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ONTARIO
DEPARTMENT OF MINES

HON. G. C. WARDROPE, *Minister*

D. P. DOUGLASS, *Deputy Minister*

R. L. SMITH, *Director, Mines Inspection Branch*

MINES INSPECTION BRANCH
ANNUAL REPORT
1966

Compiled by the Staff of the Branch

Accidents and Employment

Fires

Dust and Radioactivity

Prosecutions

Mine Rescue Stations

Cable-Testing Laboratory

BULLETIN 166

TORONTO
1967

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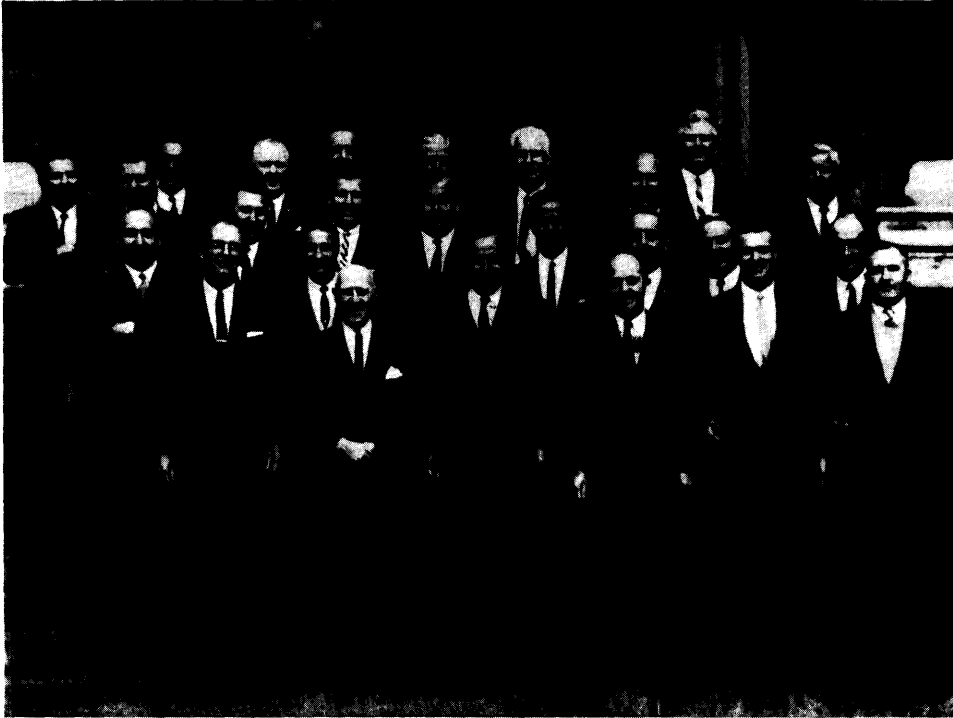
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ODM8025

Shown as they assembled in Toronto for their annual conference are members of the Mines Inspection Branch, with the Minister and Deputy Minister of the Ontario Department of Mines. From left to right, front row: D. P. Douglass, Deputy Minister; The Hon. G. C. Wardrope, Minister; R. L. Smith, Chief Engineer; R. H. Galway, London; W. K. Redsell, Sudbury; T. J. Baker, Kirkland Lake. Second row: J. J. Lazurko, Sudbury; W. A. Hoffman, Sudbury; J. M. Niels, Port Arthur; R. F. Lockhart, Timmins; S. T. Schinzel, Toronto; H. N. Curry, Elliot Lake. Third row: Wm. Hendry, Peterborough; V. Senkus, Timmins; J. K. Hurst, Kirkland Lake; F. A. Nabb, Kirkland Lake; H. F. Davis, Toronto; A. T. Kirk, Port Arthur. Fourth row: R. E. Murray, Kenora; W. V. McKnight, Toronto; C. M. Barrett, Toronto; G. S. Riddell, Toronto; O. H. Bjarnason, Peterborough; E. B. May, London; H. J. Bone, Elliot Lake; J. M. Hughes, Toronto (absent).

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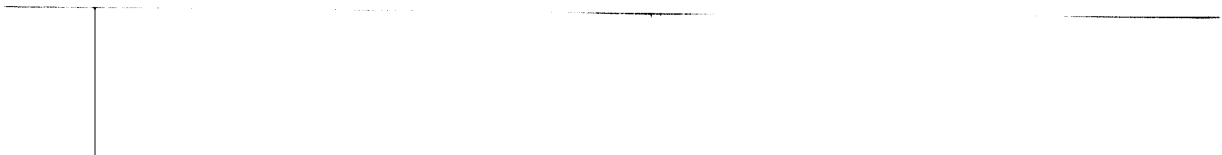
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ANNUAL REPORT

**Mines Inspection Branch
1966**

Compiled by the Staff of the Branch



ACCIDENT and EMPLOYMENT STATISTICS

Introduction

During 1966, at the mines, metallurgical works, clay, shale, sand and gravel pits, and contract diamond-drilling regulated by The Mining Act of Ontario, there were 3,655 accidents reported to the Ontario Department of Mines up to 24 January 1967; 31 of these were fatalities and 3,624 were non-fatal accidents. A non-fatal accident is one for which the Workmen's Compensation Board of Ontario has paid compensation; the waiting period was reduced from 5 to 3 days in 1963.

The report shows a fatality rate of 0.31 per million man-hours, which is an increase of 0.05 from the preceding year, and a decrease of 0.08 from the average for the last 25 years. There were 37 non-fatal accidents per million man-hours, an increase of 3 from the 1965 total, and an increase of 6 from the average for the last 25 years.

The total employment figures show an increase of 1.9 percent from 48,979 in 1965 to 49,901 in 1966; the total man-hours decreased 2.7 percent from 101.168 in 1965 to 98.455 in 1966, partly due to strikes at International Nickel and Dominion Magnesium.

CLASSIFICATION OF OPERATIONS

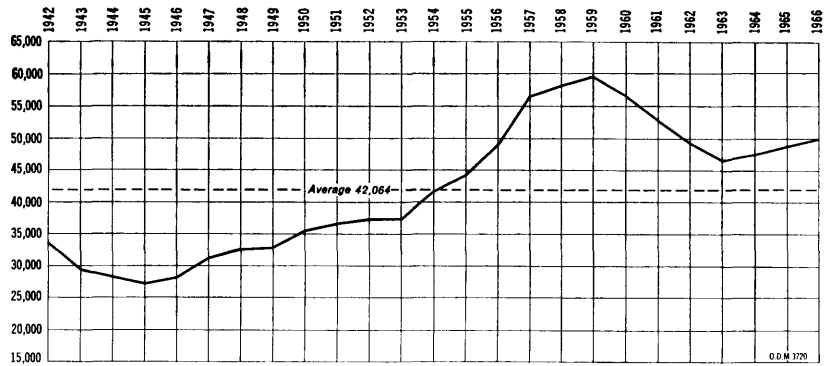
	MEN EMPLOYED
Group 1. Mines, underground ¹	17,369
2. Mines, surface	11,292
3. Metallurgical works	13,609
4. Quarries	2,928
5. Clay, shale, sand, and gravel pits	3,882
6. Contract diamond-drilling	821
7. Operations in the mining industry for which employment figures are not available	—
	49,901

¹Open-pit mining of nepheline syenite, iron, nickel, copper, etc., (as distinct from rock quarries) is included in Group 1.

EMPLOYMENT AT MINES (GROUPS 1 AND 2)

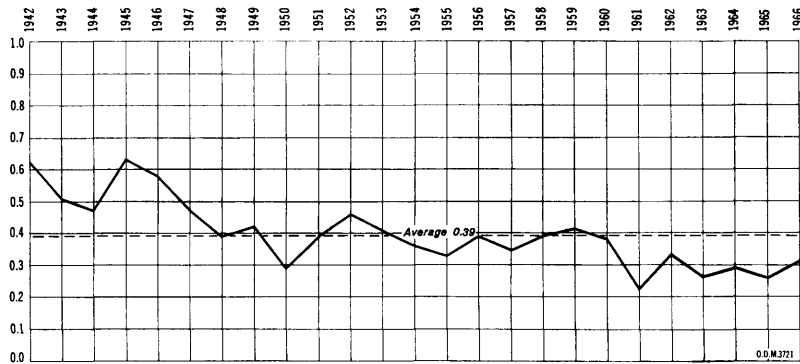
YEAR	UNDERGROUND (GROUP 1)		SURFACE (GROUP 2)		TOTAL
	Number	Percent	Number	Percent	
1957	20,733	59	14,676	41	35,409
1958	22,063	58	15,937	42	38,000
1959	24,465	63	14,395	37	38,860
1960	22,529	63	12,996	37	35,525
1961	20,321	64	11,323	36	31,644
1962	19,072	64	10,574	36	29,646
1963	17,723	63	10,313	37	28,036
1964	17,226	62	10,353	38	27,579
1965	17,252	62	10,381	38	27,633
1966	17,369	61	11,292	39	28,661
Total	198,753		122,240		320,993
Average	19,875	62	12,224	38	32,099

1-Employment



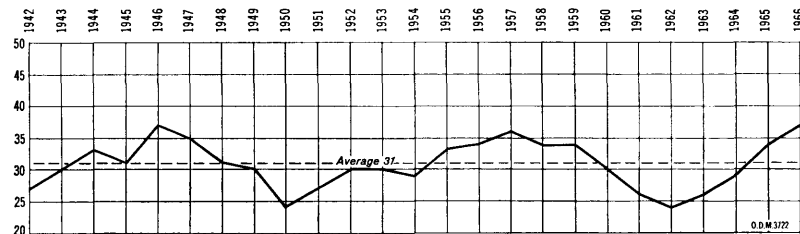
Total number of persons employed in mining operations.

2-Fatal Accidents



Number of fatalities per million man-hours in mining operations.

3-Non-Fatal Accidents



Number of non-fatalities per million man-hours in mining operations.

Summary of Employment and Fatal and Non-Fatal Accidents

The following table is a summary of the number employed, and the number injured per million man-hours at mining operations in the past 25 years.

EMPLOYMENT AND ACCIDENTS TO EMPLOYEES AT MINES (GROUPS 1-6)

YEAR	NUMBER EMPLOYED	PERSONS INJURED			NUMBER OF MILLION MAN-HOURS			RATE PER MILLION MAN-HOURS	
		Fa-tally	Non-fatally	Total	Producing Operations	Non-pro- ducing Operations	Total	Fa-tally	Non-fa-tally
1942	33,767	50	2,167	2,217	80.006	1.034	81.040	0.62	27
1943	29,477	36	2,101	2,137	69.799	0.946	70.745	0.51	30
1944	28,476	32	2,238	2,270	67.277	1.066	68.343	0.47	33
1945	27,052	41	2,026	2,067	61.534	3.391	64.925	0.63	31
1946	28,149	39	2,483	2,522	61.099	6.458	67.557	0.58	37
1947	31,101	35	2,608	2,643	71.916	2.726	74.642	0.47	35
1948	32,707	31	2,429	2,460	75.770	2.726	78.496	0.39	31
1949	32,913	33	2,341	2,374	78.206	0.785	78.991	0.42	30
1950	35,554	25	2,070	2,095	84.175	1.154	85.329	0.29	24
1951	36,729	34	2,387	2,421	86.827	1.322	88.149	0.39	27
1952	37,261	41	2,697	2,738	88.222	1.205	89.427	0.46	30
1953	37,401	37	2,654	2,691	88.274	1.488	89.762	0.41	30
1954	41,784	33	2,668	2,701	88.450	2.282	90.732	0.36	29
1955	44,366	32	3,202	3,234	91.903	4.118	96.021	0.33	33
1956	49,035	41	3,555	3,596	98.834	6.610	105.444	0.39	34
1957	56,758	42	4,254	4,296	113.405	6.210	119.615	0.35	36
1958	58,124	44	3,861	3,905	111.575	0.881	112.456	0.39	34
1959	59,474	49	4,122	4,171	118.832	1.479	120.311	0.41	34
1960	56,694	44	3,502	3,546	115.716	1.229	116.945	0.38	30
1961	52,710	25	2,827	2,852	106.314	0.743	107.057	0.23	26
1962	49,314	34	2,467	2,501	101.679	0.681	102.360	0.33	24
1963	46,562	25	2,510	2,535	95.020	0.781	95.801	0.26	26
1964	47,309	28	2,854	2,882	96.450	1.018	97.468	0.29	29
1965	48,979	26	3,436	3,462	99.811	1.357	101.168	0.26	34
1966	49,901	31	3,624	3,655	95.793	2.662	98.455	0.31	37
Total	1,051,597	888	71,083	71,971	2,246,887	54.352	2,301.239		
Average	42,064	36	2,843	2,879	89.875	2.174	92.049	0.39	31

Fatal Accidents

FATALITY RATE PER MILLION MAN-HOURS (GROUPS 1-6), 1966

	Million Man-Hours	Number Killed	Rate per Million Man-Hours
Group 1. Mines, underground	32.140	22	0.68
2. Mines, surface	22.510	2	0.09
3. Metallurgical works	25.251	3	0.42
4. Quarries	7.204	0	0.00
5. Clay, shale, sand, and gravel pits	9.404	3	0.32
6. Contract diamond-drilling	1.946	1	0.51
Total	98.455	31	0.31

A COMPARISON OF FATAL ACCIDENTS AND FATALITIES (GROUPS 1-6)

Distribution	1962		1963		1964		1965		1966	
	Accidents	Killed	Accidents	Killed	Accidents	Killed	Accidents	Killed	Accidents	Killed
Group 1. Mines, underground	24	26	19	20	17	19	18	18	21	22
2. Mines, surface	3	3	3	3	3	3	2	2	2	2
3. Metallurgical works	2	2	1	1	2	2	1	1	3	3
4. Quarries	0	0	0	0	0	0	2	2	0	0
5. Clay, shale, sand, and gravel pits	3	3	1	1	3	3	3	3	3	3
6. Contract diamond-drilling	0	0	0	0	1	1	0	0	1	1
Total	32	34	24	25	26	28	26	26	30	31

A COMPARISON OF FATALITIES BY MONTHS (GROUPS 1-6)

	1942	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	Total Average	
	January	6	5	3	4	6	1	6	4	2	5	3	4	1	2	6	3	6	3	2	2	4	3	4	2	2	89	3.6
February	4	4	1	19	6	0	2	2	1	2	2	4	5	2	5	1	2	2	1	2	3	2	2	2	0	76	3.0
March	5	5	1	1	0	3	1	3	1	2	3	4	3	1	2	1	2	5	3	0	6	1	0	1	3	57	2.3
April	7	1	1	2	3	3	4	1	0	3	2	2	1	0	3	2	4	4	2	4	3	2	3	1	2	60	2.4
May	9	1	2	3	3	3	6	2	7	4	10	1	1	3	6	4	4	4	5	3	4	0	1	1	5	92	3.7
June	2	4	3	3	6	2	1	4	4	2	5	2	3	4	0	5	5	5	5	3	2	3	1	2	4	80	3.2
July	3	4	1	0	2	4	0	3	1	5	5	2	5	2	3	1	3	4	4	2	2	2	2	2	0	62	2.5
August	2	0	3	2	2	2	3	4	1	1	3	2	1	3	2	5	3	2	5	2	4	1	4	4	5	66	2.6
September	4	3	3	1	4	4	1	4	2	2	2	5	1	5	3	9	3	5	2	2	2	4	3	2	2	78	3.1
October	3	7	6	3	3	7	1	3	2	4	1	3	7	1	5	8	5	4	3	3	3	1	1	5	0	89	3.6
November	1	0	4	2	1	2	2	1	0	2	1	3	4	9	1	2	4	6	7	1	1	4	3	1	6	68	2.7
December	4	2	4	1	3	4	2	2	3	2	4	4	1	2	5	1	3	3	5	1	0	2	2	3	2	65	2.6
Total	50	36	32	41	39	35	29	33	24	34	41	35	33	32	41	42	44	47	44	25	34	25	28	26	31	882	2.9

FATALITIES ACCORDING TO INDUSTRIES (GROUPS 1-6)

	1962	1963	1964	1965	1966
Copper, nickel, and zinc mines	8	6	5	9	11
Gold mines	18	10	10	10	11
Iron mines	0	3	1	0	2
Silver-cobalt mines	0	1	0	0	0
Uranium mines	3	0	4	0	0
Non-metallic mines	0	3	2	1	0
Metallurgical works	2	1	2	1	3
Quarries	0	0	0	2	0
Clay, shale, sand, and gravel pits	3	1	3	3	3
Contract diamond-drilling	0	0	1	0	1
Total	34	25	28	26	31

FATALITIES AT MINES (GROUPS 1-6)

UNDERGROUND (GROUP 1)

Cause	Class of Accident	1962	1963	1964	1965	1966	
		percent	percent	percent	percent	number	percent
Fall of ground	A	35	25	32	50	7	32
Explosives	B	15	5	0	0	0	0
Run of ore, rock, etc.	C	23	10	5	0	1	5
Shaft accidents	D	11	15	16	17	4	18
Fall down stope, raise, etc.	E	4	10	5	11	5	22
Haulage	F	8	20	5	0	4	18
Rockburst	G	4	10	21	0	0	0
Unclassified	H	0	5	16	22	1	5
Total		100	100	100	100	22	100

ON SURFACE (GROUPS 2-6)

Cause	Class of Accident	1962	1963	1964	1965	1966	
		percent	percent	percent	percent	number	percent
Falling objects	A	0	0	0	0	2	22
Explosives	B	0	0	11	0	0	0
Run of materials	C	0	0	11	13	0	0
Machinery	D	37	40	0	0	2	22
Fall of persons	E	13	0	0	0	0	0
Transportation and haulage	F	0	20	56	87	4	45
Chemicals and burns	G	13	20	11	0	1	11
Unclassified	H	37	20	11	0	0	0
Total		100	100	100	100	9	100

SUMMARY OF FATAL ACCIDENTS, 1966, GROUPS 1-7

No.	Date of Accident	Name of Operator	Name of Mine, Plant, or Location	Name of Deceased
Group 1 Underground at Mines				
1	Nov. 28	Dravo of Canada Ltd.	INCo. Kirkwood Mine	Russel MacMillan
2	Jan. 24	Falconbridge Nickel Mines Ltd.	Falconbridge	Metro Zadorozniak
3	Apr. 30	Falconbridge Nickel Mines Ltd.	Onaping	J. E. Durocher
4	Aug. 22	Hollinger Consolidated Gold Mines Ltd.	Hollinger	Tibor Lesko
5	Nov. 15	Hollinger Consolidated Gold Mines Ltd.	Ross	{ Rolland Desormeaux
6	Apr. 4	Inspiration Ltd.	Dome	{ Pierre Gravel
7	Mar. 16	International Nickel Co. of Can. Ltd.	Levack	Fernand Lepage
8	May 9	International Nickel Co. of Can. Ltd.	Garson	Gino Brignolio
9	May 12	International Nickel Co. of Can. Ltd.	Garson	Adolph Schiller
10	June 20	International Nickel Co. of Can. Ltd.	Garson	S. J. McGillis
11	Nov. 10	International Nickel Co. of Can. Ltd.	Frood-Stobie	Wilfred Labre
12	Dec. 23	Kerr-Addison Mines Ltd.	Kerr-Addison	Rheal Lajeunesse
13	Mar. 7	Lowphos Ore Ltd.	Moose Mountain	R. T. Jones
				D. A. Beaulieu
14	May 25	Macassa Gold Mines Ltd.	Macassa	R. L. Sipprell
15	Mar. 2	MacLeod-Cockshutt Gold Mines Ltd.	MacLeod	A. M. Steadman
16	May 9	MacLeod-Cockshutt Gold Mines Ltd.	Mosher No. 1 shaft	Frederick Grimm
17	Jan. 13	McIntyre Porcupine Mines Ltd.	McIntyre	Donald Cochrane
18	May 5	McIntyre Porcupine Mines Ltd.	McIntyre	George Ondis
19	June 2	McIntyre Porcupine Mines Ltd.	McIntyre	E. G. Lebrun
20	June 4	Metal Mines Ltd.	Gordon Lake	L. R. Beland
21	Sept. 23	Willroy Mines Ltd.	Willroy	B. G. Welsh
Group 2. On Surface at Mines				
22	Aug. 15	Steep Rock Iron Mines Ltd.	North concentrator	M. S. Nugent
23	Sept. 30	Willroy Mines Ltd.	Willecho Mine	C. B. Lawter
Group 3. Metallurgical Works				
24	Aug. 23	International Nickel Co. of Can. Ltd.	Copper Cliff smelter	Michael Rachkowski
25	Dec. 18	International Nickel Co. of Can. Ltd.	Iron Ore Recovery plant	J. A. Hamilton
26	June 30	Steel Company of Canada Ltd.	Hilton works	H. W. DeCoste
Group 4. Quarries				
None				
Group 5. Clay, Shale, Sand, and Gravel Pits				
27	Nov. 7	Kam Aggregates Ltd.	Port Arthur	Pentti Sipia
28	Aug. 7	Law Construction Ltd.	Mine Centre	J. S. Carter
29	Nov. 29	McCarthy Bros. Construction	Gamebridge	J. P. McCarthy
Group 6. Contract Diamond-Drilling				
30	Aug. 9	Morrisette Diamond Drilling Co.	Geco	Philippe Marcoux
Group 7. Accidents for which Employment Figures are Unobtainable				
31	Mar. 29	Canadian Bechtel Ltd.	Griffith Mine	R. J. Fox
32	Nov. 11	Industrial Mines Installations Ltd.	Reeves Mine	E. H. Beauchamp
33	Sept. 24	Noront Steel Construction Co. Ltd.	INCo. smelter	Andre Gervais
34	June 21	Parsons, Ralph M. Const. Co. of Can. Ltd.	Kidd Creek concentrator	Theodore LaRose
35	Aug. 16	Parsons, Ralph M. Const. Co. of Can. Ltd.	Kidd Creek concentrator	Victor Castonguay

Age	Occupation	Nationality	Married (M) Single (S) Widower (W)	Class of Accident	Cause
45	Shaftman	Canadian	M	D	Struck by falling divider in shaft.
39	Miner	Canadian	M	A	Fall of ground.
49	Shaft Inspector	Canadian	M	D	Caught by conveyance in shaft.
37	Switchman	Hungarian	M	F	Crushed between locomotive and wall.
45	Miner	Canadian	M	A	Fall of ground.
23	Miner's helper	Canadian	M	A	Fall of ground.
43	Shaftman	Canadian	S	D	Struck by dislodged shaft timber.
29	Miner	Canadian	M	E	Fall down raise.
44	Miner	Canadian	M	E	Fall down raise.
36	Stope leader	Canadian	M	A	Fall of ground.
43	Motorman	Canadian	M	F	Struck by fill car.
45	Miner	Canadian	M	C	Crushed by run of ore.
33	Miner	Canadian	M	A	Fall of ground.
30	Miner's helper	Canadian	M	F	Crushed between compressor and grader.
57	Shiftboss	Canadian	M	F	Crushed between motor and chute.
58	Maintenance Shaftman	British	S	D	Fall down shaft.
65	Miner	Canadian	M	H	Over exertion working underground.
47	Miner	Canadian	M	A	Fall of ground.
65	Miner	Canadian	W	E	Fall into chute.
53	Stope leader	Canadian	M	A	Fall of ground.
21	Chute puller	Canadian	S	E	Fall down orepass.
23	Miner	Canadian	S	E	Fall down raise
19	Crusher operator	Canadian	S	A	Crushed by grizzly door.
57	Mechanic	Canadian	M	D	Caught in drum of hoist.
41	Skimmer	Canadian	M	G	Burned by molten material.
23	Pellet loader	Canadian	M	F	Crushed between rail road car and door.
20	Car unloader	Canadian	S	F	Knocked down and run over by train on high dock.
None					
21	Loader operator	Canadian	M	F	Crushed by overturned loader.
64	Grade foreman	Canadian	M	F	Run over by truck.
54	Crusher operator	Canadian	M	D	Caught in drive shaft of screening plant.
46	Diamond-Driller	Canadian	S	A	Drill equipment toppled over on workman.
43	Compressor operator	Canadian	M		Struck when grinding stone burst.
52	Labourer	Canadian	M		Fall through roof of service building.
26	Job foreman	Canadian	M		Fall from flue.
33	Pipefitter	Canadian	M		Electrocuted.
38	Mechanic	Canadian	M		Crushed by crane boom.

