METEOROLOGIST'S INVESTIGATION

of the

MACINTYRE CRASH

Prepared By:

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Robson Forensic

Engineers, Architects, Scientists & Fire Investigators

Jonathan M. Cohen, Esq.
Kline and Specter
19th Floor, 1525 Locust St.
Philadelphia, PA 19102

Re: weather conditions in William P. MacIntyre, III v. Scott Johnson, et al.

Dear Attorney Cohen:

I have examined meteorological records to determine how quickly weather conditions and visibility were changing at and near this case's crash scene on the early afternoon of 28 December 2001. My analysis is based in part on these materials:

- National Weather Service (NWS) hourly surface weather observations for 28 December 2001 at Williamsport, PA (station IPT),
- NWS hourly surface weather observations for 28 December 2001 at State College, PA (station UNV),
- NWS hourly surface weather observations for 28 December 2001 at Selinsgrove, PA (station SEG),
- NWS weather radar records for 28 December 2001 from NEXRAD radar site KCCX located ~ 12 miles northwest of State College, PA,
- numerous color photocopies of crash-scene photographs among case Exhibits 17-125,
- transcript of the 28 September 2004 deposition of Jason Saam,
- transcript of the 29 September 2004 deposition of Richard Gough,
- transcript of the 18 October 2004 deposition of Trooper Allen D. Green,
- transcript of the 20 October 2004 deposition of Scott Johnson,
- transcript of the 8 November 2004 deposition of Ruth E. Edwards,
- transcript of the 9 November 2004 deposition of Vivian D. Holloway,
- transcript of the 10 November 2004 deposition of Patricia Ann Czapski,
- published references cited below.

Introduction

Trooper Allen Green of the Pennsylvania State Police testified that this multiple-vehicle crash occurred near mile marker 186 on westbound I-80 at ~ 1250 EST on 28 November 2001 (Green deposition, pp. 19, 71). The crash site is in Clinton County, PA near the town of Loganton. NWS hourly weather data on 28 December 2001 for the station closest to the crash site are from Williamsport, PA (station IPT). Throughout the morning of 28 December, IPT recorded a persistent low overcast with periods of broken and scattered cloudiness beneath it. Light snow began at IPT at 1045 EST, and the station's horizontal visibility distance decreased from 10 miles at 0954 EST to 3 miles an hour later. Visibility distances remained low at IPT until 1322 EST, ranging from 2.5–6 miles. IPT's light snow stopped at 1326 EST, resumed for 9 minutes at 1445 EST, and then heavy snow began at 1539 EST. This heavy snow was accompanied by a much lower overcast (~ 800' above the station) and much lower visibility (1.5 miles). Yet 15 minutes later (1554 EST), IPT classified the snow as “light,” and visibility increased to 3 miles by 1601 EST. Similar variations in visibility between 0.5–15.1 miles were reported by the nearby State College and Selinsgrove, PA NWS stations from 0947-1247 EST. Collectively, these NWS observations are consistent with the numerous eyewitness accounts that snowfall intensity and visibility varied over periods of several minutes as they approached the crash scene (e.g., Edwards deposition, pp. 25-27; Holloway deposition, pp. 28-29; Saam deposition, p. 69).

Weather and Visibility Conditions at the Crash Site

Station KCCX near State College, PA is the Doppler weather radar closest to the crash site. Compared with the surface observations from IPT, KCCX’s radar archives show in much greater spatial and temporal detail the snowfall history near the crash site on 28 December 2001. From this archived data, NWS calculates several measures of snow intensity, including the relative strength of radar signals reflected by the snow (Ahrens 1991, pp. 434-436). This “base reflectivity” is measured in reflected decibels (abbreviated dBz) and is mapped in Fig. 1 below.

