

Occupational Health and Safety

Fatality Report

Worker Crushed by Ice

Type of Incident: Fatality

Date of Incident: December 31, 2008

Alberta 

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SECTION 1.0 DATE AND TIME OF INCIDENT

1.1 The incident occurred on December 31, 2008 at approximately 10:30 a.m.

SECTION 2.0 NAME AND ADDRESS OF PRINCIPAL PARTIES

2.1 Owner(s)

2.1.1 Syncrude Canada Ltd.
301-9911 MacDonald Avenue
Fort McMurray, Alberta
T9H 3H5

2.2 Prime Contractor

2.2.1 Not applicable

2.3 Employer(s)

2.3.1 Syncrude Canada Ltd.
301-9911 MacDonald Avenue
Fort McMurray, Alberta
T9H 3H5

2.4 Contractor(s)

2.4.1 Jacobs Catalytic Ltd.
106B – 9816 Hardin Street
Fort McMurray, Alberta

2.5 Supplier(s)

2.5.1 Not applicable

2.6 Worker(s)

2.6.1 The Process Operator [REDACTED]
[REDACTED]
Fort McMurray, Alberta

2.7 Others

2.7.1 Not applicable

SECTION 3.0 DESCRIPTION OF PRINCIPAL PARTIES

- 3.1 Syncrude Canada Ltd. is a joint venture undertaking that mines and processes oil sands in the Fort McMurray region to produce synthetic crude oil. Syncrude Canada Ltd.'s Mildred Lake processing facility is located 40 km north of Fort McMurray.
- 3.2 Jacobs Catalytic Ltd. is an engineering procurement, construction and maintenance company. Jacobs Catalytic Ltd. had been contracted by Syncrude Canada Ltd. to carry out maintenance work at the Mildred Lake processing facility.

SECTION 4.0 LOCATION OF INCIDENT

- 4.1 Syncrude Canada Ltd.'s Mildred Lake processing facility, in the 8-0 Pipe Rack (Attachment A – Map).

SECTION 5.0 EQUIPMENT, MATERIAL AND OBSERVATIONS

5.1 Equipment and Material

5.1.1 Syncrude Canada Mildred Lake Processing Facility

- 5.1.1.1 The Syncrude Canada Mildred Lake oil sands crude oil production facility processes bitumen from oil sands mined at the Mildred Lake and Aurora mine sites. The bitumen is upgraded into synthetic crude oil and sent by pipeline to refineries and pipeline terminals. (Attachment C, Photograph #1)

5.1.2 The 8.0 Pipe Rack

- 5.1.2.1 The 8.0 pipe rack is a steel framework containing pipes carrying tail-gases into the coker. (Attachment C – Photographs #1, #2).

5.1.3 Ice Melting Equipment

- 5.1.3.1 Ice melting equipment consists of steam pipes and lances. The steam lances are made on-site and consist of a length of rigid pipe with a valve and handle. Tarpaulins are used to cover ice during the melting process.

5.2 Observations

- 5.2.1 Initial examination of the site revealed a blood trail leading from the location where the Process Operator [REDACTED] received his injuries to the location where he was found. (Attachment B – Diagram)
- 5.2.2 An Environment Canada weather report was obtained for Fort McMurray. On the morning of the incident the temperature varied from minus 31.7 degrees Celsius at 6:00 a.m. to minus 28.9 degrees Celsius at 11:00 a.m.

