

Factual Report

Attachment 1 – Interview Summaries

OPERATIONAL FACTORS/HUMAN PERFORMANCE

DCA18IA081

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1.0 Interviewee: Derek Mulvihill, Horizon Air Q-400 First Officer (FO)

Representative: Greg Unterseher, Director of Representation, IBT #1224

Date / Time: February 6, 2018 / 1300 EST

Location: via telephone

Present: David Lawrence, Katherine Wilson – National Transportation Safety Board (NTSB); Robert Hendrickson – Federal Aviation Administration (FAA); Jason Atterbury – Horizon Air; Dan Buckley – International Brotherhood of Teamsters (IBT)

During the interview, FO Mulvihill stated the following:

His name was Derek Mulvihill, and he was 38 years. His background included being a flight instructor at three different flight schools. He had just completed training at Horizon Air. He was originally based in Spokane, but at the time of the incident was based in SEA. He estimated that his total flight time at 1,582 hours, with 95.5 hours in the Q-400. He was given a drug test after the event in Portland the following day. He had never failed a drug or alcohol screening, or been fired, terminated or asked to resign from a previous employment.

When asked if he had ever failed a checkride before, he said the he failed his instrument rating, multi-engine rating, and struggled with training at Horizon Air, having failed an MV (maneuvers validation) and a line check at the airline.

He held a CFII (Certified Flight Instructor-Instrument) and ATP (Airline Transport Pilot) certificate with a Dash 8 restricted rating. He also held a First-Class Medical certificate with no limitations.

His date of hire with Horizon Air was July 10, 2017. On the incident flight, there were no jumpseaters. He had flown with the captain on one leg the previous day to the event, and one leg prior to the incident flight.

When asked to describe the incident flight, he said it had been a month since the flight, but he remembered the flight as a short leg from Seattle to Pullman/Moscow Regional Airport (PUW) that was uneventful until the landing. He and the captain had talked about the approach into PUW, getting the weather and programming the approach into the FMS (flight management system). They conducted the descent checklist, contacted the radio remote at PUW, and everything was uneventful. When they got inside the final approach fix (FAF), the captain called runway/landing. Prior to that they had run the appropriate checklists. He saw the runway environment, and he went visual from there. He saw the PAPI (precision approach path indicator) and noticed they were on the glide path. At touchdown, while still in the flare, as pilot monitoring (PM) he was looking for visual cues and noticed the blue taxi lights. Right before touchdown he saw that they were on the taxiway. He and the captain were both surprised. As they slowed down, they taxied on the full length of the taxiway, back-taxed on the runway, then went to the gate. Other than the landing, it was an uneventful flight.

When asked about the weather, he said he recalled it being 5 miles visibility with mist and light rain. He did not recall what the ceiling was, but they broke out of the clouds right about the FAF after being in and out of the clouds on the approach. When the captain called the runway, they

still made their FAF call, including their FAF point call, altitude crosscheck and approach active, and then landed. The captain was the pilot flying.

The approach they conducted was the RNAV RNP M to runway 06. He had flown to PUW twice before; once during the day and once at night to runway 24. Both times the captain flew the approach. He had never flown the approach to runway 06. He first flew into PUW on his first leg of IOE during the day. He said PUW was different in that there was terrain around the airport and the runway was shorter. He did not recall anything being deferred in the logbooks that would have affected the approach. There were no aural or visual annunciations during the flight and could not remember if there were any annunciations on the HUD (heads up display) Annunciator Panel (HAP), although he typically only monitored that during Cat III approaches. He did not recall the approach speed, and said it was “whatever the bug was at.” They flew the “solid bug” for the approach since there was ice on the wings, which was a little faster than normal. He did not recall if they had the anti-ice system on for the approach, but he thought that it was on. They would put the speeds in based on their information from their EFB. He assumed they landed with flaps 35.

When asked if the captain had the autopilot on for the approach, he said once the captain called runway/landing right inside the FAF, the autopilot was disengaged. He said the autopilot was not required when flying visually to the runway. Once the approach became a visual maneuver, he did not think it was required, but was not sure if there was guidance regarding that.

He was looking at the PAPI to make sure they were on the glidepath when they became visual. In his mind, he saw the runway and taxiway lights and the PAPI. He was glancing at the PFD (primary flight display), looking carefully and monitoring the approach, and running the landing checklist. He had a CDI (course deviation indicator) on the PFD to look for deviations, and an FMS (flight management system) generated glidepath. He did not notice any issues with the FMS generated glidepath. He did not recall what minimums they used for the approach, but believed they briefed the lower ones.

He received training on RNAV approaches in the simulator, but he could not remember if that included the RNAV approach into PUW, and said that PUW was not considered a special airport.

When asked about his duties as PM, he said they included monitoring the approach, conducting checklists, and backing up the PF (pilot flying). He also gave callouts, set the missed approach altitude, and generally backed up the PF. When asked if he could call for a go-around, he said yes, but he believed they were landing on the runway so there was not a need to make that call, and it was not until after touchdown that he realized they were on the taxiway. It was a shock to both pilots.

When asked about the approach briefing, he said the PF generally conducted the briefing, and for the incident flight the Captain did brief it. Generally, the briefing included the title of the approach, location, plate number, date, course, minimum altitude at the FAF, DH (decision height), TDZE (touchdown zone elevation), required visibility, and the missed approach

procedure. They also added a runway exit strategy after landing, and for this landing they planned on going to the end of the runway. They also had a checklist for a couple of things specific to the RNAV type of approaches, and they reviewed that prior to the approach.

When asked if the briefing included approach, runway and PAPI lighting to be expected on the approach, he said no, it was not normally briefed, and he had never heard it briefed before. When asked if he knew where the PAPI was positioned to the runway, he said thought he knew the position of the PAPI and saw the PAPI, but they did not talk about which side of the runway it should have been on. He said after the incident he looked at the chart and saw where the PAPI should have been related to the runway.

For the HUD Control Panel (HCP), he thought it was set to the primary mode, and that was checked as part of the approach checklist. He thought the runway length was entered in the HCP, but he could not remember if the TDZE was entered or if there was any change to the glideslope angle since those functions were not the FO's duty. He also did not know if the HUD was in IMC (instrument meteorological conditions) mode, or if the runway edge lines or flare cues were visible in the HUD for the approach.

When asked if the captain looked around HUD or fold up the combiner when he was landing, he said he did not remember but believed the HUD was still down. He was not watching the captain, and instead was looking at the runway environment. When the captain had made the "runway landing" call, he looked out and, in his mind and memory, he was thinking that what he saw was the runway.

He did not recall seeing any buildings lit up since the area was dark, and thought he saw the REILs (runway end identifier lights) on the runway. He said they should have been to the right of the taxiway lights when they were lined up for the approach and he saw the runway environment. He believed they were lined up correctly. They did not include the REILs in the approach briefing.

When asked if the HUD was used during the entire flight, he said he did not think so, but could not recall. He was not sure when the HUD was required to be used.

When asked after landing when he got the sense of the taxi lights, he said he was almost certain he saw the taxi lights after landing, and it was possible he saw other lights that he thought were taxi lights. At touchdown, he noticed to the right the blue lights, and that they were on the taxiway. The captain tried to illuminate the lights with the microphone after landing, and they increased on the taxiway lights, but no other lights increased. He did not know if the runway lights had shorted out or not.

The captain clicked the lights to turn up the intensity of the runway lights during the approach. He tried it again on the ground, and the only lights that were working were on the taxiway. The lights never went out when they were checking, they only changed in intensity levels.

On approach, he said the color of the runway lights looked white, but they seemed a little dimmer than normal. He seemed to remember the captain trying to change the intensity. He had never heard of runway light problems at PUW before.

The training he received on the Q-400 was provided by Horizon Air, using Horizon Air instructors. He considered the training “pretty good.” He could not think of anything he would like to see more training on from a line aspect. Horizon Air had recently “revamped” their training program, and he had gone through the new footprint but he did not think that affected the flight portion of training.

He thought the captain’s leadership and CRM (crew resource management) skills were “really good.” The captain was “really helpful and relaxed,” which was how you would want a crew to interact. This was his first line trip following IOE, and they had flown one flight the previous day, and one flight prior to flying to PUW. It was normal for the pilots to swap legs during a trip and he and the captain did this on this trip.

He said Horizon Air trained pilots on both CRM and threat and error management.

On Tuesday, December 26, 2017, he did not recall when he woke up. He thought he had commuted to work that day since he was scheduled to be on reserve for the 27th. He stayed at a hotel in Portland that night. He commuted just as a non-revenue passenger, but did not recall when he commuted that day. He thought he went to bed about 2200 that night. Since he was

still new to the company, he did not have a crash-pad, and just got hotel rooms when he needed to.

On Wednesday, December 27, 2017, he thought he woke up about 0430, but could not remember if he was on airport or on hotel reserve. He thought he hung around the hotel as hotel reserve, so he may have slept in a little more than normal. He did not get called to fly that day. His activities that day included a run on a treadmill, lunch, and not much else he could remember. He was not a big napper, so he would not have taken a nap that day. He went to bed at about 2000-2100.

On Thursday, December 28, 2017, he was on airport reserve and could not remember when he was required to be at the airport, and thought he woke up about 0430. He sat in the crew room at the airport, walked laps around the airport, and did some people-watching. He did not get called to fly that day. He sat airport reserve in the morning, and then was scheduled to fly two legs; a deadhead to Seattle, then a leg with the captain. That night they overnighted at a hotel, but he was not sure where or what time he went to bed, but it could have been about 2300. They went straight to the hotel and to bed about an hour after getting into the hotel.

On Friday, December 29, 2017, he slept in and woke about 0900-1000. His activities that day included going to the gym, watching a Netflix show, and looking at approach plates and things to prepare for the day's flights since he was still new to the company. They utilized the hotel van services for transportation, and those schedules were pre-arranged by the company.

He did not notice anything unusual with the captain the leg before or the night before the incident. The captain seemed fine, and he did not complain about being tired. He said he also felt fine that day.

He had no problems falling asleep at night, and he had never been diagnosed with a sleep disorder. He typically drank coffee throughout the day. His sleep schedule when not working was dependent on his two 6-year old twins, but he would typically go to bed at 2130 and his kids would wake up at about 0530.

He had never been involved in an aviation accident or incident before and had never been disciplined for his performance. He had not received any commendations for his performance at Horizon Air.

He said he was a “check airman” at the flight school he worked at before Horizon Air. He had never been involved in any emergency or abnormal situation when flying.

He had no major changes to his health, financial situation or personal life in the 12 months prior to the incident. He characterized his health as “pretty healthy,” and he exercised “a lot” but a little less since going to work for Horizon Air. He had no issues with his vision, having taken his Medical exam on October 31, 2017, and had no color vision issues. He had a little hearing loss, but it was not that bad.

He did not take prescription medications, only multi-vitamins, fish oil and some protein shakes. He last drank alcohol on Christmas day, and did not smoke. He also did not take illicit drugs and did not take any prescription or non-prescription medications in the 72 hours prior to the incident that could have affected his performance.

