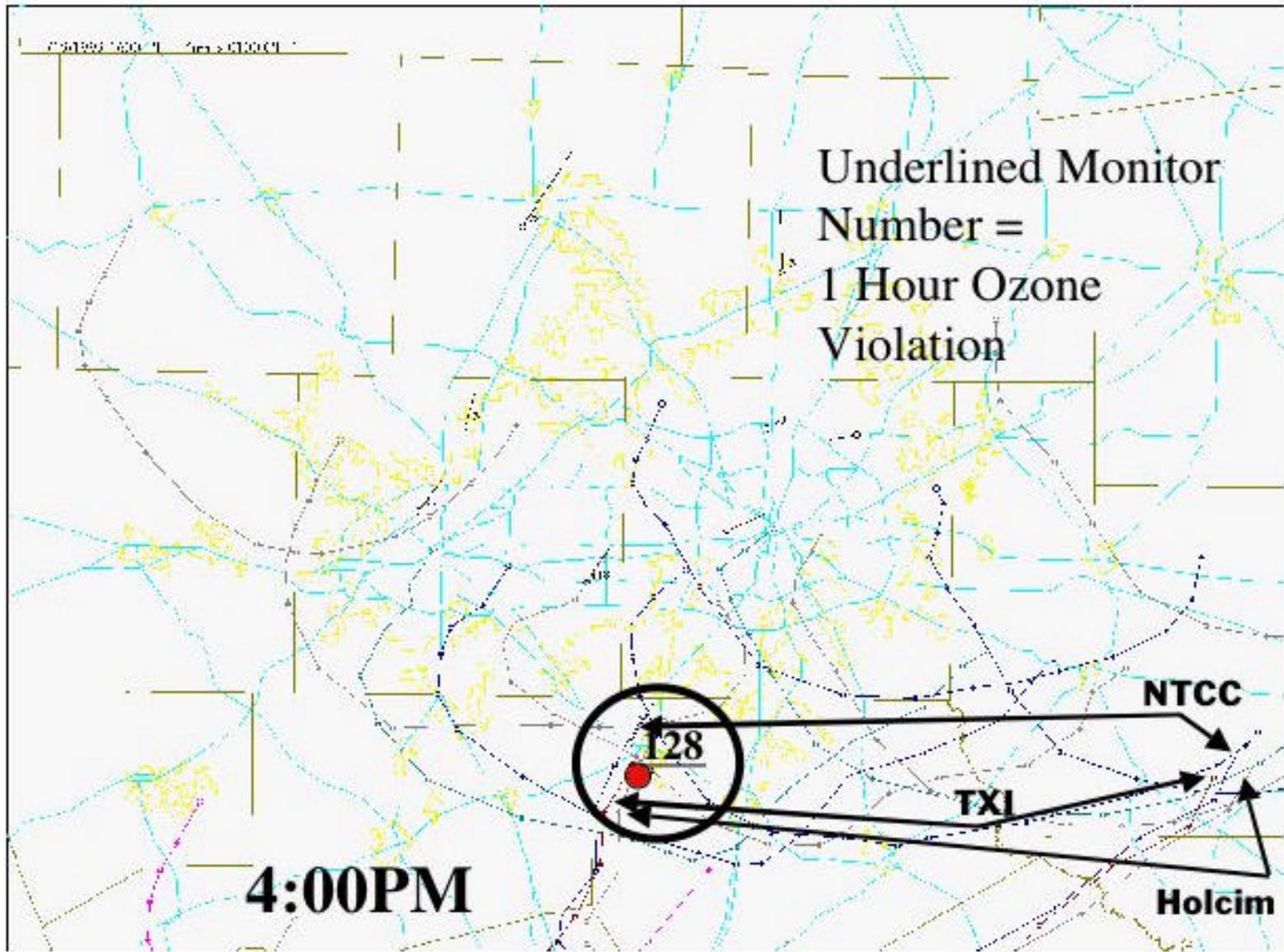


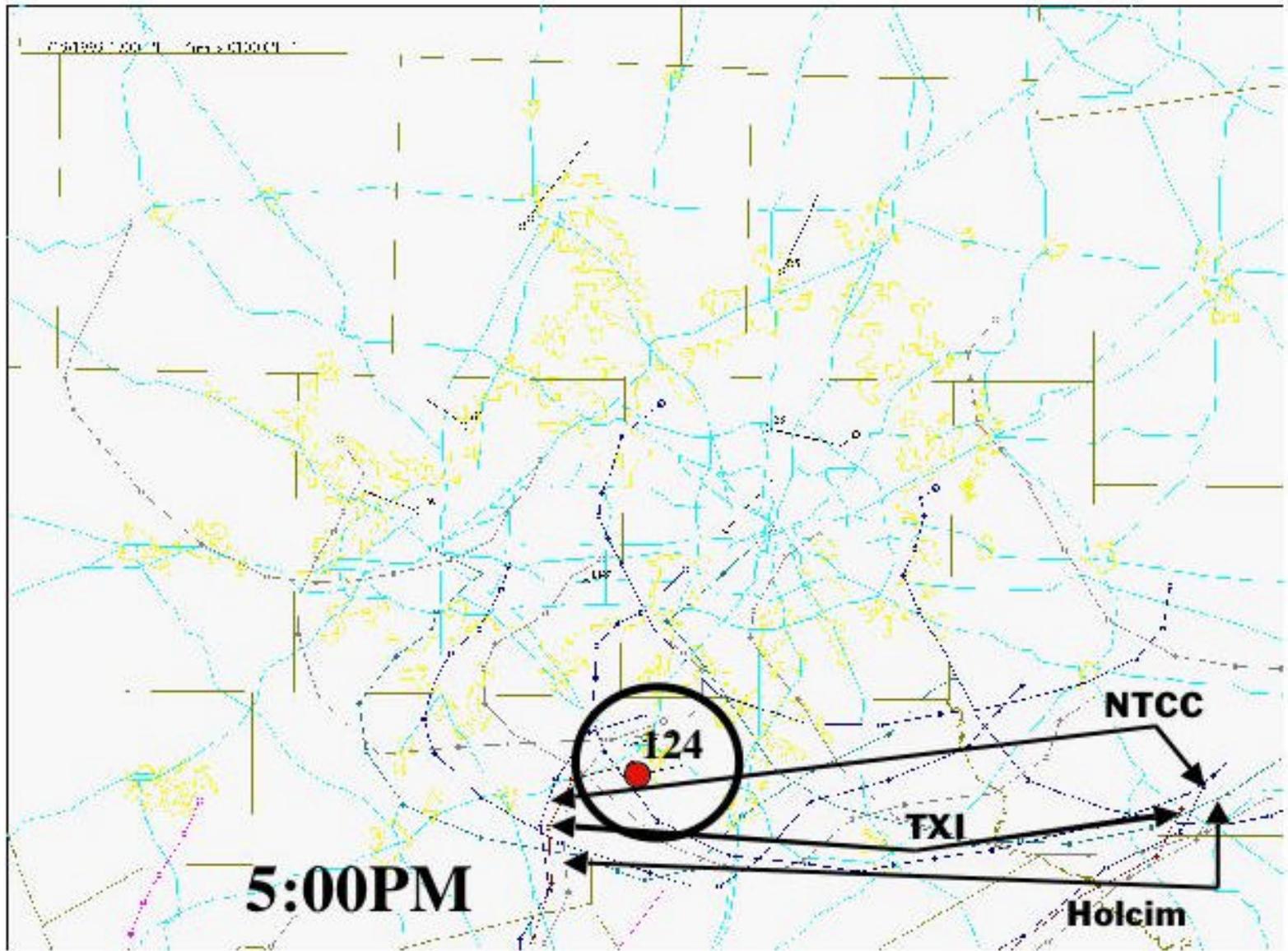


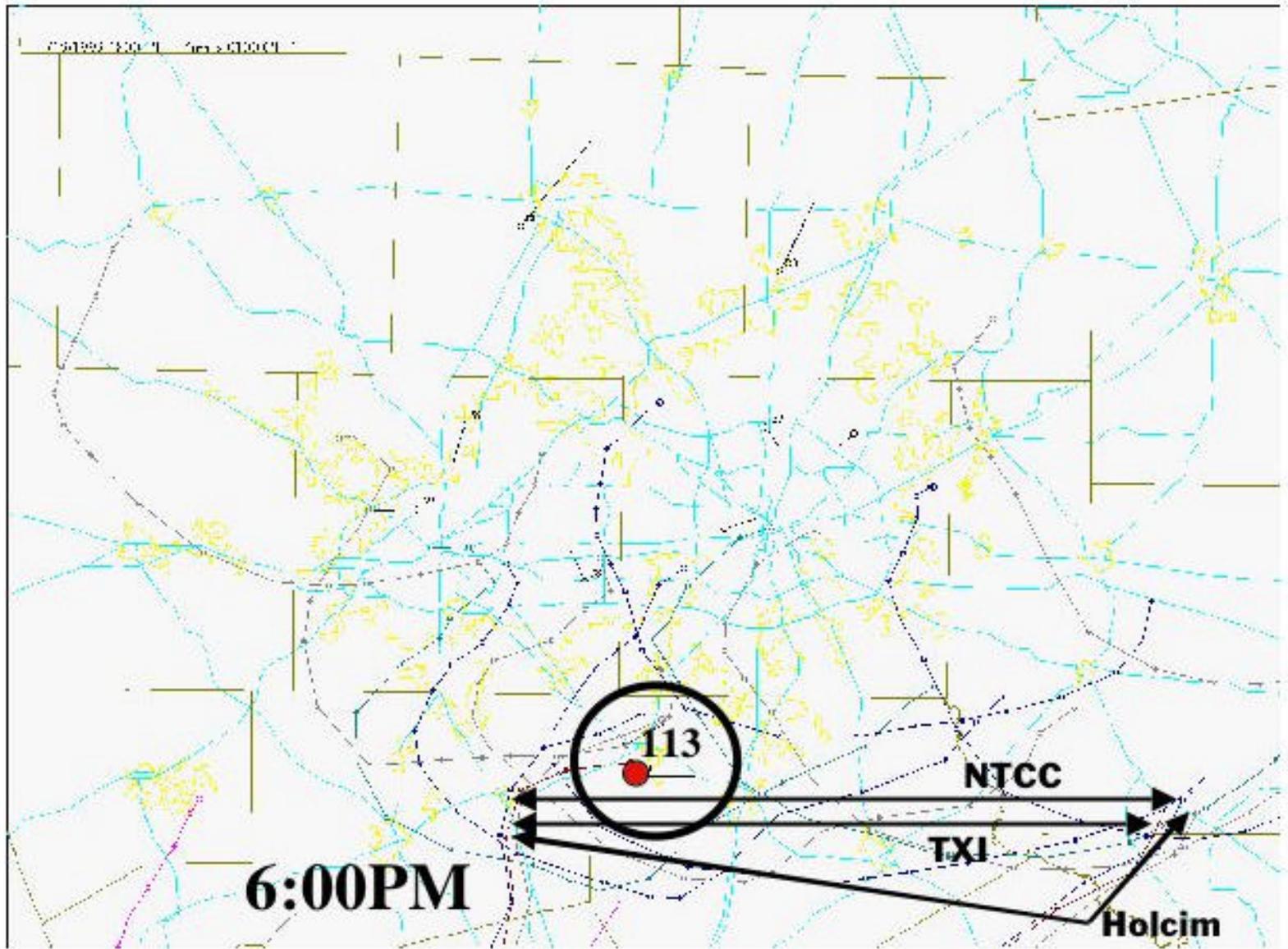












