

## INTRODUCTION

In an effort to chronicle the events of May 4, 2007 and our association with them, we have put together this piece that is a compilation of everyone's memories of what transpired. Every effort has been made to ensure that this record is accurate and honest.

MESO is a storm chase team that has been in existence since 1998. The original idea behind MESO was to compile a sort of "dream team". The original two members, Nancy Bose and John Bender, worked for a year to compile a team with diverse people, but each a specialist in their field. We had a world-class photojournalist, an extraordinary videographer, a Skywarn instructor that had been chasing since before the early days of Skywarn, a gifted and prolific reporter, a brilliant young scientist, and a licensed pilot to take care of our navigational needs. From that group, MESO was formed, a nonprofit organization dedicated to severe weather awareness and preparedness through education. We're still chasers, we love the pursuit, but it is not the main thrust of this group. 2007 represented our 10<sup>th</sup> year chasing together, now more a family than a team. MESO has grown, and our mission has grown too. As we seem to be acquiring as many Emergency Service people as we are scientists, a segment of our organization is dedicated to the specific area of Severe Weather Training for First Responders (firefighters, rescue workers, search and rescue teams, etc). We are unique in our structure, which is an explanation why a bunch of firefighter/EMTs, forecasters, and a photojournalist were traveling through south central Kansas in May.

On the night of May 4, 2007, a large tornado, 1.6 miles wide, cut a path through Kiowa County, destroying the town of Greensburg, KS (population 1600). We were a couple miles from the town when the tornado went through, much closer to it than we care to think about. This is the series of events that lead to our being in Greensburg during and after the first EF5 tornado in history. The previous F5 was 8 years earlier, on May 3, 1999, in Oklahoma City. The Fujita Scale (denoted by an F) was replaced by a more robust and accurate Enhanced Fujita Scale (denoted by an EF) in 2007.

## THE AFTERNOON OF MAY 4

We started the day moving north from Perryton, TX to Dodge City, KS where we decided to grab a hotel early in the day, anticipating a very active day. By late morning, we began "the hunt" and headed to Great Bend KS on Hwy 56 into what were utterly ideal conditions for supercell and tornado development. CAPE was 4500 J/kg, deep shear and low-level helicity were insanely strong, we had sustained 25 kt south-easterly surface winds feeding in hot moist air, a hefty cap was expected to break by early evening, and a potent upper-level jet was nosing into the area to trigger convection. We drove a little, waited, drove a little, waited, and waited. We spent a couple



hours sitting on a dirt road east of Lyons, watching a hopelessly blue sky. Imagine our surprise when absolutely NOTHING happened. Even when the cap eroded, nothing went up. We stuck on one pocket of convection until near sunset, and then headed back toward Dodge City to wallow in disappointed defeat. In the setting sun, we caught a magnificent cell that shot up rapidly in the

distance, and started eyeing one moving northeast from the Dodge City area. At the time, we didn't think it was capable of anything but giving us lightning opportunities so we decided to intercept it, hopeful of getting some late night lightning shots. It was heading directly for us and we were heading for it, so the intercept time would be remarkably short. Things got "interesting" real quick, and tornado warnings were close to follow.