He characterized his workload during the incident flight as normal, and said it was normal for the approach. The weather was not an issue, and it did not affect his workload.

There were no issues with visibility outside the cockpit, and he said that nothing stood out like it being misty outside.

He said Horizon Air had been good to him, and had been a big, new and exciting change. The incident happened on his first trip. His experience at Horizon Air had been mainly in the training environment. He did not believe the company applied pressure to its pilots to fly.

Since the incident, he had flown a couple of trips. Following the incident, he was required to receive additional simulator training that included looking at the situation at PUW and playing with different light intensities on the runway. The simulator was not able to replicate exactly what they saw at PUW, and that replaying the scenario in the simulator made it easier to see since you already knew the runway lights would be turned off.

He did not remember seeing the captain do any maneuvering of the airplane to line up with the taxiway.

When he was looking at the runway environment, he was looking through his forward window, not through the captain's forward window.

He said they had a crosswind on the approach, but he was not sure of its strength or direction. The airplane may have been crabbing to the right along the lateral course, but he was not sure.

When asked if the color of the taxi lights looked different than others, he said when they landed and saw them, they looked like normal taxi lights. While on the approach, he remembered the captain clicking the lights on when they were still in the clouds. He was not sure if the captain tried again when they were further down the approach.

For PUW, they were pilot-controlled lighting, and the pilot would first have to turn them on before changing the intensity. He believed the captain verbalized that he was turning on the runway lights when they were further out on the approach, but he was not sure exactly when that occurred.

When asked if there was anything he would have done differently, he said he did not know what he could have done, and everything seemed so normal until the touchdown. A missed approach on the taxiway would not have been a good idea. There was nothing else they could have done to prevent the incident.

Interview concluded at 1420.

2.0 Interviewee: David Wilcox, Horizon Air Q-400 Captain

Representative: Greg Untersher, Director of Representation, IBT #1224

Date / Time: February 6, 2018 / 1500 EST

Location: via telephone

Present: David Lawrence, Katherine Wilson – NTSB; Robert Hendrickson – FAA; Jason Atterbury – Horizon Air; Dan Buckley - IBT

During the interview Captain Wilcox stated the following:

His name was David Glenn Wilcox, and he was 49 years old. His background included being born in Fairbanks, Alaska, where he started flying with an instructor who was also an FAA inspector. He later got into construction and gave up flying but returned to aviation to try and become an airline pilot. He obtained additional ratings in Fairbanks, and continued his progression in Florida, becoming an instructor out of Paine Field and Riverside. He returned to Alaska and flew Part 135 passenger and freight operations throughout the villages. He then was hired by Ameriflight based out of Seattle on the Chieftain and Beech 99. He was hired by Horizon in 2000, initially as a First Officer (FO) on the F-28 and then on CRJ. He finally upgraded on the Q-400 as a captain, and had only flown the Q-400 in the left seat. He was based in Medford, Oregon, and he lived in Portland, Oregon.

He estimated his total flight time at 13,000 hours, with about 5,000+ hours in the Q-400 all of which was as pilot in command (PIC) except what he received during Q-400 training. There was a brief time when he got downgraded to FO on the CRJ for about 6 months as Horizon reduced their fleet, but he returned to the Q-400 as captain.

He was not immediately drug or alcohol screened after the event. After the incident, the entire crew remained at the airport for about 2 hours before the flight attendants went to the hotel. The company tried to track down someone to drug test, but eventually he and the FO were released and returned to the hotel. The next day, they had a mechanical problem with the airplane they were to fly out on, and sat at the airport until another airplane landed and they returned to Portland where they did the drug test. He had never failed a drug or alcohol screening previously, and had never been fired, terminated or asked to resign from an employment. He had never failed a check ride.

He held an ATP certificate with a D-8 rating and CL-65 SIC privileges. His D-8 rating had a VMC circle limitation. He held a First-Class medical certificate with no limitations. He had never been a check airman before, but was in the “pipeline” to become a check airman for Horizon Air prior to the incident.

There was no one in the jumpseat on the incident flight, and he had only flown with the FO on the previous two legs prior to the incident flight.

He said basically from the final fix inbound, they were flying the RNAV (RNP) M approach into runway 06. The initial approach fix was OFXEF. Just outside of there, he believed he clicked on the CTAF to illuminate the field, even though it was still IMC; he was doing that to have the lights available when they broke out of the clouds. Shortly after crossing that fix, he had the runway in sight, and called runway in sight and landing. He said it was clear as day at that time, though it was night time. They proceeded inbound, and he questioned whether the lights were on bright or dim. He attempted to “turn the brights” up more, and it was unclear if they had changed; he was not sure if he verbalized it. He did not feel as clear about the event as he was right after the event. He tried to get the lights brighter, and he verbalized “hey does it look good to you,” and did not remember the FO’s response. He was the pilot flying. He clearly felt he had the runway in sight and the runway lights were on, and it was just a question of the lights not going up to bright, not to an “on” setting. He did that about three times. The next thing he remembered was checking that the gear was down, which he said was his biggest fear in his career – landing with the gear up. He looked back out to see the runway and saw nothing but black out in front of the airplane. He was not sure if it was time compression, but it all happened quickly. Out of the left side, he saw identifiable pavement that was lit up, and he thought he had slid the airplane over a little to line up with it, but there was no abrupt maneuver. They then

landed, and it was not until the FO said something like “this is a taxiway” that he realized he had landed on the taxiway. As soon as he said that, out of his right eye he saw one blue light go by. He was not sure if at the same time the gear was on the ground or not, but he thought it was already on the ground and he just wanted to stop the airplane; they were committed to the landing at that point. There was nothing in front of the airplane on the taxiway that was of any danger, and he did not see taxiway lights, but saw the pavement and concentrated on stopping the airplane. He was not sure if they actually stopped or slowed down to a slow roll. He looked to the left to see if he could turn, and was not comfortable with that, and decided to taxi to the end, turn on the runway and taxi back to the terminal. He wanted to get the passengers off and then deal with the event.

They were flying the RNAV (RNP) M approach to runway 06, and he remembered the missed approach was out to the right and easy to fly. He was not sure if he had flown that actual approach before, but pretty sure he had flown that at least once before, but not to a missed approach. When asked how often he had landed at PUW, he said it comes and goes, but maybe about 5 or 6 times each year depending on his monthly schedule. He did not remember the last time he had landed at PUW.

There were no deferred maintenance items in the maintenance log for the incident flight, and he did not recall any aural or visual annunciation before, during or after the event.

When asked about the weather, he said it was mostly smooth, with about 5 miles visibility and rain, and the cloud ceiling was at about 5,000 feet with night conditions. The winds were at

about 120° at 9 knots, but he did not recall the airplane crabbing down the approach. It did not feel like they were flying sideways, and it all felt normal. He could not remember when he selected the autopilot off, but thought it was shortly after seeing the runway in sight. He did not recall what the indicated airspeed was on the approach. The anti-ice had been selected on due to ice accumulation on the wings, and they were flying “solid bug” as a faster approach speed due to the ice. He believed the flap setting for landing was at 35, and they were configured by 1000 feet and suspected they had selected landing flaps a couple hundred feet before that. It was an uncomfortable position to configure them low to the ground with an FO that was slow. There was a typical pitch change when the flaps were lowered, but it was not unmanageable. The pilot flying would confirm that the gear was down. He checked that the gear was down more than once; early on when it was first selected, and later on the approach. The last time he checked the gear was when the flaps were already down within the last minute of the flight to make sure everything was ready for landing. Occasionally he would verbalize to the FO “everything look good to you” for open communications.

When asked when the autopilot was selected off, he said it was sometime inside the initial approach fix after he had acquired the runway and said it was in sight and they were landing. When asked why he disconnected the autopilot, he said there was nothing adverse to see a need to leave it on. He also wanted to get a feel for the airplane before landing. When asked what guidance was provided as part of using the autopilot on RNAV approaches, he said they were following the RNAV initially, then when they transitioned to visual conditions they could turn it off. It was not a standard practice for him to turn the autopilot off in visual conditions, and it

would depend on the circumstances. For this flight, they were all caught up and everything was normal.

When asked if he did any maneuvering to line up with the lights he did see, he said when he checked the gear the last time, he looked up and saw illuminated pavement, and he did not recall seeing white or blue lights. He lined up with the pavement, not the taxiway lights, and never saw the taxiway lights, and what he saw looked like runway pavement. After that was when he noticed the blue taxiway light go by after they were on the ground.

The last time he saw an RNAV approach in training was during his last CQ (continuing qualification) check. He did not recall specifically if he ever saw an RNAV approach into PUW in the simulator. He thought the approach was in the simulator database, but PUW airport was not modeled in the simulator.

As pilot flying, he conducted the approach briefing, and it included the chart number, date, missed approach procedure, and looking at the backside of the normal checklist for RNAV procedures. His brief also included where they would turn off after landing. When asked if he briefed the approach or runway lights, or the PAPI lights, he said no, and he believed that was not a requirement.

During the visual portion of the approach, he noticed the PAPI pretty far out, and it was directly in front of them. He remembered seeing it one more time mostly in front of the airplane. For glideslope information, he was following the RNAV glideslope then visually seeing the runway

and did not specifically remember looking at the PAPI. He said the PAPI should have been on the left of the runway but did not think about that aspect when he was briefing the approach, and thought he was on the PAPI glideslope, and believed he did look at it. He could not remember the last time he observed the PAPI prior to the landing, but thought he looked at it at least two times.

He set up the HUD for the approach, and he entered the TDZE and confirmed the glideslope angle matched the approach chart. The combiner was down for the approach and was set to primary mode. He thought he put the runway length in the HUD control panel, but he was not sure. He said the combiner was likely stowed for cruise flight until they descended to 10,000 feet, and from the initial approach fix inbound it was down. The brightness was on auto, which was his normal setting.

He saw the runway lights through the combiner and through the forward window, looking around the combiner to the right. When clicking the lights to get them brighter, he looked through the combiner and window. He almost always looked to the right when looking out the forward window. He did not notice any color changes in the runway lights when he looked through the combiner. The HUD was down during the entire landing and he executed the landing while looking through the combiner.

He did not believe the runway edge lines were visible in the HUD since those were only visible during CatIII approaches. The HUD was not in IMC mode, but a standard mode where it looks

like the PFD. He did not know if the HUD image was decluttered, and he did not recall seeing any flare cues in the HUD during the landing.

When asked if he ever just stowed the combiner on visual approaches, he said sometimes, and it depended on if something was not looking right. In the simulator, when practicing visual approaches, it was a challenge to have the HUD down. In real life he would prefer it stowed for some visual approaches. When asked about company guidance regarding stowing the HUD, he said it was their SOP (standard operating procedure) that the combiner was down, but you could “clear” it anytime.

When asked what was the benefit of using the HUD for landing, he said he believed that it was perfectly suited for Cat III approaches, and it could help identify imminent windshear. He said the HUD was “phenomenal” for steep turns and helped him monitor when not acting as pilot flying. He could not remember normally seeing flare cues in the HUD, and he was not sure it that would be approach-specific.