Non-Fatal Accidents

Mines (Groups 1 and 2)

There were 54.650 million man-hours at mines in Ontario in 1966. During the year there were 2,632 injuries giving a non-fatal accident rate of 48 per million man-hours.

NON-FATAL ACCIDENTS AT MINES, 1966

Cause	Underground (Group 1)	On Surface (Group 2)	Total
Fall of person	247	117	364
Strain while lifting	199	61	260
Strain while moving	170	59	229
Handling material other than rock or ore	134	58	192
Drilling machines	154	1	155
Running into or striking object	91	48	139
Hand tool	92	35	127
Falling object	84	33	117
Fall of loose rock or ore	105	...	105
Flying object, drilling, sledging, etc.	79	24	103
Crushed between two objects	74	25	99
Handling or trammig mine car	82	8	90
Mechanical transportation	64	12	76
Fall of rock or ore, drilling, scaling, etc.	64	1	65
Handling rock or ore	62	1	63
Tugger hoist, scraper, etc.	61	1	62
Machinery, general	15	44	59
Roll of broken rock or ore	54	1	55
Rock or ore at chute	49	1	50
Burns	25	21	46
Nail or splinter	38	3	41
Mechanical loader	25	0	25
Explosives	22	0	22
Fall down winze, shaft, or stope	20	0	20
Cage, skip, or bucket in shaft	16	0	16
Dermatitis	3	5	8
Rockburst	7	0	7
Electricity	4	2	6
Noxious gas	3	0	3
Unclassified	20	8	28
Total	2,063	569	2,632

Metallurgical Works (Group 3)

There were 25.251 million man-hours at metallurgical works in Ontario in 1966. During the year there were 498 injuries, giving a non-fatal accident rate of 20 per million man-hours.

NON-FATAL ACCIDENTS AT METALLURGICAL WORKS, 1966

CAUSE		CAUSE	
Strain while lifting or moving	86	Flying object, sledging, etc.	22
Handling material	65	Burns	19
Fall of person	51	Loading, unloading, or handling car	18
Hand tool	43	Hoisting equipment, hook, sling, or block	18
Burned by slag or metal	35	Transportation	9
Running into or striking object	28	Noxious gas	4
Dermatitis, chemical burn	27	Nail or splinter	3
Falling object	24	Electricity	1
Crushed between two objects	23		
Machinery, general	22	Total	498

Quarries (Group 4)

There were 7.204 million man-hours at quarries in Ontario in 1966. During the year there were 97 injuries, giving a non-fatal accident rate of 13 per million man-hours.

NON-FATAL ACCIDENTS AT QUARRIES, 1966

CAUSE		CAUSE	
Handling material	14	Running into or striking object	3
Fall of person	13	Crushed between two objects	2
Strain while lifting or moving	10	Drilling machines	2
Transportation	9	Burns	1
Fall of material during handling	9	Nail or splinter	1
Machinery	9	Noxious gas	1
Falling object	9		
Flying object, sledging, etc.	7	Total	97
Hand tool	7		

Clay, Shale, Sand and Gravel Pits (Group 5)

There were 9.404 million man-hours at clay, shale, sand and gravel pits in Ontario in 1966. During the year there were 176 injuries, giving a non-fatal accident rate of 19 per million man-hours.

NON-FATAL ACCIDENTS AT CLAY, SHALE, SAND AND GRAVEL PITS, 1966

CAUSE		CAUSE	
Strain while lifting or moving	37	Running into or striking object	8
Fall of person	26	Hand tool	7
Machinery	24	Falling object	6
Transportation	17	Fall of material during handling	3
Flying object	15	Fall of material from bank	2
Burns	10	Dermatitis	2
Crushed between two objects	10		
Handling material	9	Total	176

Contract Diamond-Drilling (Group 6)

There were 1.946 million man-hours at contract diamond-drilling in Ontario in 1966. During the year there were 221 injuries, giving a non-fatal accident rate of 114 per million man-hours.

NON-FATAL ACCIDENTS AT DIAMOND-DRILLING, 1966

CAUSE		CAUSE	
Handling drill rods	35	Burns	11
Strain while lifting or moving	24	Running into or striking object	11
Hand tool	21	Caught in moving parts	8
Machinery	21	Transportation	6
Fall of person	18	Flying object, sledging, etc.	5
Wire, nail or splinter	17	Noxious gas	1
Falling object	16		
Handling material	14	Total	221
Crushed between two objects	13		

Infection (Groups 1-6)

Infection followed in 64 cases out of a total of 3,624 accidents in 1966.

ACCIDENTS FOLLOWED BY INFECTION, 1966

	Number of Accidents	Accidents Followed by Infection	Percentage Infection
Group 1. Mines, underground	2,063	12	19
2. Mines, surface	569	7	11
3. Metallurgical works	498	9	14
4. Quarries	97	5	8
5. Clay, shale, sand, and gravel pits	176	8	12
6. Contact diamond-drilling	221	23	36
Total	3,624	64	100

Electrical Accidents (Groups 1-6)

	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	Total
Fatal	0	0	0	2	0	2	1	0	0	0	5
Non-fatal	7	4	8	5	5	6	9	5	5	11	65
Total	7	4	8	7	5	8	10	5	5	11	70

Explosives

ACCIDENTS DUE TO EXPLOSIVES, 1966

Cause	Number of Accidents	Persons Injured		
		Non- Fatally	Fatally	Total
Drilled into missed hole	8	10	0	10
Delayed too long at scene of blast	4	5	0	5
Injury due to blast concussion	4	4	0	4
Explosion of detonator	2	2	0	2
Returned too soon to scene of blast	1	1	0	1
Approached unguarded blast	1	1	0	1
Total	20	23	0	23

DETAILS OF FATAL ACCIDENTS (GROUPS 1-7)

Underground at Mines (Group 1)

Dravo of Canada Limited

No. 1

Russel MacMillan (Canadian, 45, married) was struck by a falling divider that had been dislodged by an ascending bucket of muck, while operating a Cryderman shaft mucker in the Kirkwood mine shaft at 6:30AM, 28 November. He fell 25 feet to the shaft bottom. He died the same day in Sudbury General Hospital as a result of severe head injuries.

The Kirkwood mineshaft is being sunk for the International Nickel Company by Dravo of Canada Limited, a contracting firm. It is a standard three-compartment shaft with manway and two hoisting compartments. Two ropes from the double-drum hoist handle buckets in balance while a third bucket on the bottom is being filled. The Cryderman mucker is hung in the bottom part of the manway compartment at the south end of the shaft. The Cryderman operator has control of the bucket in the No. 2 hoisting compartment by means of a signal-line. The signal-line for the No. 3 hoisting compartment at the north end is under the control of the leader on the shaft bottom. The shaft is lined with concrete rings 7 feet 6 inches long with 3 feet open between each ring. Pockets at the top of each ring receive the 10- by 10-inch B.C. fir dividers that separate the compartments and to which the guides are attached by metal brackets and bolts. These dividers are wedged tightly into the pockets at each end. At the time of the accident the shaft bottom was 1458 feet below surface, and three rings had been poured below the 1400-foot level station. The lower crosshead chair was at the second set above this station, a distance of 90 feet from the shaft bottom. The shaft guides had not yet been extended through the 1400-foot level shaft station, leaving three sets of dividers without guides attached but with guide brackets in place.

The crew had finished drilling, and had blasted at 4:30AM. They set up for mucking and had loaded out twelve buckets of muck by 6:30AM. The next bucket of muck was rung away by MacMillan in the No. 2 hoisting compartment after being lifted from the bottom and steadied by the men on the bottom. The ascending bucket bumped in passage through the concreting form and started swinging. It hooked under the double bracket of the south divider at the floor of 1400-foot-level station and pulled the timber out of the pockets. MacMillan, 28 feet below, and unaware of the danger, had started mucking. He was struck by the falling divider, was knocked out of the operating cage, and fell 25 feet to the shaft bottom. He was immediately taken to surface, and by ambulance to Sudbury General Hospital. He died, however, from severe head injuries twelve hours later.

The following safety measures were instituted following this accident:

1. The clam operator wears a safetybelt with short lanyard.
2. The guides and crosshead chairs are kept as close as possible to the last ring poured.
3. Hanging-rods are used in any divider below the last set of guides. In this manner they are tied down by the concreting form and ring of concrete.

The inquest, held before Coroner J. A. Pidutti, M.D., at the Sudbury Court House on 28 December, resulted in the following verdict by the jury:

That Russell MacMillan, the deceased person came to his death at 6:40 o'clock in the afternoon on the 28th day of November 1966 at Sudbury General Hospital and that the death was caused by a blow to the head and the subsequent fall at Kirkwood Mine resulting in hemorrhage and swelling of the brain.

Verdict - Accidental death.

We recommend that Safety procedures brought to light today to be carried on.

Falconbridge Nickel Mines Limited

No. 2

Metro Zadorozniak (Canadian, 39, married) was instantly killed at 1:20PM, 24 January, by a fall of rock from the back of 2902-6-10 stope at the Falconbridge mine in Falconbridge township. Zadorozniak had been employed since October 1952 at the Falconbridge mine.

The mining of the horizontal cut, 91 feet above the 2950-foot level, in 2902-6-10 stope, was well advanced on 24 January. The previous cut had been tightly filled with hydraulic tailings. The narrow east end of the stope had been slashed-out to a height of 12 feet above the fill, rockbolted and left open. Because the west end was about 80 feet wide for a hundred feet of length, mining was done in three portions and, as each part was mined-out, the back was rockbolted and tightly filled. The northern portion had been filled, the southeast portion had been slashed-out, and the southwest portion was still in place. Two millholes, No. 7 and No. 5, were located 50 feet apart just south of the fill fence of the north portion. A slusher hoist was installed at each millhole to scrape the broken ore to the millhole. A projecting point of southwest portion was drilled with short blastholes on 21 January to break up large loose pieces of ore resting on the fill. On the dayshift of 24 January, Zadorozniak operated No. 7 hoist to scrape away broken rock from the blast of 21 January while John Hancock operated No. 5 hoist to scrape out the southeast portion. The cables of No. 7 hoist crossed over those of No. 5 and caused some interference.

Eric Marchbank, captain, and Albert Farnand, shiftboss, visited the stope before 11:00AM, inspected the stope and found a thick piece of loose rock over the blasted area. They instructed Zadorozniak to install immediately three posts under the loose back on top of the broken rock. Scaling or gadding down the thick loose was considered impossible, and blasting was to be avoided because the blast might cause more loose. Rockbolting was to follow the posting. The captain and shiftboss left at 11:10AM.

Scraping continued until lunchtime at 11:35AM. After lunch, Zadorozniak drilled a hole in the back near the edge of the loose, inserted an eyebolt and hung the tail pulley of No. 7 slusher on it in order that the cables would not interfere with those of No. 5. He scraped for another 20 minutes and then barred down the loose wall along the north side of the southwest portion. He progressed along the wall until he was under the loose back, from where he called to Hancock to bring a footboard with the apparent intention of standing the first post. Hancock saw the loose rock fall without warning on Zadorozniak. He ran out of the stope immediately and told men on the level. They returned with him to find Zadorozniak buried beneath a large rock weighing about 20 tons. The accident happened at 1:20PM. Rescuers installed posts around the rock, moved a number of smaller pieces of rock and jacked up the large rock. The body was removed at 3:10PM. A scalingbar was found beside Zadorozniak. Zadorozniak had died instantly from extensive crushing of the right side of his body.

An inquest was held before Coroner G. Demarais, M.D., in the Sudbury Court House on 16 February. The jury returned the following verdict:

That Metro Zadorozniak the deceased person came to his death at 1.20 p.m. on the 24th day of January 1966 at Falconbridge Nickel Mine, Falconbridge, Ontario and that the death was caused by laxity in carrying out orders to be executed immediately given by the Mine Captain and Shift Boss.

**Falconbridge Nickel Mines Limited
(Onaping Mine)**

No. 3

J. Emil Durocher (Canadian, 49, married) suffered crushing injuries to his legs at 2:00PM on 30 April when caught between the cage and the shaft timber in No. 3 compartment of Onaping mineshaft of the Falconbridge Nickel Mines Limited. His death was caused by asphyxia due to vomiting while he was being carried by ambulance to the Sudbury General Hospital. He had been employed as a shaft inspector at Falconbridge mines since 1954.

The Onaping No. 1 shaft has five compartments in line: Nos. 1 and 2 are spare, Nos. 3 and 4 are hoisting compartments for the double deck cages, No. 5 is the manway. Each cage is a single rigid unit with a 1 $\frac{1}{4}$ -inch clearance between the deck floor and the shaft-set. The shaft-sets of 9 $\frac{1}{2}$ -inch timber forming the compartments are at 6-foot vertical intervals. The fourth shaft-set below the 2050-foot level is surrounded by a catchpit of 2-inch planks, nailed horizontally on the outer side of the posts. The shaft equipment for signalling to the hoistroom consists of Crouse Hind type AFL switchboxes that are fitted with 10-pound pullsprings and mounted on the shaftpost at each level. The switch is operated by a rope pullcord at the level and a plastic-coated wire pullcord anywhere between levels. The plastic-coated wire pullcord hangs on a bronze spring down to the next level and is held in the corner of the compartment against the post by spikes anchored in the wallplate and bent over to touch the divider. The signalling equipment of No. 3 compartment operates a bell signal and a light signal at the levels and in the hoistroom.

J. E. Durocher, the shaft inspector, and Toivo Keranen, temporary assistant shaft inspector, were inspecting the shaft compartments on Saturday 30 April. During the inspection they stood on a flat platform mounted over the top deck covers. By 2:00PM they reached the fourth set below the 2050-foot level on inspection of No. 3 compartment. Durocher signalled the hoistman by a one-bell on the long pullcord to stop the downward movement of the cage, and then he and Keranen planned for a few moments the nailing of two loose planks of the catchpit on the side opposite to the pullcord. The manner in which they held the planks for re-nailing caused them to place both feet on the 9 $\frac{1}{2}$ - by 9 $\frac{1}{2}$ -inch wallplate and face outwards. Keranen was starting to nail when he felt the platform slowly brushing up against his leg and heard Durocher shout to him to get on. Neither got on but in the attempt Durocher was turned upside down. Durocher's legs were caught between the cage cover and the wallplate and in some manner he fell into the bottom deck through the open doorway. The cage came finally to a stop with the top deck at the 2050-foot level. Keranen climbed out to the manway and went up to the level to find Durocher sitting against the side of the bottom deck. He telephoned the hoistman, Joe Sweeney, about the accident and then signalled the cage to surface. Sweeney relayed the message to Al Jussila, the relief shiftboss, who telephoned for the ambulance and doctor.

Durocher told Keranen that he was badly hurt. He also told Sweeney that he guessed the switch had stuck. This comment referred to the reason for moving the cage and to an arrangement the two men had made. Dr. H. Jalkotzy saw Durocher at about 2:10PM in the shaft cage and applied a tourniquet to his leg

before moving him by ambulance to the Onaping first-aid room for further examination. The doctor put a Thomas splint on Durocher's left leg and gave him a sedative. Durocher answered questions freely and talked lucidly, not complaining seriously of his injuries. He was taken in the company ambulance to Sudbury, attended by L. H. Hussey, first-aid man. Halfway there, he started blowing and breathing through closed lips and his breathing became shallow. Oxygen was administered on demand. Respiration varied and pulse weakened. When respiration and pulse ceased, resuscitation was started. He was pronounced dead on arrival at the Sudbury General Hospital.

Dr. R. E. Bonin, pathologist, reported Durocher's injuries were limited to crushing injuries to his legs. He gave the cause of death due to asphyxia from the blockage of the larynx and trachea by vomit. The vomit did not reach the mouth.

An inquest was held by Coroner E. Leclair, M.D., at Sudbury, on 8 June. The jury returned the following verdict:

That J. E. Durocher the deceased person came to his death at approximately 2:45 o'clock in the afternoon on the 30th day of April 1966 en route to General Hospital and that the death D.O.A. was caused as a result of injuries received as testified by the pathologist and in our opinion we regard it as an accident death, possibly due to unofficial personal arrangements by the employees, contrary to company safety regulations.

On one occasion three years previously, Sweeney had heard one bell and saw that the light had remained on; on his own initiative he had brought the cage up in No. 4 compartment to the inspectors. The switch for the bell signal had stuck. It was then that Durocher made the arrangement for the future that, when a switch stuck, Sweeney should, after a short wait, slowly move the cage up and down a few inches and then raise the cage to the level above. Sweeney had used this arrangement about eight times and two other hoistmen were aware of the plan. Keranen and the regular assistant inspector found the arrangement worked well. The mine supervisors were unaware of this arrangement. A switch sticking in No. 4 compartment gives a continuous sound of the horn that would be heard by the inspectors and would alert them to expect movement. The bell signal, however, rings only once as in this accident, but the signal light remains on in the hoistroom and at all the levels. Indeed, two men at another level saw the light remain on at about 2:00PM. However, the inspectors could not see the light and therefore had no warning in No. 3 compartment. The electrician regularly repaired the switches. The switch used in this accident was found to be in excellent condition. Keranen felt certain the long pullcord had caught on a bent nail owing to a kink in the wire although inspection following the accident did not reveal the cause for the sticking of the switch. The hoistman should not have moved the cage without a signal nor should he have agreed to the arrangement.

Hollinger Consolidated Gold Mines Limited

No. 4

Tibor Lesko (Hungarian, 37, married), employed at Hollinger Consolidated Gold Mines Limited as a switchman since 18 August 1966, was instantly killed when he was knocked off the top of a moving trolley locomotive, on which he was riding, by the trolley pole which had jumped off the trolley wire. The accident occurred at approximately 9:00AM, 22 August, in the mainline drive No. 4 at the intersection of 12 crosscut north on the 800-foot level. Lesko had about 4½ years experience as a motorman and switchman at Hollinger Mine.

Raymond Faucher, motorman, and Tibor Lesko, switchman, were tramming gravel backfill. The train consisted of five loaded 3-ton Granby-type cars and a

4-ton General Electric trolley locomotive. The locomotive was pulling the train of cars west in mainline drive No. 4. The motorman's cab and controls were at the lead end of the locomotive. Lesko was sitting on the flat top of the locomotive facing forward, toward Faucher.

The trolley pole consists of a piece of 3- by 3-inch timber, 5 feet 6 inches long. The trolley wheel is secured to one end and a spring-loaded hinged fitting is secured to the other. The spring-loaded hinge keeps the grooved trolley wheel in contact with the overhead trolley wire. The hinged fitting rests in a heavy vertical socket secured to the top of the locomotive between the motorman's cab and the position occupied by the switchman. This vertical cylindrical socket measures 3½ inches inside diameter by 14½ inches long. The hinged attachment on the pole measures 3½ inches in diameter by 14 inches long and rests in the socket. It is not fastened or secured in place and is free to swing in a full circle. The complete pole, with base fitting and trolley wheel assembly, weighs about 42 pounds.

Faucher states that he and Lesko had made two complete trips and were proceeding westward with the third loaded train. He was turned away from Lesko looking ahead in the direction of travel. The locomotive headlight went out and Faucher realized the trolley pole had jumped off the trolley wire. He applied the brakes and turned in time to see Lesko roll backward off the top of the locomotive. When the locomotive and train had stopped, Lesko was found on the north side of the train beside the first car. The trolley pole was on top of him. The base fitting with pole attached had come out of the socket. The electric cable leading down the pole from the collector wheel to the locomotive motors was pulled loose from the pole. Lesko fell or rolled from between the locomotive and first car and struck a vertical post beside the track that was supporting back timber. The post was knocked free, fell, and became lodged against the side of the first car. Lesko was struck and was pushed along the drift between the train and the wall by the forward end of the post. Death was from suffocation due to pressure on the chest and ruptured lungs.

It is difficult to understand how the base fitting on the pole pulled vertically out of the heavy socket. The socket was not deformed or bent out of position, and the fitting was a snug sliding fit in it; there was no detectable horizontal play between the two. The spring-loaded hinge would only permit the pole to elevate to an angle of 45 degrees. The heavy hinge stops were not broken, worn, or deformed. There have been incidents when the pole has become dislodged from the socket in derailments but never as a result of an in-line pull on the pole. The fitting was not fastened in the socket deliberately. The pole and fitting could be lifted out of it, swung around, and replaced where the drift was too narrow or too low to permit the pole to be swung around directly before the direction of travel of the locomotive was reversed. Following the accident, the following changes were made in the trolley pole assembly:

1. The hinged fitting on the lower end of the pole was secured in the vertical socket so that it cannot be pulled or lifted out.
2. The clamp-type socket on the hinged fitting to receive the wooden pole was replaced by a cylindrical socket with a pin through it to secure the pole. Removing the pin permits the wood pole to be lifted out.
3. The collector-wheel assembly connection to the top of the pole was altered to permit the assembly to pull free if it should become caught in back timber.

An inquest was held before Coroner D. Johnston, M.D., in the Timmins Municipal Building at 2:00PM, 14 October 1966. The Jury returned the following verdict:

We, the Jury, find that Tibor Lesko, the deceased person, came to his death at 9 o'clock in the forenoon on the 22nd day of August, 1966, at Hollinger Mine, and that his death was caused by crushing injuries to his chest which were believed to have been caused by a trolley pole of the motor on which he was riding. We find no blame attached to anyone.

We believe that alterations to the pole such as used at the time of the accident at the Hollinger quite adequate to prevent any further accident.

**Hollinger Consolidated Gold Mines Limited
(Ross Mine)**

No. 5

Rolland Desormeaux (Canadian, 45, married) and Pierre Gravel (Canadian, 23, married) were fatally injured when struck by falling rock in No. 12 shrinkage stope, 1800-foot level, at the Ross mine, Holtyre, Ontario, on 15 November. Desormeaux, employed since April 1953, was a machine runner and was considered an experienced miner. Gravel, employed since November 1965, was a machine helper.

No. 12 stope is being mined by shrinkage method using rockbolts and posts to support the back. The stope strikes north and south and is approximately 120 feet long and varies in width from 30 to 40 feet. At the time of the accident the stope had reached an elevation of 100 feet above the 1800-foot level. Access to the stope is down through an inclined raise from the 1650-foot level to the east side of the stope, 20 feet from the north end. There is a cribbed manway, from the level below, on the west wall of the stope, 60 feet from the north end. The stope was being advanced southerly from the raise in ten-foot cuts, and at the time of the accident the breast was 45 feet from the raise. The back was posted and rockbolted to within ten feet of the breast. Work was being done on a one-shift basis.

On Thursday 10 November, on the 4:00 to 12:00PM shift, Desormeaux and Gravel had blasted 30 holes in the south breast. No further work was done in the stope until Tuesday 15 November, because Desormeaux was off work due to illness. On 15 November Desormeaux, before going underground at 8:00AM, was instructed by W. C. Draves, shiftboss, to scale, post, and rockbolt the roof behind the breast before drilling. At approximately 9:30AM, shiftboss Draves entered the stope and saw the crew loading five missed holes in the breast. Gravel was on the west side tamping the last hole; Desormeaux was on the east side, a few feet north of the breast, making up a charge of powder. This charge was to be used to blast down a large rock hanging by a roofbolt from the back, near the manway. Seeing that they had proceeded this far with the preparation to reblast, Draves told them to blast and then post and rockbolt the unsupported back. Shiftboss Draves then left the stope by the raise. This was at approximately 9:40AM.

