



**SURVIVAL FACTORS GROUP CHAIRMAN'S
FACTUAL REPORT**

**Bridge Collapse
Mount Vernon, WA; 05/23/2013**

HWY-13-MH-012

(18 Pages)



**NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF HIGHWAY SAFETY
WASHINGTON, D.C. 20594**

A. ACCIDENT

LOCATION: Interstate 5 at Milepost 228.25 over the Skagit River, in Mount Vernon, Skagit County, Washington.

VEHICLE 1: 2010 Kenworth Truck Tractor and 1997 Aspen Flatbed Trailer, Hauling an Oversize Load
OPERATOR: Mullen Trucking LP, Aldersyde, Alberta, Canada

VEHICLE 2: 1997 Dodge Ram Pickup Truck, Piloting the Oversize Load
OPERATOR: G&T Crawlers, Olympia, Washington

VEHICLE 3: 2000 Kenworth Truck Tractor and 1996 Utility Refrigerated Trailer
OPERATOR: Motorways Transport LTD, Surrey, British Columbia, Canada

VEHICLE 4: 2010 Dodge Ram Pickup Truck and 2009 Jayco Travel Trailer
OPERATOR: Private owner

VEHICLE 5: 2013 Subaru VX Crosstrek
OPERATOR: Private owner

VEHICLE 6: 1995 BMW 525i
OPERATOR: Private owner

DATE: May 23, 2013

TIME: Approximately 7:05 p.m. PDT

FATAL: 0

INJURED: 3 minor, 5 uninjured

NTSB #: **HWY13MH012**

B. SURVIVAL FACTORS GROUP

Thomas Barth, PhD
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NTSB
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Washington State Patrol
Major Accident Investigation Team

C. ACCIDENT SUMMARY

For a summary of the accident, please refer to the Accident Summary report in the docket for this investigation.

D. VEHICLE INFORMATION

The accident involved 6 vehicles as identified in section A. Vehicles 1, 2, 3, 4, and 6 were travelling southbound while vehicle 5 was traveling northbound at the time of the accident. The State of Washington Police Traffic Collision Report, Attachment 1, contains a diagram of the vehicles in relationship to each other and the bridge at the time of the accident.¹

1. 2010 Kenworth Truck Tractor and 1997 Aspen Flatbed Trailer, Hauling an Oversize Load

The accident combination unit was a 2010 Kenworth T800B truck tractor, Vehicle Identification Number (VIN) 1XKDDDB0XAJXXXXXX in combination with a 1997 Aspen SD40-3TR extendable semitrailer, VIN 2A9PF4033VN1XXXXXX.² The combination unit was hauling an oversized load consisting of a casing shed. The casing shed manufacturer provided basic dimensions, which were approximately 60 feet in length, 11.5 feet in width, 12.25 feet in height and an approximate weight of 40,000 pounds.

The top, front portion of the casing shed struck the first overhead truss structure when approaching the bridge from the north. The Skagit River Bridge had 12 spans of which 8 were suspended by an overhead truss structure. More detail of the bridge and the damage sustained is available in the Highway Group Chairman's Factual Report and the Technical Reconstruction Forensic Documentation Report, contained in the accident docket. The first truss span collapsed into the river. The truck tractor continued driving under the truss structure and came to a stop south of the bridge. The accident docket contains a photo of the collapsed section of bridge.³

The 2010 Kenworth sustained damage to the right front corner of the load. Scratches and dents present along the entire length of the right top edge of the load. There was also a set of

¹ Attachment 1: Washington State Police Report, available in the accident docket.

² Last 6 Digits of all VIN in this report are redacted and replaced with X.

³ Photo 1: Collapsed Section of Skagit River Bridge in Mount Vernon, WA.

scratches noted on the left front side of the load. The frame of the load was distorted at its four bottom corners where it was chained to the trailer. The chain at the right front bottom corner had broken loose and chain links were found on the bridge south of the collapsed section. A webbed tie down also broke off.

The truck tractor showed no signs of damage as a result of the accident. The engine and electrical systems remained intact and functional. The air system for the brakes and suspension for both the truck and the trailer also remained intact and functional. The accident combination unit driver seat was an air-suspended seat with a 3-point lap belt and leather upholstery. The seat and belt were inspected and were intact and functional. Further information about the truck tractor and trailer is contained in the Vehicle Factor's Group Chairman's Factual Report, available in the accident docket.

2. 1997 Dodge Ram Pickup Truck, Piloting the Oversize Load

The pilot vehicle was in front of the truck and clear of the falling bridge structure during the collapse. It was not damaged in the accident, and was involved in the accident in the respect that there was an operational connection with the accident truck. The Vehicle, Motor Carrier, and the Human Performance Group Chairman's Factual Reports contain further information regarding the pilot car.