The green line in Fig. 1 is I-80, and the black arrow near Fig. 1’s center is the crash site. The time of the radar sweep shown in Fig. 1’s upper left is 1718 GMT or 1218 EST. Because weather radar beams are aimed slightly upward, they are reflected by snowflakes anywhere from several hundred meters to 1 kilometer or more above the surface, an altitude partly determined by a site’s distance from the radar. In this case, snow took several minutes to fall to the surface from the average radar-beam altitude above the crash site. I calculate in Fig. 1 that snow reached the surface by ~ 1236 EST. A color scale on Fig. 1’s left edge gives base reflectivity in dBz: white areas flanked by purple indicate the heaviest snowfall (20 to 28 dBz, equivalent to > 1"/hour; see Rasmussen et al. 2001); yellow to light green areas indicate the lightest snow (-4 to -16 dBz, equivalent to flurries).

Thus Fig. 1 shows (1) red and purple areas of moderate to heavy snow extending 5-10 miles east of the crash site and (2) white and purple areas of heavy snow just to its southwest at ~ 1236 EST on 28 December 2001. By the time of Fig. 2 (~ 1246 EST at the surface), heavy snow was falling at the crash site and along I-80 to its east. Time-lapse sequences of these Doppler radar maps show that the snow consistently moved to the east-northeast. Thus drivers westbound on I-80 then would have seen snowfall intensity increase as they and the area of heaviest snow neared each other. Several drivers testified that this was their experience (e.g., Czapski deposition, pp. 25-26; Edwards deposition, pp. 25-27; Johnson deposition, p. 32; Saam deposition, pp. 58, 69), and some estimated that they were driving in heavy snow for more than 2 minutes (Holloway deposition, pp. 28-29) or for 3-5 miles (Gough deposition, p. 45) before reaching the crash scene. By ~ 1255 EST at the surface (see Fig. 3), an area of heavy snow still surrounded the crash site but was beginning to move east-northeast away from it.

Although some drivers described weather conditions just before the crash site as a “whiteout” (Czapski deposition, p. 22; Johnson deposition, p. 149; Saam deposition, p. 70), neither the everyday nor the formal definitions of whiteout mean zero visibility. In fact, the canonical *Glossary of Meteorology* describes whiteout conditions as those in which “sense of depth and orientation is lost; only very dark, nearby objects can be seen” (Glickman 2000, p.

842). This is quite different from true zero-visibility conditions (e.g., those in the thickest fog) where visibility distances are less than 10' — far less than any possible emergency stopping distance. For example, Johnson testified that while he could not distinguish between cars and trucks when he encountered what he called whiteout conditions at the crash scene, nonetheless he could *still* see that the roadway was obstructed by vehicles (Johnson deposition, pp. 39, 49, 149). Thus perceived whiteout conditions by themselves do not guarantee that a driver will crash: even if no hazards are visible, drivers can avoid striking or being struck by other vehicles by promptly and completely pulling off the roadway.

Conclusions

In my professional opinion as a meteorologist, all available government weather data clearly indicate that weather conditions and visibility deteriorated over a period of several minutes, not just a few seconds, for westbound drivers approaching the crash scene. Neither (1) variations in snow intensity within these steadily worsening conditions nor (2) perceived whiteout conditions near the crash scene would by themselves inevitably cause drivers to crash. Practical support for this conclusion comes from the fact that some drivers avoided colliding with others even under these low visibility conditions.

My opinions and conclusions are based on the information available to me as of today and are accurate to within a reasonable degree of scientific certainty. If new or changed data becomes available, I would need to determine whether that data affects my conclusions above.

Sincerely,

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References

Ahrens, C. Donald, 1991: *Meteorology Today* (West Publishing Co., St. Paul, MN; 4th edition, 576 pp.).

Glickman, Todd S., ed., 2000: *Glossary of Meteorology* (American Meteorological Society, Boston; 2nd edition), 855 pp.

Rasmussen, Roy, Mike Dixon, Frank Hage, Jeff Cole, Chuck Wade, John Tuttle, Starr McGettigan, Thomas Carty, Lloyd Stevenson, Warren Fellner, Shelly Knight, Eli Karplus, and Nancy Rehak, 2001: "Weather support to deicing decision making (WSDDM): A winter weather nowcasting system," *Bulletin of the American Metorological Society*, v. 82, pp. 579-595.

