

Start of the Week July 10th

I was assigned to Hydroelectric support in the Auburn watershed with PGE for the week of July 10th to July 15th. I came into work at 0700 at PJ helicopters and departed in a company vehicle to Auburn municipal airport shortly thereafter. I drove to the airport and went to the hangar to preflight the helicopter and prepare it for any calls if needed, as nothing was on the schedule for the day. While at the hangar, I preflighted N357PJ, cleaned it, and acquired more fuel for the quad and conducted basic housekeeping of the hangar. I left the hangar a few times to acquire fuel for the quad and then returned to hangar to secure the facility before departing to the hotel in Auburn. That afternoon PGE Hydro General Supervisor Ray Farmer had contacted me via text about a potential flight on Tuesday for Dam inspections with a pickup at 1300 at the Spaulding #3 powerhouse. In a later phone call, he said this flight would just be needed in addition to Wednesday's routine upper lakes patrol. Ray also stated there would be 5 passengers going and that he would prepare a manifest and official request from PGE Heli-Ops to conduct the flight. I then asked what locations he wanted to go to for dam inspections. After his response, I began preflight planning for weight and balance, performance, weather and the given landing zones. I spoke with Ray and confirmed that the flight could be performed with the parameters safely. He told me again that the request was sent off to PGE Heli-Ops and it should be received the next morning. That evening I did an hour workout at the hotel gym followed by eating dinner at the hotel restaurant. That evening I went to sleep around 2300 and slept uninterrupted until 0730 that next morning.

July 11th, 2017

Started the morning by checking the weather for the day ahead. Performed a 20-minute workout at the hotel gym followed by eating breakfast. Hung out at hotel and prepared for the day ahead. Departed the hotel at 1045 to arrive at the Auburn airport 1115, stopped along the way to grab lunch. Arrived at the hangar, and still had not received the PGE Heli-Ops request from dispatch. I asked about the request from Ray Farmer, Casey Tingley, and in addition calling the hydro clerk at Wise powerhouse. The clerk stated she would look into it. Shortly thereafter the request came in from PGE Heli-Ops with the flight request. It was also received shortly thereafter by Casey Tingley. This request only stated 4 passengers, compared to my original flight planning of 5. The request said we would be going to 4 different lakes to conduct dam inspections. I crosschecked the LZs with our daily temperatures to ensure aircraft performance was sufficient, which it was. I then preflighted N357PJ for the flight and documented the ALF/BFF inspection in the logbook. Called PGE Heli-Ops and spoke to Bill Ristevski for the daily call in required on all PGE flights. Pulled out helicopter to the open area east of the hangar to prepare for departure. Secured hangar by putting quad away and locking it up prior to departing. Performed walk around on the aircraft to ensure all doors and latches were secured. Started up helicopter performing all the checks required, obtained weather and listened to the CTAF to be aware of traffic in the pattern at AUN. Took off out of the southeast corner conducting a max power take off and performed a clearing turn at ample altitude to see traffic. One airplane was on the downwind leg departing southeast. At this point I departed on a left downwind departure maintaining visual separation from the airplane-departing southeast. Flew a heading northeast to get to Spaulding Lake and advise Wise powerhouse that I was airborne en-route to Spaulding powerhouse#3 and would advise upon landing. Performed a power check en-route and results were good according to the VEMD page.

Spaulding Powerhouse #3 (First Landing)

It was a 20-minute flight to get to Spaulding Lake. Upon arriving in the locality of the powerhouse I assessed the Altitude, Winds, Obstacles, Terrain, Forced Landing areas, entry path, exit path, and landing