At approximately 12:30PM Marcel Dumouchel and Raymond Goulet, who were eating lunch at the 1650-foot level station, became concerned when Desormeaux and Gravel did not come to eat their lunches, which were at the station. Dumouchel went to No. 12 stope but not seeing anyone there returned to the station for Coulet. Together, they went to No. 12 stope and found Desormeaux, whose head, right arm, and right shoulder were visible, under a large piece of loose. They did not see Gravel. They summoned help by phoning to surface. Shiftboss Draves arrived at the scene at approximately 1:00PM and R. Caylor, mine superintendent, arrived at about 1:15PM. It was apparent that

Desormeaux, whose head, shoulder and right arm were not covered by the loose, had been dead for some time. He still held a bundle of powder in his right hand. After posting the back, rescue operations were begun and Gravel was found farther under the loose. He also appeared to have died instantly. The bodies were brought to surface at approximately 3:15PM.

As there were no witnesses to the accident, the events preceding it must be assumed. Examination of the stope after the accident revealed that the five missed holes were all wired and the lead wires extended back to the location of the fall of ground. It would appear that Desormeaux left his position at the east side of the stope and with Gravel was connecting leads from the holes on the west side of the breast when the loose fell on them. This loose, about 8 by 6 feet and 2 feet thick, fell from an area in the back just southeast of the manway.

The bodies were taken to the Kirkland Lake and District Hospital where an autopsy was performed by Dr. J. W. Clegg, district pathologist. Death was caused by multiple fractures and was probably instantaneous.

An inquest into the death of Rolland Desormeaux was held before Coroner R. Killingbeck, M.D., in the Provincial Police Building in Matheson, Ontario, at 7:30PM, on Wednesday 30 November. The jury returned the following verdict:

We, the jury, find that Rolland Desormeaux, the deceased person, came to his death between 9:45 a.m. and 11:00 a.m. in the forenoon of the 15th day of November 1966, in the No. 12 Stope of the Ross Mine in Holtvre, Ontario, and that death was caused by a fall of rock, and we conclude that death was accidental with blame attached to no one.

Recommendations: That posts and rock bolts be installed closer to the breast.

Inspiration Limited

No. 6

Fernand Lepage (Canadian, 43, single) employed by Inspiration Limited in sinking No. 7 internal shaft at Dome Mines Limited, South Porcupine, Ontario, was instantly killed when struck on the head by a timber divider that fell from its position 85 feet above the shaft bottom at about 10:30PM 4 April.

Inspiration Limited of North Bay, Ontario, has a contract to deepen No. 7 internal shaft at the Dome mine. This is a three compartment-in-line shaft; the long axis is approximately north and south with the manway compartment situated at the north end. The shaftposts, wallplates, and endplates are 9½- by 9½-inch B.C. fir. The two dividers are 7½- by 9½-inch B.C. fir 6 feet 2 inches long including the 1-inch tapered tenon framed on each end. These tenons fit into matching tapered mortises cut in opposite wallplates; the taper helps to secure the dividers in place. The 5½- by 7½-inch by 28-foot long guides are bolted to steel guidebrackets bolted to each divider. Sets are at 7-foot centres. Each wallplate is suspended on three solid 5⁄8-inch diameter hanging-rods. The blasting set with the Riddel mucking machine was located 36 feet from the bottom; the crosshead chairs were seven sets (49 feet) above the blasting-set. The guides extended two sets (14 feet) below the chairs.

The steel crosshead chairs consisted of a piece of ½-inch steel plate 2 feet 6 inches long bent at a right angle lengthwise so as to rest on top of a divider and extend down each side of the guide. A slot the width of the guide was cut out of the vertical leg to permit the guide to position and hold the chair. The chair occupied the same position as a guidebracket. For this reason the guide was not bolted to the divider on which the crosshead chairs were situated. It was the divider supporting the crosshead chairs in the centre compartment that fell. This divider was positioned at about the centre of the loading-pocket opening that

had been excavated for a height of five sets on the west side of the shaft. The excavation had been partly timbered to control the exposed walls while shaft sinking was completed. The shaft timber was blocked in this area, but some of the wall blocks had fallen out. Horizontal tie-rods had been placed through the shaft timber at all the shaft station excavations above the loading-pocket, but none had been placed to tie the timber together at the pocket area. As a result, the two wallplates at the set involved had spread a measured $\frac{3}{8}$ inches, and the top of the shaftpost under the east end of the divider that fell had shifted east a further $\frac{1}{2}$ inch. This left the 1-inch-long tenon on the divider bearing only $\frac{1}{8}$ inch on the post shoulder. Continued chairing of the crosshead eventually forced and wedged the tenon free of the mortise, and the crosshead chair and divider fell.

At the time of the accident, the shaft bottom was within fifteen feet of the ultimate depth. Four of the five-man crew were on the bottom and had just finished drilling a bench. Hugh MacEachern, the other shaftman, was descending the shaft in the centre compartment sinking bucket immediately prior to the accident. The crosshead chaired normally and without any excessive bump. He continued to descend in the bucket toward the stopmark above the blasting-set. Before the stopmark was reached, the divider and crosshead fell. The crosshead catch closed on the hoist rope and momentarily forced the rope and bucket down until the crosshead struck and stopped on the blasting-set. The hoistman controlled the momentary runaway bucket and stopped it about 10 feet below the blasting set. MacEachern was not injured.

Vilho Rintamaki, shaftleader, Albert Boudreau and Alex Lefebvre, shaftmen, were on the shaft bottom with Lepage, when he was struck by the timber divider. They were not struck nor injured by the falling timber. Rintamaki climbed the shaft to the 36 level to phone the hoistman. The men then had to examine the rope and bucket and manoeuvre the crosshead back into the guides, to be hoisted up to the deck for help. The crosshead was damaged and twisted in such a way that it stuck in the guides and would not descend. It was chained up in the headworks and the men returned to the shaft bottom in the bucket without it. The counterbalanced bucket and crosshead in No. 3 compartment is on the clutched drum side; No. 2 compartment drum is fixed. The men chose to ride No. 2 compartment bucket without crosshead to bring Lepage to surface rather than No. 3 bucket and crosshead because they could guide No. 2 bucket with their hands while it moved on slow bells. They could not guide the bucket if they travelled in No. 3 compartment. Lepage's body was recovered without further incident.

An inquest was held before Coroner D. Johnston, M.D., of South Porcupine, at 2:00PM 5 May. The jury returned the following verdict:

We, the Jury, find the deceased person came to his death at 10:30 p.m. on the 4th of April, 1966, at #7 Shaft, Dome Mine. Death was caused by a fractured skull received when he was struck on the head and shoulders by a falling divider timber. From the evidence we the Jury feel the accident was accidental, no blame be attached to anyone and we recommend that tie rods be used on all divider timber where chairs are used.

**The International Nickel Company of Canada Limited
(Levack Mine)**

No. 7

Gino Brignolio (Canadian, 29, married) was instantly killed when he fell approximately 108 feet in a pillar chute at Levack mine of The International Nickel Company of Canada Limited. Time of the accident was approximately

11:25AM on 16 March. Brignolio, a driller, had been employed by the company since 12 June 1956 and had worked underground since January 1957.

Scene of the accident was No. 10275 undercut and fill pillar being mined downward from the 2650- to the 2800-foot level. The average length of this pillar is 170 feet and it is the standard 22 feet in width. Stopes on each side have been mined and filled with hydraulic sandfill. Near the centre of the pillar a slot was mined up from the 2800- to the 2650-foot level. A manway had been carried up against the east side of the pillar when the adjacent 103.00 stope was mined. This 103.04 stope manway was used to establish the two-set slot extending approximately 11 feet into the pillar. In the slot, the west set was lined for a vertical chute and the east set was used as a wing at each cut. A second wing was provided on the west side by benching the pillar floor into the vertical chute. Each cut or bench of ore was taken out as four separate slices or panels, mined alternately from the central chute area. The bench being taken at the time was the third 11-foot lift below the topsill on the 2,650-foot level. On this fourth bench, the southwest slice had been mined and was to be filled while a slice to the north was being mined. Two slashes, one on each side of the east chute wing, had to be taken in order to start mining the northeast slice. This would make room to stand posts, install another raised grizzly, and move the slusher hoist to a new set up.

On 15 March, the 4-12PM shift crew of Paul Leblanc and Phil Leroux drilled the south slash and blasted it at lunch time. They had to close off the new 102.75 pillar manway that provides service from above and is directly over the east chute wing. They slabbed up the old 103.04 stope manway for one set to keep out fly muck from the blast. They also uncovered the east chute wing to pass muck from the blast. The opening over the vertical chute remained covered with a double layer of 5-inch flatted timbers and the raised grizzly still covered the west chute wing. A temporary opening into the old manway, 6½ feet above the stope floor, was now the entrance and exit to the pillar stope. This opening measured 3 feet 8 inches by 3 feet in height. The crew nailed a 2- by 6-inch guardrail 5 feet 6 inches long across the outside of this opening with two 5-inch Ardox spikes, one driven at each end of the plank into the end grain of the cribbing. Safetybelt lifelines were secured in the manway at this location, by the crew, and they posted a standard sign which reads "Safety Belts Must Be Worn Beyond This Point". The men, on their return from lunch, used the lanyards to enter, scale, muck-down, and cover the east chute wing with a layer of 5-inch flatted timbers. At the end of the shift, they reported the changes made at the pillar entry and a record left in the shifters' log book warned the oncoming crew of this condition.

The dayshift crew of Jim Lewis, leader, and Gino Brignolio, driller, received the above report on 102.75 pillar from their shiftboss, Walter Finn. They used the lanyards and experienced no trouble in entering the working place. During the forenoon, the slash on the north side of the chute wing was drilled-off and loaded. The east wing was again uncovered before blasting. Brignolio and Lewis climbed out through the old manway opening, lit the igniter cord to blast, and left their safety lanyards on the manway landing. Brignolio guarded below and Lewis went up the manway to guard. Following the blast, and after guarding time had elapsed, the leader called to Brignolio who then came up to the pillar entrance. Lewis had opened the trapdoor and was looking down the steel slide of the new manway. He could see light from Brignolio's caplamp and called to ask if the posts were allright after the blast. He heard Brignolio reply in the affirmative and then saw Brignolio's light disappear down the chute. He was sure

his partner had fallen from the manway opening into the open chute wing. Lewis hastened from the travelway to the 2650-foot level where he met a drill sharpener whom he sent to get the shiftboss and the crew from the next stope. Lewis then hurried down the manway and stopped the trammings crew from pulling the chute. With help from one of the trammers he made an opening into the chute at the first blasting chamber above the 2800-foot level. They found Brignolio lying on the muck eight feet below this entry into the chute.

Walter Finn, the shiftboss, organized the rescue operations. Dr. C. Jessop had been brought underground but he found Brignolio was dead when taken from the chute.

Brignolio had not attached a lifeline to his safety belt before checking on the results of the blast. In some manner, he lost his balance and fell from the manway into the chute. It is assumed that he may have leaned over the guardrail to inspect the results of the blast. The guardrail was detached at one end and was hanging from the spike at the other end. Whether the guardrail was displaced by the blast or by Brignolio is not known.

An inquest was held before Dr. E. Leclair, Coroner, in Sudbury Court House on 6 April. The following verdict was returned by the jury:

That Gino Brignolio came to his death at Levack mine on March 16, 1966 and that death was caused by falling approximately 110 feet into a chute. We find the deceased was negligent in not attaching the lanyard to his safety belt according to mining regulations. We recommend that a scab (cleat) be used on the inside of the cribbing and the barricade nailed to this scab (cleat) on the inside, for more precautionary measures.

**The International Nickel Company of Canada Limited
(Garson Mine)**

No. 8

Adolph Schiller (Canadian, 44, married) a raise driller at the International Nickel Company of Canada Limited, Garson mine, was severely injured when he fell about 26 feet to the broken muck in 3480 fillraise. The accident occurred at about 5:00PM on 9 May and Schiller died at about 4:00AM on 10 May in Sudbury General Hospital. Schiller had worked for Inco since 1942 and had over 15 years raising experience at Garson mine.

The 3480 fillraise was being driven from the 2800-foot level to 2600-foot level by Adolph Schiller and Kauno Ylitalo, who had worked together as a raise crew for the last four years. The 3480 stope section had been silled-out at gangway elevation and the fillraise started off from stope back 18 feet above 2800-foot level base of rail. From this elevation the raise had been advanced 100 feet by 9 May. Broken muck from the raise is scraped a short distance to a gangway chute and passes directly into 110-cubic-foot cars. The 7- by 9-foot vertical raise is timbered on one side with 5-inch by 5-foot-6-inch cribbing to provide a manway compartment having offset ladders with landings and a boxed-in steel slide equipped with tugger hoist. The remaining cross-section of the raw raise is the muck compartment approximately 3 feet by 7 feet in size. Two-inch planks, 5-foot 6-inches or 8-foot 3-inches in length, are nailed as lining on that side of the cribbing which is exposed to the broken muck. Most sections of plank are put on vertically, but a few horizontal lining planks are required to make up the difference between the length of round and the length of lining plank. There is usually a small gap of 2 to 3 inches between sets of lining planks. It was after putting chute lining in place that the accident occurred.

Schiller and Ylitalo drove the raise on a single-shift-per-day basis. They slushed and pulled their own muck. For safest and best working conditions it was

usual only to pull sufficient muck before a blast to have the next level of broken muck a foot or so below the crawlthrough at top of cribbing. This eliminated the need of a working stage in the muck compartment at the crawlthrough. However at this time, the muck was too low and a working stage was required as well as a drilling stage for the round completed on Friday 6 May. The crew slushed only five cars before blasting this round. Usually eight cars are pulled before blasting an 8-foot round and 10 cars for a 10-foot round. They found the muck was still low on entering the raise the next day and a working stage was again required at the crawlthrough. An 8-foot round was drilled-off.

On the next shift, Monday 4-12PM, they proceeded to raise the crib timber prior to loading the round and placing the headcover. Location for the crawlthrough was now about seven feet higher but the working stage remained in place 21 feet above the muck. Schiller climbed down the side of cribbing to the staging and stood on it to nail the lining planks passed to him by Ylitalo. Two horizontal planks were put on by Schiller, then a set of 5-foot-6-inch vertical planks. Ylitalo nailed the top end of the planks in place. The lining planks now covered the spaces between cribbing, and Schiller had to find a way to remove the stage he was working on and scramble up to the top of the timber. Ylitalo placed a plank sprag between the wall and cribbing at the top end of the lining. He also drove a timber dog into the lining down about two feet, which was as low as he could reach. Using a gap in the lining for toehold and the timber dog as a handhold, Schiller removed and passed up the last plank of the staging. He now tried to climb out by reaching up with one hand to grasp the sprag plank and with one foot against the rock wall, move the other foot from toehold to timber dog. He succeeded in getting his foot onto the timber dog but the other foot slipped on the wall and his grasp on the sprag was not secure enough to save him from falling. He landed on the muck about 25 feet below, and the back of his head hit the rock wall either on the way down or at the time of impact. His hard hat probably came off during the fall. He had not pulled himself high enough for Ylitalo to grab hold of the ring on his safetybelt to boost him up. Schiller did not lose consciousness but was incoherent. His partner summoned help and the victim was removed in a basket stretcher through an opening cut in the manway cribbing. Schiller was examined on arrival at surface by Dr. W. Woychuk who had him taken at once by ambulance to Sudbury General Hospital. He underwent an operation for depressed skull fracture on the left side but died at 4:00AM the next morning. An autopsy revealed considerable pressure on the brain from internal hemorrhaging and further brain injury from a blow on right side of head. It also disclosed a fracture of the breast bone.

An inquest was held in Sudbury Court House on 22 June before Coroner J. A. Pidutti, M.D. The following opinions were presented:

1. Head protection gear similar to a football helmet could lessen the severity of head injury. A chinstrap on the miner's skullguard hat would hold it more securely in place.
2. Safety lines, required by Inco standard practice for this type of situation, were readily available but were not used.
3. There was a supply of timber dogs at the bottom of the raise. Two or three more timber dogs driven in place before removing the stage would have provided ladder rungs with secure foothold and handhold.
4. The crew did not split up when scraping muck with one man at the top checking muck-level while the other man slushed.

The following verdict was returned by the jury:

That Adolf Schiller, the deceased person, came to his death at 4:00 o'clock in the forenoon on the 10th day of May 1966 at General Hospital and that the death was caused by brain damage from a fall down chute (accidental) due to the fact he wasn't wearing safety belt, and muck was too low in chute.

Closer supervision should be maintained in hazardous areas such as this to make sure muck is not pulled too low and more stricter regulations as to wearing of safety belts when muck is below (6') six feet.

**The International Nickel Company of Canada Limited
(Garson Mine)**

No. 9

Stanley J. McGillis (Canadian, 36, married) was struck and instantly killed by a fall of ground in 9-0 cut-and-fill stope of Garson mine of The International Nickel Company of Canada Limited at about 1:10PM on 12 May. He suffered multiple and severe crushing injuries and was declared dead by Dr. W. Woychuk before removal to surface. It took about two hours to release the body from under the large chunks of fallen ground. McGillis was a stopeleader with fifteen years mining experience.

The 9-0 stope had been mined to a height of 135 feet above the 2200-foot level. The west end of this longitudinal stope had been filled and the east end was being prepared for the balance of this ninth lift of sandfill. In addition to mining the east end between pours of fill there was an interval of nearly four months while a hangingwall offshoot was developed by subdrifting and driving a boxhole raise from below. A short inclined crosscut was also driven through the hanging-wall into the main stope as a fill passage. Following the breakthrough the ground around the bottom of the fillraise appeared to be heavy. Supervision ordered that it be supported by cribs. The crib and boom timber were to be utilized for the construction of a fill-control chute.

The stope crew of Stanley McGillis, leader, Ralph Ringuette, driller, and Wayne Charron, helper, were instructed on this timber job by Merrill Currie, the shiftboss. Currie was in the stope between 8:30 and 9:00AM. He checked and found that the crew had scaled well around the breakthrough before they picked out the location for the cribs. An eight-foot crib was put in place on the west footwall side of the raise before lunch. McGillis then decided that he would use the slusher to scrape aside some muck from the breakthrough in order to have a level base for the next crib. The scraper had to be pulled in from the subdrift and the crew experienced difficulty getting it through the inclined crosscut. Ringuette and Charron were out of sight in the subdrift when they heard and felt a heavy fall of ground. Just prior to the rockfall, McGillis had been reefing hard with the slusher hoist. Two guide sheaves were hooked to rockbolts in the loose ground that fell. The crosscut breakthrough was practically blocked with large chunks of rock. Ringuette and Charron left by the subdrift entrance and Ringuette sent Charron to get Merrill Currie, the shiftboss. In the meantime, Currie had arrived at the other side of rockfall by way of the west manway. He could see there was trouble but was unable to converse with Ringuette on the east side because of noise from the broken airlines and waterlines. Currie left the stope by the west manway and went through an adjacent stope to the 2000-foot level where he turned off the air and water at the top of 9-0 fillraise. He then went back down into 9-0 stope by way of this fillraise. Currie and Ringuette concluded that McGillis was caught under the rockfall.

A rescue operation was quickly set up but it took about two hours to recover McGillis' body. No loose rock fell on the slusher or on the operator's position at

the controls. McGillis was found about eight feet to the left and slightly ahead of the slusher. He had suffered numerous severe crushing injuries and disembowelment. Dr. W. Woychuk, who had been brought underground during recovery operations, declared that McGillis had been instantly killed.

An inquest was held before Coroner J. A. Pidutti, M.D., on 29 June in the Sudbury Court House and the following verdict was returned by the jury:

That Stanley McGillis the deceased person came to his death at 1:20 to 1:30 o'clock in the afternoon on the 12th day of May 1966 at Garson Mine and that the death was caused by a fall of loose rock that fell from roof of 9.0 stope on 2200 foot level which crushed his skull causing death instantly.

In the case of death of S. McGillis, we the Jury recommend after hearing the evidence feel that there should be a closer co-ordination between employees and all levels of supervision including safety. We also feel that no one individual could be blamed for the fall of rock which was accidental.

**The International Nickel Company of Canada Limited
(Garson Mine)**

No. 10

Wilfred Labre (Canadian, 43, married) was instantly killed when accidentally struck by a fillcar that dumped unexpectedly. The accident occurred at the 11.00 stope fillraise dump on 2000-foot level of Garson mine at approximately 10:00AM on 20 June.

The 11.00 fillraise dump on 2000-foot level is 600 feet south and 360 feet west of the main fillraise in No. 2 shaft crosscut. The fill tramway is straight except for a curve at the intersection of the No. 2 shaft crosscut and the main west drift. This is a 50-foot-radius curve with a change in direction of nearly 90 degrees. A standard fill train is usually composed of three 110-cubic-foot cars pushed when loaded by a battery-powered 4-ton locomotive. The required practice is for a switchman to walk ahead of the train both on the way into the dump and on the way out to the loading site.

On dayshift 20 June, a fill crew composed of Wilfred Labre, switch motorman, and Dave Latendre, motor switchman, were delegated by Harry Lynds, shiftboss, to dump fill into 11.00 stope. The stope crew, Gerry Charpentier, leader, and Don Bedford, driller, were to work in the stope, twenty feet below, slushing the fill into place, from the bottom of the fillraise. Five trainloads of fill had been trammed and dumped prior to the accident. The train, which had been made up by the crew, contained five cars. In addition they had placed an extra locomotive at the front end. This was contrary to Inco standard practice, for which the instruction reads "No second electric locomotive may be used under power in a train unless the train is under the direct supervision of the shiftboss or person authorized by the shiftboss to supervise and direct the operation". The shiftboss, Harry Lynds, was in the 11.00 stope at about 9:00AM. He met the tramping crew at the top of 11.00 fillraise when he climbed up out of the fillraise manway. The loaded train, on the fourth trip, had been stopped on the west side of the dump and the crew was about to lift the ramp then to move the cars back over the ramp in order to dump. At this time, Labre asked Lynds if they could use two motors in order to pull around the curve at intersection. Lynds was persuaded by Labre that it would be more efficient and faster than changing run-down batteries. He did not notice the crew were already using the second motor and five cars. Lynds did specify that the second motor could only be used, under power, around the curve with loaded cars and that at all other times the switchman must walk ahead of the train.

On the sixth trip, Labre stayed on the motor at the head of the train. As the train was passing the dump, Latendre on the rear motor felt a bump and saw a car dumping. He stopped the train immediately and walked ahead to check the trouble. He found Labre lying beside the train at the east end of the dump. Labre's skull was badly fractured and he was bleeding from nose, ears, and lacerations at the back of his head. Dr. W. Woychuk examined Labre at the scene of the accident and declared that he had suffered severe head injury and skull fracture causing instantaneous death.

Latendre claims he did not see Labre get off the moving motor. He must have jumped off as the train approached the dump. It appears that the dump wheel on the second car caught the ramp, pulling it up, and this caused the car to dump. It is assumed that Labre's head was crushed between this car door and a driftpost situated at the east end of the ramp. Subsequent tests showed that this second car would catch the ramp if the ramp was not lowered completely.

An inquest was held before Coroner J. A. Pidutti, M.D., at the Sudbury Court House on 14 September with the jury's verdict as follows:

That Wilfred Labre, the deceased person, came to his death at 10:00 o'clock in the forenoon on the 20th day of June 1966 at Garson Mine and that the death was caused by skull fracture which he suffered thru crushing between the opened door of the mine car and the drift timber. No blame being attached to anyone.

We would recommend that when two motors are used in future three (3) men will be assigned to the tram crew. Further, that a mechanical device should replace the present ramp system of dumping cars, said device should be clear of cars by approximately one (1) foot, when not in use.