SECTION 6.0 NARRATIVE DESCRIPTION OF THE INCIDENT

- 6.1 The Process Operator [REDACTED] started work at 7:30 a.m. on December 31, 2008 at the Syncrude Canada Ltd. Mildred Lake processing facility. The Process Operator [REDACTED] was on an assignment to monitor and escort a team of contract workers from Jacobs Catalytic Ltd., who were carrying out leak repairs to steam tracer pipes at the 8-0 pipe rack. The Process Operator [REDACTED] reported to a shift supervisor but was largely responsible for organizing the work that had been delegated to him and the Jacobs Catalytic Ltd. team. The Process Operator [REDACTED] was responsible for issuing a work permit to Jacobs Catalytic Ltd. for the day's work, to carry out isolations and de-pressuring of pipes that the Jacobs Catalytic Ltd. team were repairing, and to clear ice buildup away from leaks that were to be repaired. The work had been proceeding since late November 2008, when the weather became cold enough to cause ice to build up under pipe leaks.
- 6.2 At approximately 7:45 a.m. a Shift Team Leader [REDACTED] held a safety meeting for his team. The Process Operator [REDACTED] was not part of the Shift Team Leader's [REDACTED] crew, but still attended the safety meeting. Topics discussed included working alone and working in the cold. The Process Operator [REDACTED] told the Shift Team Leader [REDACTED] that he was melting ice to clean up an area ready for the Jacobs Catalytic Ltd. team to move a steam line.
- 6.3 The Process Operator [REDACTED] had breakfast with another worker in the Satellite Building at approximately 9:30 a.m.
- 6.4 At approximately 10:35 a.m. three Jacobs Catalytic Ltd. workers approached the 8-0 pipe rack. Jacobs Catalytic Ltd. Worker 1 [REDACTED] started to climb an access ladder. Jacobs Catalytic Ltd. Worker 2 [REDACTED] followed. As Jacobs Catalytic Ltd. Worker 2 [REDACTED] was climbing the ladder he saw gloves, then blood, then a pair of boots hanging over the edge of the landing. Jacobs Catalytic Ltd. Worker 2 [REDACTED] called out to Jacobs Catalytic Ltd. Worker 1 [REDACTED] who then also saw legs extending from beneath a temporary scaffold that had been erected on the landing level. The Jacobs Catalytic Ltd. Workers then saw a man laying face up on the landing level underneath the temporary scaffold. Jacobs Catalytic Ltd. Worker 2 [REDACTED] called out to the injured worker but received no response. Jacobs Catalytic Ltd. Worker 2 [REDACTED] called "Man Down" to the Jacobs Catalytic Ltd. Foreman [REDACTED] who was still at ground level. The Jacobs Catalytic Ltd. Foreman [REDACTED] called into Syncrude Canada Ltd. emergency services by radio. (Attachment B – Diagram) (Attachment C – Photographs #3, #4)
- 6.5 The Jacobs Catalytic Ltd. Foreman [REDACTED] guided emergency vehicles into the location.

- 6.6 The Jacobs Catalytic Ltd. workers remained on the platform level, assisted the injured worker and started to clear materials from the platform. Jacobs Catalytic Ltd. Worker 2 [REDACTED] observed that a steam lance was left on at the landing level. The Jacobs Catalytic Ltd. Workers believed the injured worker to be the Process Operator [REDACTED] but were unable to make a positive identification because of the extent of the injuries.
- 6.7 Syncrude Canada Ltd. emergency services received an emergency call at 10:39 a.m. Emergency Services arrived at the scene within a few minutes. The injured worker was attended to and lowered from the platform to ground level. The injured worker was removed by Syncrude Canada Ltd. ambulance and met by a Regional Municipality of Wood Buffalo (RMWB) ambulance on Highway 63. The injured worker was assessed by the RMWB paramedics and continued in the Syncrude Canada Ltd. ambulance to hospital at Fort McMurray. The injured worker was pronounced dead by emergency physicians at the hospital.
- 6.8 A head count was taken at the site and it was confirmed that the injured worker was the Process Operator [REDACTED].
- 6.9 Initial investigation by Syncrude Canada Ltd. workers found that there was a blood trail extending from where the Process Operator [REDACTED] had been found injured to the location where the injury had occurred. It was found that a large mass of ice had fallen onto a work platform, striking the Process Operator [REDACTED] or crushing him against adjacent metal railings and pipes. After the incident the Process Operator [REDACTED] had moved from the site of the incident to the place where he was subsequently found. Further investigation showed that the ice had been extending from a railing to a manifold box, and had fallen, rotating as it fell onto the platform level. According to Jacobs Catalytic Ltd. workers the ice had originally extended all the way down to the work platform before the Process Operator [REDACTED] had started to melt it.
- 6.10 At 11:14 a.m. Syncrude Canada Ltd. declared an emergency situation and notified Fort McMurray RCMP. The RCMP responded to the scene and carried out an investigation. At 11:26 a.m. Syncrude Canada Ltd. notified Occupational Health and Safety and Occupational Health and Safety officers from Fort McMurray attended the scene. The RCMP officers and Occupational Health and Safety officers followed the blood trail to the location of the incident. It was observed that a large mass of ice had fallen onto the platform level at the location of the incident. The weight of the ice was estimated at 1200 to 1600 lbs. (545-727 kg.) A small amount of blood was observed on the top of the ice. Further blood and the Process Operator's [REDACTED] hard hat were found on a lower work platform approximately 3 m below the platform level. (Attachment B – Diagram) (Attachment C – Photographs #4, #5, #6, #7)