zone of the Spaulding #3 powerhouse pad. This is concrete landing pad with a walkway directly connected to the powerhouse. The altitude was about 5000 MSL, winds out of the southwest, obstacles were shoreline terrain, powerhouse itself, and rising terrain just north of the landing pad, forced landing areas were the shoreline or ridge just north of it, entry was southwest along the shore, exit was southwest along the shore, and the landing zone itself is a concrete pad about 10'x10' level with rising terrain off the forward tip path plane. I have been to this LZ one time during my Hydro training and knew I had to be cautious about the rising terrain off the nose. Mitigating risk here is done by performing a flat approach in and noting when the concrete pad is ending in the chin bubble the reference cue as to stabilize the aircraft and set down. Performed the landing assessment on the downwind leg to land, and pulled into a HOGUE to determine the aircraft performance and wind characteristics. Performance and wind were suitable for landing. I Approached into the LZ pad with a normal approach followed by a shallow flat approach into the pad to safely land and maintain blade clearance from rising terrain. Set the aircraft down, shut it down, and let blades come to a complete stop. Completed shut down checks and departed aircraft to meet the passengers. Met with Ray Farmer to check in and then introduced myself to all the other passengers at the site. It was a few minutes before they were all ready as they were finishing up at the site. Ray mentioned to me there was a fifth passenger and she weighed 138 lbs. (I had originally planned for 5 based on the request received from Ray Farmer the night before and the request from PGE that morning only stated 4, so I knew that 5 passengers was still within the aircrafts capabilities and it would not be an issue. I double-checked the weight and performance and the aircraft was still within the performance parameters for the operation. I had everyone gather around to conduct the safety briefing on the aircraft. The PGE passenger safety briefing card was utilized verbatim with physical demonstrations by myself to the passengers. I asked after every section if there were questions pertaining to the aforementioned material, which there were none. After the safety brief I gave the JSA (job safety analysis) Handbook to Ray Farmer to go over the safety details of the flight. After the JSA was conducted I then asked Ray about the course of the flight since the request had stated Culbertson, Blue, Upper and Lower peak Lakes. Ray stated that we would only be going to Blue, Kidd, Upper and Lower Peak Lakes and not Culbertson. It was one lake different from the request received that morning from PGE, but it was not an issue since I knew where the lakes were at and they were in the GPS. After the JSA and flight plan we then discussed the seating arrangements and I verified everyone's weight verbally. Andrew stated 270 and sat in front left seat for visibility purposes, Dan stated 170 and sat in rear left window seat, Ray Farmer stated 190 and sat in rear left middle seat, Jamie stated 138 and sat in rear right middle seat, and Jen stated 110 and sat in rear right window seat. Double-checked it on ibal with our current fuel load of 85 gallons on board and we were within limitations of the aircraft. After everyone was inside the aircraft, I performed a walk around to ensure that all doors were latched and closed. Taking my seat, I then ensured everyone was seat belted in and then secured my own. I began to go through the start up process and ensure all systems functioning normally. Started up the helicopter and performed required checks prior to lifting. Cleared the area left, right and above knowing I had the powerhouse on the left, rising terrain to the front and rescinding shoreline to my right. I pulled the helicopter into a hover to check performance and controllability of the aircraft, both of which were sufficient. I then departed southwest into the wind over the shoreline to the west. After departing we began the flight to our first request by two of the inspectors. That was to observe the #1 and #2 Spaulding powerhouse dams and drainages below them. They needed to see close and far with photo documentation, using a camera to obtain close photos while I maintained sufficient distance from the drainage floor and canyon walls (approximately 200yards). 3 passes were made in the vicinity to allow them to do that. Once they were done I asked if they needed anything else, and they said no. We departed to our first dam, which was at Blue Lake and was only 1.5 miles from Spaulding Lake.

Blue Lake Dam (Second Landing)

It was a short flight from the observations that were done by the Spaulding powerhouses to Blue Lake. On the way up to this lake I was assessing the winds and mechanical turbulence characteristics. Winds were