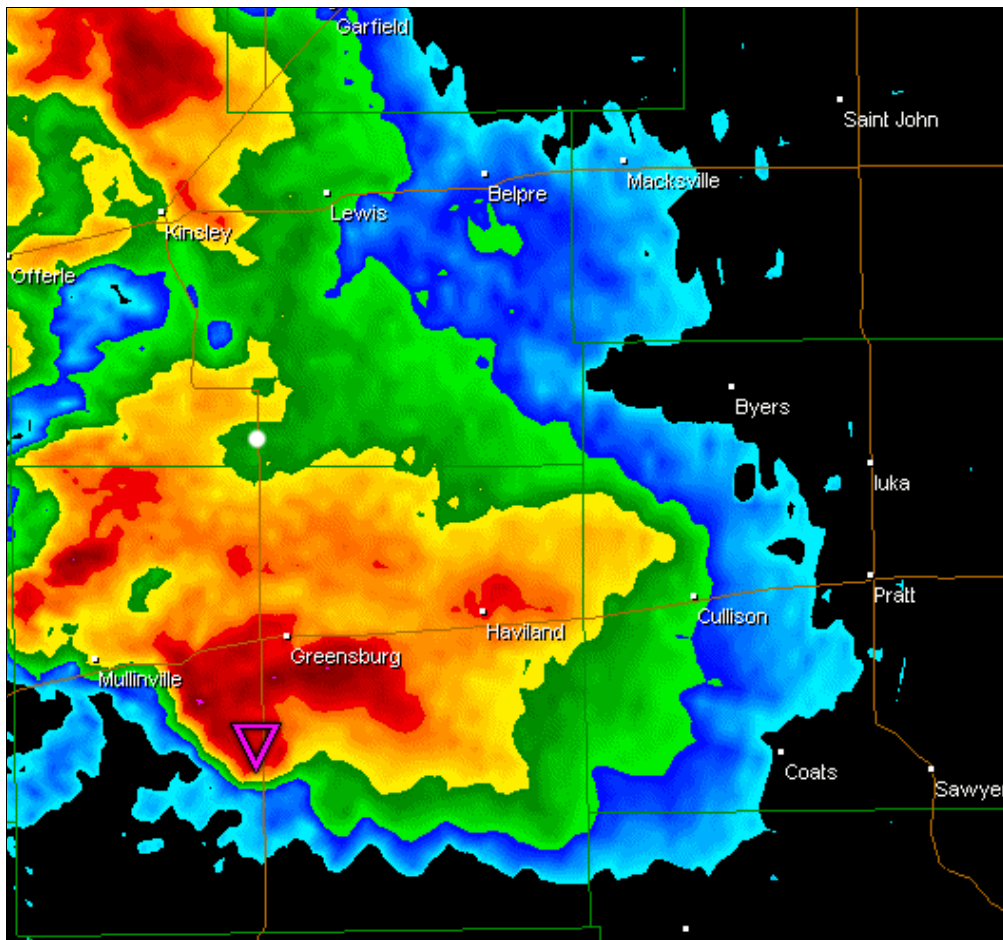


The developing supercell south of Dodge City at sunset. This is the storm that would spawn the EF5 tornado an hour later.