3. 2000 Kenworth Truck Tractor and 1996 Utility Refrigerated Trailer

The 2000 Kenworth truck tractor and refrigerated trailer combination unit was in the left lane passing the 2010 Kenworth that was hauling the oversize load at the time of the accident. The 2000 Kenworth was identified from witness statements and from video evidence collected during the investigation. Once it was located, contact damage from the casing shed of the oversized load was found on the upper right side of the refrigerated semitrailer. The driver of the 2000 Kenworth reported that he did not realize his truck had been involved in the accident and continued driving from the scene. The Vehicle Factors Group Chairman's Factual Report contains further information about the 2000 Kenworth truck tractor and 1996 utility refrigerated trailer.

4. 2010 Dodge Ram Pickup Truck and 2009 Jayco Travel Trailer

A 2010 Dodge Ram pickup, VIN 1D7RV1GT8ASXXXXXX was hauling a 2009 Jayco Jay Flight travel trailer, VIN: 1UJBJ02K0978AXXXX, and was following behind the 2010 Kenworth combination unit. The pickup and trailer were on the collapsed portion of the bridge during the accident, and were found among the debris of the bridge in the river. The pickup truck was facing south, and was found near the sound end of the collapsed section, on the concrete center median of the bridge⁴. The trailer was found in the river trapped in the debris of the bridge truss structure.⁵ The truck was removed from the river using a crane and two chain loops

⁴ Survival Factors Photograph 2: Rest Position of the 2010 Dodge.

⁵ Survival Factors Photograph 3: Rest Position of 2009 Jayco, available in the accident docket.

positioned just forward of the rear axle and just aft of the front axle. The trailer was destroyed and removed from the river in pieces by a clam bucket operated from a crane.⁶

The truck was inspected at an impound lot. The primary damage was to the front bumper and the roof. The front bumper was deformed near the center on the left side. It exhibited scrape marks and orange paint. The roof was deformed downward in the center, also with scrape marks and orange paint.⁷ The truck interior was inspected, focusing on the front seats which were occupied during the accident. Measurements were taken in the interior of the truck from the corners of the front seats, vertically to the lowest point in the ceiling. The clearances for the driver seat were: left front 23 inches, left rear 30 inches, right front 16.5 inches, and left rear 20.25 inches. The clearances for the passenger front seat were: left front 23 inches, left rear 26.5 inches, right front 26.75 inches, and left rear 32 inches. The airbags did not deploy in the accident. The Washington state patrol downloaded the airbag control module data, and the report indicated no event. Further information is available in the Vehicle Group Chairman's Factual Report. The seats had 3-point lap belts which were intact and functional. No occupant impact marks were found.

5. 2013 Subaru XV Crosstrek

The Subaru XV Crosstrek sedan was VIN: JF2GPACC8D2XXXXXX. The vehicle was found in the debris of the bridge in the river, facing north, and on the west side of the collapsed truss. The vehicle was removed from the river using a crane and two chain loops positioned through the front and rear windows.⁸

The primary damage to the sedan was at the front and the right rear corner. The front was crumpled with the front bumper displaced from the vehicle. The front damage was worse on the driver side, with the headlight missing and the left front wheel dislocated from the transaxle. There were scrape marks and orange paint found in the damaged region at the front of the vehicle. The damage on right rear corner of the vehicle was concentrated in the upper portion, with extensive scrape marks and torn metal with orange paint transfer.

The front driver airbag and left and right side curtain airbags were deployed. The passenger front airbag was not deployed. Attempts were made to download data from the airbag control module, but were unsuccessful. Further information is available in the Vehicle Group Chairman's Factual Report in the accident docket. The left front and both rear windows were broken out during the extraction of the vehicle to provide a route for the chain. The right front door was partially open, and the chain was passed through the gap without breaking the window. The left side curtain airbag was also cut away during the extraction. The right side curtain airbag was not cut away, and was found in the partially deployed position, with the aft sections of the airbag torn open in the area of the right rear corner damage.

⁶ Survival Factors Photograph 4: 2010 Dodge and Survival Factors Photograph 5: 2009 Jayco, available in the accident docket.

⁷ Survival Factors Photograph 6: Roof Damage to 2010 Dodge, available in the accident docket.

⁸ Survival Factors Photograph 7: Rest Position of 2013 Subaru; Photograph 8: 2103 Subaru, available in the accident docket.

The interior of the sedan was inspected with focus on the driver seat and surroundings. The seat had a 3-point belt and was found intact and functional. There were no visible occupant impact marks found.

6. 1995 BMW 525I

The BMW 525I, VIN WBAHD63XSGKXXXXXX was behind the 2010 Kenworth combination unit and witnessed the oversize load impact the bridge. The BMW slowed down to avoid the collision, but then realized the bridge was collapsing and sped up. The occupants of the BMW felt a bump, and were not sure if it was caused by disruption of the road surface from the collapsing bridge or by running over debris in the roadway. The BMW drove clear of the bridge and stopped at the scene. Further information is available in the Vehicle Factors Group Chairman’s Factual Report.

