TECHNICIAN FALLS ONTO ELEVATOR
Type of Incident: Fatality
Date of Incident: October 18, 2012

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SECTION 1.0 DATE AND TIME OF INCIDENT

1.1 The incident occurred on October 18, 2012 at approximately 9:00 a.m.

SECTION 2.0 NAME AND ADDRESS OF PRINCIPAL PARTIES

2.1 Owner

2.1.1 Atco Power Canada Ltd.
900, 919 – 11 Avenue, SW
Calgary, AB
T2R 1P3

2.2 Prime Contractor

2.2.1 Atco Power Canada Ltd.
900, 919 – 11 Avenue, SW
Calgary, AB
T2R 1P3

2.3 Employer

2.3.1 Agat Laboratories Ltd.
2910 – 12 Street, NE
Calgary, AB
T2E 7P7

2.4 Contractor

2.4.1 Agat Laboratories Ltd.
2910 – 12 Street, NE
Calgary, AB
T2E 7P7

2.5 Suppliers

2.5.1 Sky-Van (company no longer exists)
3541 Cornett Road
Vancouver, BC
V5M 2H4

2.5.2 Apex Instruments, Inc.
204 Technology Park Lane
Fuquay-Varina, North Carolina, USA
27526

2.6 Workers

2.6.1 Technician #1 ([redacted])

2.6.2 Technician #2 ([redacted])

2.6.3 Supervisor #1 ([redacted])

2.7 Others

2.7.1 R & E Elevator Ltd.
43 Dolan Close
Red Deer, AB
T4N 1Y1

2.7.2 Alberta Elevating Devices and Amusement Rides Safety Association (AEDARSA)
#104, 8616 – 51 Avenue
Edmonton, AB
T6E 6E6

SECTION 3.0 DESCRIPTION OF PRINCIPAL PARTIES

3.1 Owner/Prime Contractor

3.1.1 Atco Power Canada Ltd. was a world-class developer, construction manager, owner and operator of technologically advanced and environmentally progressive independent power generation plants. With a combined capacity of 4,590 megawatts, Atco Power Ltd. operated 15 generating facilities in Canada and the United Kingdom: 12 facilities fuelled by clean natural gas, one emissions-free hydroelectric facility and two coal-fired plants. The Battle River Generating Station (BRGS) was a coal-fired plant located approximately 200 kilometers southeast of Edmonton on the banks of the Battle River. The station was a major employer for people living in the farming communities surrounding the station.

3.2 Employer/Contractor

3.2.1 Agat Laboratories Ltd. was a highly specialized company that provides laboratory services in the following scientific areas: environmental chemistry, ultra-trace toxicology, agricultural analysis, food testing, geology and petrology, reservoir characterization, air quality monitoring, oil and gas chemistry, oilsands analysis, routine core, mining geochemistry, tribology preventative maintenance. Agat Laboratories Ltd.'s air quality monitoring program specialized in source emissions testing, ambient air monitoring, meteorological monitoring, passive air monitoring, and data acquisition. Through these air monitoring programs they assisted in achieving regulatory compliance by evaluating the effectiveness of their clients' air monitoring management systems and providing accurate assessments for environmental impact studies.

3.3 Suppliers

3.3.1 Sky-Van Ltd. was a Vancouver-based company who manufactured metal containers and the trailers, cranes, and elevators required to move these containers. The company was last found to be active in 1976 when they filed a "Change of Name" with the United States Patent and Trademark Office. The new name of the company was Heede International Ltd., which was then dissolved in 1985 (information from Corporations Canada website).

3.3.2 Apex Instruments, Inc. was established in 1988 as an American-owned company who manufactured equipment for sampling emissions from industrial chimneys and smoke stacks. They provided testing consoles, probes, pitots, umbilicals, glassware, and filters to the environmental industry.

3.4 Workers

3.4.1 Technician #1 ([redacted]) earned a Bachelor of Science in the spring of 2012, and began working as a Source Testing Technician at Agat Laboratories Ltd. in June

of 2012. At the time of the incident he was participating in a RATA (relative accuracy test audit) in the BRGS Station B Stack. He had participated in this same work on the day previous to the incident, but in the Station C Stack on the same site. The day of the incident was his 8th day working on the site.