still out of the southwest about 7-10 knots and the mechanical turbulence was minimal. Upon arriving to the lake I could see the dam in the northwest corner of the lake. It was about 20' wide and 100' long from the air. I have flown to this dam before to perform staff gauge readings as I was somewhat familiar with the dam. There was a pole in the middle of the dam that has a light and solar panel on it about 25' tall. Ray Famer came on over the intercom and mentioned we land on the dam and there is a pole there as well to watch out for. I thanked him for the input. I performed two orbits conducting my assessment of altitude, winds, obstructions, terrain, forced landing areas, entry path, exit path, and landing zone. The altitude of the spot was about 6000 MSL; as I knew this was within my performance margin and would shortly be verified by a power check. Winds were out of the southwest and constant and I verified this by ground drift in the orbits, aircraft trim position in orbit, ripples on the lake, and crosschecked GPS ground speed verses airspeed indications. Obstructions were the trees surrounding the lake, obstacles on approach from the northeast being trees and the light pole at the dam. Terrain was landing on shoreline saddle (dam) ridgeline approach over the shoreline side of the ridge to the dam. Did not expect much mechanical turbulence from this terrain as the wind was flowing laminar across the lake. Forced landing areas would be the ridgeline along the approach and the northwest drainage upon the departure. Entry path was from the northeast to the southwest along the ridgeline. Exit path would be either southwest along the shoreline or north into the drainage just below the dam. Landing zone itself was the dam which was about 20' x 100' flat with a light pole on it about mid way on the south side where the gauging staff is located. This hazard would be mitigated by landing west of it with enough room to ensure adequate main rotor and tail rotor clearances. There were no persons on the dam and 2 orbits were conducted to gather the information in order to execute the approach. The approach started from the northeast along the ridge, and came into a HOGUE to verify power check and wind stability before beginning the approach, both of which were sufficient. I then descended along the western side of the ridge over the shore and came into a normal approach profile while maintaining clearance of the light pole from the aircraft by keeping it off to the right and then later behind. As I came over the dam I maneuvered the aircraft towards southern spillway, as I knew that the main and tail rotors were sufficiently clear of the light pole and no factor. I landed on the dam parallel and began the shutdown procedure. After completing the shutdown procedure, I ensured that the blades came to a complete stop before the passengers disembarked the aircraft. At blue lake dam the inspectors spent about 45 minutes conducting their inspections. While there I walked around the adjacent areas to the aircraft and maintained security and greeted people passing by. After the inspections were done we then gathered back up to depart to the next dam. The next dam would be Kidd Lake, which was about 9 miles away to the east. After everyone got into the aircraft, I then performed a walk around to ensure that all doors and cowlings were latched and closed. I took my seat in the aircraft, ensured that everyone had their seat belts on and then buckled myself in. I began to go through the start up process and ensure all systems functioning normally. Started up the helicopter and performed required checks prior to lifting. Cleared the area left, right and above while knowing that I had the light pole behind me to left on the dam. I pulled the helicopter into a hover to check performance and controllability of the aircraft, both of which were sufficient. I departed southwest into the wind over the shoreline to the southwest. I then departed the vicinity of Blue lake and made an easterly turn towards Kidd Lake. The flight to Kidd Lake was a few minutes and winds were still out of the west with minimal mechanical turbulence from the terrain.

Kidd Lake Dam (Third Landing)

It was few minutes from Blue Lake Dam to Kidd Lake Dam and upon arriving on site I could see that there was a dam on the northwest side. Flying over the dam I could see that it was concrete and had a few spots to land on it. Ray Farmer had mentioned we usually land on the dam in the corner. I looked at what he was talking about and the spot was suitable to land at. I performed two orbits conducting my assessment of altitude, winds, obstructions, terrain, forced landing areas, entry path, exit path, and landing zone. The altitude of Kidd Lake was 6640 MSL and I knew this was within performance margin and would later be verified by a power check. The winds were coming out of the west and I verified this by ground drift in