**The International Nickel Company of Canada Limited
(Stobie Mine)**

No. 11

Rheal Lajeunesse (Canadian, 45, married) chuteblaster, was caught and fatally injured in a run of muck from a boxhole in the 10.0 slusher trench on the 1000-foot level, Stobie mine at 2:20AM, 10 November while attempting to place an explosive charge in the boxhole. Lajeunesse had worked underground at The International Nickel Company's mines for 16 years, and had spent a total of 2½ years on slusher trench work during the last 6 years.

Rheal Lajeunesse with his partner Leo Blanchard, slusherman, arrived at their working place at 11:45PM 9 November. The shiftboss, E. Levo, had designated Blanchard as slusherman and Lajeunesse as chuteblaster. Both men were qualified as chuteblasters and slushermen. Lajeunesse first checked the boxholes and determined that there was sufficient muck available to fill 7 or 8 tippie cars before it would be necessary to blast. Blanchard proceeded to slush this muck and had it banked up at the drawhole when Levo arrived at 12:20AM. Levo checked the slusher area and discussed the shift's work with the two men. Before leaving he informed them that he would send a train in for the muck. The crew told him they would have to blast after loading the first train. They completed the loading of eight cars by 2.05AM, after which they prepared to blast. Lajeunesse again checked the hungup boxholes and decided to blast in 4R boxhole first. They took in three blasting poles and three 10-pound burlap bags of Amex, two of which were primed with stick powder and B-line. Lajeunesse climbed up into 4R boxhole, under the hangup, and placed the three charges one at a time as they were passed up to him by Blanchard. One was placed between two chunks approximately 30 feet above the trench floor and the other two charges were placed together against a big chunk about 5 feet lower down. Lajeunesse then decided to load 4L boxhole and they brought in two more blasting poles and two 10-pound bags of Amex both of which they had primed.

Lajeunesse took a blasting pole with a 10-pound bag of primed Amex affixed to one end and entered the left side of 4L boxhole. He was up several feet above the brow, and in the act of placing the charge, when the hangup let go. The muck swept him into the trench below and buried him near the opposite wall. Some 20 to 30 tons had flowed out of the boxhole. Blanchard, who was standing in a safe position to the left of the boxhole, jumped back and escaped unharmed. He had seen his partner buried by the muck and hurried to get help to uncover him. He ran to the south refuge station, 600 feet away, and reported the accident to Levo at 2:20AM. Levo organized a rescue party and they quickly found Lajeunesse under the shallow part of the muckpile. It was necessary to brace a large chunk with timber so that smaller pieces could be moved to release Lajeunesse. He was taken to surface in a basket stretcher at 3:15AM. He was examined by Dr. R. Ghent and pronounced dead. The postmortem disclosed severe head and facial fractures with brain damage and quick death.

Investigation of the accident disclosed that Lajeunesse was in the habit of climbing up under hangups to place explosives. All slusher trenches are equipped with AN/FO blowers which permit the placing of explosive charges from a safe position on the floor of the trench. Crews are instructed not to enter boxholes any farther than the brow and to use the blower for a hangup that is beyond the reach of a blasting pole.

An inquest was held at the Sudbury Court House before Coroner J. A. Pidutti, M.D., with the following verdict returned by the jury:

That Rheel Lajeunesse the deceased person came to his death at 2:30 o'clock in the forenoon on the 10th day of November 1966 at Stobie Mine and that the death was caused by fractured skull due to an unexpected rock fall upon himself while he was attempting to insert Amex with a blasting pole at a limit of height exceeding company regulations. We find the deceased Rheel Lajeunesse negligent in his occupational duties at the time of his death.

We recommend that miners in hazardous duties be instructed by their supervisors more vigorously in the method of operations in box holes and chutes.

Kerr Addison Mines Limited

No. 12

Richard T. Jones (Canadian, 33, married) was fatally injured when struck by falling rock in the 1906-21 square-set and fillstope on 23 December at approximately 9:45AM. He was hired at Kerr Addison Mines Limited on 5 September 1964 as a mine labourer. He advanced to apprentice miner the same month and became a miner on 26 November 1965. Jones had eight years of mining experience prior to being hired at Kerr Addison. He worked as a motorman and miner at Lake Shore, Teck Hughes, Macassa, Sylvanite, and Wright Hargreaves mines.

The 1906-21 pillar is a transverse square-set and fill operation, and is 40 feet wide and 44 feet from the hangingwall (or south wall) to the footwall (or north wall). The pillar had been mined to a height of 121 feet above the 1900-foot level; from there, mining was begun east through the crown pillar of 1906-22 stope, which is 110 feet long, and which varies in width from 23 feet to 40 feet. At the time of the accident the face had advanced to a point 86 feet east from the millhole. The 1906-22 stope had been mined some considerable time previously by shrinkage stoping, and had then been backfilled.

On the 7:00PM-3:00AM shift of 21 December, the crew blasted the east face. On the 8:00AM-4:00PM shift of 22 December, Jones and his partner, Gaston Yergeau, started to slush, but finding the break was tight on the hangingwall side, drilled and blasted nine holes to the east shortly before 1:00AM. Returning after the blast, they found the hangingwall post of the last set had been broken. Shift-

boss, J. Barbour, visited the stope at approximately 2:00PM, and instructed the crew to continue slushing, and replace the broken set. On 23 December, shiftboss Barbour notified Jones and Yergeau that no one had worked in the stope on the night shift, and repeated his instructions of the previous day. Jones and Yergeau proceeded to the stope, checked the back with a scalingbar, and commenced to slush. At approximately 9:45AM the pullback cables on the 3-drum hoist became disconnected from the scraper, and one cable fouled in the right-hand block.

Jones and Yergeau went to the face to adjust and re-attach the pullback cables. About 30 tons of ore fell from the face and the back while they were there. Yergeau was partly buried but owing to some warning had jumped clear of the main fall. Jones was struck by the falling ground. Yergeau managed to dig himself out and reported the accident at approximately 10:15AM to Clement Pepin, who was lowering timber from the level to the adjacent 1906-20 stope. Pepin called to his partner, J. Hester, in the stope, to come up, then told Yergeau to go to the station to get help, and proceeded to the 1906-21 pillar by himself.

C. Pepin, J. Hester, Captain M. MacAulay, and shiftboss Jack Turner proceeded with rescue operations, and Jones was brought to the 1750-foot level at 11:20AM where he was examined by Dr. G. E. Hagerman and pronounced dead. The cause of death was a very acute hemorrhage from a ruptured heart.

An inquest was held before Coroner J. M. LeBlond, M.D., at Virginiatown at 7:30PM on 11 January 1967, and the jury returned the following verdict:

That Richard Jones the deceased person came to his death at 9:45 o'clock in the a.m. on the 23rd day of December 1966 at Kerr Addison Mines - Pillar 1906-21 and that the death was caused by rolling muck from the face. Death caused by lacerated heart and left lung. We the jury find that Richard Jones came to his death accidentally.

Lowphos Ore Limited

No. 13

Denis Aimé Beaulieu (Canadian, 30, married) rotary drill helper was fatally injured when a model 12 Caterpillar grader backed into him at 7:30PM on 7 March at the No. 10 pit of the Moose Mountain mine in Hutton township. He had been employed since February 1965.

The overburden of sand and gravel had been removed from the higher portion of the No. 10 orebody and the first cut at 1135-foot elevation was well advanced; removal of overburden continued in the lower portions. The rock surface contour was irregular and consequently there was a 12 percent grade of the ballast fill leading up from a haulage road to a Bucyrus Erie 50R rotary drill site at 1196-foot elevation. The fill was frozen and covered with a few inches of snow. The temperature on 7 March was about +10 degrees Fahrenheit.

The rotary drill on the afternoon shift of 7 March was producing an insufficient supply of compressed air for proper operation. Dick Benoit, the pit shift foreman, ordered Aurel Martin, driver of a model 12 Caterpillar grader, to bring a Gardner-Denver 600 portable compressor from the plant. Because Martin anticipated difficulty in getting up the grade, he drove the grader at full speed in fourth gear in the high range. Halfway up the grade the wheels spun and despite a shift to third gear in the low range it began to slide down the grade. The compressor jackknifed to the left as the grader was backed down. The compressor was unhitched from the grader and manoeuvred into position for the grader by a Caterpillar 824 wheeled-dozer, driven by Romeo Essiembre. In the meantime, the grader itself was driven up the grade for a trial run without difficulty. However, the dozer was driven up the grade to blade-off most of the snow before the

grader towing the compressor made another run at the grade. This time with the grader in second gear in the low range the wheels spun; the grader slid backward and the compressor jackknifed to the left again. The front right fender of the compressor was dented on one of these trials. The dozer was again backed up to the compressor while the tongue of the compressor was swung from the grader to the dozer. Denis Beaulieu, the drill helper, Cleo Laurin, driller, and Dick Benoit were doing this work; Benoit was on the right side of the tongue, Laurin on the left and, although Beaulieu was close by, no one was sure exactly where he was. There was adequate lighting of the area from the grader and the dozer. The tongue was being fitted into the hitch on the dozer when Martin, the grader operator, moved the grader away to give more clearance for the men. The grader advanced upgrade in second gear low range for 20 feet, the wheels spun, and the grader slid back down the grade toward the men. Martin, realizing what was happening, braked the wheels, unclutched, sounded the horn, and look back at the men. Essiembre saw the grader moving and put his dozer into gear to move out of the way. Martin clutched back into second gear but could not stop the backward motion before hitting Beaulieu and Laurin. It is not known what part of the grader hit the men. Laurin felt he was hit in the back and moved violently against Benoit on his right to get away. The grader moved ahead about five feet; Martin put on the brake and left the vehicle to help the men.

Benoit sent for the ambulance from the plant. Beaulieu was assisted by Laurin and Martin and held down when he attempted to rise before the ambulance arrived. Laurin was not seriously injured but went with Beaulieu in the ambulance to Capreol Medical Centre. Martin was taken later to the Medical Centre for sedation when he realized the seriousness of the injury. Denis Beaulieu was dead on arrival and Dr. D. A. McGowan pronounced him dead. Beaulieu's injuries were: crushed abdomen, ruptured liver, stomach pushed up through the diaphragm, damaged right lung, extensive internal bleeding; they resulted from a violent blow or heavy weight on the abdomen. He may have been run over by the grader tyre. Laurin lost two weeks work with a sore back.

An inquest was held before Coroner J. A. Pidutti, M.D., at the Sudbury Court House on 13 April. The jury returned the following verdict.

That Denis Aimé Boileau, the deceased person came to his death at 7.30 o'clock in the afternoon on the 7th day of March 1966 at Pit # 10 Hutton Township, and that the death was caused by the body of the deceased being crushed between grader and the front of the compressor, or run over by tire of grader.

We recommend that better lighting be used on place of work.

We also recommend that in slippery conditions, such as this, tire chains be used or that sand be used before such an attempt of towing be done.

We also recommend that closer supervision be exercised on all operations such as this.

(The proper spelling of the man's name is Beaulieu).

**Macassa Gold Mines Limited
(Macassa Division)**

No. 14

Roy Logan Sipprell (Canadian, 57, married) was fatally injured on the 5150-foot level of the Macassa Gold Mines Limited, Macassa Division, between 12:15 and 3:35PM 25 May when he was crushed between the lip of the chute and a battery locomotive. Sipprell was employed at Macassa mine on 1 October 1938, and he had been engaged in supervisory duties as a shiftboss and mine foreman from 1 January 1939, with the exception of the period from 5 November 1942 to 15 December 1945 when he was in army service. Prior to employment by Macassa

mine, he had obtained mining experience at the East Malartic, Siscoe, and Hollinger mines. He was a graduate mining engineer.

The 51A1 East stope is a stilled shrinkage stope extending to the 5000-foot level. The last remnants of the broken ore were being pulled out on a part-time basis by crews who work there after taking timber down to the various levels below the 4625-foot level deck of the No. 2 winze. All supplies at the No. 2 winze and the transportation were being supervised by Roy Sipprell on dayshift, and on the day of the accident no crew was available to work in 51A1 East. As the duties were set out, Sipprell normally supervised this working place. Originally there were 18 chutes and two manways into the stope. As the muck was pulled and the chutes were emptied, the chutes were taken out. On the day of the accident, there were four chutes remaining, Nos. 1, 6, 8, and 10, from the west to the east in 51A1 East drift below the stope. No. 2 manway was 40 feet east of No. 8 chute; No. 10 chute was immediately to the west of the manway. The stope had been completely backfilled from No. 2 manway to the east end.

There were two Mancha motors at the 5150-foot level charging station at the start of the dayshift, 25 May. C. S. Green, general superintendent, arrived at the station on the 5150-foot level at about 10:20AM, and saw Sipprell. They discussed the ground conditions of the 51A1 East stope, and Sipprell mentioned there was a car in the way at the working place. Sipprell was asked to supply one stull and 3 posts to the 5150-foot level for the crew working in 51-04-3F stope. The two supervisors then proceeded by cage to the 4625-foot level as it was lunchtime. After lunch the cage crews delivered one load of timber to the 5000-foot level, and the timber order to the 5150-foot level. Shortly after 12 noon, the supervisors were lowered from the 4625-foot level deck in No. 2 winze; E. Hillgren to the 4900-foot level; H. Ducsharm to the 5000-foot level; and R. L. Sipprell to the 5150-foot level. No one saw Sipprell alive after this time. The supervisors were hoisted to surface from the No. 2 winze at 1:45PM. The cage stopped at the 5150-foot level for Sipprell, but because he was not on the station the supervisors proceeded to surface in the cage. Sipprell could have been in any one of several places at this time, as he had been in the past, owing to the nature of his duties.

At 2:15PM, H. Ducsharm, shiftboss, reported Sipprell had not come up. No action was taken because occasionally Sipprell would stay underground to supervise the hoisting of men at the end of the shift. At approximately 3:00PM C. S. Green, general superintendent, phoned underground to the No. 2 winze cagetender W. Lawrence, to ask if Sipprell had phoned for cage service, or had been seen going to No. 1 winze. Lawrence reported that Sipprell had not been seen nor had he phoned. Lawrence was instructed to go to the 5150-foot level station to see if Sipprell was there, and to phone back to surface; having received a negative reply, C. S. Green, H. Ducsharm, and the first-aid attendant, E. Haskins, proceeded underground immediately to search.

Since Sipprell was last seen by H. Ducsharm, and was proceeding to the 5150-foot level, the search party proceeded there. It was noticed that only one motor was in the charging station, so the party proceeded to 51A1 East drift. Sipprell was found lying half out of the motor cab, with his left side on the battery-box and his back toward No. 8 chute. His right arm at the armpit was jammed under the chutelip. The clearance from the batterybox to the bottom of the chutelip was six inches. The motor controls were in full-open forward position, the brake released, control switch on; however, the overload circuit-breaker had cut off power to the wheels. A loose bundle of ten 3-foot fuses and three 10-foot fuses was on the battery box. One 1-ton car was attached to the cab end of the motor.

Dr. E. M. Yamka was called. C. S. Green released the body, and Dr. Yamka on arrival at the scene pronounced Sipprell dead. Dr. J. W. Clegg, pathologist, performed a postmortem that evening at 7:45PM. He stated that Sipprell suffered fractured ribs on the right side, laceration of the lung, abrasions to the body, and a lump on the right side of the head. He gave the cause of death as asphyxia due to external pressure to the chest.

No crew was working in 51A1 East stope the day of the accident. It would appear that Sipprell took the motor in shortly after 12:15PM. It also would appear that he was standing in the cab rather than sitting on the seat. If he had been sitting on the seat there would have been ample clearance. The control was in the full-on position which would have moved the motor east toward No. 8 chute. Sipprell may have intended to return the capped fuse to the fuse storage situated toward the station, and therefore may have opened the control the wrong way by mistake. The motor had had a complete overhaul six weeks prior to the accident, and was fully tested following the accident. All components were found to be in good working condition and controller speeds were found to be normal in both directions; circuit breaker, headlight, and brakes were all in good condition. The battery was almost fully charged at a gravity of 1.270

An inquest was held before Coroner J. M. LeBlond on 8 June in the Ontario Provincial Police Building at Swastika. The jury returned the following verdict:

We the jury say that R. L. Sipprell the deceased person came to his death at approximately 3:25 o'clock in the afternoon on the 25th day of May, 1966 at 5150 Level Macassa Mine and that the death was caused by crushing injuries received when the body was jammed between the motor and the chute and we conclude that death was accidental with blame attached to no one.

We the jury recommend (1) A workman does not work alone. (2) Consider use of dead man control on battery motors. (3) That supervisors should be aware of location of workmen at all times.

MacLeod Cockshutt Gold Mines Limited

No. 15

Alexander M. Steadman (British, 58, single) employed as a member of the shaft maintenance crew by MacLeod Cockshutt Gold Mines Limited since 1941, was fatally injured when he fell 38 feet to the bottom of No. 2 shaft at 10:57AM on 2 March. He died at 1:30PM the same day in the Geraldton hospital.

The vertical four-compartment No. 2 shaft on Claim TB10038 is 1921 feet deep with the long axis north to south. No. 1 and 2 compartments at the south end are equipped with 3½-ton skips. No. 3 compartment had been used as a ventilation way and is fully lined. No. 4 compartment at the north end is the manway. The loading pockets are 1857 feet below the collar and spill pockets are 1869 feet below the collar in compartments No. 1 and No. 2. No. 3 compartment is bulkheaded above the 11th level and an open crosshead and bucket are used in it for mucking-out the sump. No. 3 compartment is planked-over at the spill pocket elevation except when the sump is being mucked out.

The five-man shaft maintenance crew started to clean the sump, which had not been mucked out for two years, on 23 February. Coming on shift at 8:00AM 2 March they found that the sump pump had broken down. The pump was suspended below the skip in No. 2 compartment and hoisted through the spilldoor to surface. Another sump pump was lowered to the bottom and Steve Wozniak, shaftleader, then told Steadman to close the spilldoor so skipping could start.

Steadman placed a 2-inch by 8-inch by 8-foot plank across No. 3 compartment, closed the spilldoor and then stood on a plank in No. 2 compartment while he replaced the "fillers" around the spilldoor. Erik Ylijoki, who was in the

manway, passed some wedges to Steadman at his request. Steadman then stepped back on the plank in No. 3 compartment and started to remove the plank from No. 2 compartment. While he was doing this, the skip tender called down "How are you getting along?" As Steadman answered, he appeared to lose his balance. He fell 24 feet to a platform where his head hit one of the planks and broke it. He then fell through the platform into the sump, 14 feet below.

Steve Wozniak and Nestor Tienhaara, who were in the manway near the platform, heard him fall and pulled him out of the sump. A basket stretcher was obtained from surface and Steadman was taken to surface in the No. 2 compartment skip. Dr. A. H. H. Malcolm examined Steadman in the headframe at 11:07AM, before Steadman was taken to the Geraldton Hospital where he died at 1:30PM without regaining consciousness. Dr. Malcolm stated that death was due to a fractured skull, intra-cranial bleeding, and lacerated brain.

An inquest was held in Geraldton Municipal Building on 8 March at 7:00PM. The verdict of the jury was as follows:

We the Jury find that Alexander M. Steadman came to his death at approximately 1.30 P.M. March 2, 1966 and that death was caused by a fractured skull from an accidental fall when he lost his balance and fell 38 feet to the bottom of the shaft while removing a plank. There is no blame attached to anybody or to MacLeod Gold Mine. If it is not feasible to have a man in this position wear a safety belt, it is the suggestion of this jury that in future there should be more than one plank to stand on while removing the other plank from the spill door.

MacLeod Cockshutt Gold Mines Limited

No. 16

Frederick Grimm (Canadian, 65, married), employed as a miner, was helping timbermen unload 200-pound steel plates from the cage at the Mosher No. 1 shaft, 13th-level station. At 9:15AM 9 May he complained of not feeling well. He died in Wellesley Hospital, Toronto, 18 June.

Frederick Grimm had been first employed at MacLeod Cockshutt 16 September 1941. He had been employed as a raiseman most of the time, but for the last few years had been doing rockbolting and helping the timbermen. He came on shift at 8:00AM, 9 May and was told to help timbermen Sten and Kristjanson in unloading material from No. 1 shaft cage. The material consisted of 200-pound steel plates that were tipped out of the cage onto a timber truck that was then pushed onto the main line. A second cageload of plates was unloaded, and at 9:15AM he complained of not feeling well. He was taken to surface where J. L. Doyle, safety supervisor, talked to him. At this time he appeared to have diarrhea, was trying to vomit, perspiring profusely and was quite pale. He also mentioned a pain in the back.

Doyle persuaded Grimm to go to the Geraldton Hospital for treatment and called Dr. Wardill before driving Grimm to the hospital. Dr. Wardill diagnosed a possible heart attack and proceeded to take a cardiograph and to do other testing. Grimm insisted on leaving the hospital, and he finally signed himself out of the hospital on 14 May without permission from Dr. Wardill.

Mr. and Mrs. Grimm left for Toronto shortly after this. On 25 May, Mrs. Grimm advised J. L. Doyle, safety supervisor, that her husband had entered Wellesley Hospital for treatment 20 May and that he would be hospitalized for six weeks. He died in Wellesley Hospital, Toronto, 18 June. Cause of death was myocardial infarction.

McIntyre Porcupine Mines Limited

No. 17

Donald Cochrane (Canadian, aged 47, miner), employed underground at McIntyre mine since 1948, was struck and instantly killed by a large piece of loose that fell from the hangingwall near the breast of 569 No. 11 stope, 500-foot level, No. 7 shaft, of McIntyre Porcupine Mines Limited at about 9:30AM 13 January.

The 569 No. 11 stope, 20 vein, is being mined as an open stull and floor stope from the 500- to the 400-foot level. At the time of the accident, the stopeback was about 100 feet above the 500-foot level. It is about 250 feet long in an east-west direction and averages 7½ feet wide; the dip is about 50 degrees to the south. The crew on 7:00PM to 3:00AM shift had scaled, mucked, drilled, and blasted upper holes toward the west end of the stope. After the blast, the breast was 66 feet from the west pillar. The present working stull floor is approximately 28 feet from the stopeback and a new floor is being built about 15 feet above it.

At about 9:00AM on 13 January, Donald Cochrane and his partner, Stanley Pawlak, miner, were scaling in the blasted area at the west end of the stope. A heavy seam of gouge material extended from the hangingwall of the 5½-foot-wide quartz vein to a competent hangingwall slip for most of the length of the stope. This gouge seam varied in thickness from a few inches to several feet; at the newly blasted area, the thickness was about 5 feet. The gouge material is not drilled with the vein material next to it. When a breast is blasted, the gouge falls or is scaled down easily. In this case, some of the gouge remained on the hangingwall, back from the breast. Cochrane and Pawlak noted it and tried to scale it, but could not.

At about 9:15AM the shiftboss, Frank Rankin, entered the stope. The two miners drew his attention to the large patch of loose ground on the hangingwall. The three men discussed the situation. Rankin's instructions were to place a heavy sprag from the footwall against the loose to secure it, then to drill a hole and blast it down. The width of the stope and height of the muckpile permitted the placing of the sprag without the men exposing themselves to the loose. Rankin left the stope and Pawlak went toward the east end of the stope to get tools and material to post the loose. Cochrane remained near the breast, scaling small material from the walls. While cutting a short piece of plank for a headboard, Pawlak heard the noise of falling ground. He climbed the muckpile to the face and found Cochrane lying face down, partly covered but not pinned, by a large loose that weighed about 2½ tons. The loose had fallen from the area that was to be posted. Cochrane suffered severe crushing injuries and lacerations to his head and chest. He appeared to be dead when Pawlak reached him. Dr. B. D. O'Shaughnessy was called and proceeded underground. He pronounced Cochrane dead and was of the opinion death had been instantaneous.