6:00PM

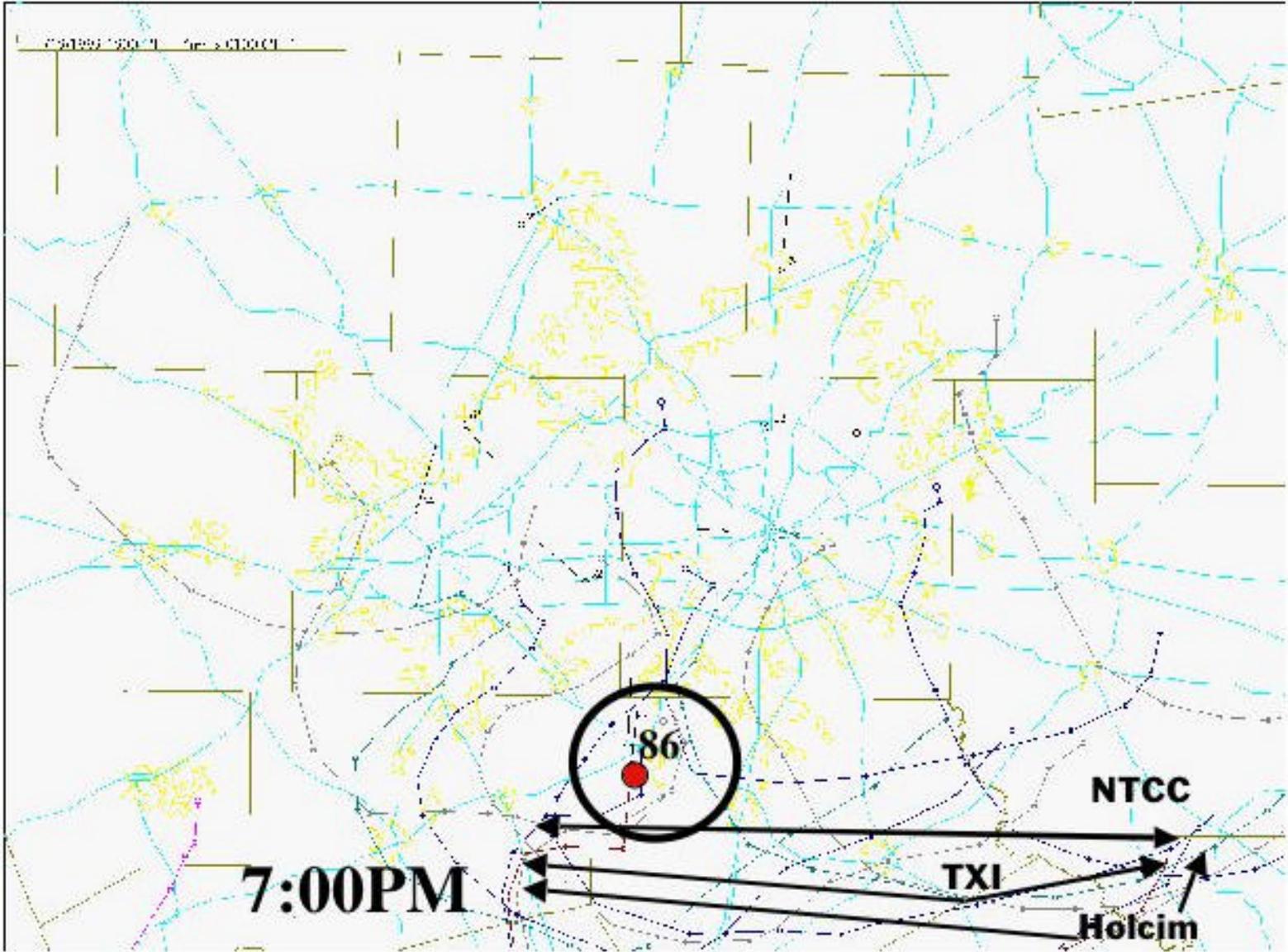
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NTCC