E. OCCUPANT AND MEDICAL INFORMATION

A total of 8 people were involved in the accident. Each vehicle was occupied by a driver, and only the 2010 Dodge Ram and 1995 BMW had a passenger. There were no fatalities or serious injuries, and there were 3 people who suffered minor injury and 5 who were uninjured. A summary of the occupant injury severity level for each of the vehicles is provided in **Table 1**. The injury levels were evaluated according to Title 49 CFR 830.2.⁹

Table 1: Occupant Injury Summary

	Uninjured	Minor	Serious	Fatal
2010 Kenworth Truck/Trailer	1	0	0	0
1997 Dodge Ram (Pilot) Driver	1	0	0	0
2000 Kenworth Truck/Trailer	1	0	0	0
2010 Dodge Ram/Camper Driver	0	1	0	0
2010 Dodge Ram/Camper Passenger	0	1	0	0
2013 Subaru Crosstrek Driver	0	1	0	0
1995 BMW 525I Driver	1	0	0	0
1995 BMW 525I Passenger	1	0	0	0
Total	5	3	0	0

1. Occupant of the 2010 Kenworth with Oversized Load

The 2010 Kenworth driver was a 42 year old male, and was not injured in the accident.

2. Occupant of the 1995 Dodge Ram Pilot Vehicle

The driver of the pilot car was a 55 year old female, and was not injured in the accident.

⁹ Title 49 CFR 830.2 defines a fatal injury as: any injury that results in death within 30 days of the accident. A serious injury as: an injury which requires hospitalization for more than 48 hours commencing within seven days from the date the injury was received; results in a fracture of any bone (except simple fractures of the fingers, toes, or nose); causes severe hemorrhages, nerve, muscle, or tendon damage; involves any internal organ; or involves second or third degree burns, or any burns affecting more than 5 percent of the body surface.

3. Occupant of the 2000 Kenworth with Refrigerated Trailer

The 2000 Kenworth driver was a 35 year old male, and was not injured in the accident.

4. Occupants of the 2010 Dodge Ram and 2009 Jayco Jay Flight Camper

The driver of the Dodge pickup truck was a 48 year old male, and was 5 feet 8 inches tall and 185 pounds. He was asked to describe his injuries during a telephone interview and again in person while he was at the vehicle impound yard collecting his personal belongings. Based on his description, he suffered a scrape and contusion on the right rear and top side of his head, a dislocated shoulder, and multiple scrapes and cuts on his arms and hands. He also had a contusion on his left knee.

The Dodge Ram driver was transported to Skagit Valley Hospital and a Subpoena was used to obtain the driver's medical records. The medical records indicated that he was admitted at 9:08 p.m. on May 23, 2013 and discharged at 10:35 p.m. He suffered a right shoulder dislocation with no indication of fractures. He also suffered contusions to the left and right knees, abrasions to the hand, forearm, and top right side of head.

The passenger in the Dodge pickup was a 56 year old female, and was 4 feet 8 inches tall and 110 pounds. Based on her description of injuries from a telephone interview, she suffered internal bleeding and a contusion on the right shoulder in the region that the seat belt was worn. She was held in the hospital overnight for observation and was released from the hospital the following day.

The Dodge Ram passenger was transported to Skagit Valley Hospital and a Subpoena was used to obtain the passenger's medical records. The medical records indicated that while on scene she was noted to have normal blood pressure and heart rate in the 110's. She was also noted to have lost consciousness at the scene. She arrived at the hospital at 8:39 p.m. She received initial treatment, for which the records did not provide a clear admittance time and discharge times. She subsequently returned to the hospital later that night with concern of internal bleeding. She was admitted at 1:37 a.m. on May 24, 2013, held overnight for observation, and discharged at 3:49 p.m. on May 24, 2013. The medical records indicated that she suffered head, back, and hip pain, and gastrointestinal bleeding.

5. Occupant of the 2013 Subaru Crosstrek

The driver of the Subaru was a 20 year old male, and 6 feet 1 inches tall and 182 pounds. Based on his description of his injuries during a telephone interview, he suffered head contusions, chest contusions, and neck pain. He was transported to United General Hospital in Sedro Woolley, Washington, and was treated and released.

6. Occupants of the 1995 BMW 525I

The BMW had two occupants, a 76 year old male driver and a female passenger. Both were not injured in the accident.

F. FIRST RESPONDER INFORMATION

1. Skagit County 911

The Skagit 911 Emergency Communications Center (ECC) located in Mt Vernon was established in 1998 and provided emergency communications and dispatch services for law enforcement, fire, and EMS agencies in Skagit County. The call center was governed by a management council which includes three Skagit County commissioners and the mayors of the eight cities and town in Skagit County. The Skagit 911 Year End Report provided information about Skagit County and the structure, training, and incidents relative to emergency communications.¹⁰ Skagit 911 had two primary types of equipment for communication, radios and telephones. Primary communications between Skagit 911 dispatchers and first responders included Very High Frequency (VHF) channels designated for Fire and EMS agencies and Ultra High Frequency (UHF) channels designated for Law Enforcement. The telephone system was used primarily for incoming 911 calls from the public to a 911 call taker (operator). Skagit 911 had a separate telephone system used for non-emergency administrative calls.