An inquest was held before Coroner J. B. McClinton, M.D., in the Fire Hall, Schumacher, Ontario, at 2:00PM 18 February. The jury returned the following verdict:

We, the Jury, summoned regarding the death of Donald Cochrane, find the deceased came to his death on Thursday, January 13, 1966, at approximately 9:30 a.m., 569 #11 Stope, 500 Level, #7 Shaft, McIntyre Porcupine Mines Ltd., Schumacher, as a result of extensive fractures to the skull as a result of loose falling on the deceased.

We, the Jury, believe no one was to blame. The Jury recommends that in an area designated as dangerous, no person be left alone as all parties should leave the dangerous area until the proper action is taken.

McIntyre Porcupine Mines Limited

No. 18

George Ondis (Canadian, 65, widower), employed as a stopeman, died in 2057-No. 3 square-set stope, 2025-foot level, No. 11 shaft of McIntyre Porcupine Mines Limited, from injuries received when he fell from the mining floor into an open set and down the muckpile, while barring muck from the breast. The accident occurred at about 12:50AM 5 May.

The 2057-No. 3 stope is a regular square-set stope that averages three sets in width. It had been widened to five sets at the west chute, where the two-man crew was working at the time of the accident.

The crew, consisting of George Ondis, stopeman and leader, and John Fournier, stopeman, arrived in the stope at about 7:15PM. Their instructions from shiftboss F. Frost were to scale the breast, square it up and stand a set of timber in an area opened up by the previous dayshift blast. The crew proceeded as instructed. They scaled, drilled three 4-foot holes, blasted, and went to lunch while the smoke cleared.

On returning from lunch, Fournier commenced scaling and barring muck at the breast to make room to stand a set. Ondis relieved Fournier, who stepped back to rest. Fournier was two sets away from Ondis, but not looking directly at him when Fournier heard a noise, turned and saw Ondis fall from the mining floor, down the muckpile, and into a wing of the chute that was full of muck. Fournier ran down to the mucking floor and over to the chute ahead of the breast to assist Ondis. In the meantime, Ondis crawled clear of the chute wing and onto the mucking floor. Ondis appeared to have a broken left leg and a severe gash in the left groin. Fournier attempted to make Ondis comfortable, then went to the 2025-foot level for help. He met two stopemen and shiftbosses McCann and Frost, sent them to the stope, then called surface for medical aid. Dr. E. Dobson arrived at the scene about 1:30PM and pronounced Ondis dead.

At the inquest John Fournier could not say what had happened to Ondis. The break in Ondis' left leg could have resulted from his fall but it is not likely that the deep cut in the groin occurred in the same way. Dr. Hamerski, who performed a postmortem examination, thought the wound was caused by a sharp pointed object that had penetrated then torn free. The instrument could have been the scaling bar Ondis was using and which was found on the muck where he had been working. Fournier did not think any amount of muck had fallen with Ondis, but one piece might have struck the bar, driven it into Ondis' groin, then fallen down the muck pile with him. Ondis bled to death owing to his left femoral artery having been severed.

An inquest was held before Coroner D. Johnston, M.D., in the Schumacher Fire Hall at 2:00PM 16 September. The jury returned the following verdict:

We, the Jury, find Mr. George Ondis came to his death at 12:50 A.M. on the 5th day of May, 1966, at McIntyre Mine, 2025 Level. Death was caused by shock caused by loss of blood due to a severed artery. Death occurred within minutes of the injury and was due to a fall. We can attach no blame to any party involved. We can make no recommendations since proper mining and safety procedures were being carried out by the crew.

McIntyre Porcupine Mines Limited

No. 19

Ernest G. LeBrun, stopeleader (Canadian, 53, married), employed underground by McIntyre Porcupine Mines Limited as a miner since July 1945, was instantly killed when struck on the back by a piece of loose that fell from the back of 4779-No.4 cut-and-fill stope, 4775-foot level at about 8:20PM 2 June.

The 4779-No.4 stope is being mined by inclined cut-and-fill method above the 4775-foot level. The stope is about 100 feet long, averages about 6 feet in width, and the top of the first and only cut of fill is 35 feet above the track. The cut being mined was started at the east end of the stope and had advanced westward about 50 feet. The slusher was ahead of the breast up to this point, and only sufficient broken ore to give head room had been removed. The stopeback had been rockbolted partway to the breast.

The last breast blast had been on 8-4 shift 1 June. On the afternoon shift (7:00PM to 3:00AM) LeBrun and his partner had scaled, discovered two missed holes, and spent the remainder of the shift doing work on the level. They blasted the two missed holes at the end of the shift. The dayshift (8:00AM to 4:00PM) on 2 June scaled, installed rockbolts in the back, and started to move the slusher hoist from ahead of the breast up the muck pile to a position back in the new cut. On the afternoon shift of 2 June shiftboss E. Dixon instructed Ernest LeBrun, stopeleader, and Ernest Gill, stopeminer, to scale, finish moving the slusher hoist to the new position, then set it up and proceed to scrape muck from the stope. Gill and LeBrun proceeded as instructed. LeBrun scaled the whole new cut area down as far as they would be working under the breast while moving the slusher hoist and Gill check-scaled it. They then proceeded to move the hoist. They moved it some 10 feet under its own power, by remote control, before the hoist became jammed against the south wall of the stope. Gill turned off the air at the header and LeBrun walked to the front of the hoist to move the cable attached to it from the centre to one side to make the hoist pull away from the wall. While he was bent over making the adjustment, the loose fell directly onto him from the stope back. It fell a distance of about 5 feet and measured 5 feet by 7 feet by $\frac{1}{2}$ foot in thickness. It weighed about $1\frac{1}{2}$ tons.

The two miners apparently spent very little time scaling; a check on the hoisting schedule, travel time, and work done to time of accident would indicate that the whole working area had been scaled and check-scaled in less than ten minutes. Gill stated that there was no indication that the loose fell as the result of a rockburst.

Gill tried to pry the loose off his partner but could not, so he climbed down to the level to summon help. A few feet from the bottom of the manway he met shiftboss Ernest Dixon on his way to the stope. The two men returned to the scene and succeeded in releasing LeBrun. He was dead.

An inquest was held in the Schumacher Fire Hall, Schumacher, Ontario, at 2:00PM 19 August, before Coroner J. B. McClinton, M.D. The jury returned the following verdict:

We, the Jury, summoned regarding the death of Ernest LeBrun, find the deceased came to his death on Thursday, June 2nd, 1966, at about 8:25 p.m. at the McIntyre Porcupine Mines Limited, Schumacher, Ontario, 4779 #4 Cut & Fill Stope, 4775 Level. Death was due to the fracture of the 4th cervical vertebrae as a result of a piece of loose weighing about $1\frac{1}{2}$ tons falling directly on him.

We, the Jury, believe to the best of our knowledge, that LeBrun met his death accidentally and no blame attached to anyone and we make no recommendations.

**Metal Mines Limited
(Gordon Lake Division)**

No. 20

Lawrence R. Beland (Canadian, 21, single) was instantly killed between 1:00AM and 3:00AM, 4 June when he fell an estimated distance of 1100 feet down the 450-foot-level orepass. Beland had been employed as a chutepuller since

17 May 1966. He had 3 years' previous mining experience in the Timmins area.

The main orepass system extends from the 300-foot level to the 1650-foot level and is connected at all working levels. The ore is drawn out on the 1650-foot level and trammed to the loading pocket. The orepass is about 8 feet by 8 feet and has an average dip of 70 degrees. At the time of the accident it was estimated there was about 100 feet of ore in the orepass above the 1650-foot-level chute. The 450-foot-level orepass dump is on the south side of the 2-4 east drift. It is $8\frac{1}{2}$ feet in length and 4 feet in width at the widest point. At each end of the dump there is an 8-inch round timber extending from the track to the back of the drift. On each timber there are two U-shaped steel brackets, 10 inches apart, into which slide two 14-foot by 2-inch by 8-inch planks, that serve as a guard when the dump is not in use. The dump is equipped with a carclamp to prevent cars from falling into the orepass. A safetybelt with a chain is fastened to the drift at the side of the dump. There is no grizzly. Trimming is done using two 2-ton sidedump cars pulled by a $1\frac{1}{2}$ -ton electric locomotive.

On the day of the accident (8:00PM to 4:00AM shift) Beland was instructed by shiftboss A. Bembenek to tram ore from the 4-123 stope, which is located about 700 feet west of the dump. Beland was familiar with the procedure, having worked about 8 days on the same job. Bembenek visited Beland at 9:30PM but because of trouble on the 1650-foot level did not see him again after lunch, as was normal; however, he talked to Beland on the phone at 1:20AM. Beland reported that everything was going well. At about 1:30AM R. Carriere, cagetender, received a phonecall from Beland requesting that he bring down a carjack as he had a car off the track. Carriere informed Beland that he could not do this because the cage was too busy. At the end of the shift at 3:55AM Beland did not check in with his shiftboss. The cagetender was told to go to the 450-foot level to find out what was delaying Beland. When he reported no sign of the missing man, a search of the 450-foot level was made but Beland could not be found there. All other levels and orepass dumps were also checked, and there were still no signs of Beland. Because it was then surmised that Beland was probably in the orepass and there would be no chance that he could have survived a fall of at least 1100 feet, H. Sequin, mine superintendent, ordered the 1650-foot level chute to be pulled. Beland's body was recovered at 5:40AM after pulling 6 cars (48 tons) of ore. A further 25 cars (200 tons) were pulled to empty the orepass, and Beland's hat, boots, and clothes were recovered. The ore that was pulled from the chute after the recovery of Beland's body must have been dumped into the orepass system from the 750, 1200 and 1350 levels after he fell.

Beland's body was removed to surface, and Dr. C. H. Opie was notified at Pinawa, Manitoba. He arrived a few hours later but could only confirm that Beland had died instantly from severe head injuries.

On examining the scene of the accident it was found that the planks guarding the orepass were in an open position. A carjack normally stored at the side of the drift about 10 feet east of the orepass was lying between the rails about 2 feet west of the pass. The train, consisting of a small electric locomotive and two loaded 2-ton cars, was found derailed at the intersection of 4-123W and 4-150W drifts 550 feet west of the orepass. Because there were no witnesses to the accident it can only be surmised that Beland, after dumping his last load of ore, had gone back to the 4-123 chute, and had left the guard planks at the dump in the open position. After loading the cars, the train was derailed at the switch at the intersection of 4-123 and 4-150 on the way back to the dump. He probably

phoned the cagetender because he forgot about the jack stored at the orepass; however, later on he probably remembered where the jack was and went to the dump and picked it up. While passing the open dump he may have stumbled, fell into the open orepass, and the jack was thrown to the drift floor. The jack weighed 41 pounds. Visibility at the dump was good. However the track in front of the dump was slippery and uneven and could have caused him to fall.

An inquest was held before Coroner R. G. Davidson, M.D., assisted by Crown Attorney E. C. Burton in the Metal Mines Limited Recreation Hall at 2:00PM 14 June.

The Coroner returned the following verdict:

I find Lawrence Roger Beland the deceased person came to his death at between 1-2 o'clock in the forenoon on the 4th day of June, 1966 at Werner Lake Metal Mines Limited, and that death was caused by accidentally falling down the ore pass from the 450' level to the 1650' level, as a result of slipping in the muck near the edge of the ore pass. Death was due to multiple compound fractures of the skull with traumatic absence of the brain.

It is my opinion that the failure of the deceased to restore planks closing off the ore pass opening contributed to his death. Safety in the mine is satisfactory.

Willroy Mines Limited

No. 21

Bryan Graham Welsh (Canadian, 23, single) was instantly killed when he fell about 370 feet down No. 453 service raise in No. 1 orezone of Willroy Mine at 3:10PM on 23 September. He had worked at Willroy Mines Limited since 12 September and had had 3½ years' previous underground experience.

The No. 1 zone at Willroy is 10 to 15 feet wide, strikes east-west, has a vertical dip, and plunges to the east at about 45 degrees. It is being mined by the sublevel longhole method. The 7- by 7-foot No. 453 service raise was driven at 68 degrees from the Willroy 4th level to surface. Sublevels A to G are at 50-foot intervals. The raise is divided into two compartments with a manway on the east side and a skipslide on the west. There is a tugger hoist on surface and an electrical pullcord signal system with pullcords on the centre post at each landing. A safety cable runs through an eyebolt on the west side across the skip compartment and is fastened with a safety snap to the centre post. When employees are unloading the skip, they are required to fasten the safety cable to their safetybelts.

Benny Scapinello was leader of a four-man longhole loading crew that was preparing a 30,000-ton blast in the vicinity of 453 raise. After lunch on 23 September, Rodger Michaud remained on surface to operate the tugger and to lower 50 cases of dynamite to the working levels. Scapinello sent Welsh to the F sublevel to unload the dynamite. Shortly after 3:00PM Michaud placed the last case of dynamite in the skip with a message telling Welsh that this was the last case. When the skip reached the F sublevel, Michaud received a one-bell signal to stop the skip. Shortly after, he received another one-bell signal directing him to hoist the skip, and it reached surface about 3:10PM.

Benny Scapinello and Allan Grasser were loading on the D sublevel and by 3:10PM were preparing to climb to surface when they heard something falling down the skipslide. On investigating they found a boot on the C sublevel landing. They continued down the raise to the 4th level where they found Welsh at the bottom of the raise. They went to the No. 1 shaft, reported the accident, and obtained a stretcher. Dr. P. S. Lewis met the party on the 4th level and examined the body at 4:10PM. He declared Bryan Graham Welsh dead and stated that death was due to multiple injuries including a fractured skull and broken legs.

After the accident it was found that the last case of dynamite had been taken from the skip and piled with the others. The safety cable had been stretched across the skipway and attached to the centre post. One of Welsh's gloves was found caught on a rockbolt strap in the skip compartment about 40 feet above the F sublevel. The other glove was found at the bottom of the raise. The lens and reflector from his lamp were found on the F sublevel near the skip slide. His hat was on the F sublevel about 10 feet from the slide. There were no eye-witnesses to the accident, but it seems that Welsh had tried to ride the skip to surface and had fallen from the skip as it was being hoisted to surface.

An inquest was held in the Ontario Provincial Police station at Manitowadge at 4:00PM on 28 September, with Coroner R. B. Rowed, M.D., presiding. The verdict of the jury was as follows:

We the Jury find that Bryan Graham Welsh came to his death at 3:10 p.m., September 23, 1966 in 453 Service Raise at Willroy Mine and that death was due to multiple injuries with no blame attached to anyone.

On Surface at Mines (Group 2)

Steep Rock Iron Mines Limited

No. 22

Michael Sebastian Nugent (Canadian, 19, single) crusher operator, was instantly killed at about 10:20AM on 15 August, at the Steep Rock Iron Mines Limited north concentrator when his skull was crushed between a 1200-pound grizzly door and the grizzly framework. Nugent was first employed by Steep Rock Iron Mines Limited on 13 July 1966, and after two days of training had been a crusher operator for 17 shifts.

Ore from the open pits is trucked from the pit crusher to a bin on the north side of the concentrator. The ore from the bin is carried by a pan-feeder and then a wobble-feeder to a 20-inch by 36-inch jaw crusher. A conveyor belt carries the crushed ore from the crusher south to the concentrator. There is a 4-foot 6-inch by 5-foot 4-inch grizzly door between the wobble-feeder and the jaw crusher. This door is hinged on the east side and is raised by a $\frac{3}{8}$ -inch cable from a tigger hoist controlled by the crusher operator. Normally this door is kept open and the ore feeds directly into the crusher. If the operator sees material too large for the crusher coming, he lowers the grizzly door and bypasses the oversize material down a chute on the east side of the grizzly. There is a safety chain that may be attached to the top of the grizzly door when the door is open and the operator is using the tigger cable to remove large pieces of ore that might have stuck in the throat of the crusher.

On the morning of 15 August the shift foreman, B. Modeland, visited the crusher at 9:55AM and checked the operation with Nugent. At 10:30AM Modeland noticed that the crusher was shut down and decided to investigate. He found Nugent dead with his head crushed between the grizzly door and frame work with the door closed in a horizontal position. Nugent's body and legs were hanging down below the grizzly.

The ambulance was called and Nugent's body was removed to the funeral parlour in Atikokan where an autopsy was performed. Death was due to a crushed skull.

There were no witnesses to the accident. A large piece of ore was found in the throat of the crusher with the tugger cable removed from the grizzly door and lowered into the crusher. It can only be surmised that Nugent had shut down the crusher and prepared to remove the piece of ore from the throat of the crusher with the tugger hoist and cable. The safety cable was not attached to the grizzly door. In climbing down he must have used the grizzly door as a ladder, overbalancing it and falling with the door. A 40-pound push is required to start the door falling when it is in an upright position.

An inquest was held in the Atikokan Municipal Building at 1:00PM on 23 August 1966, with Coroner A. B. Adey, M.D., presiding and Crown Attorney A. D. McLennan in attendance. The verdict of the jury was as follows:

We, the jury, say that Michael Sebastian Nugent the deceased person came to his death at 10:20 o'clock in the forenoon on the 15th day of August, 1966 at Atikokan and that the death was caused by carelessness on the part of the employee. Death accidental.

We, the jury, recommend that an auxiliary tugger be installed to carry out the chore of removing boulders, so that the original would not have to be removed from the grizzly, thus insuring a double safety feature (i.e.) a safety chain and tugger cable.

We also recommend that a steel ring be welded in the upper left corner of the grizzly and the present hook replaced with a snap type safety hook.

Willroy Mines Limited

No. 23

Charles Bertram Lawter (Canadian, 57, married) a maintenance repair mechanic, was fatally injured and died at 2:50PM 30 September at the Willecho mine hoistroom. He was working on maintenance of the hoist and presumably slipped or lost his balance and fell toward the revolving drum and projecting bolts on the drum. He had been employed by Willroy Mines Limited since 1 February 1956.

The Ingersoll-Rand P.E.-1 A.C. hoist was installed in November 1963. It is a 72-inch by 54-inch hoist with an internal expanding friction clutch and a manually-operated air-release brake valve with two post-parallel air service brakes.

Lawter, the maintenance hoist-compressor repair mechanic was doing his routine work in the Willecho hoistroom on the afternoon of 30 September. At 2:35PM, Fern Gagnon, the afternoon-shift hoist-operator, saw Lawter talking to the dayshift hoist-operator A. Donohue. Gagnon, after changing clothes, took over the hoist controls from Donohue. He made the routine check of the brakes and clutches of the hoist. In the meantime Donohue left the hoistroom.

The hoist was idle for five minutes, and during this time the underground mechanic E. Collins came and enquired about Lawter. Gagnon replied that he must be there (indicating the compressor end of the hoistroom).

Gagnon received a signal to lower the cage and answered with a two-bell signal. He had started to lower the cage and heard the sound of a falling wrench to his right. Collins yelled to Gagnon to stop. Gagnon stopped the hoist immediately. He was not able to see what was behind the main bearing area because of the large indicator and protective steel plate in front of the drum. Before calling to Gagnon, Collins had seen Lawter in the main bearing area between the hoist motor and the right-hand hoist drum, attempting to push himself away from the moving drum with his right hand. Collins, after the hoist came to a complete stop, found Lawter in the hoist pit with blood flowing from his mouth. Lawter did not speak nor make any sound. Collins ran to the office for medical help.

Dr. R. B. Rowed arrived at approximately 3:30PM, and applied artificial respiration before taking Lawter to the hospital. Lawter died of multiple crushing injuries to the chest.

An inquest was held 5 October at 3:00PM, at the O.P.P. office at Manitowadge with Coroner R. B. Rowed, M.D., presiding, and the verdict of the jury was as follows:

We the jury say that Charles Bertram Lawter the deceased person came to his death at 2:50 p.m. o'clock in the afternoon on the 30th day of September, 1966, at Manitowadge, Ontario, and that the death was caused by accident, due to carelessness of the deceased. It resulted presumably, when the deceased while standing on the main bearing of the hoist lost his balance, and fell between the clutch adjustment bolt and the clutch throw-out shaft, as the hoist drum revolved. No blame can be attached to anyone, but the jury recommends that a procedure be set up whereby the hoist must be locked out of action whenever work is to be done around it; or if such a procedure is already laid down, that it be more strictly enforced.

Metallurgical Works (Group 3)

The International Nickel Company of Canada Limited (Copper Cliff Smelter)

No. 24

Michael Rachkowski (Canadian, 41, married) a skimmer at The International Nickel Company of Canada Limited, Copper Cliff Smelter, received severe burns to his body when struck by molten material that foamed from No. 5 converter, about 3:20PM, on 23 August. Rachkowski died in Toronto General Hospital on 10 September at 9:30AM. He had been employed by the company for 19 years, which included two years apprenticeship on punching and skimming, and the last four years as a qualified skimmer on converters.

No. 5 converter is one of sixteen 13-foot by 35-foot Pierce-Smith nickel converters positioned in-line along the south side of the converter aisle. An 8-foot mouth in the middle of the shell is covered by an electrically-operated hood when in the blowing position. The skimmer's platform is at the east end of the converter with a wing extending on the north side about one-third of the way along the front of the converter. This platform is 13 feet above the converter crane aisle floor, and 3 feet below the central axis of the shell. The platform connects to the puncher's platform that runs in a continuous line along the back of the converters. Stairways lead from the puncher's platform to the ground floor. The control cab for No. 5 converter is situated on the northeast corner of the skimmer's platform. The front, back, and roof are fabricated of steel plate. The front contains a laminated safetyglass window with both sides open. It is primarily a radiant-heat shield and contains a console with levers to control the hood, converter shell rotation, and the amount of air blown through the tuyeres. There is also a safetyswitch that will raise the hood and rotate the shell to a fixed position with the tuyeres clear of the molten bath. This switch is automatic and in an emergency the skimmer can throw the switch and get clear of the area. If this safetyswitch cannot be reached there is a duplicate safetyswitch at the foot of the stairs behind the converter. It is not necessary for a skimmer to remain at the controls should foaming happen. Foaming is caused by there being too much slag in the converter. The air is being blown into slag rather than into molten matte. Usually the bath temperature is about 2300 degrees F. and in order to prevent foaming the oxygen supply should be cut back before reaching this temperature.

Rachkowski had finished a charge of primary bessemer matte at 10:20AM, and had completed casting at 11:20AM. At approximately 11:50AM Rachkowski turned on the matte charging lights on his converter and instructed his puncher, D. Weber, to look after the charging of the converter while he went to the lunch-room to have his lunch. Shortly afterward a ladle of finishing slag from No. 10 converter arrived and the converter boss, T. Miron, made a signal to Weber indicating the contents of the ladle. Weber waved-in the ladle and after it had been dumped he turned off the matte charging lights on instructions from Miron, who wished to have charging of No. 8 converter completed.

Rachkowski returned at 12:15PM and asked Weber why the matte charging lights were off. Weber stated he had turned them off on Miron's instructions and that a ladle of matte had been charged while he had been away. Rachkowski then put the gasburner on, left the converter and went to talk to the skimmer at No. 3 converter. The charge lights were put on again at 2:00PM. Between 2:00 and 2:45PM the converter was charged with four ladles of reverb matte and one ladle of copper converter slag from No. 18 converter. L. Marier, slagboss, signalled to Rachkowski that copper slag was being charged.

Rachkowski commenced the first blow at 2:45PM, using oxygen with the blast air to supply a total of 28 percent oxygen by volume in the blast. At approximately 3:18PM the converter started to foam and molten metal was thrown out of the mouth. Rachkowski was seen by a main aisle craneman to be standing at the east end of the converter near the flux garr gun, from where he ran to the converter control canopy, raised the hood and started to turn the converter off tuyeres. At this point the converter contents were thrown in all directions. Rachkowski attempted to escape along the platform at the east end of the converter, but tripped and fell going down two steps at the south end of the platform. His clothing caught fire and he then got up, crossed the walkway between No. 5 and No. 6 converters and went down the stairs at the west end of No. 6 converter, where he was given first-aid treatment and rushed to Copper Cliff Hospital by ambulance.