Figures

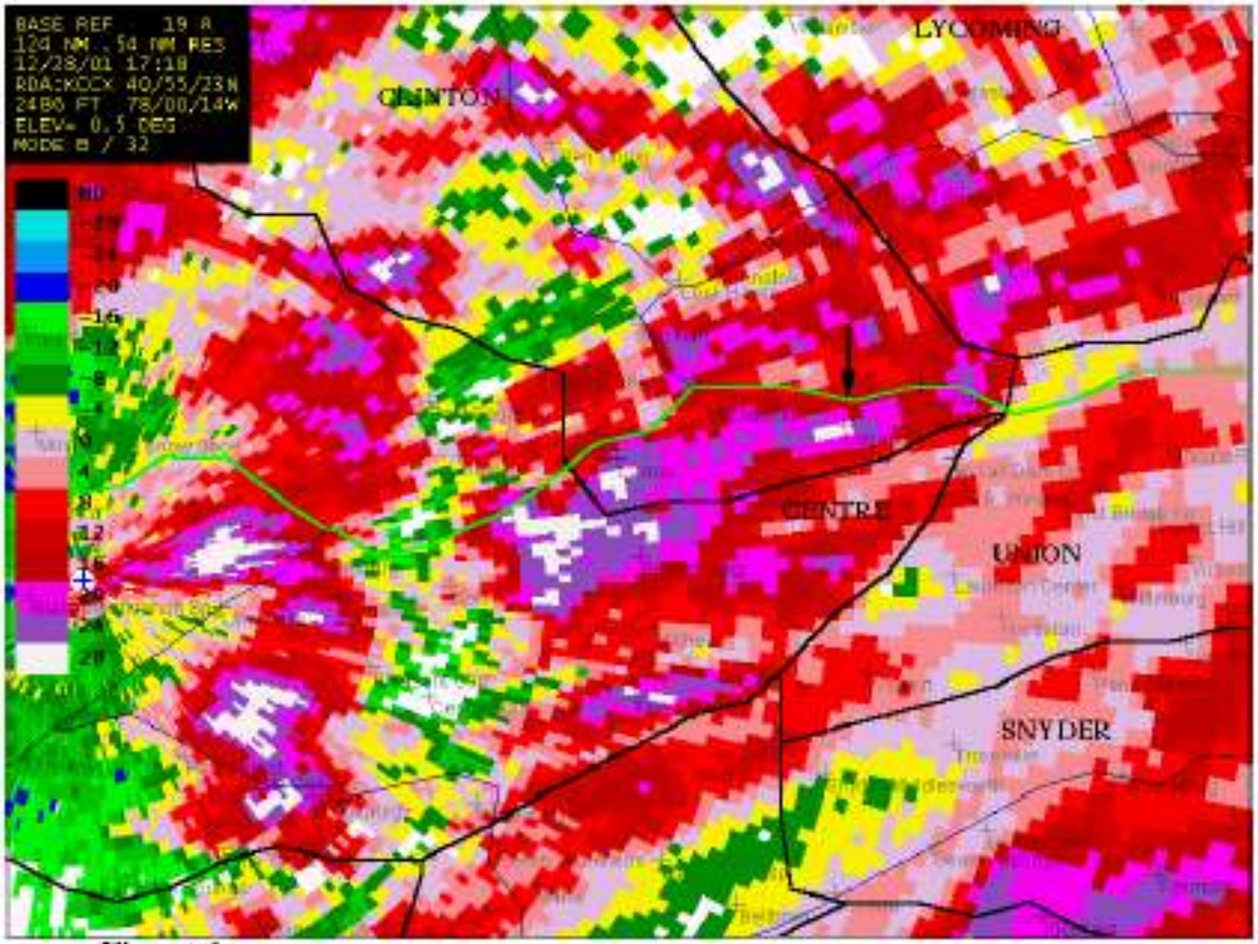