A Skagit County Radio Communications Plan was in place for the Fire and EMS radio system. Additional Fire and EMS procedures and all law enforcement radio procedures were contained and documented in the Skagit 911 Standard Operating Guidelines (SOG). Procedures were in place to establish, vet and approve the SOGs through Fire/EMS and Law Enforcement Technical Committees and a Communications Advisory Board.¹¹

a. Accident Response

The Incident was established at 7:05:27 p.m. when 911 calls started to be received by the Skagit 911 call center. The incident log was obtained from the Washington State Patrol.¹² Units were dispatched within the minute and the first unit reported on scene at 7:07:52 p.m. Skagit 911, based on incoming 911 calls, informed responders that a section of the bridge collapsed, that both north and southbound lanes compromised at 7:06:40 p.m., and people were reportedly in the river at 7:06:54 p.m. The Washington State Department of Transportation (DOT) was advised at 7:08:09 p.m. Two vehicles and one trailer were confirmed in the water at 7:11:27 p.m. Incident command was established on the south side of the bridge at 7:16:17 p.m. and on the north side at 7:16:24 p.m. The coast guard was en-route at 7:17:16 p.m. and a helicopter and water rescue were dispatched by 7:32:55 p.m. Rescue boats were on scene at 7:38:08 p.m. and the first vehicle occupant was removed from the river at 7:43:26 p.m. Seattle City Light, who controlled the water flow of the river, reported that they would drop the flow of the water in the river. The vehicle occupants were on-route to hospital at 8:56:13 p.m. At 11:00:12 p.m. the truck driver was transported to hospital for a blood draw.

One of the incident commanders on scene, a Battalion Chief from Mount Vernon Fire Department provided an Incident Command Report, which included information regarding

¹⁰ Attachment 2: Skagit 911 Year End Report, available in the accident docket.

¹¹ Attachment 3: Skagit 911 Radio Communications Plan, available in the accident docket.

¹² Attachment 4: Washington State Patrol Incident Log, in the accident docket.

communications for various first response agencies on scene.¹³ The Skagit County law enforcement agencies used a UHF radio system while the fire and EMS used a VHF radio system. The incident occurred in an area with sufficient radio coverage and there were no communications issues reported from either law enforcement or fire-EMS.

The Mount Vernon Fire Department Incident Command Report identified disruptions to some telephone communications networks during the aftermath of the accident. Further investigation identified the effect on Skagit 911 as detailed below. The investigation also collected other information about the reported disruptions and the communications infrastructure in the Mt Vernon area, and is contained in Section H.

The initial 911 calls were received through the local telephone system without incident. Primary radio communications between Skagit 911 and the agencies responding to the incident also functioned normally and without incident. Both UHF and VHF radio communications were reported to have experienced no failures or degradation of operational capability despite the unusually heavy use and traffic associated with the accident. The telephone system became saturated with a high volume of phone traffic related to the bridge collapse. Saturation of the telephone system had no effect on primary communications between first responders because they used radio communication systems. Skagit 911 conducted a post-accident review in cooperation with the investigation, and found secondary effects of the telephone system congestion, as described in section b. below.

b. Skagit County 911 Communications and Training

Skagit County 911 reviewed radio and telephone communications that occurred the day of the accident as well as the systems and training that were in place prior to and during the accident. Radio communications were reported to experience no operational problems or issues, and communications between Skagit 911 and all Fire/EMS and Law Enforcement agencies was described as clear and consistently maintained throughout the incident. Citizen 911 calls were received and processed without incident until the volume of incoming calls saturated the system. Dispatch personnel reportedly had no issues fulfilling job duties and responsibilities, because the notification of the accident occurred prior to the high volume saturation of the system.

The Government Emergency Telephone Service (GETS) system was reported to be secondary system for accessing land line telephone circuits at Skagit 911, and was found not to function as designed. This method of making non-emergency outside calls was abandoned in the aftermath of the accident, and personal cell phones were used instead. The Computer Telephony Integration (CTI) system was a Meridian Private Branch Exchange (PBX), and was found to have outdated software. Evaluation of the current version of operating software determined the PBX system was missing two area codes (710 and 888), used by GETS, which caused the GETS dedicated lines to be non-functional.

The Skagit County 911 phone lines dedicated to 911 call used a Positron/Viper 911 system, which has access to the 710 and 888 area codes. GETS calls made using this system

¹³ Attachment 5: Mt Vernon FD Incident Command Report, available in the accident docket.

were sporadically successful, but were found to have glitches attributed to software problems with the system. Despite the secondary nature and value of the GETS system for emergency communications, several key issues were noted.

Telephone System Software Requires Upgrades:

Outdated operating system software for the Skagit 911 PBX telephone system prevented full functionality and use of the GETS system. Skagit 911 reported that since the post-accident review, they have completed a comprehensive software upgrade to the PBX system and conducted thorough testing to confirm that the GETS is fully functional.