TXI

Holcim

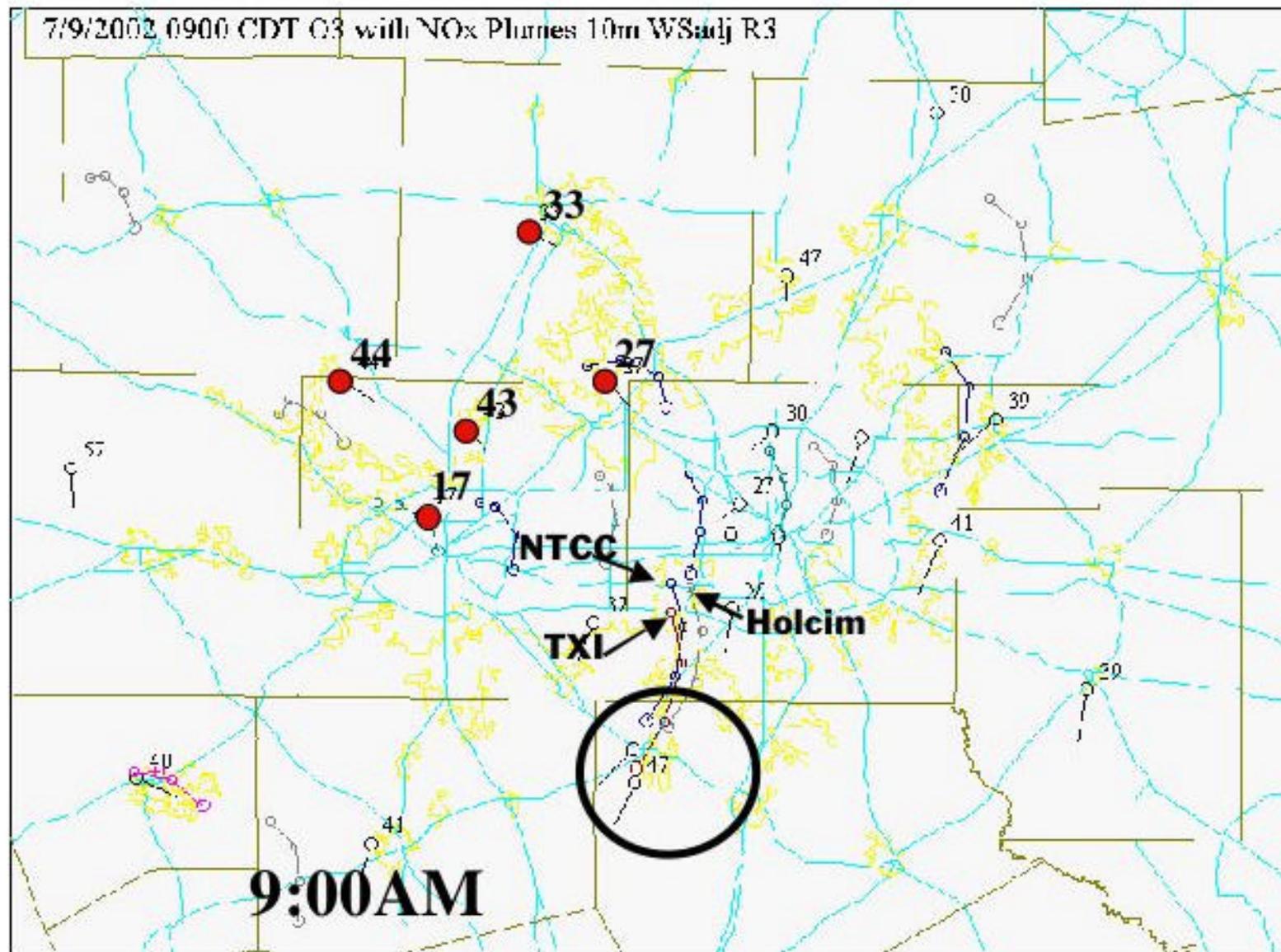




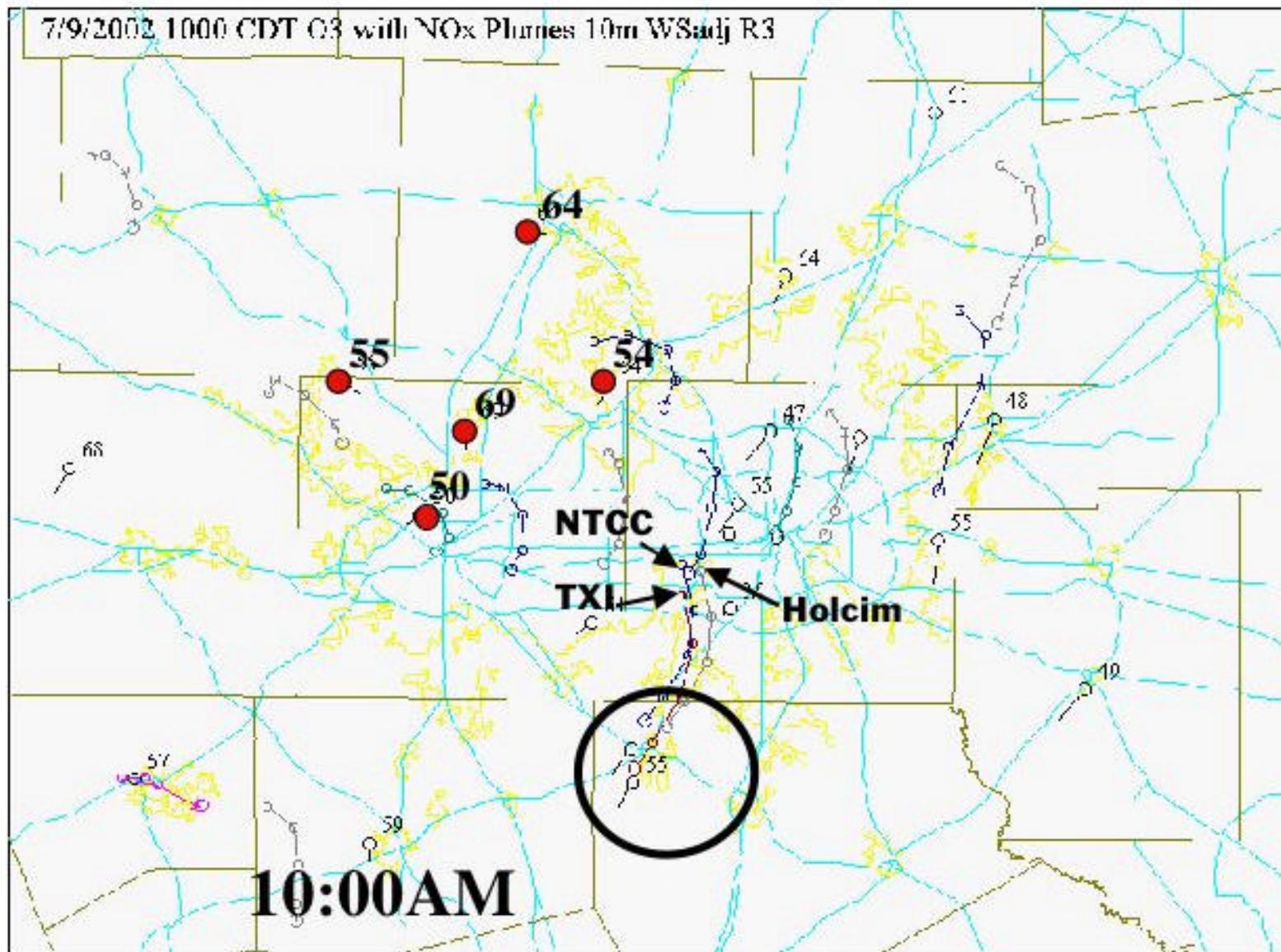
**2002 TCEQ DFW
Point Source
Plume Maps**

**TCEQ DFW
Point Source
Plume Map
Of July 9th,
2002**

7/9/2002 0900 CDT 03 with NOx Plumes 10m WSatj R3



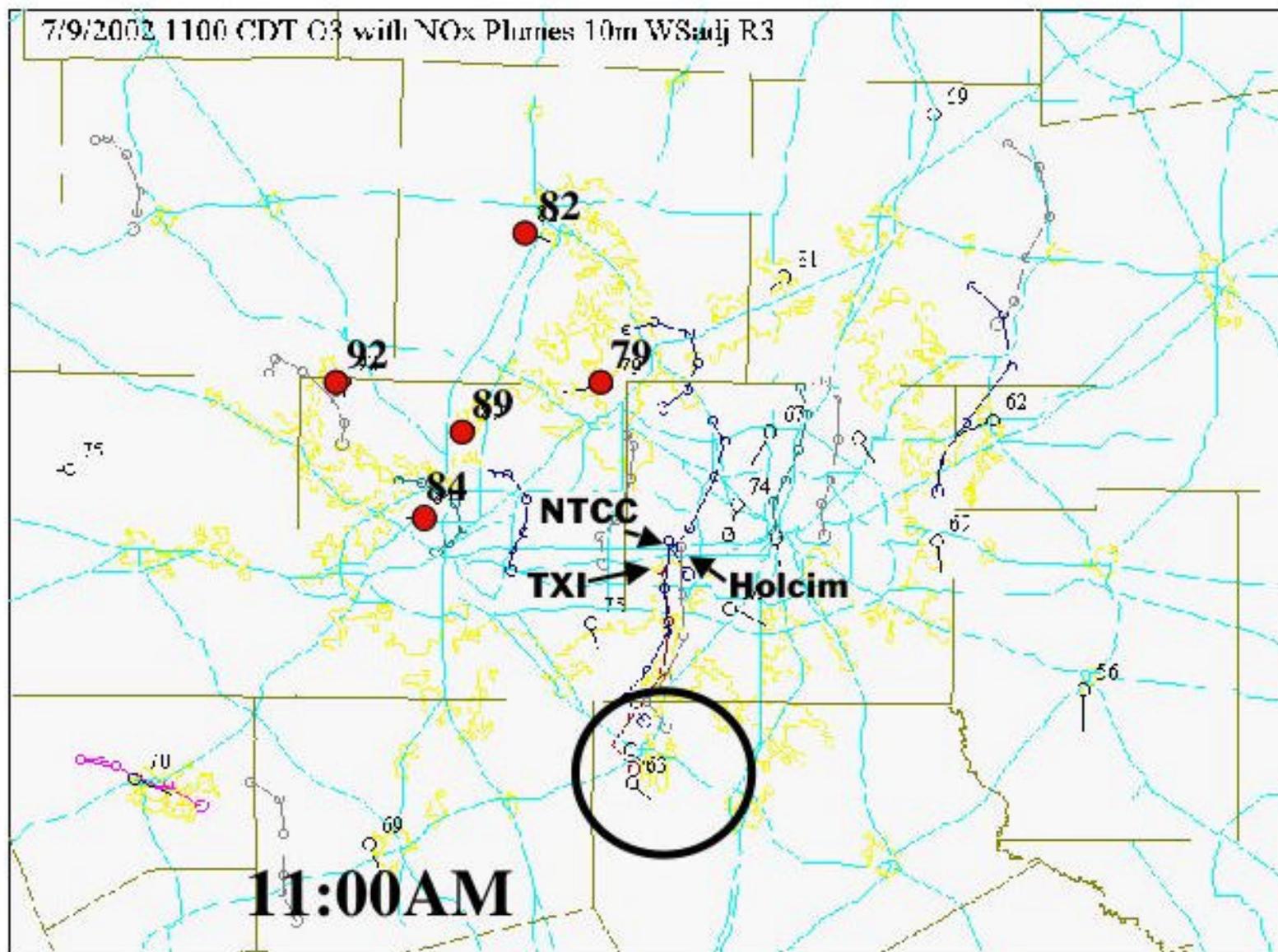
7/9/2002 1000 CDT 03 with NOx Plumes 10m WSatj R3