SECTION 7.0 ANALYSIS

7.1 Direct Cause

7.1.1 The Process Operator [REDACTED] had been melting a large mass of ice from a work platform. The Process Operator [REDACTED] had melted the ice from the bottom, causing the remaining ice to become unstable. The ice fell and rotated as it fell, striking the Process Operator [REDACTED], or crushing him against adjacent metal railings and pipework, and caused injuries that proved to be fatal. The weight of the ice mass, based on volume, was estimated to be between 1200 lbs (545 kg) and 1600 lbs (727 kg). The Process Operator [REDACTED] had moved towards an access ladder after the incident, where he collapsed and was found.

7.2 Contributing Factors

7.2.1 Steam had been leaking from a tracer line on a tail gas pipe, causing a large pillar of ice to grow from the platform level underneath the leak. The ice had originally extended from the platform level, encasing the railing and over the manifold box, a total height of approximately 2.7 m. The evidence indicated that the Process Operator [REDACTED] had been melting the ice from the bottom. The ice mass had eventually become unstable, rotating around the railing and striking the Process Operator [REDACTED] as it fell.

7.2.2 The Process Operator [REDACTED] had started to melt the ice mass on the previous day. Steam lances had been left on in the ice mass overnight. Ice would have been melting from the base of the ice mass and still accumulating at the top of the ice mass. It is likely that the ice mass had become less stable overnight.

7.2.2 Melting and removing ice from pipe racks and equipment is a continuous activity at the site during cold weather. Steam lances were routinely used to inject heat into accumulations of ice and tarpaulins were used to cover the ice and keep the heat from the steam lances trapped to melt the ice.

7.2.3 Ice removal was a common and routine part of the work of process operators during cold weather. There was evidence of established verbal procedures for ice removal that were passed on from operator to operator. At the time of the incident a procedure for ice removal was being written by the Syncrude Canada Ltd. Personal Safety Leaders Team, but it had not been completed or implemented. At the time of the incident there was no hazard assessment that had been carried out for ice removal. There were no effective measures to eliminate or control the hazards arising from ice melting and removal. No formal training had been provided for process operators who were required to carry out ice removal.

- 7.2.4 There was a system for Field Level Risk Assessments (FLRA's) that was in place at the site. The format consisted of a step-by step checklist. Workers were encouraged to complete FLRA's for hazardous activities. Other process operators who were interviewed during the investigation stated that they would complete FLRA's when they were required to melt large masses of ice. The FLRA system did not require the user to keep a written record of the FLRA. It is not known if the Process Operator [REDACTED] had carried out a FLRA before starting work on the day of the incident.
- 7.2.5 The weather was very cold at the time of the incident. The incident happened during a holiday period when a reduced number of workers and contractors were working at the facility.

SECTION 8.0 FOLLOW-UP/ ACTION TAKEN

8.1 Employment and Immigration; Occupational Health and Safety

- 8.1.2 Occupational Health and Safety issued a stop work order to secure the incident scene for investigation, and orders for information. After the site investigation was complete the stop work order to secure the scene was lifted and a new stop work order was issued requiring Syncrude Canada Ltd. to prepare a written hazard assessment and methods to eliminate or control hazards arising from removing ice. Syncrude Canada Ltd. was required to inform workers of the hazards arising from ice removal and the methods used to eliminate or control the hazards.

8.2 Industry

- 8.2.1 Syncrude Canada Ltd. complied with orders written by Occupational Health and Safety. Syncrude Canada Ltd. carried out an investigation and produced a report. Syncrude Canada Ltd. implemented a training program and a procedure for ice removal at the site.