Dr. J. Jones and Dr. R. Grosso gave the victim emergency burn treatment and prepared him for transfer to Toronto. He was placed under the care of Dr. A. W. Farmer, a specialist at Toronto General Hospital, but died at 9:30AM on 10 September from third degree burns to over 80 percent of his body area.

An inquest was held before Coroner J. A. Pidutti, M.D., 12 October, with the following verdict returned by the jury:

That Michael Rachkowski, the deceased person, came to his death at 9:30 o'clock in the forenoon on the 10th day of September 1966 at Toronto General Hospital and that the death was caused by approximately 85%-90% burns from the molten metal foaming from the No. 5 converter at the Inco Smelter in Copper Cliff. It is assumed and appears that the molten slag was at a higher than normal degree of heat.

Although his death was accidental there appeared strongly to the Jury that there was a great lack of communication in this circumstance, where the skimmer was not informed of the mix in this particular charge.

The Jury in this case makes the following recommendations:

1. Protection in between the control cab to the instrument panel such as suggested shield or elevated tunnel to be built as soon as possible by each converter. A skimmer or anyone else working on the converter will be protected.
2. An operator *must be* in the main control panel by the Superintendent's office at all times to control fully the oxygen inflow and the excessive temperatures in the converters (each converter). The skimmer must be informed immediately by the operator and/or by the supervisory personnel of any troubles.
3. The safety features, as stated, that were introduced approximately a year ago, pertaining to temperatures in the converters, though it could have possibly been standard practice, must now that they are instituted, be continued.
4. A stricter control of the heat in each converter should be exercised by both the skimmer and supervision.

**The International Nickel Company of Canada Limited
(Iron Ore Recovery Plant)**

No. 25

J. A. Hamilton (Canadian, 23, married) pellet loader, was crushed between the top of a railway hopper car and the bottom of a loading-area door while he was moving the car, loaded with iron ore pellets, on 18 December at about 6:00AM. He died in hospital two hours later. Hamilton had worked for about one year on this operation at the Iron Ore Recovery Plant of International Nickel Company of Canada Limited at Copper Cliff.

Iron ore pellets from the pellet-sintering process are loaded from a bin into standard railroad cars of cross-hopper type. Empty cars are spotted on tracks south of the loading station. They are moved down the two-percent grade one at a time by individual control of the hand brake. In addition to setting the brakes, a rail clamp and wood block are used to hold the car in position on the weighscale under the loading chutes. The car is loaded and the weight is recorded. It is then moved out of the loading area and down the tracks to a marshalling area on the north side.

Large doors weighing approximately 1600 pounds are situated at both ends of the loading area. Each steel-framed wooden door, 18 feet wide by $16\frac{3}{4}$ feet high by $2\frac{1}{8}$ inches thick, moves in vertical side channels and is raised and lowered by two cables attached to drums. A third cable drum on the common driveshaft winds a 1750 pound counterweight. The driveshaft that is positioned above each door, is connected through a speed reducer (of 110 to 1 ratio) to a reversing electric 3-horsepower motor. An electric limit-switch of the revolution-counter type is set to control the upper and lower limit of door travel. This door-raising mechanism is situated on the roof and is exposed to the weather. The push-button door-control switch is situated in the scalehouse. The control is interlocked so that both north and south doors open or close simultaneously. It takes approximately 15 seconds for the doors to open or close.

Arthur Hamilton and John Little were the car loading crew on the 12:00PM to 8:00AM shift, 18 December. Both men were experienced in this work; Little checked and moved cars in, and Hamilton loaded and moved cars out. They had loaded 10 cars by about 6:00AM. Car No. CP-358179 was loaded, and Hamilton activated the doorswitch before going out to move this car. J. Little remained in the scalehouse working on car-loading records. He was joined by a rod mill operator, B. Skiffington, who entered the scalehouse from the pelletizing area in order to complete a pulp density record.

A bitterly cold wind was blowing snow into the north doorway when Hamilton went out to move the car. He removed the car stop, climbed to the brake platform, attached his safetybelt lanyard, and released the brake. The brake wheel was on the north or leading end of the car. He apparently did not notice that the north door had failed to open fully. His back was to the door, and the upper portion of his torso was above the top of car. The partly opened door squeezed him severely against the top of the moving car. Hamilton was doubled over the top of car when it bumped the filled cars. His hardhat had been knocked into the car of pellets. He managed to unhook his safety lanyard, climb down, and walk 175 yards back to the loading area. He rapped on the scalehouse window and then collapsed on the scale pad.

Little and Skiffington hurried out to aid Hamilton, but did not move him when he complained of back injury. He told Little the door did not go all the way

up, when asked what had happened. Skiffington stayed with him while Little phoned the shiftboss, William E. MacKay. First-aid attendants moved Hamilton by stretcher and ambulance to Sudbury General Hospital. He was treated by Dr. R. E. Morgan but died within two hours of ruptured liver and kidneys.

Immediately after the accident, the north door was checked mechanically and electrically. There was nothing obstructing the door movement, but it was found that the electrical relay was heating up and tripping out. This was attributed to the oil thickening in the speed reducer resulting from the overnight drop in temperature to 15°F below zero. An oxy-acetylene torch was then used to heat the speed reducer and the oil, with the result that the door operated normally to fully open and fully closed positions. The oil was then changed to a lighter grade in both speed reducers.

Green signal-lights that will light up only when the doors are fully open have now been installed. No car movement is permitted until the green lights come on. Only a handlever on each door can activate the green signal-lights when the door is fully open. Operating this handlever also cuts off power to the drive motor and, at the same time, places a mechanical stop under the open door.

An inquest was held before Dr. H. P. Cotnam, Supervising Coroner for Ontario, at Sudbury Court House on 15 March 1967. The following verdict was returned by the jury:

That J. A. Hamilton, the deceased person, came to his death at 7:55 o'clock in the A.M. on the 18th day of December 1966, at the Sudbury General Hospital, and that death was caused by shock, extensive haemorrhaging of the liver and kidney. Death was caused by being crushed between the bottom of the north loading door and the top of the ore car. This accident was caused by malfunction of the north loading door. We find this door did not open all the way to the top due to the fact of improper lubrication to the speed reducer.

Recommendations:

1. Lighting directly on doors inside on north door, outside on south door.
2. A definite waiting period before leaving the scalehouse for purpose of dust clearing.
3. Regular cleaning of all lights and reflectors.
4. Better protection and heating for electrical motors and speed reducers.
5. Seasonal inspection on reducers.
6. Proper instruction on operation and safety to be given by supervision to new men.
7. Hastening of safety precaution between the company and the union.

**The Steel Company of Canada, Limited
(Hilton Works)**

No. 26

Harold William De Coste (Canadian, 20, single) employed as a hopper car-unloader at the high-dock by the Steel Company of Canada Limited, Hilton Works, died from extreme shock due to extensive severe crushing injuries received about 3:10AM on 30 June. He was knocked down between the rails and run over by a slow-moving train consisting of four 70-ton hopper cars, while crossing a track in the high-dock haulage yard. He was dragged 93 feet beneath the diesel locomotive, which was pushing the cars along the inside track used as the siding during the lunchbreak. He had been employed by the company from March 1966 until the time of his death, and had worked about three months in the high-dock haulage yard. He had been previously employed elsewhere as a painter and steeplejack.

The Steel Company of Canada Limited, Hilton Works, Hamilton, is a large, complex, and highly integrated steel company operating several main divisions, one of which is the blastfurnace division. The high-dock haulage yard is a relatively small integral part of the whole blastfurnace operations. Essentially

it is a narrow and rectangular elevated marshalling or haulage yard extending over numerous storage bins. There are three standard heavy-gauge parallel tracks used on a three-shift-per-day basis by a four-man crew on each of two Stelco 900HP 135-ton diesel locomotives; these are used to transport, switch, and spot hopper cars filled with coke, stone, or beneficiated materials such as sinter and pellets from a plant source to overtop of designated bins. The crew of six car-unloaders work from the walkway-platforms along each track, opening the car hopper doors to discharge materials into stock bins that make up the burdens of the four operating blastfurnaces. The operating cycle involves about 300 full cars of material each day.

Unloading operations had been routine. About 3:00AM Stelco engine No. 89, pulling eight cars of sinter, arrived along the outside track in the vicinity of Nos. 1, 2, and 4 blastfurnaces. Diak Bowhuis, dockforeman, instructed the fore and aft switchmen, N. Redpath, conductor, and E. Glanville, helper, to spot four sinter cars at the No. 4 furnace sinter bins, then switch the remainder of the train to the inside track No. 148 (passing in front of the lunchroom) and then to park the train on this track about 100 feet beyond the point of crossover. The balance of the train crew, A. Page, engineer, and M. Dockman, fireman, proceeded to carry out the instructions. Similarly, the two crews of two car-unloaders had been instructed by the dockforeman to open the hopper doors of one car and empty the spotted car through the outside track before proceeding to the lunchroom. Work was scheduled so that the car-unloaders and train crew could lunch together. However, while De Coste was walking from the centre walkway across the inside track toward the lunchroom along the normal point of crossover, he was knocked down by the lead car and dragged 93 feet by the slow-moving engine.

When De Coste failed to show for lunch his partner, D. Woods, investigated and found De Coste pinned beneath the diesel locomotive. His hat was found on the sill of the lead car. The first-aid department and security personnel who were immediately summoned, noted no pulse on their arrival. Dr. J. Charters appeared at the scene about 3:30AM, and pronounced the victim dead. Detective Sgt. J. Stribbell investigated the accident for the Hamilton Police Department. A representative of Coroner W. S. T. Connell, M.D., arrived about 4:00AM and ordered removal of the body. Recovery of the victim was delayed until the mobile crane-derrick was permitted by the coroner to lift the locomotive. The body was extricated about 5:00AM, and taken to the Hamilton General Hospital. An examination was performed at the morgue 30 June by Dr. A. Michalski, Assistant Coroner, and Dr. J. Charters. The injuries reported were extensive severe crushing injuries and mutilation. Death was caused by extreme shock due to multiple fractures, severe crushing injuries to the chest, and a fractured pelvis.

There were no witnesses to the accident; however, the results of the investigation permit reasonable deductions. About 3:10AM Harold De Coste and his partner D. Woods completed their assignment and contrary to the company's safe-job procedures they crossed over the drawbars between hopper cars positioned on the centre track to reach the adjoining walkway-platform that was clear of haulage activities. Light readings in the travel area exceeded three times the C.S.A. requirements for street lighting connecting arterial roads with inter-sections. De Coste, leading Woods by about 75 feet, proceeded toward the point of crossover at the end of the 42-inch-high plate barricade or guardrailing. Presumably De Coste was unaware that engine No. 89 was pushing cars on the

adjacent inside track outside the barricade toward the parking area and would collide with him if he unhesitatingly traversed the point of crossover. Owing to the limited visibility, the train crew was also not aware of De Coste's presence. The train was travelling about 4 mph toward the siding. A normal cast was in progress at No. 2 furnace at this time thus raising the noise level from the open snort valve. At the moment that De Coste passed the end of the barricade prior to making a 90-degree right turn over the point of crossover, his vision may have been momentarily reduced if his eyes failed to adapt for the change from above average to average illumination; the change was due to the position of the light fixtures at the turning point. As a result or combination of the preoccupation of lunch time, the victim's failure to stop and look before crossing, the noise background, inattention, and restricted visibility of all parties, the victim was struck down between the rails of inside track No. 148 by the lead hopper car. The train continued 243 feet beyond the point of impact, causing further injuries to the body when it was dragged 93 feet beneath the locomotive along the steel decking.

The following items were approved and have been implemented:

1. The area from the end of the guardrailing, where the accident occurred, to the beginning of the guardrailing east of this point has now had railroad marker posts installed that designate a crossing. Trains stop and then proceed on signal after the switching crew have checked that personnel are not crossing.
2. Switchmen have been re-instructed to continuously precede the lead car of a train when approaching a point of crossover or until the train is halted.
3. The 42-inch-high plate barricade previously used as the guardrailing and windbreak along the centre walkway was replaced with expanded metal for about 20 feet back from the point of crossover.
4. The lighting fixtures previously situated at the end of the barricade and at the point of crossover were relocated following the detailed electrical engineering study of area illumination.
5. High-dock personnel will be identified with fluorescent paint on their hard hats.

An inquest was held 23 August at 4:30PM, in the Wentworth County Court Building, Hamilton, with Assistant Coroner A. Michalski, M.D., presiding, and Assistant Crown Attorney W. E. Bird, Q.C. as legal advisor. The jury returned the following verdict:

We, the jury, say that Harold William De Coste, the deceased person came to his death at 3:10 A.M., in the forenoon, on the 30th day of June, 1966, at Hamilton, Ontario, at the High Dock Haulage Yard, Stelco, and that death was caused by multiple crushing of the body in head, chest and pelvic regions. The deceased came into contact with Engine No. 89, Track No. 148, as a result of his lack of caution on crossing at a designated cross-walk area.

Recommendations:

That a switchman be assigned to a lead car until the train unit is stopped, and the recommendation of Mr. Hughes be implemented.

Clay, Shale, Sand and Gravel Pits (Group 5)

Kam Aggregates Limited

No. 27

Pentti Sipila (Canadian, 21, married) was crushed under a front-end loader that he was driving, at approximately 9:00AM, 7 November on Kam property about 19 miles west of Port Arthur. He had been employed as a loader operator since April 1966.

Kam Aggregates Limited produces sand, gravel, and crushed rock from Dawson Road Lots 112, 106, 89, and 13. The plant, shops, and office building are on Lot 112 on the south side of Dawson Road (Highway 17A). An access road joins Highway 17A about 1,000 feet east of the shop area.

At about 8:30AM on 7 November Sipila drove a Caterpillar 944 loader east on the access road to see if the road needed sanding. At 9:20AM Martin Doyle, who was visiting the Kam property, noticed the loader in the creek that runs parallel to and north of the access road. He reported this to Harold Hill, the Kam foreman. Hill found Sipila lying on some boulders beside the creek, 20 feet below the road and about 34 feet north of it. There were no witnesses to the accident. Sipila was taken to St. Joseph's Hospital in Port Arthur where he was examined by Dr. G. E. Steinhoff who pronounced him dead. The autopsy that was performed indicated that death was due to hemorrhaging from severe internal injuries.

The Caterpillar 944 loader has four speeds in each of forward and reverse, two in work range and two in travel range. Power goes to four wheels in work range; travel range has two-wheel drive. Steering is hydraulically boosted, and four-wheel hydraulic brakes are air-actuated. The loader is equipped with a 922 Series B fully enclosed steel cab, windshield wipers, and a defroster fan.

Examination of the tracks made by the loader showed that apparently Sipila had driven as far as Highway 17A, had turned around, and had driven back 750 feet toward the garage before running off the road. Snow was falling at the time, and the roads were slippery. However, examination of the tracks indicated that the loader had not slipped but had been driven gradually closer to the edge of the road until it fell over the embankment. The loader was in driving gear and had been driving downgrade for about 250 feet so that it could have picked up considerable speed. It is also possible that the falling snow impaired Sipila's vision. It appears that the loader landed upside down at the bottom of the embankment on top of Sipila. At this time the cab was crushed and broke away from the loader. The loader then toppled over into the creek.

An inquest was held 22 December, at 4:00PM, in the Court House, Port Arthur, with Coroner F. F. P. Thompson, M.D., presiding and Crown Attorney P. V. Ibbetson in attendance. The verdict of the jury was as follows:

We, the jury, find that Pentti Sipila, the deceased person came to his death at about 8:45 o'clock in the forenoon on the 7th day of November, 1966, at Dawson Lots and that the death was caused by massive internal haemorrhage due to multiple internal crushing injuries. The deceased was operating a front-end loader for Kam Aggregates Limited, under bad weather and road conditions when for some unexplained cause it left the roadway and toppled down the embankment into Strawberry Creek. Apparently the deceased fell out of the loader and was crushed by the machine.

The jury recommends this private road be widened to permit vehicles to meet and pass each other in safety and that the shoulder along the creek be clearly marked.

Law Construction Company Limited

No. 28

James Stanley Carter (Canadian, 64, married) was fatally injured at 2:57PM 7 August, when the front and rear wheels of a Dodge 4-ton truck ran over him in a gravel pit 5 miles west of Mine Centre on the north side of Highway 11. He died at 2:20PM on 8 August while being flown to Winnipeg.

Carter had been employed by Law Construction Company since 17 June as grade foreman, and as helper on the crushing operation. He was reported to have worked on highway construction most of his life. Law Construction Company were paving contractors for 38.69 miles of paving in the Mine Centre area under Ontario Department of Highways contract No. 66-19. A portable crusher was being used in the gravel pit to crush boulders and provide material for the paving contract.

On 7 August Carman Weise, driving a Dodge 4-ton truck, was trucking crushed rock from the crusher to a stockpile about 500 feet from the crusher. After dumping a load on the stockpile shortly before 3:00PM, he found that his rear wheels had sunk into the soft brow, and help was needed to move his truck. An Allis-Chalmers front-end loader was brought from the crusher area and placed in position in front of the truck. Carter crawled under the truck to attach the towchain, and the truck was pulled to firm ground. Carter then got under the truck, removed the towchain, and called out "O.K."

The front-end loader drove away and the truck followed him. As Weise drove away, he felt his rear wheels hit something and stopped his truck. It was found that Carter was still under the truck when he called "O.K." and the front and rear wheels had passed over him. A call was put through to Fort Frances for a doctor and ambulance. In the meantime nurse D. A. Dennis of Mine Centre attended Carter.

Dr. D. C. Harvey arrived at the gravel pit and Carter was taken to La Verendrye Hospital in Fort Frances. Dr. Harvey found injuries to include a fractured left femur, fractured and dislocated pelvis, and multiple chest injuries. On 8 August it was decided to fly Carter to Winnipeg for further treatment. He died during the flight at 2:20PM 8 August with Dr. D. C. Harvey in attendance. The body was returned to the La Verendrye Hospital morgue and an autopsy was performed by pathologist Peter Pan, M.D., of Kenora.

An inquest was held at the Court House in Fort Frances at 7:30PM 28 September, before Coroner W. G. Boyle, M.D., assisted by A. D. McLennan, Crown Attorney. The jury's verdict was as follows:

Stanley Carter the deceased person came to his death at 1 o'clock in the afternoon on the 10th day of August 1966, and that the death was caused by being run over by a truck. No blame attached to any employee. It would appear that a better safety program may have helped to prevent the fatality.

McCarthy Brothers

No. 29

John Patrick McCarthy (Canadian, 54, married) died shortly after 2:00PM on 29 November, from injuries received when he became entangled in the drive-shaft of a screening plant in a gravel pit on lot 17, concession I in Thorah township near Beaverton, Ontario.

McCarthy Brothers, Gamebridge, Ontario, is operated on a partnership basis by three brothers, Frank (manager), Morris, and Stanley McCarthy. The fourth

brother, John Patrick McCarthy, was working for the other three. They do some contracting (mainly excavating), operate a small limestone quarry, and custom-crush material for others. At this particular time they were crushing a stockpile of coarse gravel owned by Mr. Don Dawson who has a lease on the above-mentioned gravel pit that is owned by Mr. Angus Gillespie, R.R. 1, Beaverton, Ontario.

McCarthy Brothers' crushing equipment includes: a 3-yard diesel Michigan front-end loader; a 30- by 30-inch Cedar Rapids impact crusher, powered by 2 International U.D.14 diesel motors; and a 2-deck 4- by 12-foot screening plant, powered by 2 gasoline motors. One of these gas motors, a 22 horsepower Wisconsin V-4, powers the screens as well as the sand conveyor. The other gas motor powers another conveyor, handling the material that passes through the $\frac{3}{4}$ -inch screen and that which is retained on the $\frac{1}{4}$ -inch screen. The oversize is run onto the ground and then re-run through the crusher. The Wisconsin motor is mounted at the rear of the screening plant, 7 feet above the ground on the lower deck of a double-decked cantilever steel frame that also supports the inclined sand conveyor. Power from this motor is transmitted through a combination clutch and speed reducer, thence through a sprocket and chain drive to a double sprocket that is fitted to the eccentric of the screens. From the outer member of the double sprocket, the power continues through a second chain to a fourth sprocket keyed to a cross-shaft mounted in bearings on the top deck of the framework. This cross-shaft, in turn, drives through a second clutch to a fifth sprocket and chain connected to a sprocket on the head pulley of the sand conveyor. Both clutches have handles long enough to be operated from the ground.

On the day of the accident John McCarthy, the victim, was attending to both plants; Stanley McCarthy was operating the loader, and James Brennan was trucking finished materials to stockpiles. Don Dawson was also trucking from this pit for his own business. At noon John McCarthy did some greasing and oiling while the plant was stopped. Brennan last saw John McCarthy walking toward the rear of the screening plant with a quart can of oil in his hand at about 2:00PM. Soon after, Stanley McCarthy was dumping coarse aggregate onto the crusher feeder when he became aware that the screening plant motor was stalled. On closer inspection he found his brother entangled in the $1\frac{1}{2}$ -inch diameter cross-drive shaft between the two bearings that are about $4\frac{1}{2}$ feet apart. Brennan and Dawson hastened to the scene to lend assistance. Dawson drove to the nearest farmhouse to call a doctor. Stanley claimed that John's respiration had stopped by the time he reached him and he must have died very quickly. His head was against the bearing on the motor side and his feet were near the other bearing. Stanley and Brennan had some difficulty releasing John McCarthy, and had to cut away some of the clothing from around the shaft. They lowered him to the ground by using the front-end loader bucket. Dr. H. Ames of Beaverton arrived about 2:20PM and pronounced the victim dead. Coroner K. G. Jardine, M.D., arrived soon after and released the body. Constable D. Fenton, O.P.P., of the Brechin detachment, investigated. Dr. G. Buckely, pathologist, conducted a postmortem at the Soldiers Memorial Hospital in Orillia. Cause of death was attributed to massive pulmonary edema.

No one witnessed the occurrence of the accident, and it is assumed that the deceased was standing either on the frame over the revolving cross-shaft or alongside the motor on the lower deck, and was applying oil to the drive-chains, when he became entangled. The oilcan was found on the ground almost directly under

these drives. It is possible that he either had leaned over far enough for his clothing to get caught in the shaft, or had fallen. An 8-foot steel-rung ladder was found leaning against the lower deck of the frame and almost under the sprocket drive on the end of the cross-shaft. Stanley McCarthy claims he moved this ladder from its normal position on the other side of the plant while rescuing his brother. He also stated that John must have neglected to oil the chains at noon while the plant was shut down, and must have unwisely elected to do so while the plant was running, although the screening plant was running empty and the clutch could have been released without interfering with the operation.

An inquest was held February 21, 1967, at 7:00PM in the Town Hall, Beaverton, with Coroner K. G. Jardine, M.D., presiding. Mr. J. E. Howell, assistant Crown Attorney from Whitby, conducted the inquest. The jury returned the following verdict:

That John Patrick McCarthy, the deceased person, came to his death on the 29th day of November, 1966, in a gravel pit on Lot 17, Concession 1 in Thorah Township, by means of his clothes being caught in the shaft of a machine that was in operation, his body being squeezed against the braces of the machine. We, the jurors, find this to be accidental death with no blame on anyone.

Contract Diamond-Drilling (Group 6)

Morrisette Diamond Drilling Company

No. 30

Philippe Marcoux (Canadian, 46, single) diamond-drill runner was fatally injured at 10:15AM 9 August, in 3051 west drift No. 4 shaft, Noranda Mines Limited (Geco Division) when a drillhead, motor, two bars, and two arms fell on him. He died at 10:25AM 11 August, while being flown from Manitouswadge to Fort William. The aircraft was about 12 miles south of Nipigon at the time of his death.

Morrisette has a crew of 8 to 10 men doing contract drilling in the Geco mine under foreman Sylvio Chartrand. Marcoux had worked for Morrisette at Geco since April 1964 and had been a runner since October 1964.