Dispatcher Familiarity:

The investigation raised questions about the ability of operators to use the GETS system. Skagit 911 reported that consistent training and use of the GETS system contributed to operator familiarity with the system and an understanding of the peculiarities associated with its use. Examples of potential issues due to un-familiarity were described as the potential for users to not understand or to not hear the short signal beep and dial tone indicating proper connection, and that they must stay on the line even when no dial tone is present. Users should also be aware that alternate (work around) GETS numbers are available. It was also noted that the various GETS provider systems, such as using a recorded versus live operator, cause different user experiences and add to user difficulty.

Skagit 911 found no evidence of mis-use of the system, and do not have records of successful calls using the GETS system. The system was reportedly tried, but the source of failure to complete a GETS call was not known, because unsuccessful placement of call could be due to the user abandoning the call or from congestion of the phone system. Callers reverted to personal cell phones, and were able to complete the necessary communications using this method.

Training:

A review of the GETS training indicated that employee training was limited to a random selection of dispatchers and that training was not done on a regular basis or recorded in detail. Skagit 911 reported that since the post-accident review, they have updated and implemented a new GETS Training Bulletin and conducted tests using all 14 active cards. A follow-on training program was introduced to ensure all employees cycle through GETS testing a minimum of one time per quarter.

2. Washington State Patrol

The Washington State Patrol had primary jurisdiction for the accident. The Police Traffic Collision Report, as previously referenced contained information about the vehicles, occupants, and circumstances of the accident. The Washington State Patrol incident log, as previously referenced (Attachment 4) contained information about the timing of the accident and response. Driver license information, Attachment 7, was obtained from the Washington State Police.¹⁴

¹⁴ Attachment 7: Driver's License Information, available in the accident docket.

3. Skagit County Sheriff's Office

The Skagit County Sheriff's Office coordinated the rescue of the accident victims, and information was provided in the Skagit County Sheriff Incident Report.¹⁵ The incident report provided a narrative of the actions taken by the Sheriff's office. The narrative indicated that upon dispatch, resources were sent to the bridge as well as to the storage location for the Sheriff's Office boat. The Sheriff's Office advised the dispatcher to contact George Larson Water Rescue, who was able to provide another boat. The George Larson Water Rescue boat arrived on scene reportedly at approximately 8:10 p.m., and a deputy was assigned to organize the search and rescue. The Sheriff deputy on scene noted seeing a man sitting on top of each vehicle and learned that there was another person inside the truck.

The Sheriff's Office boat was launched from the Gardner Road access point, and arrived at about 7:40 p.m. Several other rescue providers were asked to assist, including Snohomish County, the Coast Guard, Naval Air Station at Whidbey. The Sheriff's Office also requested a mountain rescue unit in case the rescue would have had to been done from above on the remaining portion of the bridge.

There was a report of a possible person in the water downstream. The Sheriff's Office cooperated with the Mount Vernon Police Department to check and confirm that there was not a person in the water downstream. There was debris found downstream. Helicopters from the NAS arrived on scene and Navy personnel were taken to the scene on boats in order to assist with the rescue. Other helicopters were used to further search downstream along the river for possible people in the water. Bystanders were found along the shore about 1.5 miles downstream waving their arms. It was determined that they were signaling about debris in the water.

Rescue Operation

The Subaru driver was sitting on the roof of his vehicle and was approached by the rescue boat and given a Personal Flotation Device (PFD) and a rope. He was able to stand on a section of bridge and access the boat. He was transported to shore and turned over to medical personnel on shore.

The location and condition of the driver and passenger in the Dodge pickup truck were assessed, as well as the surrounding environment. The water current and bridge debris were a concern, so they waited to see if a helicopter would be able to lift them out. They were given PFD's. The passenger was sitting in the truck with water up to her knees, and the man was standing on the running board on the driver's side of the truck. After the NAS helicopter landed, a NAS diver was brought to the rescue scene and was then able to access the Dodge victims from the boat. The passenger was loaded onto a backboard and placed into the boat. The driver was able to climb into the boat and they were taken to shore. They were then transported to the hospital.

Because there were no reported missing people, and due to the danger associated with the water currents, divers were not sent in to search the water for victims. A Sheriff's deputy who was on College Way received the call from dispatch and witnessed cars stopping and backing up on the bridge. He saw a pickup truck and tractor trailer parked on the right shoulder on the south

¹⁵ Attachment 8: Skagit County Sheriff Incident Report, in the accident docket.

side of the bridge. The deputy traveled to the south side of the bridge and assisted in setting up an evacuation of the south side of the remaining bridge.

4. Other Police Departments

The Mount Vernon Police Department, the Burlington Police Department, Washington Department of Transportation, and the Skagit County Office of Emergency Management and 911 Call Center also provided assistance.

The Tribal Police Department launched a boat with 4 agents to assist in upstream operations. They recovered a piece of evidence which was determined to be a C-PAP machine that belonged to the Dodge passenger. Three other agents assisted with traffic control.

The Washington Department of Fish and Wildlife launched a boat with three agents at approximately 8:30 p.m. to assist in searching the river downstream.