8.3 Additional Measures

- 8.3.1 No additional measures were required.

SECTION 9.0 SIGNATURES

ORIGINAL REPORT SIGNED
Lead Investigator

Date

ORIGINAL REPORT SIGNED
Investigator

Date

ORIGINAL REPORT SIGNED
Manager

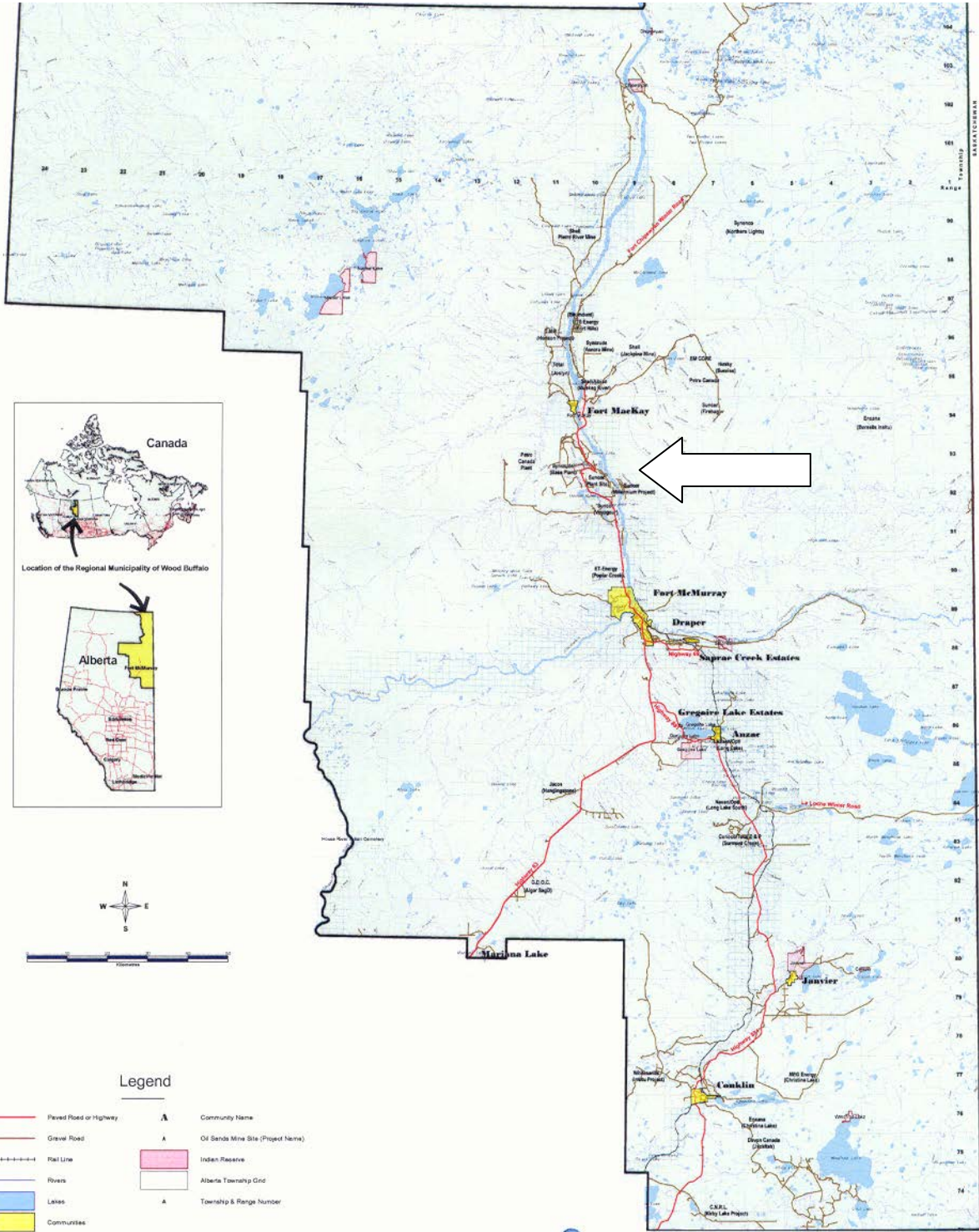
Date

ORIGINAL REPORT SIGNED