On the morning of 9 August, Chartrand told Marcoux and his helper, Raoul Morin, to move the drill to a location 460 feet west of No. 4 shaft in 3051 W drift. At this location the drift was 10 feet 2 inches high and 9 feet 4 inches wide. The bars, arms, drill head, and motor were set in position and blocked. Morin proceeded to jack the bars, which were equipped with hydraulic jacks. Morin asked Marcoux if the bars were tight enough and Marcoux said they were. Morin then stepped back to place the bar ratchet and handle at the side of the drift. Marcoux was standing on the west side of the drill and was bending over. At this time the top blocking slipped sideways and the bars, arms, drill head and motor, weighing a total of 510 pounds, fell on top of Marcoux. Morin went to the station for help and with three other men was able to lift the drill off Marcoux. Marcoux told the men that his back was broken and it was decided not to move him until the doctor arrived. Dr. Rowed arrived in 15 minutes and Marcoux was placed in a stretcher and taken to the Manitouswadge Hospital. Dr. Rowed reported that he found fractured spine, fractured ribs, punctured lung, kidney damage, and injury to the spinal cord.

On 11 August Dr. Rowed decided to have the patient flown to a Lakehead hospital with nurse D. MacSween, R.N., in attendance. Marcoux died at 10:25AM (E.D.S.T.) when the aircraft was about 12 miles south of Nipigon. Marcoux's body was taken to McKellar Hospital in Fort William where pathologist D. C. Rayner, M.D., performed a postmortem examination. The postmortem revealed severe internal injuries in addition to those already mentioned.

Following the accident Chartrand, Morin, and others visited the scene of the accident and set up the drill as it was immediately before it fell, and took pictures. The pictures show the blocking above the two bars, consisting of three 5-inch ties across both bars with one 2-inch crossed spacer and three 3-inch crossed spacers above the left bar. Crossed spacers above the right bar consisted of three 2-inch spacers and one 3-inch spacer. There was then a total of 26 inches of blocking above one bar and 24 inches above the other.

An inquest was held on 17 August in the Manitouwadge Police Court with Coroner R. B. Rowed, M.D., presiding. The verdict of the jury was as follows:

We the jury find that Philippe Marcoux the deceased person came to his death at 10:25 E.D.S.T. o'clock in the forenoon on 11th day of August, 1966, at 12 miles south of Nipigon and that the death was caused by multiple injuries received from an accident occurring at 3051 West Drift No. 4 Shaft Geco Mine at 10:15 A.M. on August 9th.

The Jury recommends that larger sized blocking and longer bars be made available.

Accidents for which Employment Figures are Unobtainable (Group 7)

Canadian Bechtel Limited

No. 31

Robert J. Fox (Canadian, 43, married) was fatally injured at 11:10AM 29 March when struck by fragments of a bursting grinding wheel at the Griffith mine. He died in the Margaret Cochenour Memorial Hospital, Cochenour, Ontario at 2:45PM the same day. Fox had been employed by Canadian Bechtel Limited since 1 March 1966 as a compressor operator.

The Griffith mine is at Bruce Lake 30 miles south of the town of Red Lake. The property is under lease by the Steel Company of Canada from Iron Bay Mines Limited. Canadian Bechtel Limited is the prime contractor for Pickands Mather and Company who will operate the mine. At the present time, work is just getting underway and most men are employed in construction of temporary buildings, preparation for foundations, and removal of overburden. At the time of the accident Fox was employed as a compressor operator. His duties consisted of looking after 2 portable 600 cfm Ingersoll-Rand compressors and sharpening bits for 2 Rand Air-Trac drills that were preparing the site for the main crusher. Fox had very little previous experience in this type of work and for several days Steve Karp, Ingersoll-Rand sales representative, had been instructing him in the operation of the compressor, and in the sharpening of bits. For some time previous to the accident, the 2½-inch carbide bits had been sharpened in Balmer-town, because the new grinder owned by Bechtel had been delivered without the proper air-connections. In order to avoid the inconvenience of transporting bits 60 miles every day, Karp volunteered the loan of an old grinder that he had been using for demonstration work for several years. The grinder on loan was a portable Canadian Ingersoll-Rand CV8 airvane type, rated at 3000 rpm. It was

mounted on a 36-inch-high table constructed of 2-inch by 4-inch lumber with a $\frac{3}{4}$ -inch plywood top 36 by 26 inches. The grinder was connected with a 65-foot hose to one of the 600-cfm portable compressors. The only air valve was at the compressor. The grinding wheel used was 8- by $1\frac{1}{4}$ - by $\frac{5}{8}$ -inch vitrified silicon carbide, manufactured in Norway and rated at 3104 rpm. The grinder was not equipped with a guard or workrest.

On the day of the accident, Fox was sharpening bits under Karp's instruction at the crusher site. After several bits had been sharpened, Karp left Fox on his own and went to another part of the property. Shortly after 11:00AM, K. Killan, an engineer working about 100 feet from the grinder, heard a loud "bang". He looked toward the grinder and observed Fox falling backwards to the ground. He immediately summoned help and the company nurse, Miss M. McAteer, R.N., arrived on the scene within a few minutes. Fox was unconscious and had obvious severe head injuries. He was immediately placed in the company ambulance and taken to the hospital at Cochenour. Fox died at 2:45PM the same day. A postmortem was performed later. The cause of death was from severe brain lacerations and fractures of the skull.

On examining the scene of the accident, it was found that the grinding wheel had burst and one of the fragments had struck Fox's helmet just above the left eye. The fragment had pierced the hat and had split it across the top. His goggles also were shattered. The top of the table was severely damaged. A search was made for the fragments of the wheel, and three pieces were recovered about 150 feet from the grinder. An examination of the fragments showed no indication of a fault in manufacturing. The bit being sharpened at the time of the accident was located a few feet away. It showed discoloration due to being overheated during the sharpening; also there were abrasions on the shank as if it had been jammed between the grinding wheel and the top of the table.

A test was made at the scene of the accident under conditions similar to that which existed during the accident. A grinding wheel of the same type was mounted on the spindle and the machine started. This wheel burst after about 20 seconds. Examination of fragments from this wheel showed about 50 percent of the interior of the wheel was discolored; the discoloration may indicate a fault in manufacturing. Two more grinding wheels were tested and they were run for about one minute without bursting. The rpm of the grinder was then checked using two tachometers. Both tachometers registered up to 9000 rpm with the air full-on and 6000 at half throttle. The grinder motor was then dismantled and it was found that the governor was missing, which would account for the over-speed conditions. To date, no one has been able to account for the missing governor. This grinder is obsolete and had been used on many different jobs by several different persons for over 7 or 8 years.

It would appear that the most likely cause of the bursting of the grinding wheel would be a combination of an extreme overspeeding of the wheel and the jamming of the bit between the wheel and the top of the table.

An inquest was held at the Griffith mine at 1:PM, 10 May before Coroner R. G. Davidson M.D., assisted by E. C. Burton, Crown Attorney.

The Coroner's verdict will be given at a later date.

Industrial Mines Installations Limited

No. 32

Edmond Hector Beauchamp (Canadian, 52, married) received head injuries when he fell through the roof of the service building at the Reeves mine of Johns-Manville Mining and Trading Limited in Reeves township at about 11:40AM 11 November. He died in St. Mary's Hospital, Timmins, at 10:50PM 12 November.

Industrial Mines Installations Limited of Schomberg, Ontario, have a contract with Johns-Manville Mining and Trading Limited to dismantle buildings at the Munro mine and re-erect them at the Reeves mine site. The deceased was engaged in re-erecting the buildings at the time of the accident. The service building is a rectangular steel-frame structure measuring 100-feet wide by 240-feet long. The roof is flatly pitched at 1-in-12-inches and rises from both sides to a central longitudinal ridge. Steel rafters on steel columns spaced at 20-foot centres support the roof. Horizontal steel girts spaced at centres of 3 feet 3½-inches are connected to the adjoining rafters. The roof construction consists of sheets of ½-inch-thick corrugated Transite, 117 inches long by 42 inches wide, fastened to the steel girts with Ramset studs. The sheets are placed with the long dimension and the corrugations parallel to the rafters and at right angles to the girts. Each full sheet spans three openings between girts. They are placed butt to butt with no overlap of sheets on the edges or ends. Sheets of Roofinsul, a rigid wood-fibre material 4 feet by 8 feet by 2 inches thick, are fastened to the Transite with woodscrews. Tar and felt paper are then applied over the insulation to waterproof and complete the roofing. Transite is a material manufactured by Canadian Johns-Manville Company. It consists of a mixture of asbestos fibre and cement, the dimensions and thickness of the sheets depending on the requirements of the use to which they are put. In this instance the material was ½ inch thick and heavily corrugated. It has considerable mechanical strength but is brittle and shatters easily.

At the time of the accident, the installation of Transite had been almost completed by I.M.I. employees. A small area at the northeast corner of the roof remained, and that was to be completed the day of the accident. The Roofinsul sheeting was being placed about 60 feet behind the I.M.I. employees, then was being covered with tar and felt paper by employees of Leo Perrier, a roofing contractor, Edmond Beauchamp, Herve Jelbert, William Martin, and Frank Warne, all labourers working for I.M.I., were moving a pile of Transite sheeting from an area just ahead of the roofers to a site near the area still to be covered. Jelbert and Beauchamp had moved several sheets a piece at a time and were returning for the last sheet. Jelbert walked ahead of Beauchamp; he tipped the sheet on-edge and waited for Beauchamp to walk past him to lift the other end. Beauchamp reached the end of the sheet, then turned; but before he started to lift, the Transite under him broke and he fell through the roof a distance of 18 feet 6 inches to the concrete floor below. Augustine Nantel, rigger foreman, was inside the building working close to the spot where Beauchamp landed. When Nantel first heard the noise of pieces of "Transite" falling close to him, he jumped aside, then turned and saw Beauchamp lying on the floor. Nantel went to the construction office outside the service building for a stretcher while Blake Lorenz, construction foreman for I.M.I., who had seen Beauchamp come through the roof, organized aid for the injured man. Beauchamp was placed in a station wagon and Emile Beaudry, stonemason, and Russell Reed, electrician, drove the

47 miles to St. Mary's Hospital in Timmins. Beauchamp was admitted to the hospital at 12:50PM, and was examined by Drs. A. E. Dobson and R. Dymond. He was conscious during the trip but did not seem to know what had happened to him and died of a fractured skull in the hospital at 10:50PM 12 November.

Montgomery Reed, general manager for I.M.I., and Blake Lorenz state that they saw the remainder of the broken sheet of Transite in-place on the roof after the accident and saw Leo Moffett, carpenter foreman, remove the Ramset studs holding the broken sheet to the girts in order to remove it and replace it with a new sheet. They state the broken sheet had definitely been held by seven studs.

Certainly the Transite sheeting is not a safe material on which to walk. The material being used had been salvaged from the roof of the mill at Munro mine. It is possible that some sheets had been damaged during the salvaging operation or in transit. The manufacturer, Canadian Johns-Manville Company, recognizes that the material is brittle and recommends that plank or plywood walkways be placed over the working areas until the 2-inch Roofinsul is fastened in place. There were no walkways on the exposed Transite-sheeted area of this roof. Employees had been cautioned by D. G. Fowler, construction engineer for Canadian Johns-Manville Company, and by Leopold Doggett, superintendent for Industrial Mine Installations Limited, to walk over the rafters and girts only, and not in the centre of panels between them. The safe walkways were marked by the rows of Ramset studs fastening the "Transite" to the roof supports. These studs are easily visible from the top side of the decking. Evidence given at the inquest was that the working area of the roof had been swept clean of snow.

Immediately following the accident instructions were given to establish walkways of 4- by 8-foot sheets of $\frac{3}{4}$ -inch plywood on all travelled portions of the roof; that workmen be instructed to use them at all times and that their use be strictly enforced. This was done.

An inquest was held before Coroner D. Johnston, M.D., in the Township of Mountjoy Municipal Offices at 2:00PM 12 December. The jury returned the following verdict:

We, the Jury, find Edmond Hector Beauchamp, the deceased person, came to his death at 10:30 o'clock in the afternoon on the 12th day of November, 1966, at St. Mary's Hospital, Timmins, and that the death was caused as a result of an accidental fall he suffered on November 11, 1966, at approximately 11:45 a.m. while working on a roof of a building erected on the property of Johns-Manville Mining & Trading Company Limited, at Reeves Mine. The jury recommends that when used, doubtful materials are used in building a roof, extraordinary safety precautions should be taken such as first, adequate platforms in order to prevent any falling through materials being installed. Second, adequate warnings of danger involved in installation of roof be given by referring over, making sure every man on the job receives the warnings. So say we all.

Noront Steel Construction Company Limited

No. 33

André Gervais (Canadian, 26, married) boilermaker (pusher) on a small crew for Noront Steel Construction Company Limited was instantly killed on September 24 at 9:15AM, when a steel plate knocked him off the top of a large flue to the concrete floor 35 feet below. The Noront Steel Construction Company Limited was engaged in flue replacement at the Copper Cliff smelter of the International Nickel Company of Canada Limited; Gervais had worked on this job for three months. He had been promoted to pusher or job foreman by Noront Steel on 16 August.

The main flue behind the nickel converters is being renovated by the contractor. It is 17½ feet high by 15 feet wide, with the top of the flue arch 35 feet above floor level. The sides of the flue are vertical and the bottom is V-shaped to form dust hoppers. The crew had completed the renovation work on the section behind No. 6 converter on 23 September. On Saturday morning 24 September, the crew were making preparations that would enable them to start renovation of No. 7 flue section the following week. This work required the transfer of bulkhead plates from their previous position between No. 5 and No. 6 sections to a new location between No. 6 and No. 7 sections.

André Gervais made arrangements with Bob Neal, Converter Department Superintendent, for gas control to the flue so that the bulkhead could be removed and relocated. This was done by skimming and holding down No. 7 converter, charging at No. 4 converter and casting at No. 5 converter. The No. 6 converter directly in front of the Noront Steel crew was shut down for repairs.

The bulkhead plates were removed and stacked on top of the arched roof of the flue at the west end of No. 6 section. André Gervais, as pusher, had placed his crew in various locations. Ed. Belanger was on the tugger hoist set up at ground floor level near the east end of No. 7 flue section. Armand Gervais, André's brother, was in position as signalman on ground level opposite No. 6 flue section where he could see the tugger hoistman and also the crew on top of the flue, 35 feet up. André Gervais took Gerald Talbot as helper to aid him in hooking up and guiding the plates along the top of the flue. Gaetan Belanger was inside the flue to receive the plates at the new location for bulkheading and to place timber bracing. Mike Jackson and Jack Daigle were heating and welding on closure plates to fill the gap between No. 5 and No. 6 flue sections at the previous bulkhead location. Two of the smaller bulkhead plates had been moved without incident. The next bulkhead plate had been attached to the tugger cable and was being shifted ahead off the pile and onto the top of the flue. In some manner it caught and swung around, scraping Talbot's leg and knocking Gervais from the top of the flue. The plate slid down over the arch of the flue and hung at an angle from the tugger cable; the tugger hoist was stopped immediately.

Gervais must have received a violent blow from the plate as he was hurled over the ledge of a brick wall, which at a point twelve feet below is five feet out from the flue. He fell a distance of 35 feet and landed on the concrete floor a further twelve feet out from the base of this wall. He suffered a severe fracture to skull and facial bones, broken right femur, and fracture to both wrists. Gervais was taken to Copper Cliff Hospital by ambulance where he was pronounced dead by Dr. R. Grosso.

On previous occasions, the method of moving bulkhead plates was to lower them to ground level, then to drag them along the floor and hoist them into place at the new location. Why Gervais, on this occasion, decided to make the move along the top of the flue could not be determined. A second tugger hoist cable hooked to the back end has been used to complete the transfer of the balance of the plates. Further transfers will henceforth be along the floor at ground level.

An inquest was held before Coroner J. A. Pidutti, M.D., at the Sudbury Court House on 26 October, with the following verdict from the jury:

That André Gervais came to his death at 9:15 o'clock in the forenoon on the 24th day of September, 1966 at Copper Cliff Smelter and that death was caused by fractured skull as a result of a fall 35' to concrete floor while moving steel plates across the top of a flue.

Recommendations:

We feel that this accident was result of lack of safety precautions by the men and Company involved. We recommend that in the future that Noront Steel institute a safety programme for their employees, also International Nickel Company should see that Contractors working on their property should use the same safety precautions that Inco require from their men.

Ralph M. Parsons Construction Company of Canada Limited

No. 34

Theodore La Rose (Canadian, 33, married) employed as a journeyman pipe-fitter by Ralph M. Parsons Construction Company of Canada Limited, at the site of the Hoyle concentrator of Texas Gulf Sulphur Company Limited since 26 April 1966, was instantly killed at 9:00AM 21 June. The accident occurred when the steel boom of a Pitman Unidyne 11 Turret Hydro-Lift crane against which he was leaning, came in contact with the overhead wires of the 12,500-volt main distribution system.

The powerline crosses the road leading from the main gate to the concentrator building a few feet north of the Parsons office building. It consists of four strands of 1/0 A.C.S.R. (six aluminium and one steel wire per strand) cable stretched from wooden crossarms on wooden poles, 30 feet above the road surface. The four strands (one for each phase plus a grounded neutral) are strung parallel; the spacing being 29½, 34, and 29½ inches between strands.

The owner-operator of the crane, Vernon Matthews, drove the crane to a position almost directly under the powerline on instructions from La Rose, in order to pick up a Hobart portable electric welding machine to move it to another location for the pipefitters. He hoisted the welder onto the platform of his truck and started to drive off, when one of the pipefitters stopped him and asked him to pick up and move a buggy containing a standard oxy-acetylene welding outfit also. Matthews, not being able to reach the buggy with boom retracted, extended the telescoping boom. The crane cable hook was attached to the buggy and Matthews hoisted it. The extended boom made it necessary to raise the boom to bring the load close enough to the truck to be lowered onto it. Matthews knew he was almost under the powerline. When the load was suspended, he looked up to watch the tip of the boom. The boom was in direct line with the sun and could not be seen in the glare. Matthews was operating the controls on the left side of the truck; La Rose was leaning against the right side of the truck while J. Nadeau, pipefitter, and N. Ducharme, electrician's rigger, were standing clear of the truck watching proceedings. The boom came into contact with two of the phase conductors of the powerline. Matthews felt a slight tingle in his hands, saw sparks and heard someone yell. La Rose having taken the full voltage to ground, collapsed against the outrigger that was extended from the truck to steady it. Paul Ferrigan, apprentice pipefitter, who was on the truck jumped to the ground and attempted to pull La Rose clear of the outrigger but received a shock and was thrown clear. Ducharme prevented him from making a second attempt to pull La Rose clear. In the meantime, Matthews realizing what had happened, lowered the boom away from the powerline. La Rose was examined and found to be dead. The voltage to ground of each phase is 7,200 volts.

An inquest was held before Coroner D. Johnston, M.D., in the Whitney

Township Municipal Building, Porcupine, Ontario at 3:00PM 8 July. The jury returned the following verdict:

The Jury states that Mr. Ted La Rose, the deceased person, came to his death at 9 o'clock in the forenoon on June 21, 1966 at the Hoyle Concentrator. Death was caused by electrocution.

We the Jury, strongly recommend that a signal man be provided for this type of work and that the signal man does not leave his post until the job is completed.

Ralph M. Parsons Construction Company of Canada Limited

No. 35

Victor Castonguay (Canadian, 38, married), employed by the Ralph M. Parsons Construction Company of Canada Limited as a mechanic at the site of the Hoyle concentrator of Texas Gulf Sulphur Company Limited since 2 August 1966, was instantly killed when the sectional steel boom of a Link-Belt Model 108B crawler-mounted crane that he was dismantling collapsed and pinned him to the ground at 7:00PM 16 August. He died from multiple crushing injuries to the chest and abdomen.

Castonguay, his partner Max Steinbrunner, mechanic's helper, and William Paananen, hoisting engineer, had been instructed by master mechanic Howard Simpson to shorten the crane boom by removing one section from it. The boom was made up of four sections; the base section was fastened to the frame of the crawler, the two intermediate sections each 20 feet long and the tip section supported the head sheave. The pennant cables were fastened to the outer end of the tip section. One 20-foot section of the boom was to be removed. This involved the removal of the tip section, then the removal of the unwanted section, and finally the reconnecting of the tip section. The sections of the boom are rectangular in cross-section, formed from four pieces of angle iron, one at each corner, connected by zig-zag cross braces. The sections are fastened rigidly together by four steel pins secured in-place with heavy cotterpins. Each of the fastenings is in the form of a short heavy butt hinge, one half of a hinge welded to each corner of both ends of each section. The half hinges match and the steel pins are driven horizontally through the matching halves on adjoining sections to secure them in the same manner as the pin secures the two halves of a butt hinge on a door.

The three men proceeded together out of the shop and into the yard to commence work. Steinbrunner stopped to talk to Brian Cronmiller, time clerk; the other two men walked to the crane. Paananen positioned the crane boom horizontally, then locked the crane control levers, and descended from the crane cab to help Castonguay who had started to build a crib of wood blocking under the boom to support it while it was being dismantled. Steinbrunner was walking toward the crane when he saw Castonguay pick up a heavy machinist's hammer, crouch under the boom at the point where the section was to be disconnected and with two hammer blows drive the tapered connecting pins out of the two bottom fastenings holding the sections together. The boom was suspended from the tip by the pennant lines and from the base by the crane chassis. When the pins were driven out, the lower boom connections opened, owing to the hinge effect of the two top connections, and the boom folded and fell, pinning Castonguay to the ground. The boom could not be lifted by the crane hoist so Steinbrunner ran to a bulldozer parked nearby and used it to lift the boom to release Castonguay. Cronmiller, who had remained in the yard area after talking to Steinbrunner, saw the boom buckle and fall but was not close enough to note Caston-

guay's movements immediately prior to the accident. Paananen was standing beside the boom but was not looking directly at Castonguay. The inevitability of the buckling of the boom if the two pins were removed from the hinge type fastenings between the boom sections should have been evident to the deceased. The reason for his decision to remove the pins before the blocking under the boom was completed is not known.

Castonguay was an experienced mechanic. He had been employed at this type of work and on similar equipment by Mannix Company Limited at Kidd Creek Mine, by Vallee Construction Limited, Timmins, and by Porcupine Equipment Limited, Porcupine, Ontario, for the last five years. William Paananen, the operator, had known and worked with him when he was with these companies.

One explanation is that Castonguay made a mistake and removed the bottom pins when he had intended to remove the two top ones. The removal of the latter two pins before the boom was blocked up is not good practice but it would not necessarily have resulted in the immediate folding of the boom. Two used heavy cotterpins similar to those used to secure the steel hinge pins in-place, were found in Castonguay's pocket. It is not known when he removed them from the boom but Paananen assumes it was while he was securing the controls on the crane prior to leaving the operator's cab.

An inquest was held before Coroner D. Johnston, M.D., in the Municipal Building of the Township of Whitney at 2:00PM on 9 September. The jury returned the following verdict:

We, the Jury, find Mr. Victor Castonguay, the deceased, came to his death around 7 o'clock in the afternoon on the 16th of August, 1966, at Hoyle, Ontario, and that the death was caused by suffocation and crushing of chest and lower body.

We, the Jury, believe this accident was caused by misjudgment on the part of the deceased while dismantling an 80-foot crane boom by removing all bottom pins to break a section in the boom before cribbing to support the length, and weight of the boom was placed into position before lowering the boom to these necessary supports. We understand Mr. Castonguay was an experienced mechanic and in charge of this operation, therefore we attach no responsibility to his Company and fellow workers. We feel that proper safety precautions were ignored.

FIRES

Steep Rock Iron Mines Limited

No. 607

On 21 December, 1965, at 3:50PM in the compressor room at A-2 shaft, the onshift operator noticed the paint blistering on the pulsation damper in the discharge piping of No. 1 compressor.