3.4.2 Technician #2 ([redacted]) had been working full-time with Agat Laboratories Ltd. since April of 2007, and as a Source Testing Technician since April of 2008. He earned a Bachelor of Science Degree in 1999. He also participated in a RATA in the Station C Stack on the day previous to the incident. The day of the incident was his 17th day on site at the BRGS in 2012.

3.4.3 Supervisor #1 ([redacted]) was an Instrumentation Technologist who had been working in that capacity for Atco Power Canada Ltd. at the BRGS for 14 years. He was the Atco Power Canada Ltd. permit holder for the work taking place at the time of the incident. During his time at the BRGS he had participated in approximately five RATAs, and supervised two.

3.5 Others

3.5.1 R & E Elevator Ltd. was a family owned and operated company providing elevator maintenance and repairs. They had been in operation since 1996. R & E Elevator Ltd. had taken over the contract for the work on the elevators at the BRGS elevators just two days prior to the incident. An R & E Elevator Ltd representative was coincidentally on site on the day of the incident, and participated in the post-incident rescue effort.

3.5.2 Alberta Elevating Devices and Amusement Rides Safety Association (AEDARSA) was delegated by the Province of Alberta in May of 1996 to administer specified safety services in accord with regulations made under Alberta's Safety Codes Act pertaining to all elevators, escalators, and chair lifts. Their services included inspections and tests of new devices, maintenance and management of periodic inspections of existing installations, accident investigations and maintaining permanent records of existing devices. Prior to 1996 these services had been provided by Alberta Labour directly.

SECTION 4.0 LOCATION OF INCIDENT

4.1 The incident occurred inside the Station B Emissions Stack (Stack B) at the Battle River Power Generating Station near Forestburg, Alberta (see Attachment A - Map). The emissions travel through an interior steel liner that runs inside the stack. There is an annulus of empty space inside the stack between the steel liner and the exterior stack wall. The atmosphere inside this annulus is made of ambient air, slightly warmed by radiant heat from the emissions inside the liner. Stack B was 137 m tall. The exterior stack wall was made of poured concrete reinforced with rebar; approximately 24 cm thick at the elevation where the incident took place. The interior

liner consisted of a carbon steel tube covered on its exterior with insulation and wire mesh. The liner was supported by columns on a concrete foundation, and was kept centred within the exterior stack wall by bumpers mounted on the top of the liner. At 61 m from ground level there is a permanent platform inside the annulus of the stack used for both manual and automated emissions testing (200' platform). At this level there is 2.46 m between the liner and the exterior wall. The 200' platform can be accessed by an elevator which is mounted on the inside of the exterior stack wall, or by climbing a ladder mounted on the outside of the exterior stack wall. The 200' platform itself is made of steel grating supported by the exterior stack wall. Immediately prior to the incident the Technicians were working on the 200' platform inside the stack preparing to perform a RATA (relative accuracy test audit) of the automated emissions monitoring equipment located at the 200' platform.

SECTION 5.0 EQUIPMENT, MATERIAL AND OBSERVATIONS

5.1 Equipment and Material

5.1.1 Sky-Van Industrial Elevator Model S-1000 in Station B Stack (Serial #[redacted], AEDARSA Registration #[redacted])

5.1.1.1 Originally commissioned in 1975 (operational in 1976), this unit was designed and built concurrently with another unit in the Ash Plant at the Battle River Generating Station. The Stack B unit has a capacity of 453.6 kg or 6 persons, and a total run of 59.0 m. The elevator car is raised and lowered through the action of a two-speed electric motor which was designed to supply a maximum speed of 38.1 m/minute. The unit was tested at the time of installation and the car travelled at 32.0 m/minute.

5.1.1.2 There are only two stops for the elevator; one just above ground level, and one at the 200' platform. Hoistways exist at the two stops; otherwise the elevator travels freely on its mast through the annulus of the stack. The hoistways protect workers from the moving car and its components, as well as prevent access to the fall hazard at the 200' platform. The upper hoistway is made of 2.15 m high metal walls attached to the exterior wall of the stack, and to the platform itself (see Attachment C – Photographs #2 & 5).

5.1.1.3 Under normal operating conditions, the elevator car will leave a hoistway under slow speed, go up to full speed for the majority of its travel, decelerate as it nears its destination, and then slow to a stop as it comes into position in the destination hoistway. Once the elevator car begins traveling between stops, it cannot be called back until it completes its travel.