Senior Manager North Region

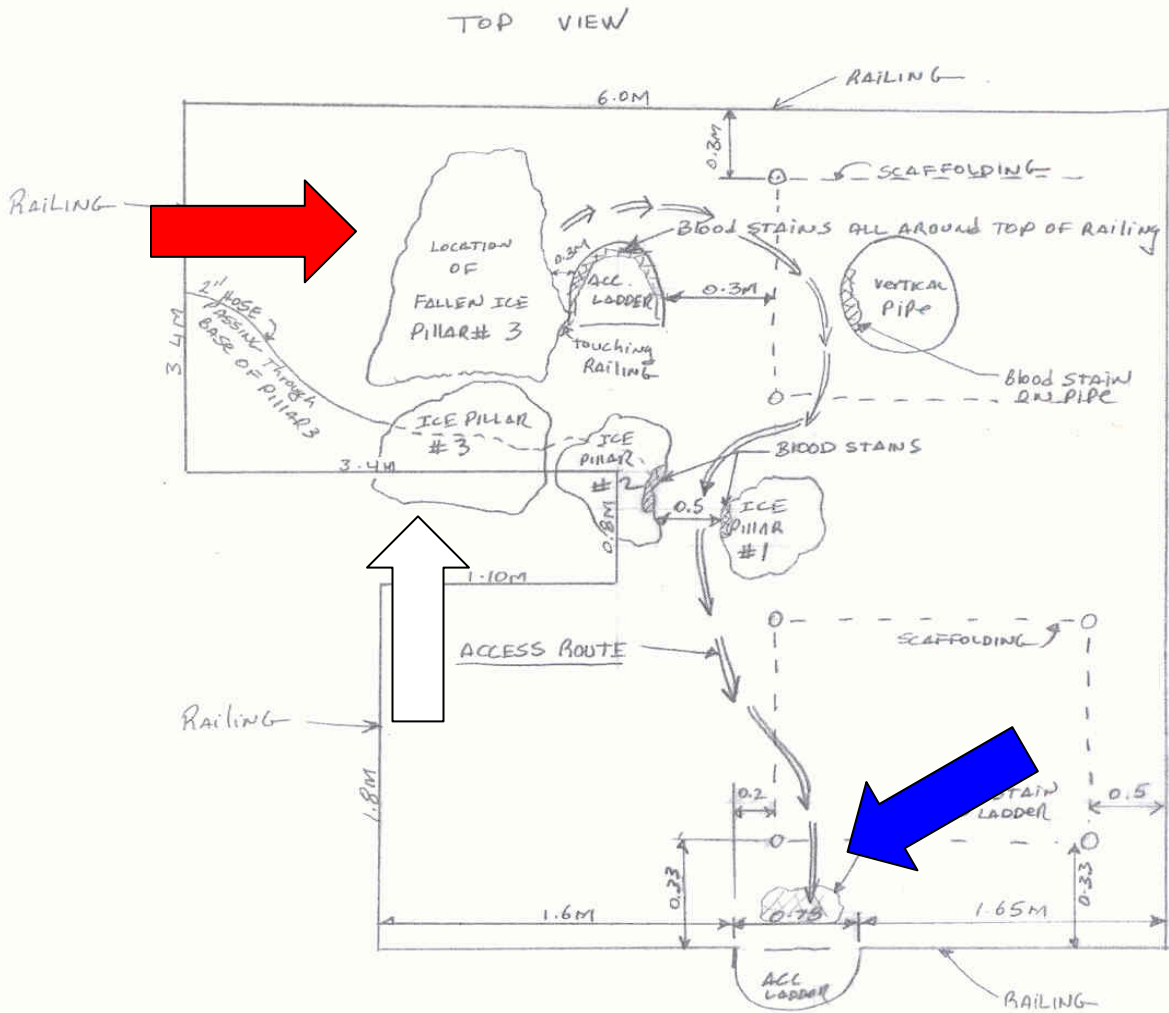
Date

SECTION 10.0 ATTACHMENTS:

Attachment A	Map
Attachment B	Diagrams
Attachment C	Photographs



Map Produced by the Regional Municipality of Wood Buffalo, Planning & Development Department - May 1, 2006 - For Illustration Purposes Only.