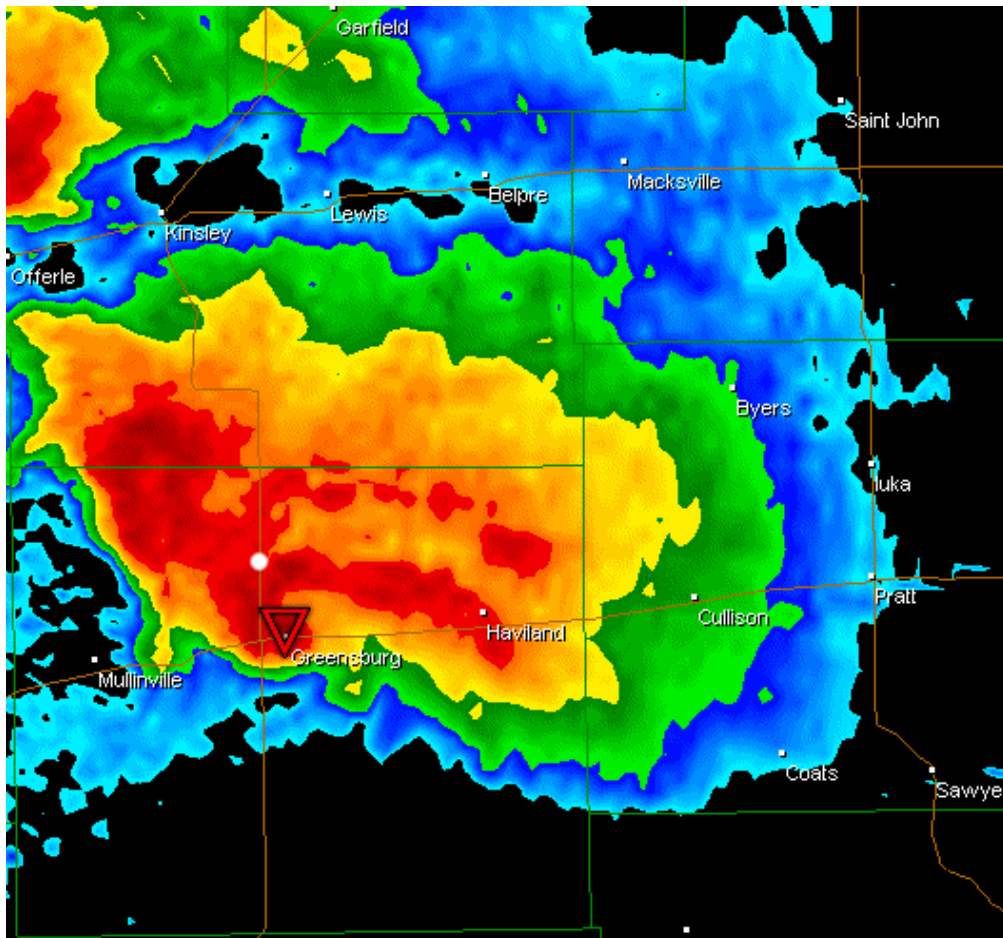
## THE NIGHT OF MAY 4

The cell we had targeted split. The northernmost cell ended up behind us, and the southern cell was in front of us. We were in contact with other chasers who were south of the cell, looking north. Even after we learned that the storm was tornadic, we thought it would be a simple task to wait for it to pass across the highway, and continue to perhaps pick up some good photos of the tornado backlit by lightning from a few miles away. We thought we were well on our way to accomplishing this, scooting in between the two, but the winds were increasing, not decreasing. The time on one of the video cameras (we left the dash cams running) was 9:46pm. We were about two miles north of the intersection of Hwy 183 and Hwy 54, heading toward Greensburg (famed for the world's largest hand-dug well). The other chasers south of the storm reported via cell phone that a large wedge had crossed the highway several miles in front of us, and was heading directly for Greensburg. We couldn't see it due to the strong winds and blowing rain and hail.

At about 10:00, west winds really kicked up, rocking the vehicles to nearly the point of rolling at times. We could occasionally see large tree branches and limbs flying over our heads, and insulation and other debris blowing across the road. There was approximately 1" hail at this time too. We assumed that this was the RFD or even inflow, since a tornado to our south would have produced EASTERLY winds. We proceeded cautiously, to avoid getting too close to the tornado. After verifying that the tornado had crossed Hwy 183, we continued at a slow pace south toward the intersection with Hwy 54. Based on the damage survey after-the-fact, it turns out that the southern portion of the now westward-moving tornado crossed Hwy 183 to the north of us! It is quite possible that the southern fringe of the tornado was less than a mile to our north during this frighteningly intense period. The parent supercell's mesocyclone occluded shortly after hitting Greensburg, which is likely why the tornado curved in a cycloidal pattern and then decayed north of the Hwy 183-54 intersection.