5.1.1.4 The hoistway doors are 0.61 m wide, horizontal sliding, self-closing metal doors. These doors can only be opened when the elevator car is in place inside one of the hoistways. (see Attachment C – Photograph #5)

5.1.1.5 There are several safety circuits included in the electrical system of the elevator. If

any of the safety circuits are incomplete, the elevator will not travel. There are circuits on the car door, on the emergency escape hatch, two emergency stop buttons, among others. Also, the elevator has a brake system that is engaged in the absence of a power supply, and can only be disengaged when the power is turned on.

5.1.1.6 The safety circuit connected to the escape hatch in the ceiling of the Stack B elevator car resembled a standard electrical outlet and plug (see Attachment C – Photograph #9). Removing the plug from the socket would open the safety circuit and disable the elevator. The plug portion of the system should be physically attached to the hatch such that if the hatch is opened, the plug gets pulled out of the socket. However, at the time of the incident the chain attaching the plug to the hatch was long enough to allow the plug to remain connected even if the hatch was slightly opened, or shifted out of its normal position. (see Attachment C - Photograph #8)

5.1.1.7 The control buttons of the Stack B elevator did not require positive pressure to remain activated. Pushing a button initiated a "call", and that "call" would stay engaged until the elevator completed its travel. If the call was initiated when one or more of the safety circuits was open, the elevator would not begin its travel. However, once the circuits were closed, the elevator would begin travelling immediately. (see Attachment C – Photograph #10)

5.1.1.8 The elevator car itself has approximate interior dimensions of 91 cm deep, 128 cm wide and 213 cm tall. The emergency exit hatch in the roof of the elevator car measures approximately 59 cm by 39 cm. There is a ladder mounted to the inside wall of the elevator car that supplies access to the emergency exit. (see Attachment C – Photographs #2, 5 & 7)

5.1.1.9 The elevator has been inspected 34 times by the Alberta Elevating Devices and Amusement Rides Safety Association (AEDARSA) and Alberta Labour since 1975. Over that time period 7 reports contained directives requiring action regarding the car-top escape hatch. All of these directives had been addressed appropriately.

5.1.1.10 Atco Power Canada Ltd. had contracted R&E Elevator Ltd. to perform regular preventative maintenance on the Stack B elevator and its components. This maintenance was performed every 2 months, or more often if required.

5.1.2 Sampling probe

5.1.2.1 Manufactured by Apex Instruments, Inc., the probe was 3.76 m long, had a typical diameter of approximately 4 cm, and was made of a combination of stainless steel tubes, electrical wiring, and other attachments (see Attachment C – Photograph #11). When in use, the probe would be connected to a gas analyser, inserted through a port into the liner of the emissions stack, and used to take samples of the emissions as they travel up through the stack.

5.2 Observations

5.2.1 The incident occurred at approximately 9:00am on October 18, 2012, and was reported to the OHS contact centre at 10:49am on the same day. Alberta Occupational Health and Safety officers arrived at the scene at 2:45pm.

5.2.2 Atco Power Canada Ltd. pre-qualifies the safety programs of other companies who want to bid on work at Atco's sites. Agat Laboratories Ltd. had been pre-qualified and deemed acceptable to work at the BRGS.

5.2.3 Agat Laboratories Ltd. was under contract to Atco Power Canada Ltd. to complete a Relative Accuracy Test Audit (RATA) calibration on new emissions monitoring equipment installed at the elevated platforms inside Stacks B and C at the BRGS. This work activity can only be completed at the elevated platforms.

5.2.4 Atco Power Canada Ltd.'s process requires their Operations Department to approve all work on site before that work begins. Upon approval from Operations, a work permit is generated and given to a permit holder. Before that work begins, the permit holder organizes a tailboard meeting, including all relevant parties, to clarify the plan for the work and assess any of the hazards involved.

5.2.5 The 200' platform in Stack B could be accessed by climbing a fixed ladder on the exterior of the stack, or by the elevator mounted in the annulus of the stack. The elevator car was small and was tight for 2 men and the equipment and tools required for the task.

5.2.6 There was an emergency exit hatch in the roof of the elevator car that could be easily opened from inside the car. The emergency exit hatch system included a safety switch that was intended to disable the elevator when the hatch was opened. The elevator hatch and switch were in a state at the time of the incident that allowed the switch to remain connected (thus making the elevator operable) with the hatch open or moved out of position.