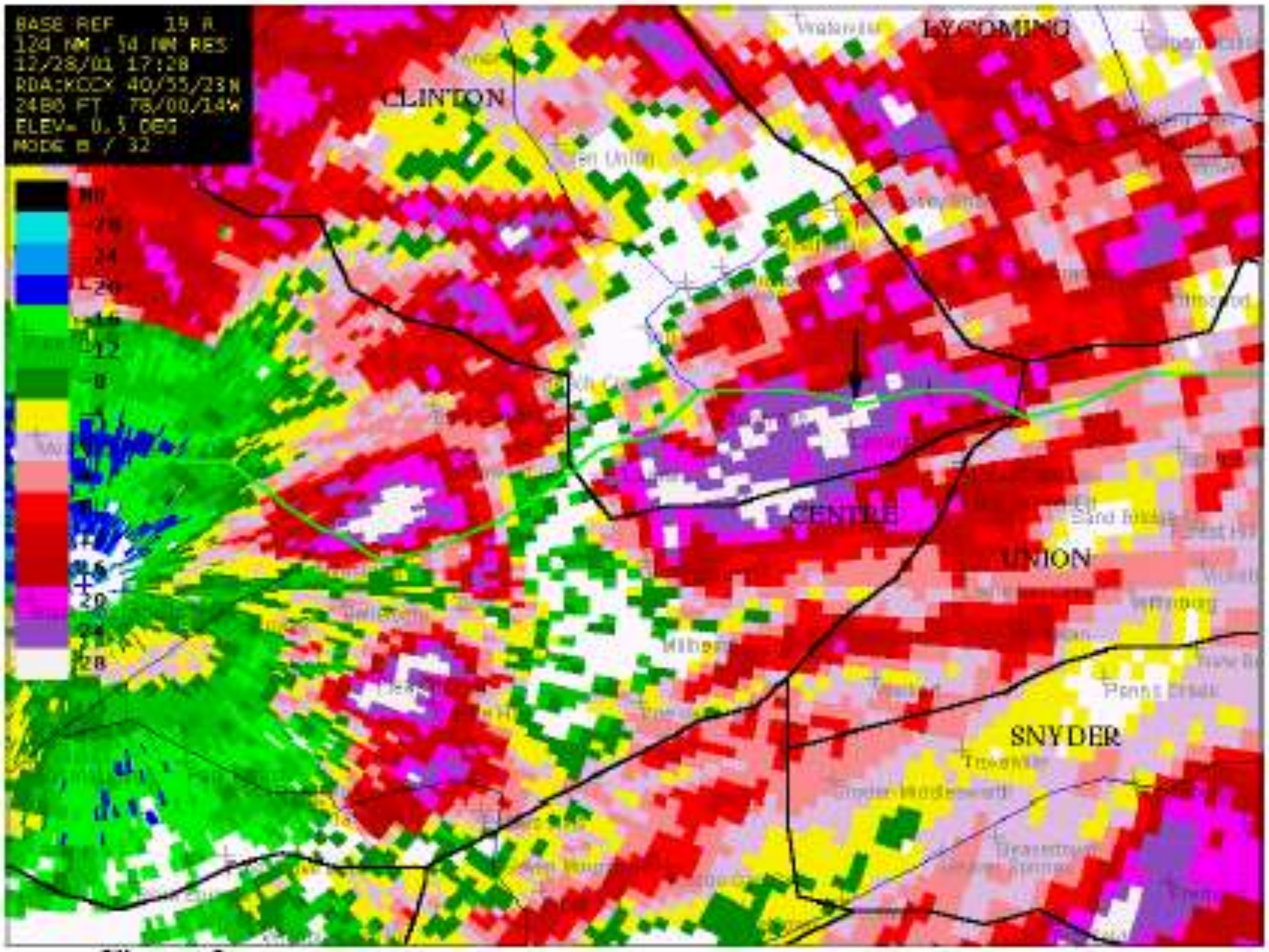