When asked if there was anything in the airplane that he could have looked at to show him they were not aligned with the runway, he said he thought he was looking at everything, and there was nothing more than what he was already using. There was slight movement of the RNAV lateral path on some RNAV approaches, but it should show that they were lined up. He was not sure what else he should have been looking at and had been asking himself if he had missed anything, but could not think of anything.

He said the HUD in the simulator distorted the environment a pilot was looking at. He thought that had something to do with the visual screens in the simulator. The HUD hardware in simulator was identical to the airplane.

He did not remember the altitude they were at when he last checked the gear, and when he checked it was not necessarily the gear handle but instead the 3 green lights.

He did not know what was illuminating the pavement he saw, and it may have been the terminal lighting that helped illuminate everything in that area. All taxiway lights appeared to be working after you landed, and he did not think there was anything strange about the taxi lights.

He first clicked on the microphone to illuminate the runway lights when they were in the clouds, and they broke out of the clouds about 5-10 seconds later. He did not recall when it was in relation to the initial approach fix, and thought he clicked the microphone about 2 more times, but not more than 3 times. He wondered if he was resetting the lights to dim.

When clicking, he could not tell if the intensity of the lights changed since they seemed to stay the same, and that was the reason why he looked around the HUD and through the window. He thought the runway lights should have been super bright. He could clearly see the runway, the slope, and the pavement, until he did not see it anymore. When clicking, he did not see the taxiway lights go off completely. After deplaning, he went back into the plane to click the lights and saw the taxi lights go up and down but no runway lights came on. Once on the ground, the

runway lights did not seem to be on. He even tried to click them on when back-taxiing on the runway.

When asked if there was any maneuvering to line up or change course with what he thought was the runway, he said absolutely not, nothing was abnormal.

He said there was a horn that went off when they set the altitude; they set it to 2600 feet, so the horn went off at 3,600 to tell you you were at 1,000 feet above the ground. The flight had to be configured by 1,000 feet, and stable by 500 feet. There was only a callout if they were not stable.

Per SOP, they were supposed to use the HUD for all approaches. There was a stipulation that allowed a pilot to use at his/her discretion, and to stow it if you have a good reason, such as it was safer without it. They did not have to report not using the HUD. The use of the HUD was encouraged and was SOP, but you were allowed to stow it.

Following the incident, he was required to return to the simulator with the same FO. Also, in the simulator was a member of their ERC (Event Review Committee) and a check airman. They flew at another airport because there was no model of the Pullman airport close to the ground, experimented with different lighting conditions, flew missed approaches, slewed to right and left of the runway to see visually, and adjusted the lighting to be close to what they saw at PUW. The simulator was configured so they could look at the displays to see that they were not lined up. There was nothing else in the cockpit he identified that would have helped them see that they were not lined up with the runway.

Horizon Air had a no-fault go-around policy. If the pilot thought something was unsafe, either pilot could call for the go-around, and then discuss it later. No fault, go around anytime you think its unsafe. Go-arounds were always performed by the pilot flying, unless there was some adverse problem. He had performed go-arounds before, and the one he remembered most was in Medford due to low weather conditions.

On December 26, 2017, he was on the 2nd day of a 3-day trip. He had a 0515 show in Reno and flew 5 legs fly followed by a deadhead to Eugene for the overnight. There was nothing of significance about the trip. He did not recall what time he went to sleep, but knew he was trying to get to sleep early.

On December 27, 2017, if he had to catch the hotel van at 0500, he would have awoken in Eugene at about 0400-0415. They flew 4 legs and ended up in Medford early in the afternoon. He was based in Medford, so he stayed at a hotel at his expense, watched TV, talked to his wife, got some groceries, and did some work. He was in bed about 2100-2300.

On December 28, 2017, he had a 1207 show time, and woke up about 0700-0900. He asked for a late checkout of 1130. They flew 4 legs with an overnight in Missoula, arriving at about 2357 (2257 his time). He thought he may have gone to bed about an hour to an hour and a half after they arrived into Missoula

On December 29, 2017, they had a show time of 1513, with an hour prior van ride. He was up “way” before then but had a wakeup call set to remind him it was time to go. He did not recall specifically when he woke up. They flew Missoula to Seattle, and then flew Seattle to Pullman incident flight. He did not have any problems falling asleep, and on the day of the incident, he felt rested. During the day, he had gone out to look for some pizza, walked around, and talked to his wife on the phone; he enjoyed being outside. It was a normal, boring day. He did not take a nap on the day of the incident.

He had never been diagnosed with a sleep disorder.

He said the FO seemed normal, but he had only flown those three legs with him, he seemed normal. He did not know the FO well enough to tell if he was rested, but the FO did not complain about being tired and he did not see him yawning.

His normal sleep schedule was getting to bed anytime between 2130 and midnight and he would wake up between 0700 and 0830.

He had not been involved in any previous accidents or incidents, and there had been no reprimands by the company. He did have a previous safety commendation from Horizon Air; he received others for helping passengers. He had never been involved in an emergency at Horizon Air, but did have a gear issue on the Q-400 during his first 3 months on the airplane, but they landed fine.

He had no changes in his health, personal or financial status in the previous 12 months. In 2016, his dad passed away, but there was nothing else, and everything was good.

He considered his health as “8.5-9 out of ten,” and was just getting older. He had no issues with his vision or hearing, and he did not take prescription medication or over the counter medication. His wife had been pushing “airborne” due to the flu outbreak. His last alcohol consumption prior to the 29th was on Christmas, and he did not take illicit drugs or prescription medication. He did not take any prescription or non-prescription medication in the 72 hours prior to the event that might have affected his performance.

He considered his workload during the flight as normal. There was some ice on the airplane, but that was uneventful, and it was not turbulent or bumpy. The weather did not impact the flight. It was night time, but no different than any other night flying. The visibility was 5 miles with light rain and mist, and he said he knew that he saw the runway on final. Nothing hindered his view outside of the cockpit.

Working for Horizon has its “ups and downs”, but it had been nice. There was no more pressure to fly at Horizon than what was expected of any airline pilot, and he never took a flight that he should not have.

Following his additional training after the event, he received a line check from the company.

When asked if he requested to have a flight director data stowed during the approach, he said he could not recall.

He said for the runway that he saw, it did not seem that the lights were as bright as they should have been. He saw the runway, and thought he saw lights on the side of the runway. When he looked down then up, he did not see anything; he recalled the lights being gone. He did not know if they were failed then or prior. He called runway in sight, and thought he saw the actual runway. To him, he saw white lights on the approach but just dimmer.

When asked if there was anything he should have done, he said he would make more of an effort to ask the FO if everything looked good. He also said he would probably start including the lights, like the PAPIs in his briefings, and which side of the runway they were on.

Interview concluded at 1702.

3.0 Interviewee: John Dittmore, Horizon Air Q-400 Check Pilot

Representative: Gary Halbert

Date / Time: February 26, 2018 / 0900 PST

Location: FlightSafety Int'l Training Center - SEA

Present: David Lawrence, Katherine Wilson – NTSB; Robert Hendrickson – FAA; Jason Atterbury – Horizon Air; Dan Buckley - IBT

During the interview Captain Dittmore stated the following:

His name was John Marvin Dittmore, and he was 63 years old. His current title was simulator and airplane check pilot, APD on the Q-400. As check pilot, he was required to adhere to the procedures and responsibilities of a pilot and remain informed on all their procedures related to the Q-400. He evaluated other pilots, FOs and captains in the airplane, and typically only

conducted line checks on captains yearly, but he evaluated the whole crew during line checks so he also evaluated FOs. Line checks specific to FOs were only conducted when the FO was in special tracking or when not performing to standards; they were called management directed line checks. He would receive a memo detailing the need for a line check.

Pilots should not come to him for a line check if they were not performing to standards. In the simulator, he mainly conducted CQs and Qual validations, including MV, LOE, Qual MV and Qual LOE. Most of his work with the training department was in the simulator, but sometimes he was on the line. Currently, he was not flying the line due to a medical issue, and his last line flight was September 2014; he was medically cleared to fly now but had not been recertified yet.

He had about 17,000 hours total flight time, with about 13,000 in the Dash 8 series aircraft. When he came to Horizon Air, he had about 4,000 total hours. He had about 9,000 hours in the Q-400. He held an ATP with a Dash 8 type rating.

His background included general aviation flying after working as a building contractor. He learned to fly during the building recession. He did CFI and fire patrol work prior to coming to Horizon Air as his first professional aviation job. He upgraded in the Dash 100 after 4 years, and flew in both seats. After he became a captain, he was an SPT trainer then became a check airman in 2006. He held an ATP with a Dash 8 series type rating. His date of hire with Horizon Air was June 1991.

He had not flown with the captain or the FO. He recalled doing simulator checks with the captain but did not recall what the FO. He had reviewed their training records prior to this interview.

For the captain, he conducted a Qual recurrent on September 16, 2016, and remembered it went quite well, and had very few comments. Sometimes people showed up and they were 100% prepared and it was a treat to fly with them; that's what he remembered about the captain. In the records, a score of 4 was a perfect rating, and an NP was normal progress. For LOEs, they did not score NPs, and rated the performance 1-4. A score of 3 meant the performance was within

the confines, a 2 was outside the boundaries but could be repeated, and a 1 was really off-base. If a pilot failed an element, he would receive a score of 1, and they still had to complete the whole ride with a debrief at the end. They could repeat 2 items if there was time, but if they failed more than two elements, they would have to repeat the whole check ride. The captain had a 2-day footprint, and had no train to proficiency or repeat items.

For the FO he conducted a Qual LOE, and the evaluation they provided used a team concept, and they evaluated the scenario as a whole. If there was a deficiency in one, it was easy to see that. They would tell the crew to perform like they were on the line, and do not restrict the captain and FOs from speaking up. They did not tell the captains not to help the FOs, and to speak up just like on a flight. For the FO, reviewing the remarks, there was a remark at the end about captain micro-managing so it was difficult to tell if the FO was knowledgeable or slow or lacking. Everything was standard, with some minor deviations, and he rated it as a 3 for the FO for not doing some things procedurally correct. He had seen it occasionally in the simulator where the captain would not let a FO get off track, and it was difficult to judge the FO's individual performance. He did not specifically remember the comment in the training records about the FO speaking up well; it was a positive comment. He would encourage FOs to speak up and briefed that in the simulator session. He would tell FOs that even though the captain had been at the airline for a number of years, they both needed to keep things safe. From his review of the records, the FO passed his Qual LOE.

After a training session, they entered information into their FTMS (flight training management system) software program, and the next instructor could pull up the comments for review. He was not sure if the FO was in special tracking when he came to Capt. Dittmore for training, and not sure if it was entered in FTMS either. He would notice if someone had extra simulator sessions or if they had come back for training every 6 months, but was not sure if that also applied to recurrent ground.