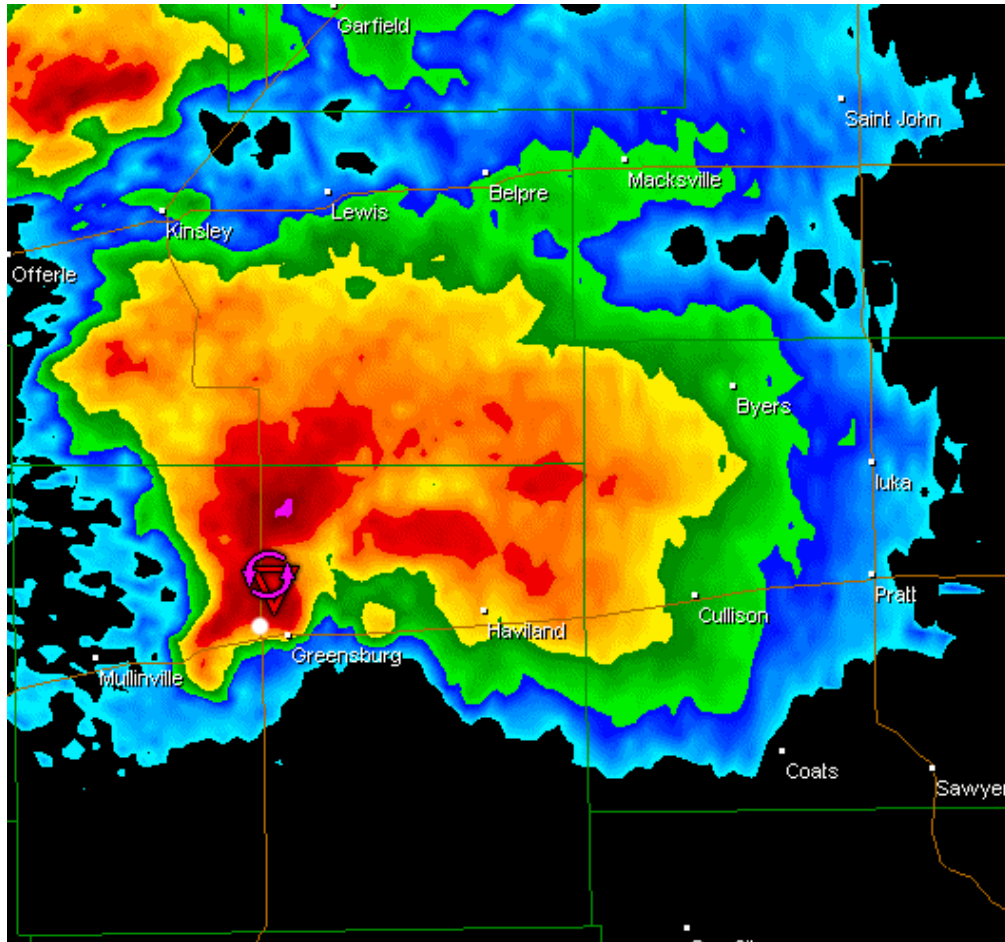


Radar image from Dodge City at 9:37pm... large tornado crossing Hwy 183 southwest of Greensburg. Our location shown by a white dot.



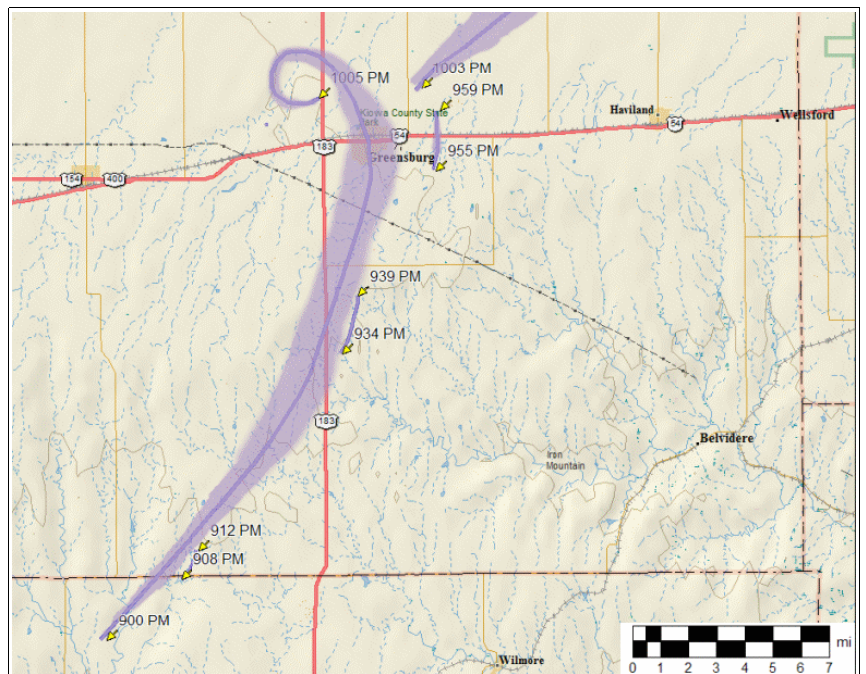
Radar image from Dodge City at 9:54pm... 1.6-mile-wide EF5 tornado crossing Hwy 54 over Greensburg. Our location shown by a white dot.

Aside from the nearly nonexistent visibility we had, we would never have seen the tornado... something 1.6 miles wide would have filled our field of view from that close. We could see nothing but debris and rain. In a way, we were lucky to be ignorant to that at the time, it helped us keep our wits about us.



Radar image from Dodge City at 10:02pm... large tornado crossing back over Hwy 183 northwest of Greensburg. Our location shown by a white dot.