the orbits, aircraft trim position in orbit, ripples on the lake, and crosschecked GPS ground speed verses airspeed indications. Obstacles were trees just to the on the west side of the dam where the corner was. This tree was about 50' tall above the dam and would be just to the front of the aircraft with adequate clearance. The terrain was a saddle like setup where as the dam was in the saddle between two hills. The terrain did not induce any mechanical turbulence issues. Forced landing areas along the approach would be to the road from the east to the west or the shoreline and upon the departure it would be the road or the shoreline as well. Entry path would be along the shoreline then making a left hand turn conducting a shallow approach to the dam with the wind being a quartering left head wind. The exit path would be a max performance takeoff with a departure southwest into the wind along the shoreline. The landing zone itself was the dam which was flat concrete 12' x 100' on the northwest corner with a tree about 20' off the nose. The approach started after the 2 orbits and it began southeast of the dam over the road with slowing the aircraft down and performing a HOGE power check and wind stability check, indicating sufficient power and acceptable wind stability. I continued the approach in towards the dam along the shoreline in a normal approach profile then into a shallow approach profile paralleling the dam and eventually terminating on the corner of the dam. Set the helicopter down on the corner of the dam and began the shutdown procedure. After completing the shutdown procedure, I ensured that the blades came to a complete stop before the passengers disembarked the aircraft. The passengers conducted their inspection at Kidd Lake dam, which lasted about 45 minutes. While they were there I ate lunch and drank water. After the inspections were done we then gathered back up to depart to the next dam. The next dam would be Upper Peak Dam, which was about 0.8 miles away to the south. After everyone got into the aircraft, I then performed a walk around to ensure that all doors and cowlings were latched and closed. I took my seat in the aircraft, ensured that everyone had their seat belts on and then buckled myself in. I began to go through the start up process and ensure all systems functioning normally. Started up the helicopter and performed required checks prior to lifting. Cleared the area left, right and above knowing I had the tree directly in front of me on the dam. I pulled the helicopter into a hover to check performance and controllability of the aircraft, both of which were sufficient. I then departed south into the wind over the shoreline to the south. The flight to Upper Peak dam was very short. The winds were still out of the southwest.

Upper Peak Dam (2 approaches to the ridge)

It was a short flight to Upper Peak dam from Kidd Lake Dam. Upon arriving Ray Farmer told me that normal landing is usually conducted just to the North of the dam about 800' along a dirt road area that widens out. Landing on the dam itself would not be conducted at this site. During this conversation it was also mentioned as well that trying to land to the side of the road would be ideal as to not block public vehicle traffic. I took these considerations into mind and began the landing assessment. I performed three orbits conducting my assessment of altitude, winds, obstructions, terrain, forced landing areas, entry path, exit path, and landing zone. The altitude of the site was 6680 MSL and I knew this was within performance margin and would be verified by a power check. The winds were coming out of the southwest and I verified this by ground drift in the orbits, aircraft trim position in orbit, ripples on the lake, and crosschecked GPS ground speed verses airspeed indications. Obstacles were the trees located on the east and west side of the road, for there was about a 100' clearance between both tree lines. Terrain was a ridge with the site being on the spine of the ridge, for this had made for the wind a slight updraft on the windward side. It was minimal and a steep approach over the tree line on the east side would be adequate. Forced landing area would be the road itself along the ridgeline. Entry path would be from the east over the tree line into the road area. The exit path would be a max performance takeoff with a departure westbound into the wind. The landing zone was on the west side of the road since it was a flatter spot compared to the east side of the road, which was sloped and closer to the trees. The landing zone and surrounding area was located in mogul like ground features; as a result, it would require precise placement of the aircraft in order to seat properly, maintain main rotor and tail rotor clearance, and also road clearance. The approach started after the third orbit and it began just to the northeast of

the spot then turning west into the wind. I pulled the aircraft into a HOGE to check power and wind stability – again finding them to be suitable. It was safe to continue the approach and I could see my intended point of landing from over the tree line and continued in with a steep approach to clear the tree line to the east. While approaching my intended spot I could see the mogul like terrain features were going to be a challenging risk to mitigate in order to land the aircraft safely. Descending in closer, the dust started to kick up but it was a normal and expected level of dust for that area, and I could see all obstacles and ground features without any issue. I came into a HOGE about 15' off the ground and reassessed the situation as I was now closer to see more finite details of this landing zone. I asked Ray Farmer how far back a tree was behind us and he stated about 30'. I took this to note as I knew I had cleared the tree line, but now the mogul like features with vegetation on them were going to be a threat to the tail rotor of the aircraft since it is only 36" from the ground. At that point I made the decision to execute a go around. I pulled in power and performed a max performance take off and cleared the tree line to the west. Once clear of that area, I then decided to take a look at the road itself to land on because landing a helicopter parallel on a road with the tail over it would be more ideal. Landing on the road would mean that I would have to monitor vehicle traffic at the location and ensure aircraft security. I performed one orbit to reassess the information I had already gathered on the first three orbits and focused on the road. I set up for an approach just like the previous approach and came into a hover just above the road about 15' and looked at the spot and it had same mogul like features with potholes in addition to the road being depressed in relation the sides of the road. This meant that the main rotors would be closer to the terrain and vehicle traffic or the vegetation alongside the road now would be closer to the tip path plane of the main rotor. I decided at this point to execute a go around. I pulled in power and performed a max performance take off and cleared the tree line to the west. At that point Ray Farmer had mentioned "That spot not going to work for you?" and I said "No." Ray then mentioned, "There is a parking lot just northeast of here." I said, "Ok, we can check it out." The flight from the road landing area to the parking lot was short as it was only about 870' away.