Looking at the FOs record, he did not have much on him, and thought the FO had done good. Sometimes, when he entered comments in the record, it usually was for procedural items. He ran

the CQ and Qual events following a script since the company wanted them to stay on track. They would run the simulator as printed in the script, with limited flexibility.

When asked where in the training footprint RNAV approaches were trained, he said for him, it was in the MV. They did an RNP and an RNAV approach. The script did not include PUW airport, and the current year script was for the approaches to be conducted in Los Angeles.

Pilots were trained to use the automation on RNAV approaches when the approach was below 0.3 RNP, and use of the autopilot was required down to 0.3 RNP. They would leave the autopilot on from the initial approach fix down to minimums.

Pilots were not trained to disconnect the autopilot when they were flying down to minimums. It typically would not be visual during training, but during OE and on the line, pilots could disconnect the autopilot when they were in visual conditions and manually fly the approach. When they went visual, they would call out “runway in sight, landing.” When asked if they encouraged pilots to remain on the autopilot even during visual conditions, he said that on OE it was difficult for an evaluator to see proficiency in flying the airplane if they remained on the autopilot, and encouraged the pilots to manually fly the airplane when able.

The HUD was required to be used from after start to 10,000 feet on the climb, and required to be down during descent from 10,000 feet to parking. When asked if it was required to be used for instrument approaches, he said they wanted the pilots to use the HUD since there was all the information in the display. For a visual approach, they were still supposed to use the information in the HUD. Horizon did not have a procedure to prohibit using the HUD but pilots were encouraged to use it.

When asked if he had seen pilots look around the combiner, he said yes, particularly when pilots were new to the airplane and learning the HUD, which sometimes could be a distraction early on. New pilots would go back to using the PFD; it was like they were using lesser automation to keep from getting confused. That was the case for when he first started using the HUD, but then

learned from a check airman that if he kept the combiner down for about a month's flying, he would get comfortable with it. After 3 months of using it, he still did not like it until it was MEL'd one day and he missed it. Now, he liked the HUD and did not consider it a distraction. He now relayed that to new captains. On Cat III approaches, they used the guidance cue and it was very precise. The HUD helped with seeing more information, and helped see things in their peripheral vision; they no longer just focused on the guidance cue, but could also see beyond that and the airport environment.

A limitation of the HUD was that the brightness could be overpowering. There was an auto adjustment mode and manual adjustment mode for the brightness. For example, when in the clouds, a pilot might keep it on one brightness but then when they breakout and see the lights, the HUD brightness was too bright and a distraction. For him, when flying visually, it was easier to simply turn down the brightness on the HUD rather than stow the HUD.

Asked if any pilots complained about using the HUD, he said the "old guard" pilots were still having problems with the HUD and were still uncomfortable with it, and did not use it unless they had to. They only liked the HUD for low visibility operations. In his experience in the simulator, he had seen pilots have difficulty determining taxi and runway lights during low visibility ground operations with the stop bars at the runway; in flight he had not seen a problem determining taxiway and runway lights.

When asked about the Horizon Air go-around policy, he said it was a no-fault policy, and if either pilot felt a need to go-around, it was encouraged. FOs were also encouraged to call for a go-around, and he had seen FOs do that when the approach became unstable. It was trained in MV. Based on his review of the FOs training notes, he would believe that the FO would have called for a go-around as pilot monitoring if it was required, based on his comment that the FO was speaking up during the session.

All of his flight time, 9,000 hours, in the Q-400 was PIC time. His Dash 8 time included about 4,000 hours SIC time.

For management directed line checks, he said those were airplane line checks, not conducted in the simulator. The last time he had one of those, the FO did really well. The FO asked him why he needed a line check. Capt. Dittmore said he did not know the reason but the FO said he and a captain did not get along so assumed the captain had written a report on the FO and management decided to conduct a line check. It was not related to the FOs training.

When asked what he was looking for in a pilot's CRM, he looked to make sure a pilot was not turning a caution light into an emergency. He said that if a pilot had an emergency or threat event, he would do everything he could to get things on the ground. Short of that, he wanted pilots to dot the "I's" and cross the "t's". He wanted to make sure the crew was dealing with the emergency situation.

In terms of a normal approach, for CRM he would look for teamwork, situational awareness, decision making ability, and dealing with each other. He wanted to see pilots be decisive in decision-making, and if they made a mistake that they could keep flying and continue on.

If they marked the pilot down in training for CRM, they would note specifically what CRM skill was deficient. Lack of assertiveness of an FO would be one of those CRM items that could be marked down.

When asked if there was always a qualified captain in the left seat during LOE, he said sometimes they would have seat-substitutes, but they were qualified captains. In those situations, they did require the seat-sub to function within the parameters. If the seat sub got off base and was graded as an unsat, it would not show as a failure on a line check but would require additional training. For FO seat-subs to upgrading captains, the FO and captain were evaluated together.

He said if a pilot was solid in the simulator, they may overlook one small mistake. If the pilot was weak all over and dipped below standards, he would tend to call that unsat.

He did not know the overall pass/fail rate, and thought the company might have access to that. For him, he had failed both FOs and captains. The number of failures per week varied.

Probationary period for new hires was one year, but he did not track that. He did not know if that affected management directed line checks. If an FO was performing below standards and it was reported, it would prompt a management directed line check.

He kept up with trends in the simulator mostly through verbal communications with other check airmen. He would ask them for their opinions and what they were seeing. It was not anything that was documented. He had talked with the chief check airman about things such as his thoughts on a scenario and the chief check airman seemed receptive. They did attend meetings for check airman; they used to be quarterly, but more recently they were yearly. The check airmen talked a lot together, and emailed with each other, but it was not any formal group email system.

He said a pilot conducting seat-support can also be failed since they also were being evaluated. It was a sore spot between the company and the union. He had failed a seat support before.

He was not sure about leadership training specifically, but said there was a captain command workshop, which he attended when he first became a captain. He did not know how long the workshop had been provided to captains.

For new hires, he was seeing some pilots who had just gone through flight training at one extreme, and the other extreme would be pilots with 30 years' experience. They also had seen a variety of recency of experience, with some pilots having never seen formal training before like towing banners. Some pilots coming straight out of a university had 1000 hours and performed really good but another university pilot with 1000 hours appeared unskilled. The experience and ability levels he had seen with new hires had been all over the board.

When asked if it was more common for check airmen to communicate with each other by phone, he said it was more common in the airplane than in the simulator.

Interview concluded at 1010.

4.0 Interviewee: Adam Corolla, Horizon Air Q-400 Instructor

Representative: Gary Halbert

Date / Time: February 26, 2018 / 1130 PST

Location: FlightSafety Int'l Training Center - SEA

Present: David Lawrence, Katherine Wilson, Dan Bower – NTSB; Robert Hendrickson – FAA; Jason Atterbury – Horizon Air; Dan Buckley - IBT

During the interview Captain Corolla stated the following:

His name was Adam Corolla and he was 29 years old. His current title was Q-400 captain, instructor and check pilot. All the instruction and evaluation for Horizon Air Q-400 pilots was conducted by Horizon Air employees. His date of hire with Horizon Air was August 2013. He became an instructor in April 2015, and a check airman July 2016, and was training to become an APD (aircrew program designee).

His roles and responsibilities included working in the simulator and taught and conducted check rides full time. Some days he trained new hires or did CQ (continuing qualification) events, and some days he did check rides. He did not conduct line checks as Horizon Air separated those duties. He described his workload in the simulator as busy. He had 13 days off each month, and occasionally flew a 2-day trip for proficiency. He considered his workload manageable.

He was line-qualified on the Q-400, and rotated to the line for one trip each month for a bid trip. He would sometimes fly an out-and-back trip, but also flew longer trips with long overnights in Los Angeles or wherever it was warm. He had no problem maintaining currency.

He started flying in high school, then flew for Great Lakes, and 2 years later was at Horizon Air in 2013. He held an ATP certificate with a Dash 8 type rating.

He did not know the captain or recall the event, but he did provide training to the captain. Reviewing the paperwork for the captain, he conducted a CQ and an MV (maneuvers validation), which was part of his yearly recurrent. It included stall maneuvers, missed approaches, HGS work, Cat III approaches and low visibility work. It was concluded on September 15, 2016. He did not recall anything specific about the check ride related to the captain's performance. He had not provided training or checking of the captain previously, and had never flown with him on the line. Overall, he characterized the captain's performance, based on a review of the paperwork, as standard.

He also provided training to the First Officer (FO). He did not remember the FO, but reviewing the paperwork, he provided training to the FO. He conducted lessons 1-4 as part of the new hire curriculum. The FO was scheduled for 8 total sessions for the new hire curriculum, and the MV was on the 9th day. When asked about the FO's performance, he said the training started off slow to get pilots used to the airplane. Days 3-4, they started introducing RNAV and RNP work. According to his notes the FO had procedural errors and flight control and guidance issues, which was considered normal for the first few sessions as there was a lot introduced to the student. The had a VPT (visual procedures trainer) which was a digital flight deck they used to practice, as opposed to the old "paper tiger" training. That was an improvement for students. He considered the FO's progress as normal for a new hire. He did not need to request additional training for the FO since his work with him was early in the training. He did not know where the FO came from, and could not remember if he asked him, though he typically did ask students where they flew before coming to Horizon Air. He was not sure who the student was in the left seat.

Horizon Air paired both FO-Captain and FO-FO in training. He did not recall the FO's interaction with the other pilot in the left seat. He did not recall the FO's CRM skills. When asked if he was evaluating the FO's CRM skills during training, he said no, not really, unless he saw a deficiency or had a student that came for a single pilot operation. He said CRM was a big part of their training, especially in the early stages of training.

For CRM training, he said the basic level was a “see something, say something” approach, similar to seeing an airspeed and calling out the airspeed, and what callouts to expect.

When asked if the FO was authoritative, he said he did not recall, and had no other observations he could remember about the FO.

They trained RNAV approaches in the simulator almost every lesson and every approach got loaded into the FMS. They would do RNAV missed approaches, even on ILS approaches, to follow an LNAV course using NAV. On the MFD, the fixes were provided for an ILS or an RNAV approach.

When asked if they taught the PUW approaches in the simulator, he said no, and did not know why. It was not considered a special airport. When asked if the RNAV RNP M approach into PUW was different from other RNAV approaches, he said he had flown into PUW and used the approach before, and did not see anything on the chart that was not familiar to him. When asked what the tailored chart meant to a pilot, he said his only level of understanding was that the approach was made for Horizon Air. The less than 0.3 RNP meant that the autopilot was required to stay on until at the minimums or if you saw the runway. The autopilot was required until the pilot flying had the runway in sight, and the pilot monitoring could call the runway in sight as well. They practiced breaking out in the simulator, and allowing the pilot flying to disconnect the autopilot. Typically they did not train them to breakout 5 miles out, but typically a mile to 2 miles out. He was not aware of any guidance that told the pilot to remain on autopilot longer even with the runway in sight. Pilots were not specifically trained to disconnect the autopilot when going visual.