5. Washington State Department Of Transportation

The Washington State Department of Transportation (WA DOT) provided the Notice of Enforcement of Safety Zone; Skagit River Bridge, Skagit River, Mount Vernon, WA from the US Department of Homeland Security, United States Coast Guard.¹⁶ The WSDOT also provided the Site Specific Safety Plan (SSSP) for the Emergency Bridge Repair.¹⁷ The plan was established to protect the safety and health of the parties involved in the bridge operations, including Atkinson Construction and their subcontractors. The plan identifies points of contact, establishes the health and safety policy as well as various procedures for conducting on site operations.

The WA DOT also provided safety plans from the sub-contractors: Pacific Pile and Marine LP, and Global Diving & Salvage Inc. Pacific Pile and Marine prepared the Health and Safety Plan, I-5 Bridge Collapse Skagit River.¹⁸ This plan included a site specific accident plan, and activity hazard analysis for operations conducted by Pacific Pile and Marine LP. Global Diving & Salvage Inc, provided the Site Specific Safety & Dive Plan, Underwater Survey and Recovery of Skagit River Bridge, Attachment 12.¹⁹

G. FIRE AND EMS INFORMATION

A Battalion Chief from Mount Vernon Fire Department was the incident commander on scene, and provided the Incident Command Report as previously referenced in Attachment 5. The Burlington Fire Department was also present on scene, set up a command post on the north side of the bridge, and coordinated EMS support. The Central Valley Ambulance Authority provided EMS services. Fire and EMS communications were managed by the Skagit County 911 call center.

¹⁶ Attachment 9: Enforcement of Safety Zone Coast Guard, in the accident docket.

¹⁷ Attachment 10: WA DOT Site Specific Safety Plan, in the accident docket.

¹⁸ Attachment 11: Pacific Pile and Marine Site Specific Safety Plan, in the accident docket.

¹⁹ Attachment 12: Global Diving and Salvage Site Specific Safety Plan, in the accident docket.

H. TELEPHONE COMMUNICATIONS

1. Communications Infrastructure

The investigation revealed that telephone communications became overloaded and non-functional for a period of time after the incident. Disruptions of landline phone networks, the GETS, and the Wireless Priority Service (WPS) were noted in the incident command report from Mount Vernon Fire Department. The report suggested that fiber optic or electrical cabling disruptions from bridge mounted cables could have been a contributing factor. The investigation collected information from Skagit County 911, the regulatory and government agencies, and the local service providers.

The Skagit County 911 center initially reported that physical line (landline) communications were partially disrupted after the accident for a period of time not exceeding 24 hours. Local service to some areas remained functional, while long distance service was disrupted. Skagit County 911 uses Frontier Communications for landline service. Skagit 911 uses landlines for normal operation and has 14 active GETS accounts. They do not issue cell phones to dispatchers, and do not use the Wireless Priority Service (WPS). Skagit 911 ultimately determined that no system outages to landline service occurred, but the system did become saturated during the aftermath of the accident, and some call attempts were denied. Incoming telephone calls to 911 were processed normally until saturation occurred.

The Washington Utilities and & Transportation Commission (WUTC) regulates communications in the Mount Vernon area, and was contacted to determine more information about the disruptions caused by the accident. The WUTC reported that there were two incumbent local exchange companies, Frontier Communications and CenturyLink, and the internet services were provided by Comcast. High telephone call volume immediately following the accident overloaded land line and cellular service. The WUTC reviewed the outage list and found no reports by WUTC related companies related to the bridge collapse.

The Department of Homeland Security (DHS) was contacted and the local representative from the Office of Emergency Communications (OEC) reported that all of the telephone land line and wireless carriers in the accident area were surveyed to determine transmission facility damage due to the bridge collapse. The reports came back negative, indicating that there were no system outages. Frontier reported that none of their system circuits were affected by the bridge collapse, and that their fiber optic lines utilize a different bridge. They noted that a Century-Link fiber optic cable was damaged by the bridge collapse, and that Frontier assisted in restoring service for Century-Link by re-routing a portion Century-Link circuits through the Frontier system.

2. GETS and WPS

The government managed emergency phone system, GETS was managed by the DHS OEC.²⁰ The system was established to support authorized national security and emergency preparedness users to facilitate a call when the landline network is congested and the probability

²⁰ <http://www.dhs.gov/government-emergency-telecommunications-service-gets>

of making a normal call is reduced. Authorized users were established as individuals who meet the responsibilities outlined in Executive Order 13618, Assignment of National Security and Emergency Preparedness Communications Functions.²¹ The similar wireless system, WPS was also managed by the EOC. The GETS and WPS fact sheets indicated that a GETS call can be made from a cellular phone, and work best when done in conjunction with each other, which provides multiple routes to complete the call, see Attachment 6.²² WPS was available on all nationwide networks and some regional networks, including AT&T, Sprint, T-Mobile, Verizon Wireless, Cellcom, C Spire, and Southern LINC.