10:00AM



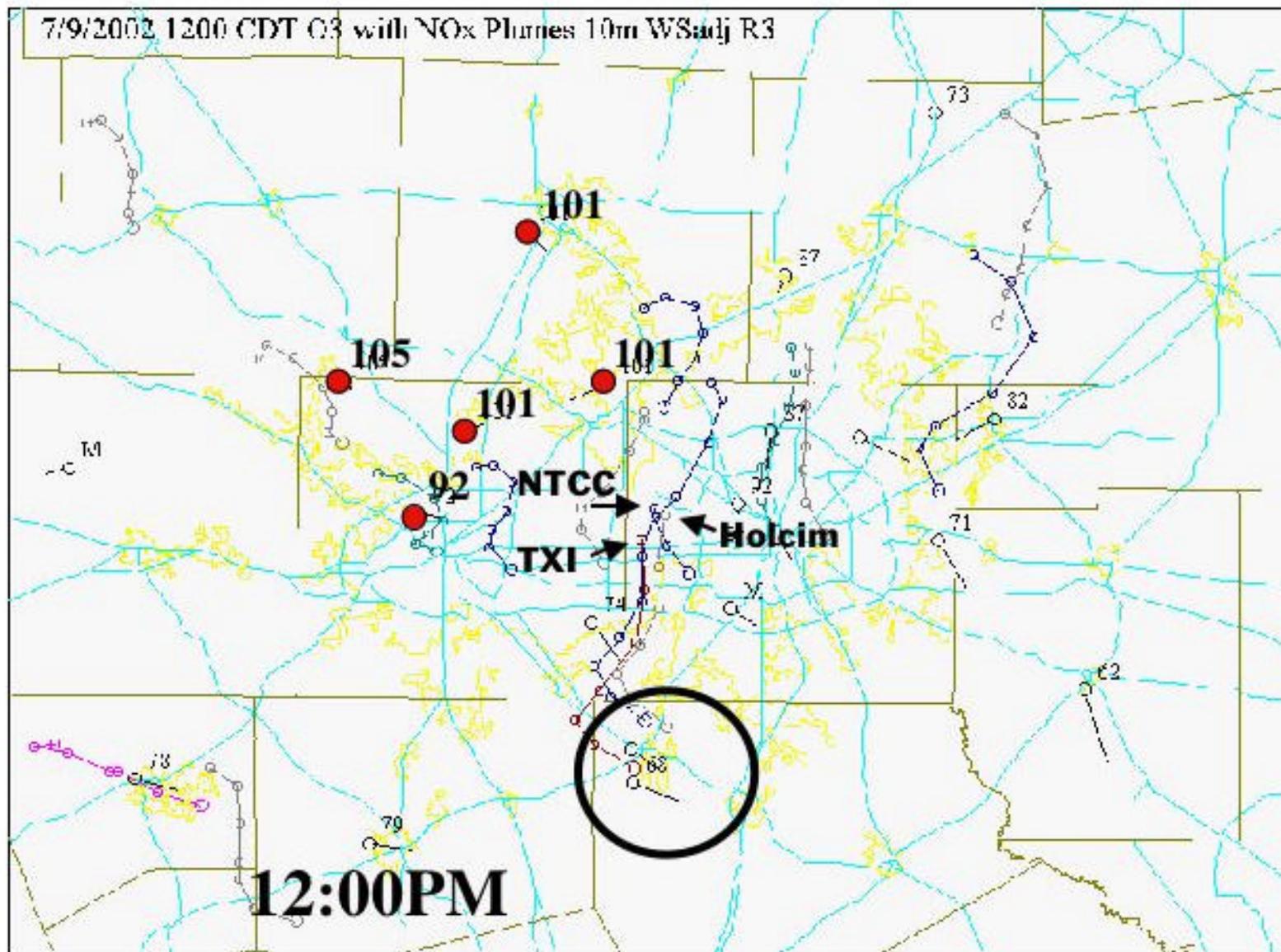
7/9/2002 1100 CDT 03 with NOx Plumes 10m WSatj R3