When asked if “visual” included the runway, or PAPI, or other, he said it was the runway since the callout was “runway in sight, landing.” He taught “green light, forward” for visual, meaning the end of the runway going forward. In his opinion, the runway meant the runway landing surface.

An approach briefing was required, even for a visual approach. There was not a requirement to brief vertical guidance on a visual approach, and he was not sure why. When asked if there was any approach they conducted where vertical guidance was not available, he said for example the runway 32 in Medford, which only had an RNP coming from the north, and typically received a downwind entry and just used the PAPI. The FMS could have a vertical path built into it, but it was not required.

When asked what was required in the approach briefing, either visual or instrument, he said for the instrument approach it would be the chart and city and runway, the final approach course, crossing altitude at the final approach fix, touchdown zone, minimums, and missed approach. For a visual with an electronic backup that had an instrument approach, they would brief that, as well as a charted visual approach. When asked if any potential threats needed to be briefed, he said he did not believe so.

When asked if anything about the runway environment, including the approach lights, runway lighting, or PAPIs, he said no. He did not know why those were not required to be briefed. When asked if there was value in including approach lights and PAPIs and where they were located related to the runway in a briefing to help with the visual picture, he said yes, and it would help the situational awareness. He said that if you briefed the PAPIs on the left, and broke out to see them on the right, that could be one more barrier to help maintain safety. They did that at Great Lakes.

He had never seen a pilot line up with something other than the runway.

He said the HUD was not trained for an FO, and for a captain, it had to do with a lot of briefings and the systems manual, and 6 lessons to practice using it during the initial qualification course. He said the HUD in the simulator was realistic to the HUD in the airplane. The combiner was not required to be down at all times, but was required to be down for Cat III. It was not required to be down, but was SOP for it to be down, and was taught to be down. The guidance to stow the combiner was above 10,000 on climb, and down when below 10,000 feet.

For and RNAV RNP approach, the HUD should be set to primary mode, which did not have a declutter mode, but the pilot could place it in IMC to declutter it. It could be a distraction to do that if not used all the time. Runway edge lines were not available in the HUD in primary mode.

Horizon Air had a no-fault go-around policy where either pilot could call for a go-around. It was encouraged in new hire training, mainly since unstable approaches were common for new hires, requiring a go-around call. In the simulator, go-arounds were typically triggered with the weather being below minimums. His expectations as an instructor for breaking out and not seeing what they briefed regarding the runway environment would be to execute a go-around. Briefing the visual picture could possibly assist the pilot. Occasionally he would trigger a go-around with a truck on the runway. He had never turned off the runway lights to trigger a go-around.

When asked if runway lights were required to land at Horizon Air, he said yes, they were required to land at night.

He said the company did have a safety newsletter, but did not know if that was part of the training department.

His total flight time was, 3,300 hours, with 1,300 hours in the Q-400. He was not sure how much was PIC in Q-400.

When asked if the runway environment, when would you expect that go-around to occur, he said he could not specifically think of a written rule on it.

He had flown into PUW before, and it was challenging the first time since he was new, but not anymore. He would not be comfortable with a new FO flying into PUW since it was a unique airport and shorter runway.

In training, typically a student made small improvements each day, and must be standard and proficient by the end of lesson 8 for the check ride. The length of the 8-lesson footprint varied, but the most efficient would be 10 calendar days. By day 7 or 8, you could tell if the pilot was progressing to the check ride. If they needed additional training, they would not send them to the check ride. Not recommending a pilot for the check ride had become more common than in the past with the less-experienced new hires.

He did not conduct ground school training. They did have a CRM block in the training footprint, with a CRM instructor. In the simulator, he would be looking for the student to speak up if they saw something not standard or not safe. They also trained CRM with the flight attendants, and to use all available resources like dispatch and maintenance control.

He did teach threat and error management (TEM), and they had posters up for TEM in the briefing rooms. It discussed the swiss cheese model, how threats and errors were defined, and the flows and procedures to trap and mitigate.

He felt the fidelity of the simulators was good and adequate for what they were doing.

Pilots came to recurrent training every 12-month, and a student in special track was seen every 6 months. Special track was an FAA term, and he was not sure what triggered special tracking. He was not involved in that process.

He had not heard or seen any procedural changes since the incident. Students could provide feedback to the training via an email survey at the end of the training. He was not sure if there was a way to provide feedback anonymously.

He clarified that another reason he would not let a new FO land at PUW was because PUW had a runway that was a little more narrow than other airports.

When asked if there's was a specific progress gate to determine a special track, he said yes, but it was a management and training board decision, not his. When asked if they used any see-something, say-something specific scenarios in the simulator, he said no.

They were required to brief for a visual approach, but not for a side-step for a visual approach.

When asked about any leadership training conducted, he said they had a command workshop for new captains that talked about captain's authority, talking to dispatch, and the foundation of decision-making. There was no specific assertiveness training at Horizon Air but it did come up in training.

Their briefings should catch if the FMS was setup wrong. Pilots were not trained to look around the HUD, though he had seen pilots do that.

Flight ops had oversight of pilots to release them to the line. He was not sure about the process to tell flight ops if a person had a training issue, if the base chief pilot could then put a name to a

face. He said generally the new hire pilots ranged from those right out of college to military pilots. Total flight times for new hires varied depending on their background; he thought pilots coming from college had to have 1000-1500 hours and military pilots had to have 1000 hours.

When asked about assertiveness training as a part of CRM training, he said they did not use that word, but taught pilots to speak up and say something if they needed to. They did teach pilots to be clear in what they were saying to the other pilot.

He said there was a substandard progress form to be used for substandard students who were not progressing through the training, but he was not sure who those forms went to.

Interview concluded at 1300.

5.0 Interviewee: Kelly Smith, Horizon Air Q-400 Instructor (FO)

Representative: Gary Halbert

Date / Time: February 26, 2018 / 1300 PST

Location: FlightSafety Int'l Training Center - SEA

Present: David Lawrence, Katherine Wilson, Dan Bower – NTSB; Robert Hendrickson – FAA; Jason Atterbury – Horizon Air; Dan Buckley - IBT

During the interview Captain Smith stated the following:

His name was Kelly Donald Smith, and he was 37 years old. His current position was Q400 captain and simulator check pilot. He was line qualified as a captain, but not as a check airman. He had not flown since August 2017, but was current in landings in the simulator. Horizon guaranteed 1 trip a month, but he had waived them to help out in the simulator; he was scheduled to fly next month. He said it was pretty atypical not to fly as much, and had been in the simulator for about a year. He mostly worked with new hires and upgrades and CQ, and recently became a simulator check pilot.

His roles and responsibilities included primarily being a simulator check pilot, and conducted training as necessary. The training to become a check pilot included 3 days of ground school, observing 6 checking events, being observed for 3 check events and an FAA check ride.

His background included 15 years in aviation, having started flight school in Seattle for all of his certificates and ratings. He was a CFII for about 2 and a half years before coming to Horizon Air in 2007. He was furloughed from the airline from 2009 to 2010. He held an ATP certificate with a Dash 8 type rating, as well as an instructor certificate. His total pilot time was about 5,500 hours, with about 4,000 hours in the Q-400, 900 hours of which were PIC time.

He knew the captain and had flown with him a few times as an FO, the last time in 2011 or 2012. When asked about the captain's cockpit style, he said nothing stood out about him, and he was fairly by the book.

He had trained the FO on September 1, 2017, for the FO's initial simulator training for a qualification course. He had 3 other lessons with the FO, but only as a seat support so he did not collect any data on that. When asked about his overall impression of the FO's performance, he said he was a pleasant individual but tended to get frustrated when not performing to standards; not angry, just frustrated with himself. The FO was a quiet guy. The root of his problems in the simulator was his aircraft control where he would get fixated. His main problems were with aircraft control, and his airspeed and bank would get sloppy when he got task-focused. Each simulator session was 4 hours, with 2 hours as PF and 2 hours as PM. The PM was the busier role, dealing with radios, checklists, and monitoring the pilot flying for correct callouts. He said the other pilot accompanying the FO in training was another FO.

The PM was trained to address the condition, and call out what was out of tolerance, hopefully to prompt the other pilot into the correct response. He also taught pilots to say what needs to be done if needed.

They did pair FO's and FO's with each other in the simulator, which could be a challenge since both pilots were new to the airline and airplane and did not have an experienced captain as a role model to learn from and observe. He guessed that FOs were paired together about 70% of the time.

He did not know much about the FO and did not think there were any issues at home during his training. He understood that the FO lived in Sacramento, but that was the only personal detail he knew about the FO.

When asked to describe the FO's CRM skills with regards to his communications abilities, he said he did not recall the FO being deficient in communications or with the radios; he was definitely a quiet and shy person but personable. The FO's primary issue was aircraft control and single-engine operations. The Q-400 was a hard airplane to fly single-engine and had a lot of procedures and button pushing. It could get busy and had heavy control forces when flying single-engine. In general, it was a busy airplane even in routine flying.

When asked if the FO was authoritative enough to question a captain on the line, he did not remember any details when the FO was a seat support for an upgrading captain, but it was typical for new hires to be "meekish" and not speak out when they were new.

Horizon Air trained RNAV approaches in MV, CQ, and during IOE. Trainees saw RNAV approaches multiple times, in lessons 3 and 4, and 6 and 8. Pilots flew an RNAV approach for every CQ, and during a qualification course, could see between 6-8 RNAV approaches in training.

The RNAV approaches at PUW were not trained in the simulator, and he was not sure why that was the case. PUW was not a special airport, and reviewing the RNAV M RNP 06 approach, there was nothing particularly remarkable about it. He was not sure if he had actually flown that approach before. The approach chart was tailored, which meant they had notes on it specific to their company operations. For the PUW approach, pilots would be expected to fly the same profile as other RNAV approaches.

For lower RNP value approaches, the pilot must have the autopilot engaged until minimums, and they were trained on those lower minimums. For an RNP of greater than 0.3, they must use the flight director, and there was no requirement for the autopilot to be engaged for a visual approach once the pilot flying called runway-landing.

For RNAV approaches, they typically would brief the lowest minimums for the approach, but procedurally there was not much difference between the different approach minimums. Briefing the lower minimums allowed for an approach to benefit from lower weather on the approach. The guidance for following an electronic glidepath was found in their FOM. When asked when an FMS glidepath was not available, he said never, and the pilot could build an FMS glidepath.

When asked if remaining on the automation longer on a visual approach would help ensure they landed on the correct runway, he said yes, and flying down to the RNP minimums would help keep the airplane lined up on the centerline of the runway, but it was not emphasized or taught that way. Pilots were required to brief visual approaches. They were required to follow an electronic glidepath if it was available.

When asked about the approach briefing, he said it included the chart number, date, briefing strip, missed approach procedure, the visibility required for the approach, anticipated taxiway off the runway, any hotspots they might encounter and that was about it. The pilot could include anything else he thought was pertinent like perceived threats, but that was a little subjective. They could use their discretion since there was nothing wrong to include additional information on the brief, and he did see that on occasion where the pilot would read the notes section of the chart. Only the bold notes on the chart needed to be read.