5.2.7 There is a system of similar safety switches throughout the elevator system. In particular, switches could be opened by moving elevator car or hoistway doors, and by depressing the emergency stop buttons. The elevator will not function until *all* of these switches are in the closed position.

5.2.8 The top of the elevator car was designed for occupation by a worker to allow for inspection and maintenance of the elevator system components. The space was entirely enclosed by guardrails, and an additional elevator control panel was present.

5.2.9 A cover from one of the emissions testing machines had been moved and placed on the 200' platform next to the hoistway wall. There were boot prints on top of the cover matching the sole pattern on the boots of Technician #1 ([redacted]) (see Attachment C – Photographs #3 & 4). There were also marks on the wall itself, above the location of the cover, consistent with someone trying to climb the wall of the hoistway. Dust on the top of, and inside, the hoistway walls had also been

significantly disturbed (see Attachment C – Photograph #6).

5.2.10 Dust had been disturbed on one of the support beams under the 200' platform, adjacent to the hoistway opening.

5.2.11 Post-incident the elevator car had been lowered to approximately 0.6 m above its normal position in the bottom hoistway to allow rescue of Technician #1 ( ). The guardrails on top of the elevator car were significantly deflected, and the emergency stop button included in the car-top controls had been depressed.

SECTION 6.0 NARRATIVE DESCRIPTION OF THE INCIDENT

6.1 Technician #1 ( ) received his site orientation on July 12, 2012, Technician #2 ( ) received his orientation on March 5, 2012. The Technicians arrived at the Battle River Generating Station together on Oct 17, 2012.

6.2 The application for the RATA work on Stacks B & C was submitted on October 16, 2012, and the work permit issued on October 17, 2012. Supervisor #1 ( ) was the permit holder.

6.3 At 11:26 a.m. on October 17, 2012 a tailboard meeting was hosted by Supervisor #1 ( ) discussing the work to be completed for the day, along with the hazards associated with the work. Present were Supervisor #1 ( ), Technician #1 ( ), and Technician #2 ( ). An Atco Power Canada Ltd. Field Level Hazard Assessment (FLHA) was included in the documentation with the Work Permit.

6.4 Technician #1 ( ) and Technician #2 ( ) then completed the RATA of the new emissions monitoring equipment in Stack C. The probe was taken to and from the elevated platform by opening the emergency hatch in the ceiling of the elevator car and extending the probe out. The safety switch connected to the hatch was located inside the car, and was bypassed using an electrical power bar.

6.5 At 7:30 a.m. on October 18, 2012 another tailboard meeting was hosted by Supervisor #1 ( ) discussing the work to be completed for the day, along with the hazards associated with the work. Present were Supervisor #1 ( ), Technician #1 ( ), and Technician #2 ( ). No new hazards were identified.

6.6 Technician #1 ( ) and Technician #2 ( ) then proceeded to the Stack B and loaded all of their required gear into the elevator, including the probe. Again, getting the probe into the elevator car required the moving of the emergency exit hatch out of place and extending the probe out through the hatch. The button inside the elevator car was pushed to send the elevator to the elevated platform, but nothing happened. Technician #1 ( ) then exited the

elevator car and proceeded to reconnect the safety switch on the roof of the elevator. Meanwhile, Technician #2 ([redacted]) held the car and hoistway doors open, thus disabling the elevator. Technician #1 ([redacted]) re-entered the elevator and the doors were allowed to close. As soon as the doors closed, the elevator began to move.

6.7 Upon arrival at the 200' platform, the Technician #1 ([redacted]) and Technician #2 ([redacted]) were unable to get the probe out through the door of the elevator car. Technician #1 ([redacted]) exited the car, climbed onto another platform directly above the elevator car where the elevator draw works were located. He pulled the probe out through the emergency hatch and then passed the probe down to Technician #2 ([redacted]) who was standing on the 200' platform.

6.8 After all of the gear had been unloaded from the elevator car onto the elevated platform the Technicians realized a few items had been forgotten at ground level. Technician #1 ([redacted]) indicated he would go down to retrieve them. Technician #2 ([redacted]) then turned his back to the hoistway and continued to prepare his equipment for the RATA.