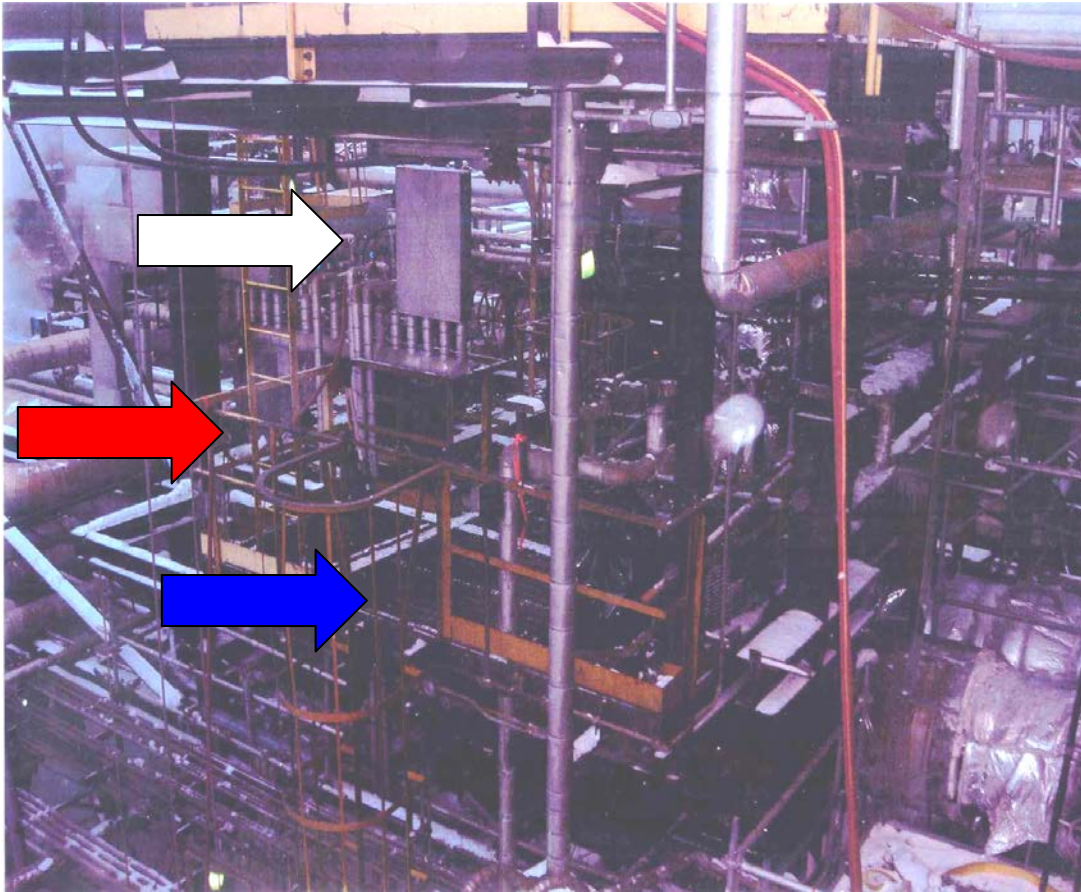
White arrow shows the ice mass location before it fell. Red arrow shows the ice mass location after it fell. Blue arrow shows the location of the Process Operator when he was found.

Diagram provided by Syncrude Canada Ltd.



Photograph #1 Shows an aerial view of the 8.1 Coker at the Syncrude Canada Ltd. Midred Lake facility. Arrow indicates the location of the 8.0 pipe rack.

Photograph supplied by Syncrude Canada Ltd.