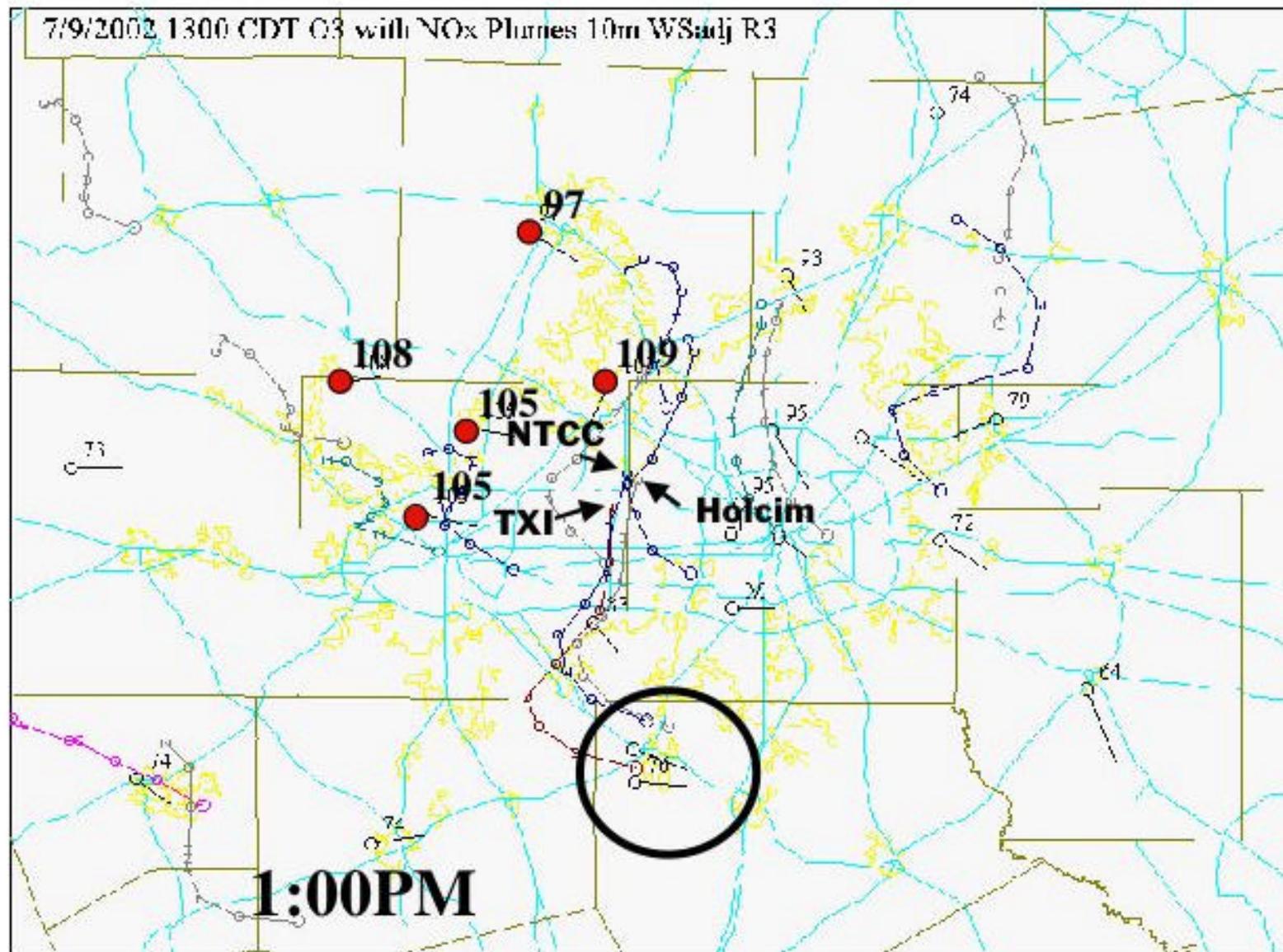
11:00 AM



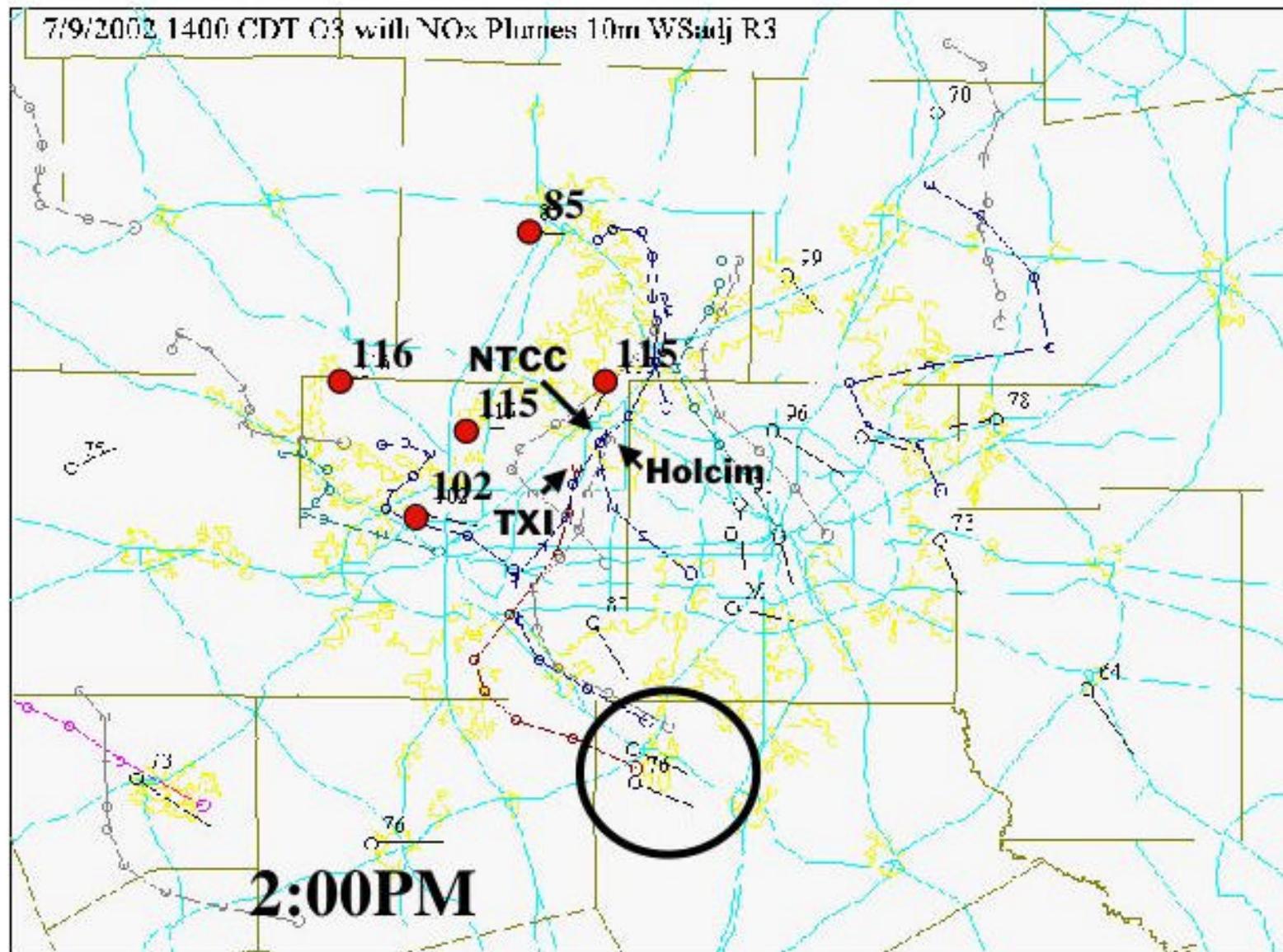
7/9/2002 12:00 CDT 03 with NOx Plumes 10m WSatj R3



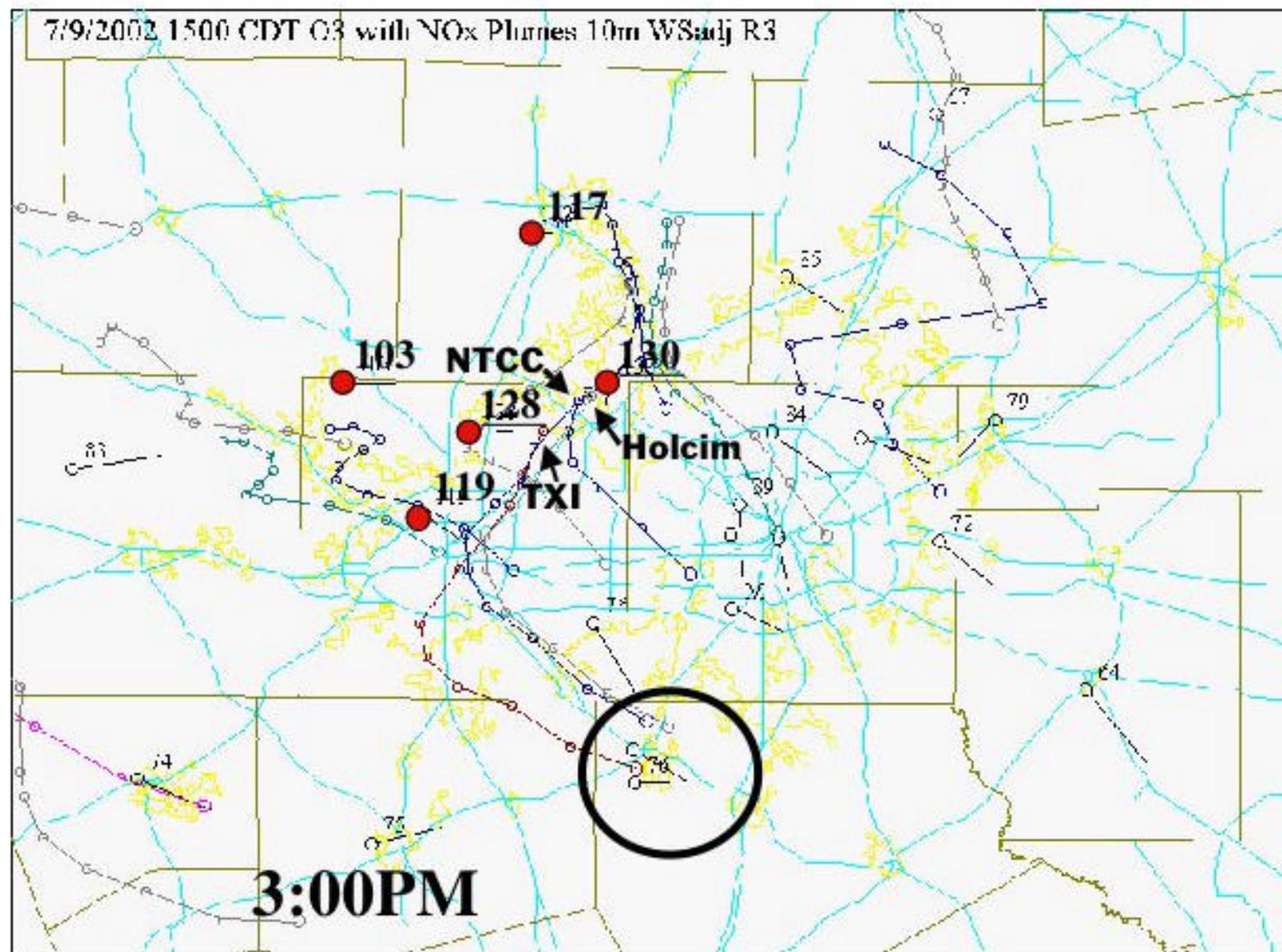
7/9/2002 1300 CDT 03 with NOx Plumes 10m WSatj R3