So, did MESO core punch the first EF5? No, it punched us. We assumed it was continuing northeast and moving away from us. We made a decision to take a calculated risk, and in hindsight, none of us would make the same decision again. We were extremely lucky to say the least. It was actually days after the event that we were made aware of the official track of the tornado. It did make the whole thing come together more for us. Did we do the smartest thing on the planet? No. Night chasing, when you weigh potential risk against possible gain, is never a good transaction. We got suckered in by what we thought was a golden opportunity after an abysmally disappointing day. Ultimately, we didn't even SEE the tornado. However, we



Aerial surveys help determine the damage path of the tornadoes, shown in purple.

learned a lot from this. A) We're not immortal. B) We can't keep pushing the outside of the envelope. We have to tamp down some of the zeal that tends to rob the oxygen from our brains. C) Tornadoes do not feel contractually bound to follow their projected paths.

We do not condone this kind of chasing, and we are neither proud nor ashamed of it. It happened. The only pride involved here was how we handled it when we realized we were in a "fix", and how we worked together calmly, sensibly, and intelligently, combining what we knew with what we saw. There was no panic, no hysterics, just a "well, now what" attitude that has served us well in times past. We were in a bad situation, and we did the best we could. One look at that path is proof enough to us that God was with us, and guided our steps. He knew we'd be needed in Greensburg, and gave us our much-needed "get out of jail free" card.

Breathing a lot easier as we got safely to the intersection of 54 and 183, we met up with a fire chief from a local department. After quickly explaining who we were, he personally escorted us into Greensburg, just a mile east of the intersection. I imagine he's still scratching his head, wondering how a group of people with meteorologists, firefighters, photographers, and EMTs, with two Mobile ThreatNets, radios, walkie talkies, a trauma pack and an AED unit, just happened to be one mile from where we were needed more than any place in the world.

## **THE AFTERMATH**

The scene that met us was surreal. The destruction was incredible. Semi-trucks were overturned, debris and power poles blocked the road, cars were crumpled like pieces of paper, houses were decimated, and there was a smell that no one among us will ever forget. It was a smell of gasoline, propane, natural gas, wet insulation and wet drywall. There was of course, no electricity, and we heard screams for help emanating from the darkness. We had been in Oklahoma City two weeks after the tornado of May 3, 1999. There is, however, a world of difference between two weeks ago and fifteen minutes ago. We were stunned, speechless. People started to emerge from the darkness, bleeding, bruised, half clothed. The sounds of wounded and dying livestock and pets drifted out of the night. There was darkness, strong winds, and the growing knowledge that this town had about 1600 people unaccounted for. "There will be deaths here."

We were immediately put into service. Amongst ourselves, we decided to split the team: half going to assist with search and rescue and half staying to set up triage for the wounded in the center of town. When the team split, the only portable communication we had were two small family band hand-held radios. A man emerging from the dark reported that he had left a friend who was trapped in the basement of a power plant. Our guys responded almost immediately. Shortly after they responded in, the radio crackled with the distressing news. The team members in the power plant relayed to Nancy that there was indeed a trapped victim, a possible HAZMAT situation (there was an overwhelming odor of caustic chemical, possibly anhydrous ammonia), and to have command shut down access from the north, and evacuate people downwind. Nancy, who was overwhelmed at triage, sent runners from the team up to the command center to arrange all this. Somehow the seriousness of the situation got lost in translation and the runners returned with the news that help could not be spared, all resources were exhausted.

Knowing the ramifications of a chemical leak, Nancy broke away from triage for moments and then ran up herself to further emphasize the seriousness of the situation in the power plant. Once the true gravity of the situation was explained, a team of volunteer firefighters was dispatched immediately with SCBA to assist our guys, who were already there. This was no small deal. Our guys, and those responding in, were in an even more dire a situation than the tornado itself. There is no shelter from a chemical leak. They were all out there in the dark, risking their very lives.