When asked if the runway environment, like approach lights and PAPIs were required to be included in the approach brief, he said no, they briefed the anticipated turnoff of the runway. He did not know why they briefed the taxiway turnoff but not the runway environment. He said there was value in briefing the lights to help backup what they saw and help clue into the pilot something was not right.

The HUD was taught in the simulator to upgrading captains since there was only one HUD on the left side of the airplane. It was also taught through the systems description manual and a ground school PowerPoint presentation. He considered the HUD in the simulator very realistic to the one in the airplane.

When asked if the combiner was required to be down, he said it was not required unless required for the approach to be flown. For flight below 10,000 feet, it was encouraged but not required. When asked why it was encouraged, he said it was a safety tool, and used for things, like tailstrike prevention and allowing the captain's eyes to be outside the aircraft more. He was not sure exactly what the guidance was to stow a combiner in flight.

When asked if some pilots had complained about visual approaches using the HUD, he said yes, and some felt it was more distracting, but some loved it and kept it down during the entire flight. He liked to use the HUD as much as possible since it added additional information, like a flight path vector, pitch attitude warnings, and would also have a flare cue. The flare cue appeared based on rate of descent. It also added an extra layer of safety and he could fly more precisely.

RNAV approaches were typically flown with the HUD in primary mode, but it was the pilot's discretion to use IMC mode. He was not sure if the runway alignment lines were visible in primary mode, but the flare cues were visible.

Pilots were not trained to look around the combiner during the approaches and had not seen anyone do that. When asked if he had ever seen a pilot have difficulty determining taxiway and runway lights, he said no. When asked if he had ever had a pilot land on a taxiway in the simulator, he said no.

Regarding the Horizon Air go-around policy, he said they had a no-fault go-around policy. It was encouraged if the flight was in an unsafe position, either pilot could call for missed approach, and that was reinforced in training by giving different scenarios to initiate a go-around. The triggers for a go-around included things like an aircraft taxing out on the runway when the

aircraft was below decision height. He had never turned off the runway lights to trigger a go-around, and it was not in the training syllabus.

When asked if the training department provided regular information to the pilots like a newsletter or other form, he was not sure, but said others, like FOQA and Safety, did send out information to the pilots.

There was not a need for anyone to intervene in the FO's training since they were just past the half-way point in the syllabus, and it was common to see new hire pilots struggle. He would give the pilot all the way up to the MT to make a decision if they needed additional training because "you never know when it will click".

A pilot in training could be identified as a special track pilot, which were individuals who had failed a gated event, had issues on the line or the pilot was a bit "more high risk". They may come through CQ every 6 months versus 12 months and have additional flying with a check airman. That was the case for this FO, he was special tracked, and he was aware of that through his role as a seat support. The FO had gotten through MT but not MV.

When asked how CRM was taught, he said he was looking at communication, teamwork, with both pilots making decisions and a clear understanding of the goal for that task. Assertiveness was definitely encouraged and looked at for the pilot monitoring role; speaking up and making call outs like when a missed approach was necessary, fluctuating airspeed, and identifying what they see. He did not recall anything specific about the FO with his pilot monitoring duties, but noted he was doing well in his training record.

He had flown into PUW before, but not using the RNAV RNP M approach. When asked if he would let an FO fly into PUW, he said yes, depending on the weather conditions. When asked if he would do anything different with a new FO going into PUW, he said yes, he would discuss

terrain awareness, a steeper glide path on the PAPI, and the chance that they could be high on the approach. If the FO had not been there before, they would talk about getting the airplane on the runway since it was shorter.

He had not heard of any concerns from other pilots about flying with the captain.

When asked what the glide path angle into runway 6 was, he said it was a 3.0 degree glide path, and a 4.0 glide path for runway 24.

RNAV approaches were seen in the FO's CQ, during the day one MT and again on the MV. The PUW RNAV RNP M approach was available in the simulator, but they mainly conducted training in Seattle, Portland and Reno.

The radio remote was a person at the airport used as a traffic observer and would look to see if traffic was on the ground or in the area. They would advise if airplanes were taxiing on the runway or if there was traffic on a parallel taxiway; they would have to announce that they were a large aircraft or Cat C so other aircraft were off the taxiway. Typically the pilots would call the radio remote when about 10-20 miles from the field. To his knowledge, he did not know if they were trained to observe if the runway lighting was illuminated. He would hope they used common sense to look at the runway lights, but was not aware of what their training entailed. He would sometimes meet the radio remotes after arrival. They used the CTAF to provide traffic information.

There was no data collected for the FO when he was providing seat-support, but he would still evaluate the FO's performance. He had received an email that said the FO was acting as a seat support partly to train him for the MV and what Capt. Smith should focus on.

Interview concluded at 1500.

6.0 Interviewee: Nick Stone, Horizon Air Director of Regulatory Compliance

Representative: Gary Halbert

Date / Time: February 26, 2018 / 1515 PST

Location: FlightSafety Int'l Training Center - SEA

Present: David Lawrence, Katherine Wilson, Dan Bower – NTSB; Robert Hendrickson – FAA; Jason Atterbury – Horizon Air; Dan Buckley - IBT

During the interview Captain Stone stated the following:

His name was Nicholas Ryan Stone, and he was 36 years old. His current title was Director of Regulatory Compliance and Fleet Technology with Flight Operations. In the Safety Department, he was the SMS liaison, where each of the operating divisions (maintenance, customer service, stations, inflight and flight ops) had an identified liaison.

His roles and responsibilities included the operations specifications, FAA liaison, day to day interaction with the FAA, and regular contact with POI and CMT. He was also responsible for all technical publications except the maintenance manual. Fleet technology included aircraft specific programs (such as iPads), low visibility, deicing, ACARS, the flight ops manual, the jumpseat program, and the weight and balance program. SMS was a large part of his duties. He was responsible for the SMS program and oversaw its compliance. He partnered with Safety in the promotion of SMS, its training, safety risk management, and safety assessment processes. His position kept him busy full time, but he had a support staff and support from Alaska Airlines.

He was type rated on the Q-400, but was not current. He had 9 years experience on the airplane, and had just started training in the E175.

His background included attending Embry Riddle Aeronautical University in Prescott, and a 4-year internship at Alaska Airlines. He was a CFI for about 2.5-3 years, flew for several GA operations, and moved to Horizon Air in Portland in 2006. He flew the line on the Q-400 for about 2 years, and did project work in Flight Operations with technical pilots. He was a systems procedural trainer in the ground school, and helped with IOSA audits which led to him becoming involved with flight operations quality management. He helped start the first QA program at Horizon Air, dedicated to flight operations.

He was the manager of Regulatory Compliance, reporting directly to the Director of Operations, then the acting Director of Safety for about 7 months during a change in leadership and restructuring of the company. He was then the Director of Standards and Regulatory Compliance until November 2017 when Horizon hired a director of that department to take that responsibility from him.

He held an ATP with a Q-400 type rating, CFI, CFII and MEI certificates. His date of hire with Horizon Air was June 2006. He had about 3,800 hours total time, with about 2,700 hours in the Q-400.

He did not know the FO, but did know the captain pretty well. The captain had been with the airline about 17 years. Capt. Stone hired the captain as a check pilot prior to the new director of standards, but that status had been suspended since the incident. He was not 100% not sure he had flown with captain, but he was one of those captains he knew by name. He had a good reputation and was known as a good captain and professional, and had qualities of a check airman they were looking for. He had also interacted with the captain when he was handling duty officer calls for events or pilots questions over the last 8 years.

When asked if he was aware of any training or performance difficulties from either pilot, he said not with the captain, and was not aware of the FO's training difficulties until after the event. He became aware of FO's background when they started an internal investigation and after he talked to the Director of Training who informed him of the extra training events for the FO.

He considered his role as part of flight operations. It was not unusual not to know a pilot's training difficulties by name. They regularly reviewed training data, but not necessarily the pilot's name unless he was part of a training board reviewing the individual pilot.

He said that the standards department bridged that gap between flight ops and training. He considered flight ops a part of training. When a pilot had challenges in training, brought before the standards and training review board. Training, standards, a chief pilot and union representation were brought in together for a training review board.

He was not aware of the training review board for the FO, but understood there were multiple review boards that reviewed the FO due to multiple unsats; he was not in attendance of those review boards.

When asked to describe the overall safety culture at Horizon Air, he said they had a strong safety culture, and crews and management could be open to share concerns and ideas, and they were provided the tools to express those ideas. They had an environment in which crews were collaborative and positive.

They had a "ready, safe, go" phrase that meant they did not go until both pilots agreed it was safe. He was proud to have helped build that culture. The tools pilots could use included submitting pilot irregularity reports, either on the iPad or computer, and could be specific about their concerns

Pilot irregularity reports can be specific about concerns, and a tool to provide feedback and solicit ideas. Those reports went into a safety database. Horizon Air also had ASAP for flight ops, inflight and maintenance. For FOQA, they had a dedicated group including line qualified pilots who served as gatekeepers and subject matter experts; it was also aligned with the Alaska Airlines FOQA department. They also had a fatigue risk management program that pilots could submit reports to. They were about half-way through their current LOSA, which occurred about

every 4 years. They found new items with each LOSA audit, and validated current concerns. Previous LOSAs focused on CRM, runway incursions, use of automation and distractions.

For risk mitigations, they were actively pursuing synchronizing operational procedures for their two fleets, paralleling their practices with Alaska Airlines. It also included manual revisions on approach profiles for the Q-400, callouts to help align the E175 with the Q-400, supported by their operations with previous observations.

They had bolstered their runway incursion policies over the years, reinforcing crew communications on the ground, practicing sterile cockpit, using tools like a Jepp app for aircraft positions on the ground with new procedures in the FOM that speak to those, including dedicated SPOT training related to runway incursions.

When asked how many voluntary safety reports they received each year, he said they received an increasing number of reports, with about 100 pilot reports each month in ASAP and irregularity reports. Some reports might be duplicates if two pilots submitted a report for the same event. They had 750 pilots at Horizon Air. He said the ASAP reports typically included things like altitude deviations, deviations related to clearances, and some ground related events (like deicing). In the summer they may have an increase in bird strike reports, lighting or TCAS RAs. They had a high reporting culture, and encouraged their crews to report for follow-up and trending.

They had reports for the PUW airport regarding the RNP approach going the opposite direction, and had provided extra guidance for that approach using FOQA data. He did not recall any PUW specific reports. He was not aware of any reports related to the use of the HUD.

Horizon had never had an airplane land on a taxiway similar to the PUW event. The closest to the PUW event they had seen would be landing on a runway without a clearance, which would be handled through the ASAP program.

Horizon Air did provide information to the pilots, typically through the manager of flight safety. FOQA sent their own newsletter, and there was also a general safety newsletter called the Safety Flash. They also communicated to their pilots via email, or through standards pilots who could spread ideas and emphasis items.