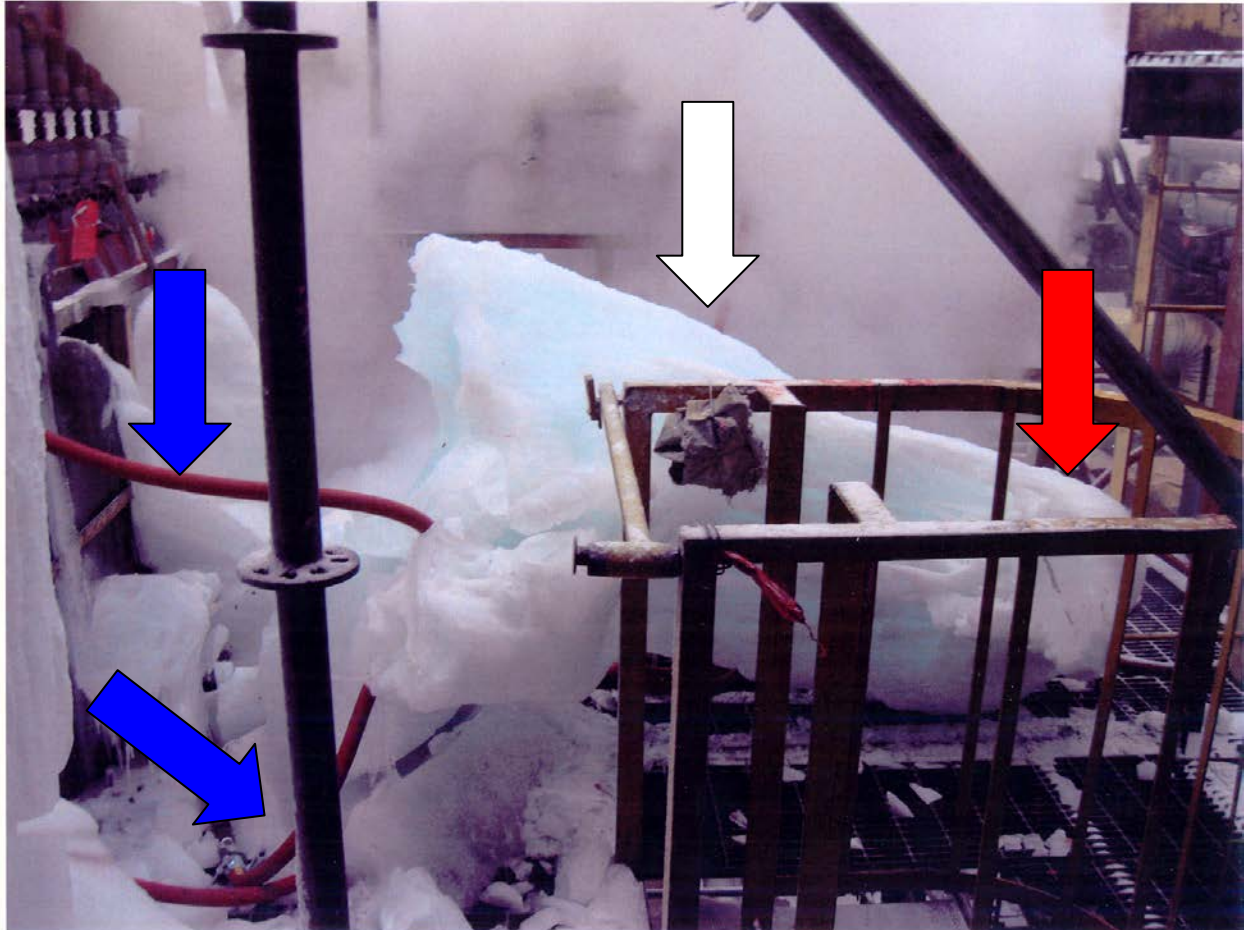


Photograph #2

Shows a view of the incident location. The white arrow indicates the manifold box, and the red arrow indicates the railing that the ice mass had been covering before it fell. The blue arrow indicates the platform level that the Process Operator was standing on when the incident occurred.