A word here is necessary. We only went into Greensburg after getting clearance from the local authorities. Many of us have spent years training for such things as this, and we know the Incident

Command System cold. When encountering a disaster of this proportion, there is an overwhelming desire to help, and help is definitely needed. However, there is a very structured system of command and accountability that is practiced universally at disaster scenes. First rule is find the guy in charge, ask him if you can help, and do exactly as you're told... even if that is to leave town and stay out of the way. Trying to help without proper training in things like extrication, structural integrity, emergency medicine, etc. could very easily make you another victim that has to be saved. Trying to get to someone who's trapped without proper training could kill him or her. We saw a little bit of freelancing that night, and though we admire the intent, these people rapidly became part of the problem, not part of the solution.

Those first few moments after the tornado struck were mind altering. People were wandering into the triage area impaled by glass shards, covered in blood and mud. People were walking through broken glass and debris barefoot, some with arms hanging, or legs dragging. Nancy explains "every one of these people needed attention of some sort. But in triage, you cannot treat the mind and soul. Your job is to make sure that those who need immediate medical attention GET immediate medical attention. But it's hard, very hard. You want to hold these people and tell them it's going to be OK, you want to comfort them, but that's not what the job calls for. Still, there were so many times where I just wanted to sit down right in the middle of all this and cry. But that's not what the job calls for either." Most of the injuries that emerged from the rubble were lacerations, bruises, embedded glass, and trauma resulting from collapsing buildings, mainly to heads and backs. We met the people "coming out" by trying to clear safe passages for them. This required breaking many of the rules of personal safety, but their need was so great. We ripped through rubble with reckless abandon, over and under power lines that could have become active with a kick from someone's generator or a lighting strike, through deep puddles that we fervently hoped only contained water. It wasn't bravery; it was a perfectly natural response to a perfectly horrific situation. These people had been through enough. We did what we could to make the last steps to safety as secure as we could.

After command of triage had passed to local responding units, Nancy worked with local EMS treating the wounded, helping load them on ambulances, and more triage. Brian, Chris H., Josh, and Matt kept an eye on developing weather, keeping all parties informed and up to date, and helped with disaster services, escorting victims to safety, running messages until communications were established. Matt also set up some Ham radio communications. These guys are not responders; they are scientists. You would have never known it, though. Without so much as a whimper, they put their safety on the line for those in need.

Memory flashes of particular moments that night have been firing since we were there. Watching our guys disappear into the darkness into who-knows-what, Allan using his camera lights to light a victim being treated, Brian silhouetted by flashing lights as he carried a terrorized dog to the rehab area, a deputy hugging his wife after finding her alive and safe, Matt trying desperately to set up a Ham network in the back of the van, an elderly man dying on the road in front of our eyes, Chris pulling nails out of his shoes while dragging bags of ice to the rehab area, a sheriff's car with four flat tires, riding on his rims, shuttling people back and forth through the worst part of the damage, Nancy carrying a frightened toddler through the debris to get her on an ambulance, people staggering out of the darkness with vacant eyes, having lost everything but the people they were holding onto very closely, a child wrapped in a plastic table cloth to keep him warm, a man covered in blood who refused medical attention until everyone else had been taken care of, and hundreds more. They will never leave us. Everyone had a story, each unique.

We worked the disaster scene until 3am, starving and exhausted. We couldn't leave. We had bonded to the scene, to the town, to the people. The heart does not comprehend geographic boundaries. Greensburg had become OUR town. Not until the last of the people were moving towards the buses that were shipping them to emergency shelters did we release ourselves from service. We were muddy, wet, smelled bad, many of us covered with bits of insulation and debris, a few of us bloodied. We NEVER looked better.