Royal Gorge Warming Hut Parking Lot (Final Approach)

It was a short flight from the last two attempted approaches to the road area on the ridge to the parking lot. Upon arriving on site I could see it was a wider area that would be more suitable than the last. From the air the spot was a clearing about 100' x 150'. I began the landing assessment. I performed two orbits conducting my assessment of altitude, winds, obstructions, terrain, forced landing areas, entry path, exit path, and landing zone. The altitude of the site was 6680 MSL and I knew this was within performance margin and would be verified by a power check later. The winds were coming out of the southwest and I verified this by ground drift in the orbits, aircraft trim position in orbit, and crosschecked GPS ground speed verses airspeed indications. Obstacles were the trees on the east side of the clearing, which were about 80' tall. The clearing also had a tree on the north side, which was about 80' tall and then on the south side there were 2 young trees conjoined about 35' tall. The departure path had a tree line to clear as well but it was about 45' tall. The terrain of the spot was flat with minimal mechanical turbulence features. Forced landing areas would be the clearing itself and the road that continued from the clearing to south. Entry would be from the northeast over the tree line into the dirt parking area. The exit would be a max performance takeoff clearing the tree line and departing southwest into the wind. The area I intended to land itself was closer to the south side of the parking lot in order to maintain clearance from the 80' tree on the north and visual cues. The south side of the parking lot area had ground cover that was about 10' x 15' wide and about 1' tall of soft vegetation. There also was a small telephone pole laying on the ground that was oriented west to east, there was a sapling about 10' tall south of the vegetation, and there were rocks just to the north of the spot about 10' away. My intended landing spot was facing southwest with the telephone pole, rocks, and green ground cover in my field of vision. This was to have adequate ground reference since the last landing was dusty on the road I knew that having visual cues would aid in landing. My observation was that this site would have sufficient main rotor clearance, tail rotor clearance, was within slope landing limitations, and would have good visual cues (the downed pole,