Figure 1



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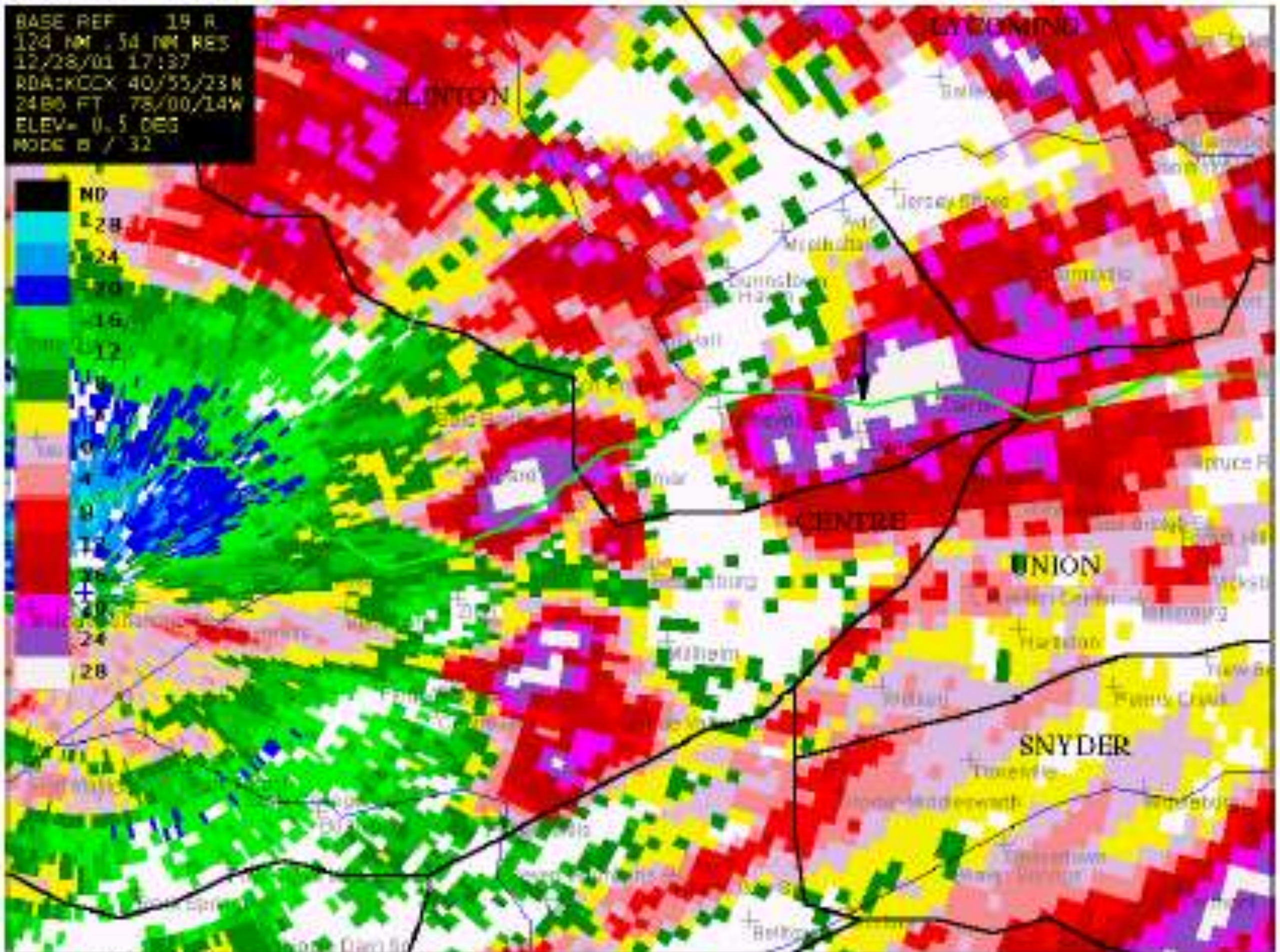
CLINTON
LYCOMING
CENTRE
UNION
SNYDER

Figure 2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ELEV= 0.5 DEG
MODE B / 32
ND
LYCOMING
CLINTON
CENTRE
UNION
SNYDER

Figure 3