7/9/2002 1400 CDT 03 with NOx Plumes 10m WSatj R3



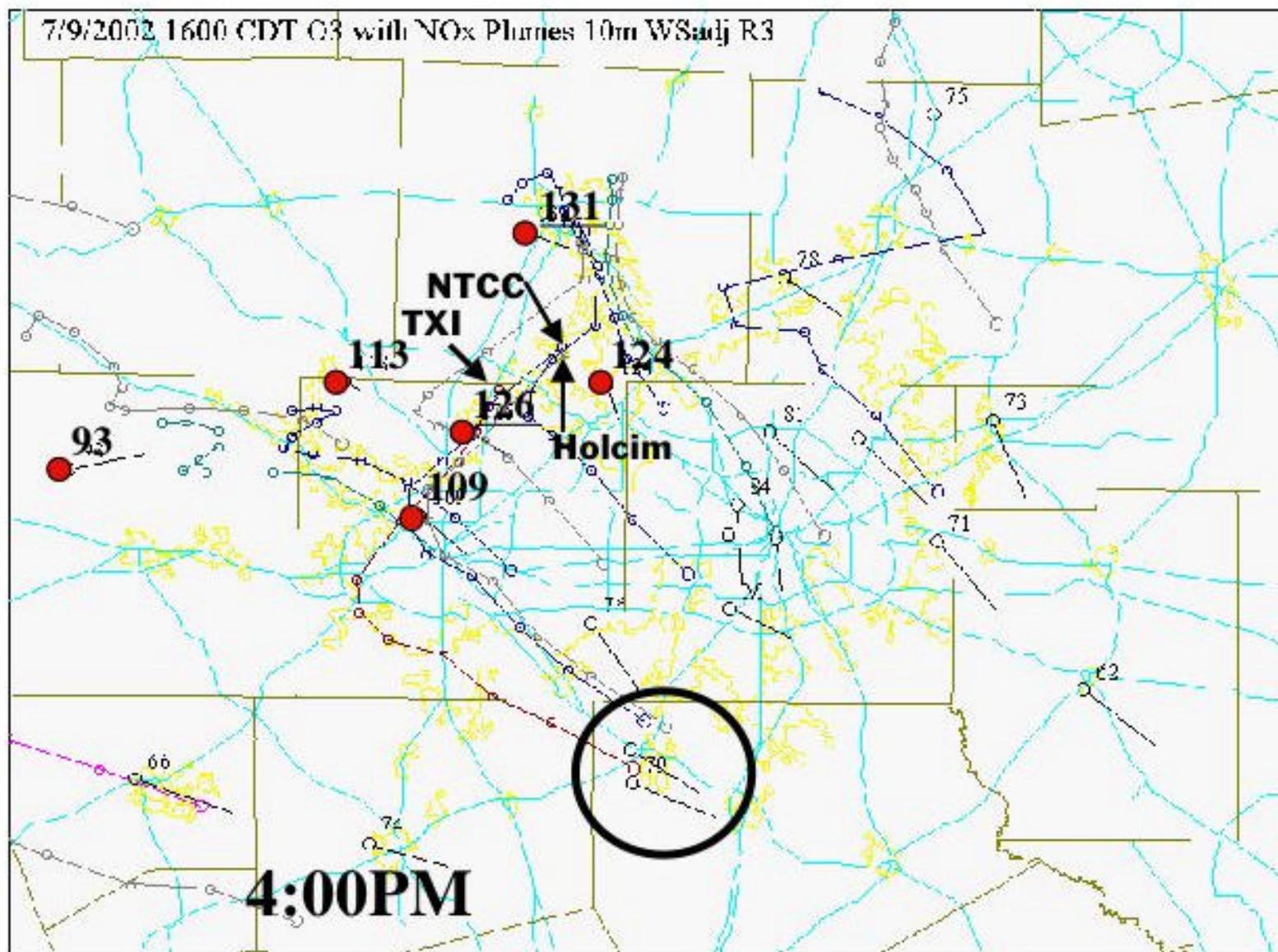
7/9/2002 1500 CDT 03 with NOx Plumes 10m WSA dj R3



3:00PM



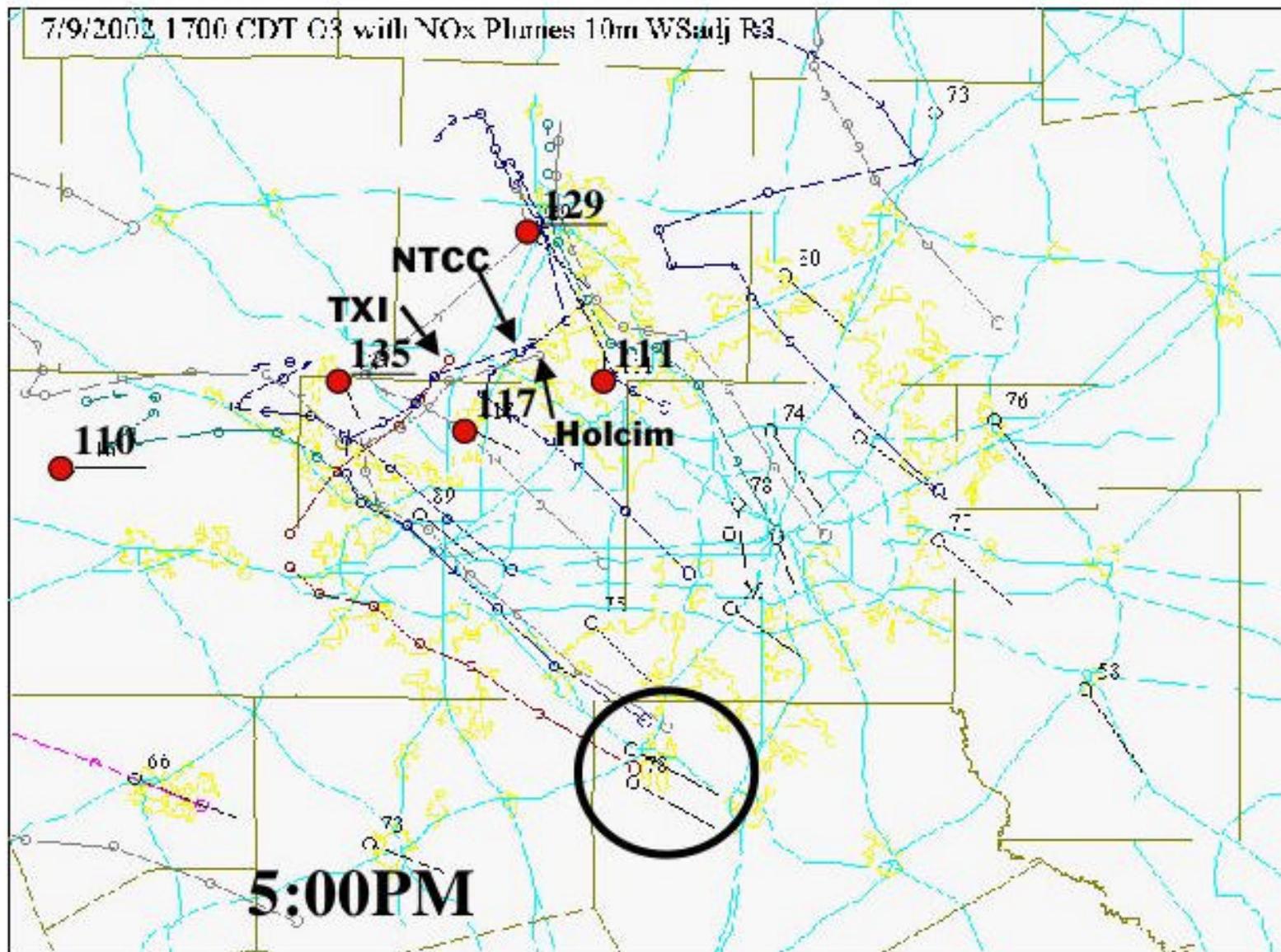
7/9/2002 1600 CDT O3 with NOx Plumes 10m WSatj R3