6.9 At some point a "call" for the elevator to the ground level was placed. This "call" would have remained engaged until all the safety circuits were closed, including the plug on the emergency hatch.

6.10 A short time later Technician #2 ([redacted]) heard the elevator engage and turned to see Technician #1 ([redacted])'s legs go down into the hoistway from above. Seconds later Technician #1 ([redacted]) was heard calling for help.

6.11 Technician #2 ([redacted]) proceeded to the elevator call button next to the hoistway and repeatedly pressed the button, hoping to bring the elevator car back to the 200' platform. He then became aware of Technician #1 ([redacted]) directly under his feet, hanging by his hands from the support beam underneath the elevated platform. The elevator continued to descend.

6.12 Technician #1 ([redacted]) was unable maintain his hold on the beam and fell. He landed on the elevator car approximately 34 m below the elevated platform. His impact depressed the emergency stop switch on the control panel located on the top of the elevator car, thus disabling the elevator.

6.13 Technician #2 ([redacted]) contacted Supervisor #1 ([redacted]) via radio and informed him that an incident had occurred.

6.14 Supervisor #1 ([redacted]) initiated the emergency response. The on-site rescue team responded to Stack B. Two rescuers climbed approximately 26 m up the elevator mast to the elevator car. The rescuers were unable to adequately assess Technician #1 ([redacted])'s condition due to his position on the elevator car, so they secured him to the elevator car in preparation for descent. Under the direct supervision of R&E Elevator Ltd. the safety circuits were bypassed, and the elevator

car lowered toward the ground-level hoistway where paramedics were waiting.

6.15 Technician #1 ([redacted]) was pronounced deceased at the scene.

SECTION 7.0 ANALYSIS

7.1 Direct Cause

7.1.1 The direct cause of Technician #1 ([redacted])'s fatal injuries was an approximately 34 m fall onto the elevator car in the Station B Stack at the Battle River Generating Station.

SECTION 8.0 FOLLOW-UP/ ACTION TAKEN

8.1 Industry

8.1.1 Atco Power Canada Ltd. conducted an investigation into the incident and made the report available to OHS. Included in the report were preventative measures to be implemented as a result of the investigation.

8.1.2 After the incident, Atco Power Canada Ltd. completed all repairs and modifications as recommended by the contracted engineers and AEDARSA. The Stop-Use order was removed February 19, 2013.