They gathered monthly for a safety review board for specific areas to concentrate on. They also monitored runway and taxiway incursions, whether small or large, through pilot reporting systems. They would follow up with the pilots for those events and they could also follow up with ATC for errors or perceived errors.

Pilots were not required to read the safety newsletters and information sent out, but they were expected to read them. They deliberately chose information the pilots were required to read prior to a trip through their log-on to their iPad, such as FCIS, new manuals and publications. Safety related articles were not required to be read at the start of their trip. Those items required to be read required a code be inputted, which went to a database that could be monitored to ensure the document had been opened and read. The iPad was issued to each pilot.

Failing one training event could trigger a training review board. If they unsat a gate event, that could trigger a review board.

SMS was a top down approach, from management down, where safety was a priority. Safety started at the top. Horizon Air had completed all levels of SMS implementation, and were compliant with part 5; he was not exactly sure but thought it was about a year and a half ago.

SMS training was coordinated with Alaska Air Group Safety; all employees were trained, and the more responsibility they had with risk would change the level of their training. He spoke for the flight ops division as an SMS liaison. They worked with Safety, Alaska Safety and the FAA.

ASAP was de-identified, and pilots could also call a hotline number on the back of their badge to report a concern anonymously.

He reported to an MD of Standards and operations and fleet technology. For his team, he had 3 managers, 2 specialists and 3 tech pilots who reported to him. He also had his peers.

He was not involved in the hiring of new hire pilots. He did hire check pilots to staff his division. He solicited feedback from other pilots about who to hire as a new check pilot.

Accident and incident investigations fell under the safety department. He got involved in this event since he was the duty officer on call at the time, but he would have been involved with his involvement and liaison work with the FAA. He learned about the incident through the duty officer page. They first talked to the crew, and made sure the passengers, aircraft and crew were ok, and got a general understanding of what happened. They started the drug testing process and the notification of leadership, and talked to their media folks. He also spoke with the CMT and POI to notify them of any significant events. It was a reportable event so he also contacted the NTSB.

Since the incident, that had been an internal safety review of PUW. They spoke with the crew, who had been retrained, but there had not been a finalized report on the event. They were still actively looking into the operations into PUW. The majority of changes since the incident had been centered around approach briefing and distractions on the flight deck, and how it could be enhanced in their training program.

If someone was involved in an event and had submitted a report, they would speak to them directly. In general, they communicated safety concerns to pilot via email and newsletters. They had standards meetings where they also talked about safety.

Since the event, he was not aware of any increased reports related to PUW.

The FAA would come in and talk about safety programs, SMS and compliance philosophy with new hires.

Chief pilots were part of the training review board, but he was not sure if that was tracked in their personnel files.

FOQA reps did provide updates to recurrent classes, providing updates on the duty officer program and other safety programs. For the newsletters, there was also an ASAP newsletter for lessons learned from FOQA data.

Pilots were required to make a report of a taxiway incursion, and follow up with an irregularity report with details.

The Q-400 had dedicated EFBs mounted in the airplane, with services similar to ACARs, but no position information on the ground or in the air was available through the EFB. The iPad could see the position on the ground. Ipads were company issued, that the pilots could take home with them, and it had a dedicated app to complete an ASAP.

They had a checklist for an incident or accident, and also have a duty officer guide to help during initial notification.

The event captain called the duty officer at their SOC after the incident, and then submitted a report. Had the captain not reported the event, they could have obtained the information about the event through the ground agent, possibly even the passengers.

The ASAP newsletter covered Horizon Air general reports.

For a runway incursion, he said he would be surprised a crew would not have called, based on their safety culture. Runway and taxiway incursions were always reportable events but the required call to the duty officer started in 2017. They did this because they did not want to wait several days following a taxiway or runway incursion because the company needed to know about those events and get that information.

Interview concluded at 1650.

7.0 Interviewee: Eric Christopher Braa, Horizon Air Q-400 Senior Instructor and Check Airman

Representative: Gary Halbert

Date / Time: February 27, 2018 / 1108 PST

Location: FlightSafety Int'l Training Center - SEA

Present: David Lawrence, Katherine Wilson – NTSB; Robert Hendrickson – FAA; Jason Atterbury – Horizon Air; Dan Buckley - IBT

During the interview Mr. Braa stated the following:

His full name was Eric Christopher Braa and he was 38 years old. He was a senior instructor and a senior check airman in the Q-400 at Horizon Air. The day after the interview he would become an APD. His roles and responsibilities included providing all training in the Q-400. He also performed qualification, annual CQ and qualification LOE checkrides in the simulator; he was not a line check airman. He worked full time in the simulator and was not currently flying the line. He did not have a current medical certificate and it had been more than a year since he had flown the line.

He went to college in Eugene, Oregon; he got his ratings there and instructed at a small FBO. One of his students bought a twin-engine airplane that Mr. Braa flew for him. During that time, he met some people who introduced him to a helicopter outlet where he flew for a summer for them, and was then hired at the startup Sky Taxi as an FO for a year and upgraded to captain for 6 months. He was then hired by Horizon Air in 2003.

His total time was about 9,500 hours, about 2,500 hours of which was as PIC. He had about 500 hours as PIC in the Q-400. He held an ATP, CFI, CFII, MEI, IGI, and AGI certificates and a Dash-8 type rating.

He thought he might have flown with the incident captain but did not recall if so or to comment on what he was like as a captain. He did a jetway swap with the captain one time and he was a “nice guy”; he never heard anyone talk about the captain. Mr. Braa flew in the right seat for a decade. He definitely had not flown the line with the FO. He had seen both incident pilots in training.

He performed the incident captain’s CQ LOE last year on September 18, 2017, and also worked with him post event. He had reviewed the captain’s training file prior to this interview. There was nothing that stood out from the training but Mr. Braa did remember it and after the event they discussed the approach. He had the same discussion with lots of pilots. He would see pilots go into raw data and he thought using raw data in the simulator was difficult. He remembered discussing that the approach was unstable on short final and they went around. He thought the captain used raw data on the second approach which was stable until touchdown. The captain’s training was “pretty unremarkable”. He was a conservative and proficient pilot.

He did not know why using raw data in the simulator was difficult but one explanation he heard was that when doing a visual approach, the pilot's eye could process information faster than the computer could simulate it causing a delay between what the pilot would see on the screen and what was being done and felt in the simulator. The simulator used was Level D.

Asked to further explain the post-training event discussion, he said there was an instructor-type seat support so it was a "very qualified" FO. What he remembered was that during the visual approach, the seat-support instructor unknowingly provided a distraction on short final. The instructor said he thought they were unstable back there on final, the crew had a discussion and then the approach became unstable and the captain went around.

When a pilot sits as a seat support, he was under evaluation but was not in jeopardy. He did not think the instructor intentionally provided a distraction. It was a good example where the captain did not vet that distraction and took the conservative route and went around. The captain and seat support talked about it after the landing at the gate and also in the debrief. Nothing was out of bounds, quite the opposite. The seat support was late to the simulator, it was a last-minute change, so the captain had everything set up just like if the FO was late on the line. When the seat support arrived, the captain told him what he had done so far.

After the incident, he participated in the simulator training for the incident crew. He was the simulator operator. The simulator event was created through the ERC and both incident pilots were together. They performed a series of approaches in Wenatchee, 6-8 approaches during a 2-hour session. The crew was presented with scenarios with various loss of lighting and go around scenarios that were dictated by the ERC representative. Mr. Braa did provide a couple of debrief items after a few missed approaches. The first few missed approaches were typical of a pilot who had not performed a missed approach in a while. He had debrief points on the first missed approach and maybe a couple others. It was nothing atypical for a line pilot.

He did not know if the captain's progress was any different. His performance in CQ LOE was consistent with his performance in the post-incident simulator session.

He performed the qualification maneuvers validation (MV) for the incident FO on October 11, 2017. He reviewed the training records from that event prior to the interview. He remembered the event but not as vividly as he did for the captain's training. The FO's training event resulted in an unsat rating that had to do with aircraft control.

He did not remember the FO's CRM skills vividly but during MV, CRM was always in play. MV was a takeoff maneuver, not designed to go point A to point B, so it was not unusual that he did not remember. The captain seat support was a FO so there was no captain authority which might be why he did not remember the CRM because of that. He did not ask the FO if there was a reason he had a bad day.

He had seen similar performance in new FOs. He thought stress was a major barrier to performance and it was not unusual for a new hire to let it eat at them when something went bad and then things would go from bad to worse. He would tell pilots in the prebrief that he cannot be their coach but if he could be he would say to put this behind them and move on.

He had access to a pilot's entire training file prior to an event if he wanted to find out the pilot's proficiency before a trainee came in. He tried to go in as objectively as he can and keep his purview to the 4 hour simulator session he was instructing. He did not want to cloud his objectivity and wanted to evaluate the pilot under the purview he was given. Pilots got better and it was not the case that once a pilot had issues that they never got better.

He could not answer whether the incident FO would command authority in the cockpit because he did not remember enough about his performance, but thought it would be difficult for any new hire to command authority. He also could not say if the incident FO would command a go around because he did not work with him enough.

He recalled the incident FO being nervous during the training and Mr. Braa did not feel like he could get through his "shell". During the debrief, the FO was not combative, but he was upset with his performance.

After a training event, he and the trainees go in to the debrief room to talk about the session and break down each maneuver. He did not only share information about what went wrong; it was not all bad feedback.

After his debrief with the incident FO was over, he let training scheduling know about the unsat (this was an unofficial procedure), and submitted an FTMS event and a gate failure notice to the FAA.

RNAV approaches were trained in the simulator. The RNP was a maneuver pilots had to perform in MV so more often than not they were doing something in RNP. Each pilot did one approach as a PF in MV, typically the SEA RNP Z to 16R via VASHN transition. They never did an approach into Pullman because it was not in the script. There was no Pullman model in the simulator but in MV4 they flew into Wenatchee which was similar. There were no checkrides performed into Wenatchee. The qualification sessions were scripted into SEA and CQ changed each year; this year CQ was into Sun Valley which had an FMS approach.

One RNP approach would be done with the captain which could not go less than point 3. If it was less than point 3, the autopilot would stay on until minimums or the airport was visually acquired. For a single engine approach, the pilot would disconnect the autopilot at 1000 feet.

It was a "mixed bag" as to whether pilots clicked off the autopilot when they acquired the airport visually. He thought it could be because pilots thought the visual approach was difficult in the simulator.

He would discuss with pilots the benefit of staying on the autopilot but in training he would have his students hand fly the airplane more than not hand fly it. When he got them to a spot where they can go off the autopilot, he wanted them to. He knew the autopilot could fly the airplane but wanted them to fly it. He would discuss use of automation with them in the debrief.

The HUD should be down under 10,000 feet; the guidance said “should” not “shall”. The airplane could be flown with the HUD MEL’d. He thought in LOFT 1 that the HGS was MEL’d. It was a big transition for pilots because for 6-8 lessons they had used it, so it was different for them.