As emergency responders, this is what we train for, hoping we never have to use this training. We refer to this as an MCI, or Multi Casualty Incident. You train, you drill, you plan... but until you're confronted with the heart-wrenching human element, you cannot count yourself as prepared. "The worst part" says MESO Vice President Nancy Bose, "Were the people looking for their family members. Where's my sister? I can't find my Mother. My grandparents are in there somewhere... it brings home the meaning of the word DISASTER". MESO Science Director Brian McNoldy spent his time in Greensburg relaying messages, helping dazed victims get to centralized first aid areas, and consoling victims who were missing loved ones or still confused about what had just happened. "It was a shock to see the scale of the devastation... the tornado must have been at least a mile wide, and probably an EF4 tornado (now determined to be an EF5). Most structures were leveled, significant brick buildings were crumbled, thick metal poles and even a fire hydrant were seen scattered about and bent. It came at about 9:45pm, so most were at home, some already in bed. There was a lot of warning, but some people didn't have enough time to get to their basements, or didn't have basements. The smell was unforgettable: even if you've never been to a scene like this, something instinctual tells you that it's a smell of disaster: gas, wet wood, wet drywall, wet insulation, etc. The look on people's faces just minutes after this event is something that's etched on my memory. Shock, confusion, disbelief, fear, yet all were grateful to simply be alive. Although I can still hear the screams and yells for help in the darkness, I can also still hear the 'Thank you so much for coming so quickly, God bless you' and the people who just wanted to be hugged or have their hand held." MESO Media Director Allan Detrich likened the scene as something "like from a horror movie. The people moving out of the darkness had a zombie like quality...they were in total shock."

There are elements of a disaster scene one never gets used to. With limited manpower and resources, you have to categorize the critical from noncritical. Imagine the pain of having to tell a mother that the cut on her infant's head is something that will have to wait. There is resource allocation. Imagine telling someone just arriving that no, he can't go look for his sister and her baby, even though they haven't been found. One more person out there in that mess is one more potential victim. Imagine telling a trooper who is doing his damndest to help a wounded community that the tornado that did all this is headed to the community that his family lives in. You do what you can. Sometimes, particularly in Greensburg, the best you could do was simply holding people up while they wept. We did everything we possibly could to help everyone we possibly could. It still didn't feel like enough.

The next day we retraced the damage path of what had then become nationally known as the “Greensburg Tornado”. This time we drove to the west of town on 183 to look out over the damage scene. In addition to incredible destruction to house after house, we came across a field of cattle that had been killed. Driving by the town during the day revealed the complete destruction of the city. Very little remains intact.



Aerial photo of Greensburg by Jamie Oppenheimer

The mood became even more somber when we retraced the route where we “dodged the bullet” and slipped between the two cells the night before. Randy’s voice crackled over the radio, “Oh my GOD”. We were at the stretch of road we had been on the night of the Greensburg tornado. On the route we traveled, there were trees uprooted, wires down, homes destroyed. All this destruction was going on WHILE we drove down that road, but we mercifully could only see what blew maybe two feet in front of the windshield. We were queasy and chilled at what we saw, and the reality of just WHERE we were the night before.

As far as the team goes, several of us had to seek professional counseling after the Greensburg Disaster. As responders, we are used to answering calls for help. It was horrible to hear so many, and NOT be able to get to the people. We are unashamed to admit that symptoms exhibited were typical of post-traumatic stress disorder: sleeplessness, short tempers, nightmares, guilt (not uncommon, you always think you could or should have done more), reclusiveness, and bursting into tears at the oddest times, like when people thank us for what we did. Talking amongst us has helped.

The spirit of the people of Greensburg became apparent even in the earliest stages of the disaster. The townspeople transitioned from, “Am I OK?” to “Are you OK?” before the dust settled. Those not hurt helped those who were. As the immediacy of the situation moved into recovery, we knew that people were now in place who could address Greensburg’s needs better than we could, and it became time to say goodbye. It was hard. We had worked side by side with responders from Greensburg and from neighboring communities, and though its difficult to imagine, had become very close to many of them in all that we shared that night. The nobility of those who came to help from neighboring communities is beyond words. We are honored to have worked with such fine people. Greensburg, its citizens, and its friends have a “forever” place in each of our hearts, and we shall all pray that the courage that got them through that night will continue to fortify them for the incredible task of rebuilding their town and their lives. May God bless every single one of them.



The 2007 MESO Chase Team:

<i>Nancy Bose</i>	(Verbank NY)
<i>Randy Denzer</i>	(Austin TX)
<i>Allan Detrich</i>	(Fremont OH)
<i>Sam Furman</i>	(Austin TX)
<i>Chris Howell</i>	(Ypsilanti MI)
<i>Josh Jans</i>	(Mankato MN)
<i>Matt Kassawara</i>	(Fort Collins CO)
<i>Brian McNoldy</i>	(Fort Collins CO)
<i>Shane Motley</i>	(College Station TX)

*For more photos and information, please visit [mcwar.org](http://mcwar.org)*