rocks, ground cover). I performed two orbits assessing this spot to gather the aforementioned information. The approach started after the second orbit and it began just to the northeast of the spot then turning southwest into the wind. I pulled the aircraft into a HOGE to check power and wind stability, both of which were sufficient. It was safe to continue the approach and I could see my intended point of landing from over the tree line and continued in with a steep approach to clear the tree line to the east. I cleared the tree line and verified this by looking in the cargo mirrors through the chin bubble. Closing in on the approach I could still see my intended point of landing through the windscreen. As I closed in more I noticed dust kicking up in the cargo mirrors which was similar to the last 2 approaches. The last two approaches were performed without incident in light dust, as I felt in control and could still see my intended point of landing on all approaches, including this one (with the green ground cover on the south side). Closing in more it became dustier so I then looked through my chin bubble and could see the rocks I had scouted on the assessment. In addition to the rocks I could see my shadow in the mirror with ground closing and estimated to be about 5-6' off the ground. While still looking through the chin bubble, it was at this point I was fixating on bringing the aircraft to the ground safely when all of a sudden I felt the impact. At first I thought I had contacted the ground. It was then immediately clear that wasn't the case, as there were subsequent impacts from the 2 additional blades impacting the tree. From the time I saw my shadow in the mirror and the rocks it was about 2 seconds to initial impact to my recollection. The aircraft reacted violently by shaking laterally then fell to the ground (an estimated 3-4 feet), and then rolled over onto its left side. During the impact the low rotor horn did come on and engine rolled down. There were audible screams from the passengers. Once the aircraft was on the ground it was apparent to me that the aircraft had been in an accident. My first concern was the 5 passengers and their egress. Prior to helping them, I was immediately concerned about cutting off the fuel and master battery switch. The engine was still running and the power was still on, so I mitigated those issues by pulling the fuel shutoff and hitting the battery switch. After that I turned my attention to the passengers, 4 of which had already egressed under their own power. I assisted the last passenger to egress and grabbed a TAIT radio and met everyone 100 yards to the west. I then ensured all my passengers were OK. There were minimal injuries such as minor cuts and pain where the seat belts contacted the body. After verifying all passengers seemed to be OK, I then tried to make radio contact with Wise Powerhouse on the TAIT radio. It would not connect so then I decided to go back to the aircraft to grab the satellite phone. After retrieving the satellite phone I tried to make contact but it would not connect. While wandering around the wreck I could see my personal cell phone so I picked it up and it already had one missed call on it from Seth Gunsauls (PJ Helicopters Business Director) I called him back stating that we did in fact have an accident and that persons were OK. After hanging up with him I then called 911 to notify of the accident event. I spoke to the dispatcher and let them know there were 6 persons involved and there was a fire potential with the aircraft. I then hung up with the 911 dispatcher. I continued to assess the wreckage and look for potential sources of ignition. I did see that the exhaust was emitting white smoke. That alarmed me so I grabbed the Halon fire extinguisher located on the left forward seat. I then went back to the exhaust and at this time it was emitting active flame out of the exhaust. I utilized the fire extinguisher to knock down the active flame. I set the fire extinguisher down about 5-10' from the exhaust to have it ready in case again. I went back to the passengers to reassess how they were doing again. The passengers main complaints were soreness in the location of their seatbelts. I myself had the same injuries with scratches on my left hand and legs. As time went on I kept going back and forth between the aircraft and the passengers to assess conditions. There were people who drove by to ask if we needed help and some of them gave us water. The first arriving Public safety official was the CHP in a cruiser. As he arrived on scene I asked him for another fire extinguisher and first aid for the passengers if they needed it. I placed the fire extinguisher at the base of the exhaust in case there was more fire potential. Shortly thereafter another CHP officer showed up in a cruiser and helped to secure the accident site by putting up yellow caution tape. The next arriving vehicle was an ambulance and when they arrived started to assess the situation and ask for all the passengers names and information (including myself). CALFIRE showed up shortly thereafter to perform their fire assessment. They had been dispatched to another call shortly after arriving on scene. The fire captain asked if I had felt comfortable if they left. The one thing I did

recommend was to disconnect the battery, so I helped them disconnect the battery as to eliminate that potential source of ignition. They departed after that to another call. My boss Seth Gunsauls had called me stating that he and another gentleman were on their way from the shop in Red Bluff, CA to get me and retrieve the aircraft upon completion of appropriate assessment of FAA/NTSB. I continued to wait with the passengers and the aircraft and I kept checking in on them. They all eventually left at the direction of PGE to get checked out by a nurse. I waited at the site until the FAA Aviation inspector arrived about 2 hours later (CHP remained on site until his arrival). Aaron Southerland (Reno FSDO) and I met and began the post-accident discussion/assessment. A while later my boss Seth Gunsauls and colleague showed up with aircraft retrieval equipment and stayed for about an hour before we all gathered up to depart the site to Truckee, CA. we arrived in Truckee, CA, got food then went to the hotel to get rest. We returned to the site at 0700 the following morning and conducted evaluations with Donald Morgan and Aaron Southerland of the Reno FSDO, both of which were operating with the authority of the NTSB as well. Upon release, the aircraft was recovered and I was told to leave the site at approximately 1430 after submitted statements to PG&E and the FAA. Upon returning to the PJ Base (KRBL), I was escorted by the Chief Pilot to the local hospital for a drug test, the results of which were negative.