8.1.3 Agat Laboratories Ltd. provided all requested additional information.

8.1.4 Atco Power Canada Ltd. provided all requested additional information.

8.2 Additional Measures

8.2.1 No additional measures required.

SECTION 9.0 SIGNATURES

[redacted] Date

[redacted] Date

[redacted] Date

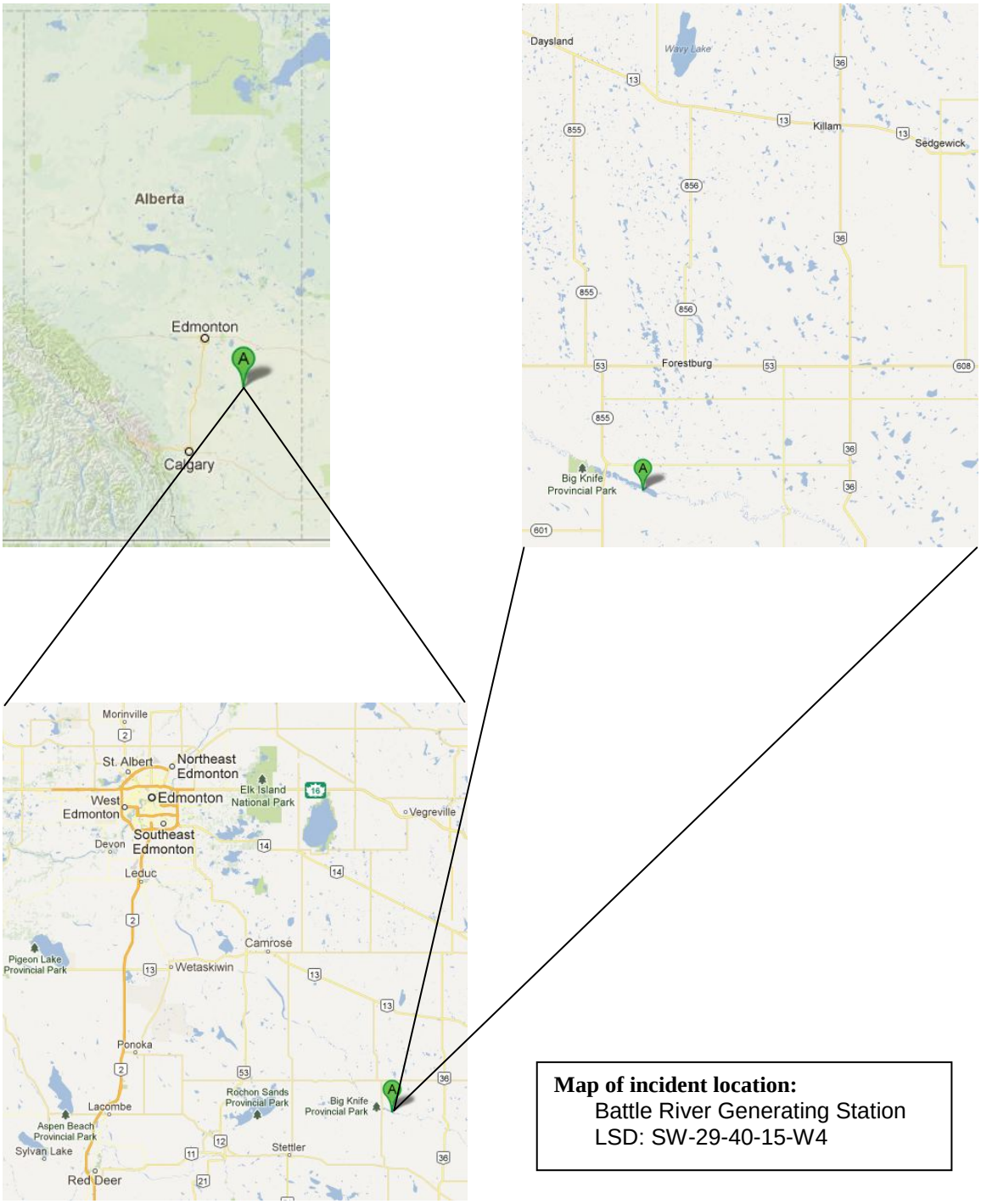
[redacted] Date

SECTION 10.0 ATTACHMENTS:

Attachment A Map
Attachment C Photographs

Jobs, Skills, Training and Labour

File: F - 1930290
Attachment "A" Map
Showing Incident Location



Map of incident location:
Battle River Generating Station
LSD: SW-29-40-15-W4

1

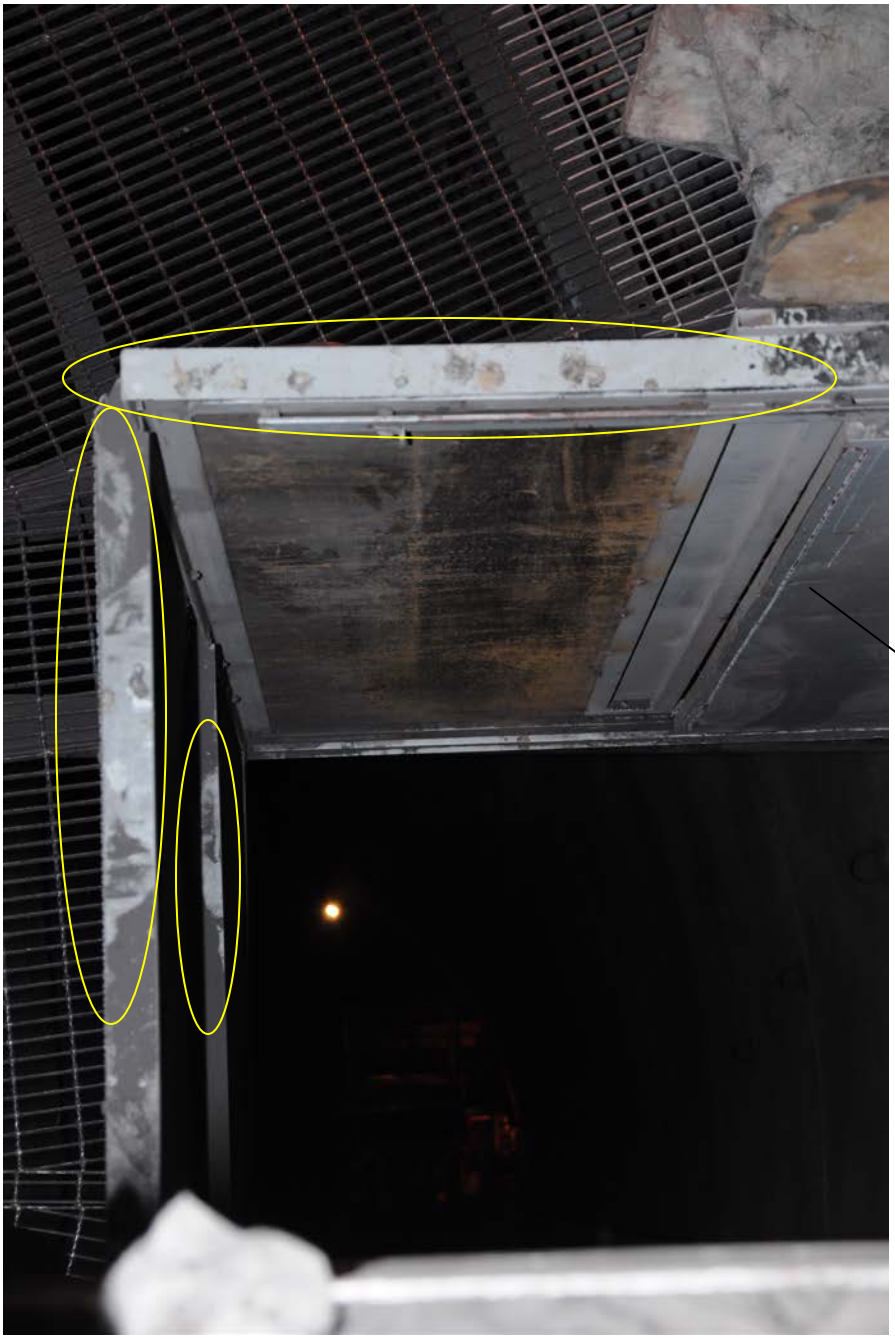
Photograph #1
Shows the exterior of the Battle River Generating Station near Forestburg, AB. The red and white striped stack is Stack B.
1 - Indicates the exterior portion of the 200' platform where the incident occurred.
Photo: [redacted]

Photograph #2
Shows ground level inside the Station "B" Stack. The elevator car can be seen inside the lower hoistway. The door to the elevator car is on the side of the hoistway away from the camera.
Photo: [redacted]

Photograph #3
Shows the upper hoistway as it was post-incident. Boot prints can be seen on the orange cover that had been placed next to the hoistway wall.
1 - Indicates the scuff marks on the hoistway wall.
Photo: [redacted]

Photograph # 4
Shows the boots worn by Technician #1 ([redacted]) at the time of the incident. Note the sole pattern is consistent with the prints left on the orange cover in Photograph #3
Photo: [redacted]

Photograph #5
Shows the hoistway at the 200' platform of Stack B after the repairs had been completed to the elevator. The elevator car is inside the hoistway.
1 - Indicates the new guardrail installed on the top of the elevator car. Similar rails were in place at the time of the incident.
Photo: [redacted]



Photograph #6
Shows the top and inside of the hoistway at the 200' platform post-incident. The elevator car is not present in the hoistway. Circled are the areas where the dust has been disturbed.
1 – Indicates the hoistway door.
Photo: [redacted]

Photograph #7
Shows the emergency hatch in the roof of the Stack B elevator car in its normal, closed position. The ladder for emergency access to the opening can also be seen.
Photo: [redacted]

Photograph #8
Shows the emergency hatch in the roof of the elevator car in a position which would allow for the probe to be extended out while the emergency switch is still connected.
1 - Indicates the location where the plug is connected to the emergency exit hatch.
Photo: [redacted]

Photograph #9
Shows the emergency exit hatch safety switch on the roof of the elevator car as it existed at the time of the incident in both a closed (top) and open (bottom) position. Note the length of the chain connecting the plug to the hatch.
Photo: [redacted].

Photograph #10
Shows the control panel inside the elevator car at the time of the incident.
Photo: [redacted]

Photograph #11
Shows the 3.76 m long probe involved in the incident, which did not fit within the confines of the elevator car.
Photo: [redacted]