The DHS OEC conducted a review of the operational measurements for the GETS system serving the Mount Vernon area. They reported that of the three switches serving this area, only one had GETS features installed. Review of that switch data revealed that no GETS calls were processed on May 23rd.

The DHS OEC also conducted a review of the operational measurements of the four WPS carriers in the area, (AT&T, Sprint, T-Mobile, Verizon Wireless). This revealed approximately eight GETS invocations occurred on May 23rd, 2013. One successfully connected to an outgoing trunk, and the others were suspected of being incorrectly dialed or executed. The DHS OEC also reported that approximately 12 WPS invocations were attempted and resulted in one probable mis-dial, three were allocated to a radio channel, and the rest were attempts from unauthorized phones.

The DHS OEC was asked about the methods for testing the capacity of the GETS/WPS systems under high stress situations. They responded that there is automatic testing of GETS calls originating from a majority of the domestic switches (more than 5,000), and internationally (more than 50). They indicated that there is no formal testing of the system during congested times, but that experienced users will on occasion make test calls into affected areas on a volunteer basis and record the results. The government operational measurements of the system that indicate capacity and activity are taken by the providers. The three GETS inter-exchange providers, (AT&T, Sprint, Verizon Wireless) provide activity records on a monthly basis, or on a daily basis if requested.

The DHS OEC was asked about monitoring network resilience. They responded that a division of the organization was recently formed that addresses this area, but that there has not been any documentation of the approach or solutions.

I. OCCUPANT INTERVIEWS AND WITNESS STATEMENTS

1. 2013 Subaru Driver

The Subaru driver provided date of birth, height and weight. He gave his contact information and then was asked to describe his experience in the accident, starting with his trip plans and the traffic conditions just prior to the accident. He lives nearby and was driving north on I-5, a route which he drives often. He noted the roads were dry and that the traffic on the

²¹ <http://www.gpo.gov/fdsys/pkg/FR-2012-07-11/pdf/2012-17022.pdf>.

²² Attachment 6: GETS, WPS, and Combined Call Fact Sheets, in the accident docket.

bridge was light, and it felt like we was one of the only cars on the northbound side of the bridge at that time. He didn't recall exactly which lane he was in, but felt he was likely in the right lane and going approximately 60 miles per hour. He did not recall anything about the vehicles in the southbound lanes, and first noticed something was wrong when he saw a big cloud of dust and the bridge falling away in front of him. He estimated he was about 30 feet from the edge, slammed on the brakes, felt the anti-lock brakes engage, went off the edge. He felt like he went airborne and the car pitched steeply downward into a nose dive.

Next he realized he was in his car and in the wreckage of the bridge in the river, and felt pain on his head. He was asked to describe his injuries. He suffered a big bump on the head, located on the back left side, near the top and above the ear. He noted that he had CT scans at the hospital and they indicated no serious injury. He also had neck pain and felt his heart rate flutter. He was surprised to find that he did not suffer cuts or scrapes. He also had a contusion over his right shoulder which described to correspond with the location of the seat belt.

He was asked what he noticed of his environment and to describe how he evacuated the vehicle. He noticed that the airbags, both side and front, had deployed. He unbuckled his belt and tried to open the driver door. The car was filling with water quickly. He could not open the driver side door and tried to kick out the windshield, which was cracked from the crash. He was unable to kick out the windshield and the water was too high, reaching within about 18 inches to the roof. There was less water on the passenger side of the car so he moved to that side. After some effort, he was able to crack the passenger door open, upon which the water rushed in, and he was then able to open the door enough to get out of the car. He grabbed the luggage rack on the roof of the car and pulled himself up onto the roof.

He sat on the roof of the car and realized there was another car and people in the water. He saw the pickup truck driver and they confirmed that each was OK. He noted that the pickup truck driver's wife was sitting in the pickup and in shock. He then noticed another vehicle in the water, and was concerned that someone might be inside. He realized it was a camper trailer and the pickup truck driver told him that it was his trailer and that there was no one inside.

He estimated that he waited about 45 minutes before the rescue boat gave him a life vest, roped him in, and took him to the pavement slab on the south end of the collapsed bridge section. There was a ladder set up on the pier, which he climbed up to the highway level on the south side and was put in an ambulance.

2. 2010 Dodge Ram Pickup Truck Driver and Passenger

The pickup truck driver and passenger were interviewed together. They provided their birthdates, height and weight, and contact information. They were then asked to describe their trip and the vehicles or other surroundings just prior to the accident. They started their trip in Oak Harbor and entered Interstate 5 going southbound at exit 230, just a few miles from the bridge. The traffic was described as fairly heavy, and they entered onto the interstate by finding a spot in between two tractor semi-trailer trucks, with the accident truck in front of them and a truck - what they believed to be a light colored, probably white tractor semi-trailer behind them

(referred to as the “white truck”). They noticed that the truck in front of them was a blue oversized load, but did not notice the pilot vehicle. They believed they were going about 50 to 55 miles per hour, and around exit 229, the white truck behind them passed them on the left. They were traveling in the right lane behind the oversize load truck. Nearing the bridge, the white truck started to pass the oversize load truck, so that they were next to each other nearing the bridge.