4:00PM



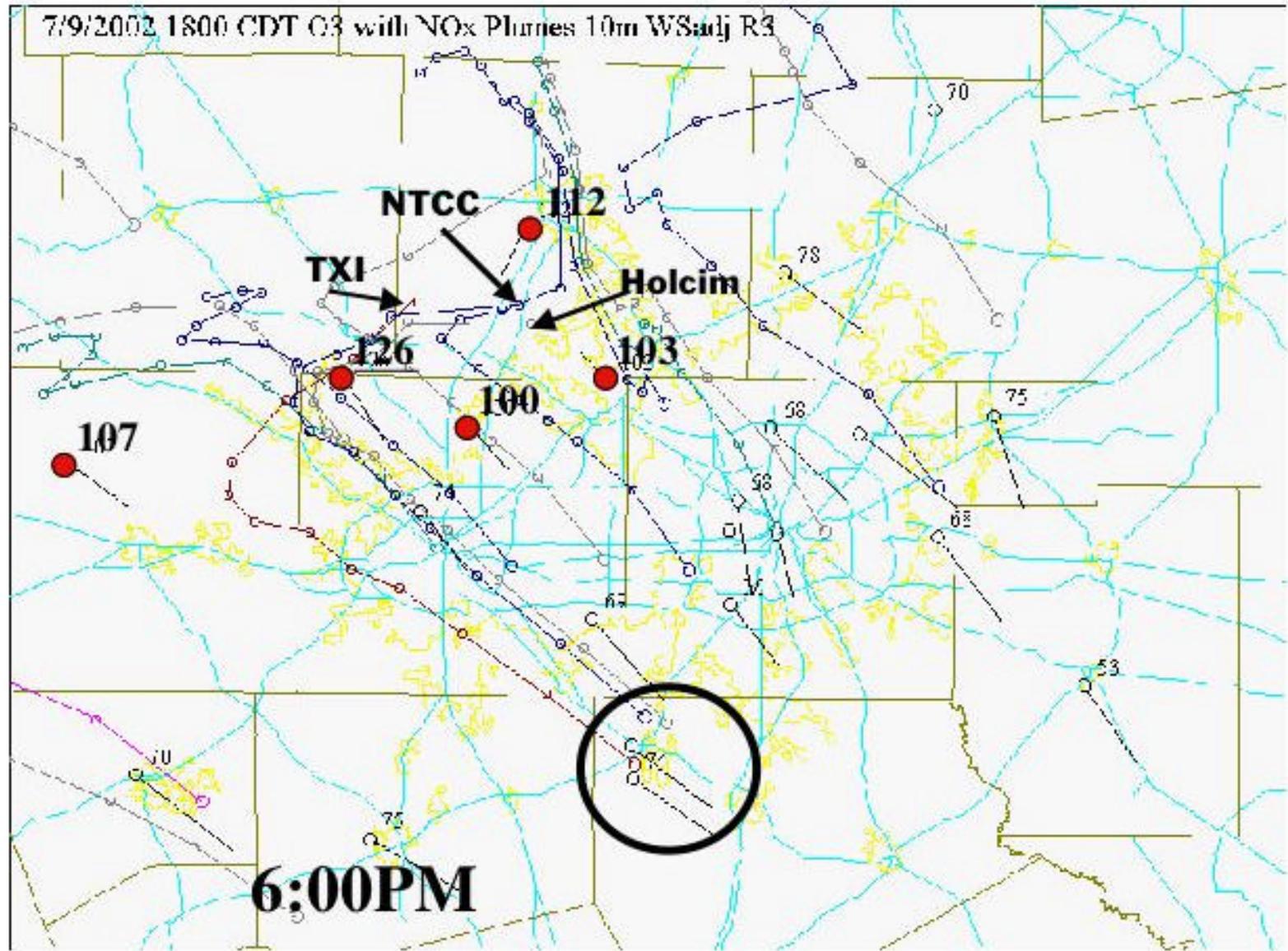
7/9/2002 1700 CDT 03 with NOx Plumes 10m WSatj R3



5:00 PM



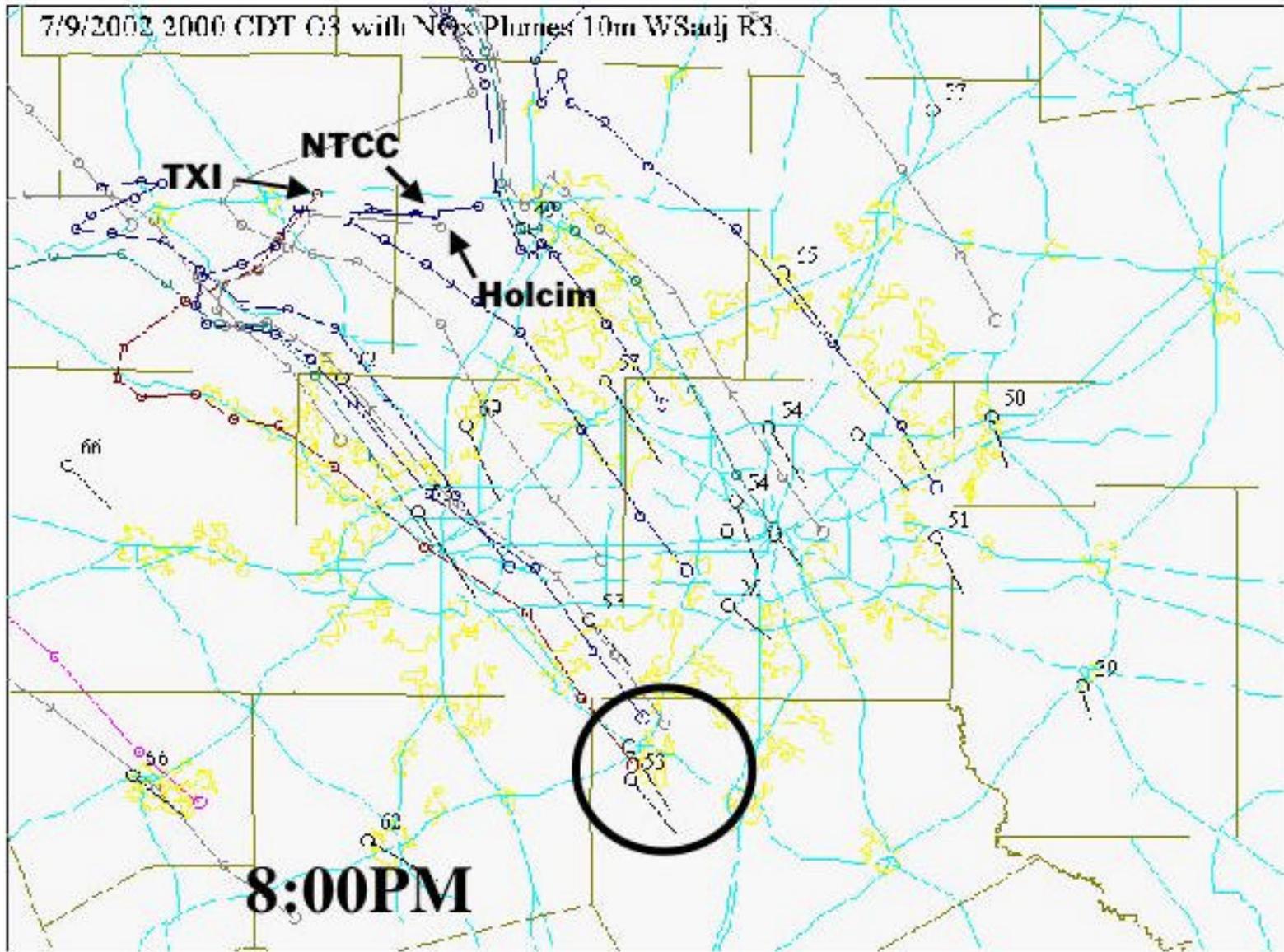
7/9/2002 1800 CDT 03 with NOx Plumes 10m WSA dj R3



6:00PM



7/9/2002 2000 CDT 03 with No. Phases 10m W Sadj R3



Conclusions:

1) 50% Reduction in Ellis Co.

**NO_x Emissions = 1 to 12 ppb Reduction
in DFW Ozone**

2) Cement Plant Plumes Contribute to Over 60% of Monitored Ozone Violations in TCEQ's Own Baseline Week

3) Cement Plant Plumes Continue to Contribute to Monitored D/FW Ozone Violations

Implications for Modeling:

- 1) Different violations (even on the same day) can have different causes. Not every violation is caused by the same source or same combination of sources.**
- 2) NO_x point sources in DFW have traditionally been underestimated in their impact on air quality.**

REDUCTIONS FROM NEW TECHNOLOGIES

The Ellis County cement plants could reduce their NOx emissions up to 80% using one or both of two control technologies already running in many European cement plants.

1) SNCR - Selective Non-Catalytic Reduction. Proven removal efficiencies of 50 to 80%.

2) SCR - Selective Catalytic Reduction. Proven removal efficiencies of 60 to 80%.

REDUCTIONS FROM NEW TECHNOLOGIES: SNCR

“SNCR relies on the reduction of NOX in exhaust gases by ammonia or urea without using any catalyst and can achieve NOX emission reductions of 30 to 70 percent.”

EPA Final Report on Cement Plant NOx Control, September 19, 2000

“Two cement plants with SNCR installations delivered by two different suppliers, which both guaranteed 80% NOx reduction, are achieving rates of 80-85%.”

European Commission, March 2000

“There have been two SNCR demonstrations at full size kilns in the United States...NCR is currently operating on numerous kilns in Europe.”

EPA Report, September 19, 2000

“There are 18 full-scale SNCR installations (at cement kilns) in operation in the EU and EFTA countries....”