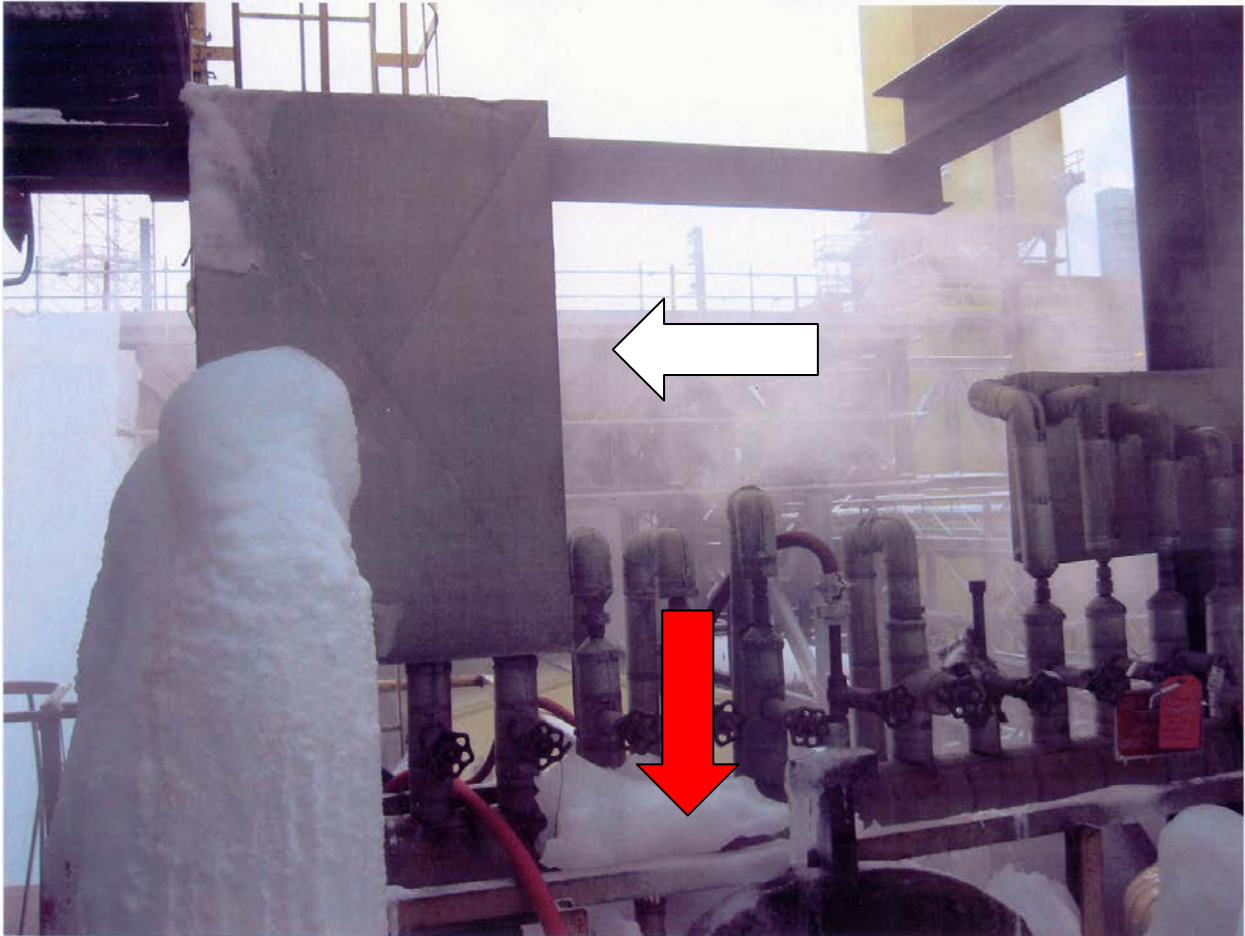
Photograph #3 Shows the staging where the Process Operator was found, The Process Operator's legs were under the scaffold member shown by the arrow, with his feet protruding over an access ladder.



Photograph #4 Shows the platform where the incident occurred. The mass of ice that fell is laying on the platform. White arrow indicates the ice mass. Red arrow indicates the fixed access ladder.. Blue arrows indicate steam pipes attached to lances placed to melt the ice.



Photograph #5 Shows the top end of the ice mass. Arrow indicates the shape of the manifold box that the ice had formed around before it fell.



Photograph #6 Shows the location of the ice mass before it fell. White arrow indicates the manifold box. Red arrow indicates the railing.



Photograph # 7 Shows the Process Operator's hard hat on a lower work platform approximately 3 m below the platform where the incident occurred.