He did not think it was trained to look around the HUD but thought during taxi if there was a lot of lighting in the background that he might look around it; he did not do that during flight.

He did not think the HUD changed the lighting color. He did not think that taxiway lights looked different when looking through the HUD. He thought there could be a phenomenon where the HUD was too bright and that could cause an issue in which the pilot would just turn it down. Pilots could also clear the HUD, not just declutter it. He might hear the captain ask an FO to clear the HUD. There was no procedure for it but a pilot could do it if it was affecting what was being seen.

There was a procedure for storing the HUD with both hands.

A pilot could look “at the HUD” or “through the HUD”. He compared it to windshield wipers in a car. When a pilot can look through the HUD, that was an advanced stage of its use.

Pilots should use the HUD on all landings.

Most pilots initially complained about the HUD because it was new, and they were not used to it. It was another spot for coaching about how it was a valuable tool. Pilots had to keep at it. The end result was that a pilot could see the HUD and what was behind it. The HUD really would make a pilot better for the precision that the airplane can be flown.

Upgrading FOs would cheat and look down at the PFD. He would cure them of that by taking the PFD away. He never had a trainee land on a taxiway in the simulator.

Asked what could alert the pilot that the airplane was not lined up with the runway, he thought some RNPs could keep the guidance but generally would show a pilot the airplane was not where it was supposed to be. If the pilot used the flight director, it would take the airplane down the localizer to touchdown; it would tell the pilot whether to go left or right. But it required that the pilot be using that. It was available in Primary mode on the HUD. He was not sure which approach the incident crew was flying. The incident crew would not have had lateral guidance in the HUD.

He did not know the FAA’s response to a gate failure. The information went to more than just the FAA.

The company did not generally follow up with him after a gate failure. No one followed up with him after the incident FO’s gate failure. He had had management call him before to ask more specific detail about comments he had made. Sometimes he would be proactive and talk to the chief check airman about what he observed.

Unsat ratings in the simulator was more common lately than usual in the simulator. He did not know why that was or what the exact percentage of failures were but there had been more both in qualification and CQ.

Asked to clarify why pilots might not perform a go around as expected, he said it was because of the callouts; occasionally a pilot would get ahead of the other pilot with the callouts. It had nothing to do with aircraft control; they was procedural things. There was one discussion of max airspeed where the flaps were parked. Another error was resetting the flight guidance. These were all typical errors from line crews.

Crews switched PF/PM duties about equally.

His total time in the Q-400 was about 7,000 hours.

PM duties were equally important as PF duties. There was always room to debrief the PM. He would note good and deficient CRM. He tried to illustrate what was done well and would also talk about callouts, deviation callouts such as reminding pilots that they did not have to wait until a deviation occurred to make a callout as deviations were pretty easy to see coming. The company had posters with the 21 CRM skills. The goal was to get pilots talking more than him. It was hard for him to say exactly what was trained, there was good and bad CRM and he knew it when he saw it.

Assertiveness was part of CRM. In the takeoff abort mentioned previously, if there were two FOs, he could highlight that. Common errors included a support pilot who would call for the wrong checklist, and that was a spot where a good FO might need to speak up and save the day. The captain may continue to call for the wrong checklist and the FO needed to speak up. He had a cliffs notes section on that.

Pilots must know when to speak up and when to listen up; both skills were on the poster. That was easier said than done for a new pilot. Occasionally they would role play. He would be the pilot that did not want to listen and the other pilot would have to take aircraft. He could not speak in absolutes but would say that was the pilot's role. He believed the PM and PF were equal and emphasized that a lot when he got the opportunity to train a new pilot.

The interview ended at 1207.

8.0 Interviewee: Dain Bjorn Orlob, Horizon Air Q-400 Senior Instructor and Check Airman

Representative: Gary Halbert

Date / Time: February 27, 2018 / 1305 PST

Location: FlightSafety Int'l Training Center - SEA

Present: David Lawrence, Katherine Wilson – NTSB; Robert Hendrickson – FAA; Jason Atterbury – Horizon Air; Dan Buckley - IBT

During the interview Capt. Orlob stated the following:

He was 46 years old. He was a Q-400 captain and line check airman at Horizon Airlines.

His roles and responsibilities included making sure pilots adhered to SOPs, and that the pilots who pass line checks meet the standards set by the company and the policies and procedures set by the FOM and FSM.

In the previous 12 months, he thought he conducted 15 qualification line checks for FOs and 5 for upgrading captains. He was both left and right seat qualified.

His dad flew in the US Navy so he always wanted to fly. He first flew for Gulfstream Airlines in Florida flying the E120 for 6 months, and then Pinnacle Airlines flying the CRJ-200 for one and a half years before being hired by Horizon Airlines. He had worked for Horizon for 11 and a half years flying the CRJ-700 for a year and a half and then the Q-400. His date of hire with Horizon was August 6, 2006.

His total time was about 9,400 hours. Of that, about 6,195 hours were in the Q-400/Dash-8. He had about 1,941 hours PIC time. He held an ATP certificate and CRJ-700 and Q-400 type ratings. He also held a first-class FAA medical certificate.

He never trained the captain but he flew with the incident captain when he (Capt. Orlob) was an FO. The captain was very professional, very much a mentor, very standard and a person he wanted to model himself after to be a good captain himself. They last flew together about 4 years ago. The captain was an above average pilot who flew to standards and followed the FSM and FOM. He would feel comfortable speaking up to the captain and questioning his decisions; he was very much the captain, and he expected you to do your duties and follow the FSM and FOM. If a pilot was not to standard and it was not brought up beforehand, the captain would question you and make sure everyone was on the same page. The captain was very much a mentor and would actively question FOs, at least the captain questioned him, using scenario-based questions. He did not remember having to question the captain's authority or a decision he made.

Capt. Orlob saw the FO in training at the end stages of his IOE. He did his qualification line check for the FO. He did not know if this check was required per 121 regulations. They would typically do a line check on an FO coming out of qualification.

He reviewed the FO's FTMS information from IOE prior to the check. He did not review the FO's simulator, MV or LOFT training records. Generally a pilot would have 4-5 trips during IOE with a different line check airman on each trip. He did not know how many trips the FO had flown before Capt. Orlob flew with him. The FO's paperwork showed that he had received all the required elements to be at that point of training and to receive a line check at the end of the trip. They flew 9 legs together and the 10th leg was a qualification line check over a total of 3 days. The FO flew as PF for 6 of the legs and was PM for 4 of the legs. They did fly into Pullman during the trip.

The first three-quarters of the trip was completely to standard but the last quarter was not to standard and unsatisfactory. The FO had difficulties with airplane control and understanding of the autopilot and the interaction between the autopilot and intercepting the final course. The FO almost undersped the minimum flap speed on several occasions, oversped the flaps on several occasions, was not stable per SOPs by 1,000 feet. He was not aware of the airplane configuration related to the height above the field, and the missed approach was not to standard. The FO did overspeed the flaps despite Capt. Orlob trying to coach him. The FO continued flying through the entire flight; he got vectors back around for the visual approach. On the approach, the FO almost undersped the flaps then oversped the flaps; he got about 8-10 knots fast that required Capt. Orlob to make an airspeed call. After the flight, Capt. Orlob called maintenance control because they oversped the flaps. He and the FO debriefed in the crew room for a fairly lengthy amount of time. The FO understood and was disappointed that it was an unsatisfactory line check. Capt. Orlob called the chief check airman and Caysie Duax [AQP Manager] to go through the paperwork; he wanted to make sure he was doing it correctly because he had never failed a pilot on a line check. He filled out the paperwork online and sent the appropriate forms to the appropriate parties. He thought scheduling planning would probably do a training review board and additional IOE and a line check at the end of that. He had no interaction with the FO after that.

The forms he sent went to 6-7 people; it was automated and sent to crew planning, scheduling, training and other departments.

He had never seen a failure on a line check. He was not aware of another check airman who failed a pilot on a line check. It was rare because the training department was very good at what it does, and the check airmen were good at what they do; when a pilot got recommended for the line check, the check airman had seen enough from the pilot over several days to feel confident they would pass.

He thought the FO was ready for the line check prior to the line check flight. He was ready for the line check but the qualification line check was not to standards. His performance on that leg was not indicative of the performance he had seen throughout the trip.

Regarding specifics about what was unsatisfactory on the FO's line check, Capt. Orlob said the FO let the autopilot fly the visual and instead of doing a gentle 30-degree intercept, he did a 90-degree intercept and blew past the localizer by a fairly good margin. Most of the other visual approaches flown were vectored by ATC but for this one they were on a 90-degree left base. Both pilots had the airport in sight, but the FO left the airplane where it was and they ended up where they did. He did not recall if they did any approaches at night; this one was a day visual.

Nothing stood out to him in terms of the FO's callouts.

He asked the FO if anything was going on and the FO was frustrated with some of the dwell time. Dwell time was the time off between ground school and simulator sessions or the simulator sessions and IOE. The FO was a little worried about having another long dwell time between this line check and the next one. The FO was also frustrated with his commute from California, the length of the training and training pay.

The FO was good at communicating and was receptive to feedback. The FO asked the appropriate questions and integrated the answers into his flying.

Regarding assertiveness, the FO was above average for a new hire pilot in IOE. In general, most FOs were reluctant to speak up due to the power dynamic. Capt. Orlob said everyone made mistakes and FOs were the “last cog in keeping us captains out of trouble.”

They had not performed a go around during the trip until the line check flight.

Nothing stood out about the FO’s PM skills; he was assertive and to standards. He did not know if the FO would have questioned Capt. Orlob’s authority or if he would have been comfortable calling for a go around.

Horizon had a no fault go around policy and that was something he emphasized with students on the first day. He made sure they understood that. He would tell them if they had an unstable approach or something seemed suspicious, they were allowed and in fact encouraged to go around.

During training, if a pilot was getting close to exceeding parameters, he would make sure they knew about it. He probably did two go arounds a month as a check airman; it used to be once a year when he was flying as captain. After a go around, they would debrief; it was not a punitive maneuver, it was a safety maneuver.

He liked to make students make mistakes because they would learn more from their mistakes and the consequences. It was memorable for a 121 pilot to do a go around. Also, students had a fairly good working knowledge of the stabilized approach criteria and could get tunnel vision.

Commuting was allowed by Horizon pilots but there had to be at least 2 flights leaving from their originating airport to their base by show time. Commuting costs were covered by the pilot themselves. He did not know if a pilot could crash in the crew lounge after commuting.

He clarified that he did not know if the FO would be comfortable speaking up to him because the situation never arose so he did not know how the FO would react to that.

When evaluating CRM, he was looking for effective communication of what the PF wanted him to do as PM. He also wanted pilots to be open to giving and receiving input and that they could come to a mutual understanding of what they would do with the airplane.

The two individuals communicated with following the FO’s failed line check were the Chief Check Pilot, and the AQP Manager

The FO initiated the go around after Capt. Orlob’s prompting. He did not know if the FO would have recognized that a go around was needed. He did not know if the FO would bring up a go around if he was PM.

The interview ended at 1650.