Both occupants of the pickup noticed that it appeared that it was going to be a tight fit for both of the trucks to go under the truss structure at the same time, and they commented about this to each other. The pickup driver indicated that he let off the gas a bit, feeling nervous about the two trucks entering the bridge. The pickup driver noted that he did not see an attempt for the truck to move to the left, and thought that it was strange, but recognized that there may not have been room anyway. The passenger did not remember anything specific about the pre-impact phase of the accident except confirming that the white truck passed them and was approaching the bridge with the other truck.

Both occupants of the pickup heard a loud boom and saw a large cloud of dust. The driver estimated that they were about 8 to 12 car lengths, or about a normal following distance, behind the accident truck. After the big cloud of dust they could not see anything, and felt the truck falling off the bridge. The driver thought he applied the brakes, but was not sure. The driver felt the roof slam down onto his head and shoulder. The passenger did not remember anything and thinks she may have been knocked unconscious.

They were asked to describe their injuries. The driver described a 3 by 4 inch scrape on the right rear and top side of his head, a dislocated shoulder, and multiple scrapes and cuts on his arms and hands. He also had a contusion on his left knee. He felt that the shoulder dislocation might have come from reaching across the cab to his wife during the impact, which put his shoulder and arm in the vicinity of the collapsing roof.

The passenger described general pain and a bruise over her right shoulder in the location where the seat belt was located. She had internal bleeding as indicated by blood in the urine and had about 8 CT scans at the hospital, which did not indicate any serious injuries. She was discharged from the hospital around 5 p.m. on Friday, May 24, 2013.

After the truck landed in the river, the driver felt like it got dragged backwards, and then looked up and noticed water to his left. He was seeing stars and a bit disoriented, and felt water rush into the truck from a strong current. The water was at his mid-belly level, and the passenger was further under. The driver called out to the passenger, who initially did not respond. He put the truck in park, released himself from his belt, and then released her from her seatbelt. He indicated that there was no difficulty in releasing the belts, other than he did it with his left hand, due to the injured right shoulder. He noted that the airbags did not deploy. He noted that the driver door was difficult to open due to the water, so he pushed on it with his back and got it open. The water was getting deeper on the passenger side. He stepped onto the running board of the truck and pulled the passenger onto the driver seat. The driver was approximately knee deep in water and the passenger was seated on the driver seat, with the water level a couple of inches over the height of the driver seat.

The pickup truck driver saw the driver of the Subaru climb out of what looked like the passenger window of the car, and called to him to see if he was OK. He told the Subaru driver that there was no one in the camping trailer. The driver noted that the Subaru was facing north but was on the west side of the bridge wreckage. He looked up and saw police and rescue personnel on the bridge. They noted that the passenger was not a good swimmer and the water appeared to be going too fast and was too dangerous to try and leave the pickup. The driver of the Subaru was the first to be taken out of the water. The driver and passenger were given life vests and roped to first responders. They spoke to the first responders to decide if it was better to be evacuated by air or from the ground level. The driver was lead off the pickup and onto the pavement slab on the south side of the collapsed portion of the river. They then lead the passenger onto the slab and they were taken by latter up to the street level. They were put in separate ambulances and transported to the hospital.

3. Other Statements

The NTSB conducted interviews of the 2010 Kenworth combination unit driver (oversize load) and the 1997 Dodge Ram (pilot car) driver, and information is available in the Human Factor Group Chairman's Factual Report. The driver of the 2000 Kenworth combination unit and the 1995 BMW gave statements to the Washington State Police, which are summarized in Attachment 13.²³

²³ Attachment 13: Summary of Additional Statements, available in the accident docket.

Documents included in accident docket:

- Attachment 1: State of WA Police Traffic Collision Report
- Attachment 2: Skagit 911 Year End Report 2012
- Attachment 3: Skagit County 911 Radio Communications Plan
- Attachment 4: Incident Log Washington State Patrol
- Attachment 5: Mount Vernon Fire Incident Command Report
- Attachment 6: Emergency Communications Fact Sheets
- Attachment 7: Driver License Records
- Attachment 8: Skagit County Sheriff Incident Report
- Attachment 9: Enforcement of Safety Zone Coast Guard
- Attachment 10: WA DOT Site Specific Safety Plan
- Attachment 11: Pacific Pile and Marine Site Specific Safety Plan
- Attachment 12: Global Diving Site Specific Safety Plan
- Attachment 13: Summary of Additional Statements

- Photograph 1: Collapsed Section of Skagit River Bridge in Mount Vernon, WA
- Photograph 2: Rest Position of 2010 Dodge
- Photograph 3: Rest Position of 2009 Jayco
- Photograph 4: 2010 Dodge (after removal from river)
- Photograph 5: 2009 Jayco (after removal from river)
- Photograph 6: Roof Damage to 2010 Dodge
- Photograph 7: Rest Position of 2013 Subaru
- Photograph 8: 2013 Subaru (after removal from river)

End of Report