European Commission, March 2000

REDUCTIONS FROM NEW TECHNOLOGIES: SCR

“SCR uses ammonia in the presence of a catalyst to reduce NOX. It’s widely used for NOX abatement in coal-fired power stations.

EPA Final Report on Cement Plant NOx Control, September 19, 2000

In 1976 an SCR manufacturer conducted three pilot test programs to evaluate SCR on cement kilns. During these tests, two suspension preheater kilns and a wet process kiln were tested for 5,400 hours each... with initial NOX removal efficiencies of 98 percent.”

EPA Final Report on Cement Plant NOx Control, September 19, 2000

“There are at least three suppliers in Europe that offer full scale SCR to the cement industry with performance levels of 100-200mg/m³.”

European Commission, March 2000

“...a full-scale SCR system has been in operation on a cement kiln in southern Germany for two years... the present emission rate corresponds to a NOx control efficiency of 80% .

Report by Camp Dresser McKee engineering firm for petition to N.Y. State Dept. of Environmental Conservation, February, 2003

REDUCTIONS FROM NEW TECHNOLOGIES: COST

“Fuel Tech (a SCR and SNCR vendor) estimates that a 50% effective SNCR would cost \$1 per ton of cement capacity if applied to the Midlothian cement plants. This means that the largest cement kiln, TXI’s #5, could be fitted with SNCR for \$2.2 million. A hybrid system using SCNR and SCR that is up to 70% effective applied to Kiln #5 would cost \$4.4 to 6.6 million”.

Terry Brown, Regional Sales Manager, Fuel Tech, Fayetteville Ga.

August 2003

“...the estimated cost in 1992 U.S. dollars was about 9.72 million for installation of SCR in a large cement kiln. NOx removal efficiency was 80 percent.”

EPA Final Report on Cement Plant NOx Control, September 19, 2000

“A Dutch study shows that an SCR installation at the Dutch cement plant would have a cost of about 2500 euros per tonne of abated NOx. The Netherlands has a NOx policy which considers costs up to 5000 euros per tonne of abated NOx as reasonable. The Netherlands regards SCR to be a cost effective NOx abatement technique for its cement industry.”

European Commission, March 2000

REDUCTIONS FROM NEW TECHNOLOGIES:

Reductions Available

Using the 2000 Emissions Inventory data from TCEQ, one can calculate how much NO_x could be reduced with application of new control technologies at the Ellis County cement plants.

At **50%** removal efficiency = 5,447.5 tons per year reduction, or
14.9 tons per day

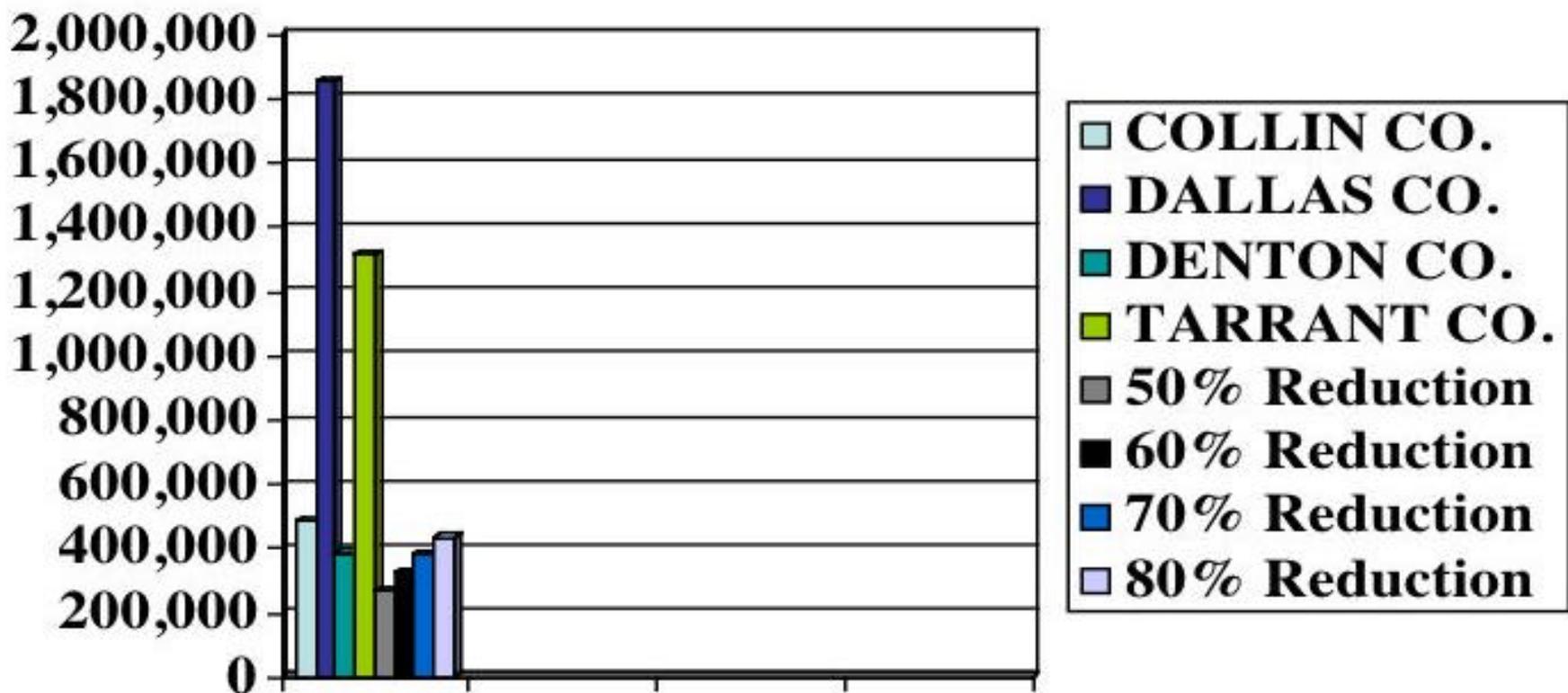
A **60%** removal efficiency = 6,537 tons per year reduction, or
17.9 tons per day

A **70%** removal efficiency = 7,626.5 tons per year reduction, or
20.8 tons per day

An **80%** removal efficiency = 8716 tons per year reduction, or
23.8 tons per day

VS. only a maximum of **6** tons reduction under the 2000 SIP

REDUCTIONS FROM NEW TECHNOLOGIES:
Equal to 400,000 cars off the road.



REDUCTIONS FROM NEW TECHNOLOGIES:

2000 SIP Information Blackout

Information about these technologies was not given to policymakers during the drafting of the 2000 SIP because the TCEQ's point source consultant did not do a thorough job of surveying control technologies for cement plants.

Thus, the 2000 SIP recommendations on cement plant reductions were made without knowledge that much larger reductions were already being achieved in Europe.

REDUCTIONS FROM NEW TECHNOLOGIES:

What TCEQ Said Post-SIP:

European Commission document on best available techniques in the cement and lime industry (March 2000) reports that there are 15 dry process cement kilns with SNCR in Germany, 1 in Switzerland and 2 in Sweden. The report states that the two kilns in Sweden are both guaranteed for 80% NO_x reduction and are achieving reductions of 80-85%.”

“Fuel Tech had previously said to me that they thought they could make SNCR work on wet kilns, but they would need support from a kiln owner to make it work.”

“The EC report is fairly positive about the potential for SCR to work. After one year of pilot scale operation, the Swedish EPA was taking the position that the economics were reasonable.”

October 5th, 2000 Memo from TCEQ Air Staffer
Randy Hamilton to other TCEQ Staff

Conclusions:

- 1) NOx control technologies for cement plants are currently running at 80% + removal efficiencies.
- 2) These technologies have been found to be cost-effective in the European cement industry.
- 3) Installation of these control technologies on all three Ellis County cement plant could reduce NOx emissions from 5400 to 8700 tons per year.
- 4) Policymakers were not made aware of the current use of these control technologies when they drafted the 2000 SIP.
- 5) TCEQ staff know that best control technologies were not adequately surveyed for the 2000 SIP and that European cement plants are doing better at reducing NOx than was presented to policymakers in 1999/2000.

WHAT'S NEEDED:

- 1) A comprehensive review of all the evidence demonstrating how Ellis County is a threat to DFW air quality.**
- 2) A comprehensive engineering review of all current technologies for reducing NOx in cement plants and how they can practically be implemented in Ellis County, including estimates for initial capital expenditures and annual operating costs, comparisons of these costs with NOx control in other industries and examination of company objections to the technology.**
- 3) New TCEQ Rules for Ellis County cement plants that would provide a scheduled reduction in NOx emissions of up to 80% by 2007.**
- 4) Local Government purchasing directed away from dirtiest kilns/plants, and toward cleaner ones.**