On inspection of piping, valves, intake, filter, and pulsation damper, the following were observed:

1. Excess carbon deposits on valves, particularly discharge valves.
2. A leaking valve in high pressure discharge.
3. Some dust deposits on intake piping.
4. A dirty intake filter.
5. Deposits in pulsation damper.

These conditions were assumed to contribute to possible burning. The protrusion of the pipe into the pulsation damper vessel would act as a trap if an excess of oil was being delivered to the compressor. It was in this area that the ash was found. Recent stockpiling of fines in this area may have given rise to a higher dust count in the area, and the frequency of filter changing should have been increased. The following report on the deposits that were sent to Imperial Oil for testing confirms the above findings. The oil used in cylinder lubrication was Polar 51.

In conclusion, all piping has been dismantled, cleaned, and re-assembled; intercooler and aftercooler have been cleaned; valves have been cleaned and replaced; filters have been changed; lube oil has been changed to Terresso 52; filter-cleaning frequency has been set up on a weekly basis.

R. B. Berkoff of Imperial Oil Research Department, Sarnia, Ontario, submitted the following report regarding the deposits sent to them from the pulsation damper:

Steep Rock Iron Mines Ltd. operate a CIR 3100 cfm air compressor, 31- $\frac{1}{2}$ x 19 x 14- $\frac{1}{2}$ XVHE, on Polar 51.

The appearance of the deposit received from this compressor was similar to that of red iron oxide. The deposit was present as a powder and as lumps. These lumps consisted of carbon coated with red iron oxide. The carbon was grey in appearance and not unlike metallurgical coke.

The deposit showed the following analysis:

Oil	8.97%
Oxidized Material	5.04%
Carbonaceous Material	53.28%
Sulphated Ash	32.71%

Carbonaceous material is an end product of oxidation. Hence, the sample is essentially an oxidation product along with ash-forming constituents. A spectrographic analysis of the sulphated ash showed it to consist essentially of compounds of iron.

These findings would indicate that the carbonaceous material was formed first, and at some later time it was coated with red iron oxide. The appearance of the carbonaceous material would indicate very high temperatures.

Too much oil to the air cylinder is generally responsible for such deposits. Hence, the rate of the oil-feed should be checked and kept at a minimum.

The large amount of red iron oxide present would indicate very dirty air entering the compressor. The maintenance of the air cleaner should be checked.

It can be assumed that because of the very intermittent use maintenance was minimum. Sludging and dirty intake air resulted in the overheating.

Upper Canada Mines Limited

No. 608

On 6 February, the 3 to 11PM shift smelled smoke on the 3625-foot level, No. 1-x shaft when they arrived there at 3:05PM. An investigation of the levels below this to the 3925-foot level was made without success before checking levels above the 3625-foot level. On the 2500-foot level the smoke was much stronger and it was found that the pump motor was hot and the insulation on the motor-coil had been destroyed.

No other damage had been done and the crews returned to work.

Agnico Mines Limited

No. 609

On 8 February at 11:00AM, a 75 hp motor pump on the 400-foot level was running normally when it suddenly burst into flames. The fire was witnessed;

the power was turned off at the switchbox and the fire was extinguished immediately with a dry-chemical extinguisher.

Damage to the motor amounted to approximately \$800.00. The pump seemed to be in good condition except for a minor amount of water leaking from packing gland.

The cause of the fire was not determined.

Hiho Silver Mines Limited

No. 610

On 17 February at 10:55AM on the first level of the Cleopatra shaft, smoke was noticed issuing from the Mancha Little Trammer; the motorman immediately notified surface.

The electrician, who was at the collar at the time, took the dry-chemical extinguisher to the level and extinguished the flames that had by then started. Owing to the density of the smoke in the vicinity of the station, all men were hoisted to surface until the smoke had been cleared.

Smoke and subsequent flames were caused by wiring from the resistor, through vibration, fraying and grounding on the frame of the trammer. In future, blocking will be installed to prevent contact of wires with the frame.

Aunor Gold Mines Limited

No. 611

At 7:00AM on 18 March the cagetender at No. 2 shaft (previously the Delnite Shaft) noticed smoke on the 2400-foot level. He immediately opened all switches to the 550-volt system and brought the cage to surface where he reported the smoke to S. Thib, senior mine captain.

S. Thib dispatched two trained mine-rescue men equipped with type N masks to the 2400-foot level. There the two mine-rescue men found the pump and motor were cool but the charger for the battery motor was smoking. They closed the switches leading to the charger but it continued to smoke. They then pulled the electrical plug in the battery, and this stopped the smoke. They proceeded to surface and reported to S. Thib that it was safe.

The shift was sent down shortly afterward, as the smoke had been quickly cleared by ventilation.

Subsequent investigation showed the initial cause to be failure of the selenium rectifier. It burned out and caused a short-circuit; this allowed the current from the battery to flow back into the charger, which in turn overheated the current-dropping resistor thus causing the wiring to overheat and smoke.

MacLeod Cockshutt Gold Mines Limited

No. 612

A minor fire occurred on the 6th level at No. 1 shaft on 26 March at approximately 7:00AM.

The cagetender, Ferg Christie, stopped on the 6th level station and noticed smoke coming from a battery locomotive which was being recharged at the station. Upon investigating, he found that the hardwood dividers between

the battery cells were smoldering. Christie immediately used a fire extinguisher to extinguish the smoldering dividers. The electricians who were called stated that the cause was probably a short circuit in the battery box. The battery was taken to surface for a complete overhaul.

Falconbridge Nickel Mines Limited

No. 613

At about 4:45PM 31 March, hot slag from an oxy-acetylene burning operation fell on the wood decking of a trestle carrying tailing fill lines out of the Hardy mill. Two planks started to burn but the fire was put out with an extinguisher.

McIntyre Porcupine Mines Limited

No. 614

At 9:10AM, 1 April, a haulage man was preparing to load a Mancha Trammer on No. 12 shaft cage, 4925-foot level. He had pressed the "deadman control" and when he moved the controller forward he saw smoke and sparks issuing from the control box. The cagetender present called the cagetender on No. 2 conveyance, who brought shiftboss F. Coulas to 4925-foot level. F. Coulas used the fire extinguisher from 4925 pump station to extinguish the smoldering cables.

An electrician was called and he stated that a loose connection had shorted against the steel frame of the motor.

Damage was minor, and the motor was returned to active service in an hour.

Denison Mines Limited

No. 615

At approximately 10:05AM on 12 April the lower scrubber tank on 2816 Unimog started to smoke. Because the tank is completely closed the fire burned itself out.

The Unimog operator stated that he had checked the reserve tank on the Unimog and it was full of water. He did not notice any excessive smoke while travelling to No. 1 shaft garage.

In the investigation it was found that the water could not drain from the reserve tank to the scrubber tank because the hole leading from the reserve tank was clogged with rust.

**The Algoma Steel Corporation, Limited
(Algoma Ore Properties Division)**

No. 616

A fire was discovered in the tertiary crushing plant switchroom of Algoma Ore Properties at 8:20AM on 18 April 1966.

Workmen noticed smoke in the tertiary crushing area, and it was finally traced to the tertiary crushing plant switchroom.

An electrician opened the door and smoke billowed from the room and fire was seen. The fire was fought with hand extinguishers and was out in 10 minutes.

Investigation revealed that the fire started when a rubber sheet over the switchgear came in contact with a hot resistor. The rubber sheeting had been erected over the switchgear to protect it from mud and dirt that falls from the screen floor above. The resistor had heated abnormally when an overload had been caused by two or three attempts made to start up a jammed crusher.

Hollinger Consolidated Gold Mines Limited

No. 617

On Friday 6 May at approximately 6:45AM, smoke was reported coming from the 200-foot level at No. 11 shaft. A five-man team of trained mine-rescue men equipped with Type N masks went to the area at 7:10AM. In the meantime A. K. Graham, superintendent of the mine-rescue station, arrived with the rescue truck and equipment and organized the standby team.

At 7:30AM the first team reported back to headquarters that the smoke had been caused by an overheated battery motor and they had dealt with it by disconnecting the source of power. The miners were allowed to go underground.

An investigation showed that a crew on the graveyard shift, in attempting to re-rail a battery motor, had chained another battery motor to it and in pulling had derailed the second motor. Having been unable to finish the job before the end of their shift, they came to surface leaving the controller in the second position and the power on. This caused the motor grids to overheat and ground to the grid case, with the resultant heat burning a small section of the lead cable.

The damage was limited to about 6 inches of power cable and the motor grids.

Hollinger Consolidated Gold Mines Limited

No. 618

At approximately 1:35PM Monday 9 May an interruption to hoisting service occurred at No. 19 shaft. The electrical inspection had just been finished and the hoist was given over to operation. As the cage was hoisted just above the 1500-foot level, the electrician, who was still in the hoistroom, noticed smoke coming from the 650HP 2200-volt synchronous motor that drives the D.C. generator of the Ward Leonard system. The electrician notified the hoistman and opened the primary oil circuit breaker to allow the M.G. set to come to rest.

Upon first examination it appears that three pairs of stator coils shorted immediately clear of the laminations on the front end. If any fire existed, it was entirely contained and extinguished, without assistance, within the end shields.

This hoist is equipped with a drive on each end, and the D.C. motor was uncoupled while the alternate 500HP A.C. motor was coupled to the opposite end. Hoisting service was resumed at 6:00PM the same day.

Falconbridge Nickel Mines Limited

No. 619

A fire occurred in a rubber belt conveyor in the Hardy mine concentrator at about 7:00PM 25 June. In the newly constructed plant for hardening the

sulphide concentrate balls, the green balls are fed by a natural frequency feeder from the top of the balling plant to a rubber belt shuttle conveyor that feeds to six hardening columns.

On 25 June, a crew employed by Kahkonen Construction Company burned holes in the conveyor supports to install brackets for the stopcord and completed the installation at about 2:30PM. Electricians discovered the belt burning about 15 feet from the bracket at 7:00PM.

Considerable smoke was given off by the burning belt and hampered the firefighters. The fire was extinguished with water.

The shuttle conveyor belt was completely destroyed, and an adjacent belt was partly damaged. The motor-drives and power-cables were also damaged.

**McIntyre Porcupine Mines Limited
(Castle Division)**

No. 620

The McIntyre Castle mine is shut down, and between the Castle and Siscoe properties is a poured concrete bulkhead. The shaft was being maintained to observe the curing of the bulkhead. On Sunday, 26 June there were only two men on the property, a mechanic and a watchman.

At 1:35PM during a violent electrical storm which did considerable damage throughout the district, lightning struck the Capitol shaft hoistroom.

The hoistroom, hoist, and two compressors were completely destroyed. Both hoisting cables were lost, the cage dogged close to surface, and the counterbalance fell to the bottom. All telephones were knocked out, and the main Ontario Hydro substation had the fuses burnt out.

The fire was spotted from a Department of Lands and Forests firetower, and the Lands and Forests sent a fire-fighting crew to the scene immediately. They succeeded in containing the fire to the one building. But for their prompt action, it is conceivable that the whole plant could have been destroyed.

Kidd Copper Mines Limited

No. 621

A fire occurred in the concentrator at the Kidd Copper mine at 1:00PM 27 June, when oxygen and acetylene tanks were being used during installation of mill equipment.

The oxygen and acetylene tanks were standing upright in a hand carriage on the sump floor of the concentrator when flames were seen on the acetylene hose near the valve. A workman turned off the oxygen cylinder valve but could not get near the acetylene cylinder valve before the flames reached the tank. The Roses metal fusible plugs melted and the flames nearly reached the floor above. The large wheeled extinguisher obtained from No. 1 shaft site failed to operate and hand extinguishers were not adequate. The hand carriage was eventually pulled out of the building by means of a rope before any damage had been done to the building.

Rio Algom Mines Limited

No. 622

A small fire occurred in the crusher building at 6:15AM 1 July resulting in the loss of 62 feet of the 30-inch conveyor belt at the Pronto Division of Rio Algom Mines Limited. The fire was confined to the conveyorway at the top of the fine ore bins.

It would appear that a surge of wet muck dropped onto the conveyor and caused slippage at the head pulley. Friction caused the belt to burn through, and one loose end of the belt dropped into No. 2 fine orebin where most of the damage was done.

The sprinkler system put out the fire with the exception of the end of the belt that was hanging in the ore bin. This was quickly quenched with a fire hose.

The fire was extinguished within 15 minutes of detection.

The International Nickel Company of Canada Limited

No. 623

A fire in an underground battery-charging station on the 3200-foot level at the Levack mine occurred on Sunday 3 July.

At approximately 4:45AM, the fireguard discovered a smoking battery on a charging stand in the charging station. He pulled the plug to disconnect the power and proceeded to the fire station on the 3200-foot level to punch his clock. On returning he discovered the main drift filled with dense smoke. He retreated to the lunchroom and phoned the divisional foreman who instructed him to return to the No. 3 shaft deck at once.

Senior supervision and members of the safety department were notified and proceeded to the mine. It was decided to send a team of supervisors with self-contained breathing apparatus and fire extinguishers to evaluate the situation. This crew proceeded to the 3200-foot level where they extinguished the battery fire but in doing so exhausted the extinguishers. Because they feared that the fire would rekindle, they returned to surface, obtained extra extinguishers, and returned to the scene of the fire, this time with McCaa apparatus. The fire was completely extinguished by 8:30AM.

Investigation showed that a broken motor cover support had possibly shorted the cells causing the wood to ignite.

Sherman Sand and Gravel Limited

No. 624

On the morning of 17 July, at approximately 5:30AM, fire broke out in the building housing the electrical starting equipment and switches for various motors in the crushing plant. The alarm was sounded by R. Pinchin, a neighbour, and the Fire Department arrived within minutes. Despite their efforts, the building and equipment were totally destroyed.

The origin of the fire is unknown, but apparently started on an outside corner. The Ontario Fire Marshal's office investigated and were unable to determine the cause, but arson was suspected.

The crushing plant was idle for two weeks while a new building was erected and equipment installed.

Steep Rock Iron Mines Limited

No. 625

A fire occurred at substation G on 22 July. There was a power outage at substation G, which serves the B-1 underground, mechanical shops, gravel plant, and south end of the pit. Investigation showed that the main breakers Nos. 6 and 11 feeding a lineup of 2300V bus and breakers were both off and one yard feeder was off owing to instantaneous trip. A ground was later found to be on another feeder supplying power to the gravel plant. The ground in this case had not blown the cable, but it was evident on ground indicator lights for this area that the feeder bus to breaker No. 12 had been arced across phase to phase and likewise to ground at one spot, but that the arc had been extinguished when breakers Nos. 6 and 11 went off removing power from the indoor bus. On checking the outdoor bus fire and arcing were found at the insulators where the bus went through the wall. The fire was spreading down the side of the substation wall and along the ground. Evidently it was an oil fire caused by oil being blown out of the zig-zag grounding transformer that burnt out owing to the excessive ground currents caused by shorted and grounded bus.

The fire was extinguished and main line airswitch was opened to remove all power from the site; D. Curtis and F. Selkirk proceeded to isolate one 2300 KVA transformer and its bus feeding No. 11 breaker in order to restore power to the system. Breaker No. 12 is the supply to an aircompressor at B-1 hoistroom and it was not operating at time of failure; therefore, the cause of grounding or arcing cannot be attributed to this particular circuit. However, from the nature of the copper burn on the bus to this breaker and the hole in the conduit that would be grounded, it would appear that an animal had tried to cross the structure at this place and started the arc. The ground on the gravel plant feeder and this ground on breaker No. 12 started an excessive arc, phase to phase, through ground, that spread to phase to phase in the bus at breaker No. 12.

The excessive phase to ground current at the fault caused large currents in the zig-zag grounding transformer to burn out the windings and form a gas pressure within the tank, and the tank exploded. The explosion was of such a nature that it expanded the tank and blew the top loose on the side next to the building, thus spraying carbonized oil up against the main transformer bus causing the second bus fault at the outside location.

Agnico Mines Limited

No. 626

At Agnico Mines Limited, 407 Shaft Nipissing Property, on the first level, a pump motor burnt out causing dense smoke above the first level. The fire started at 3:35PM, 8 August.

The pump (230-gpm 3500-rpm, 400-foot head, Ingersoll-Rand) was driven by a 15hp, 60-cycle, 550-volt motor. It had a combination starter.

When smoke was noted on the second level station of Agnico Nipissing 407 shaft property the caretender was notified. He discovered a small fire of electrical origin at a 15-hp motor pump on the first level; this pump is used to pump water to the supply tank on surface.

After shutting off power to the pump he returned to the second level and took the crew from there to surface. Dense smoke, encountered above the first level, made it impossible to bring men up from third level, and they were notified by phone to remain where they were.

The mine-rescue team, equipped with Scott Air Paks, was called out; they travelled by cage to the 1st level and found the fire was out. They opened the ventilation door on the 1st level and thereby quickly cleared the smoke from the pump station and the shaft area. By 4:00PM all men had been hoisted to surface. There were no injuries. Some time was lost, and there was some damage to the pump motor.

A fuse had blown, thus causing a single phase condition that gave a 50 percent overload condition on the other two fuses. The overload relays did not open the contactor because one contact was burnt in. The heat from this burnt contactor probably caused the fuse to deteriorate and blow.

The pump motor was repaired. This whole problem of fuse overheating conditions is now under study by the electrical manufacturers and C.S.A. laboratories.

Upper Canada Mines Limited

No. 627

A fire occurred in the discharge pipe of the No. 1 vacuum pump in the Upper Canada mill on Sunday 28 August.

At 11:50AM, D. Gillis, solution man, noticed smoke coming from the No. 1 vacuum pump discharge pipe. He shut down the pump and reported the smoke to R. Wigmore, mill superintendent. Gillis did not realize that the pipe was on fire. A few minutes later Wigmore inspected the pump, and by this time the paint was blistering on the discharge pipe and it was evident that there was a fire inside the pipe. Water was poured into the pipe and the fire extinguished.

Subsequent inspection of the pump showed that deposits of heavy carbon, or of carbon and lime, had formed around the exhaust valves and had seriously restricted the flow of air and possibly the operation of the valves as well. It is believed that this condition probably created temperature conditions that ignited the carbon.

The practice has been to inspect and clean this pump about once a year. More frequent inspection and cleaning is planned to prevent excessive carbon buildups in the future.

The Algoma Steel Corporation, Limited (Algoma Ore Properties Division)

No. 628

On 28 August a small fire occurred in the M3-343 slusher drift at Algoma Ore Properties at Wawa.

The mechanics had completed a gear change on the 125hp slusher in M3-343 drift and there was a considerable amount of old oil, grease, and cleaning solvent around the millhole. W. Dehmel and J. Dezelak started to slush at 11:30PM on 28 August. At about 2:30AM 29 August Dehmel placed a shot in No. 2 boxhole to blast down a hang-up, and because this boxhole is close to the millhole and slusher, he ran the B-line across the millhole to the blasting line and left the

B-line on the oily muck. The shot was detonated from the electric blasting-box in the usual manner, and when J. Dezelak came up from the M3-342 drift where he was guarding the blast, he saw the oily refuse burning on the drift floor. He immediately put out this small fire with the fire extinguisher from the M3-343 slusher drift.

Madsen Red Lake Gold Mines Limited

No. 629

A Mancha Titan locomotive was being used to tram ore on the 22nd level from 22-16 stope. At 1:00PM 31 August the crew had just dumped a train of ore and were pushing the three empty 3-ton cars back to the chute when the locomotive caught fire. The fire extinguisher was used immediately, then the crew walked back to the station and notified the caretender, mine captain, and electricians. A shiftboss and an electrician went to the scene to investigate and arrived there at 1:30PM.

There was no more fire nor smoke and preparations were made to get the locomotive to the station. The damaged locomotive was hoisted to surface on 1 September and taken apart. The drive gear was found to be chewed up and the gear box completely dry. It would seem that it was the oil in the gear box that caught fire because there was very little damage to the electrical wiring and the electric motor. The crew reported the locomotive as having been very slow on this day.

They did not hear any unusual noise and blamed the poor performance of the locomotive on the battery not being fully charged.

The International Nickel Company of Canada Limited

No. 630

On 5 September at approximately 10:20PM, smoke was noticed coming up No. 7 shaft, Frood-Stobie mine, by a shift electrician. No one was underground at the time. Senior supervision were notified and proceeded at once to the mine. As it was suspected that the fire was of electrical origin the power was shut off to underground. The smoke lessened somewhat but did not cease. It was decided to call out ten mine-rescue men. The mine-rescue station superintendent was also called, and all proceeded to the mine. Five of the mine-rescue men, wearing self-contained breathing apparatus and carrying a cascade system, went underground on the cage and checked the shaft station at each level. Upon reaching 1800-foot level they found smoke in the station and proceeded to the charging station. They found a battery on a charging-stand burning. The fire was quickly put out with extinguishers carried by the men, but a fog nozzle was required afterwards to cool down the heated battery to prevent a further outbreak. The fire was out by 2:30AM, but two of the mine-rescue men remained at the mine to check the area until morning.

On investigation it was found that the automatic cut-off device to turn off the power when the battery was fully charged had failed to operate. Several cells boiled dry and, in heating up, caused the wooden dividers between the cells to ignite.

The International Nickel Company of Canada Limited

No. 631

A small fire occurred in a battery locomotive in 62 crosscut on the 1000-foot level at the Frood mine at 12:10AM on 9 September. The fire was reported to the shiftboss by a trolley switchman. Senior supervision were notified. Shiftboss D. Hutchinson and two men proceeded to 62 crosscut where they found a battery locomotive giving forth heavy smoke. Several fire extinguishers were obtained from the surrounding area and the fire was quickly brought under control. It was necessary, however, to pull the motor out to No. 1 South drift where a fog nozzle was used to finally extinguish the fire burning in the wooden dividers between the cells.

From the investigation, it is suspected that this fire was caused by sabotage, owing to the fact that the motor was found with the directional level in the "ahead" position, the power full-on, and the brakes set. In the interval before the fire was discovered the heavy load on the battery caused overheating that boiled away the water and eventually started the fire.

Domtar Construction Materials Limited

No. 632

A fire was discovered at the Gypsum mine face on 12 September at 10:00AM. A faulty plug on trailing cable caused arcing and a lot of choking smoke.

In the course of routine loading of gypsum rock at the mine face, the Joy loader trailing cable connector at one of the 550-volt junction boxes arced and burned for a period of about five minutes. At least 50 percent of the connector was consumed and practically all of the connecting equipment in the box was charred.

The heavy-duty 3-prong connectors used on the loader trailing cables are standard Joy Quik-Lok type. They appear to be mainly neoprene jacketed. The burning persisted for quite some time as stated above, without opening the breaker at the portable transformer. Doubtless, this was because the power short was, in its early stages, confined to one prong only of the 3-prong connector. The arc apparently burned out the connector, point by point, without setting up a dead short in the line.

The arc burned itself out, harmlessly, but the resulting cloud of brownish-black, acrid, and choking smoke could have had fatal results in a less ventilated and more confined underground space.

The mine foreman, Arnold Brown, and shuttlecar operator, Nelson Parker, in attempting to get to the burning box and connector with a fire extinguisher, were forced to retreat by the dense smoke. Each complained later of some soreness in the bronchial tubes. Shortly after leaving the scene they felt a definite light-headedness.

The supply is 600-volt 3-phase with grounded neutral fitted with Westinghouse Limitamp breakers. They also have ground continuity monitoring that operates the main substation breaker. It seemed extraordinary that nothing tripped. On investigation the reasons were found:

1. The chief electrician was on holiday and he had given verbal instructions that this length of trailing cable was not to be used because one phase plug was badly pitted.

2. In spite of this, the faulty plug was used and got so hot that it melted off the soldered ground connection in the female portion of the plug in the connecting chamber and the grounding became disconnected. This happened before the arcing got so bad that the plug flashed from phase to ground. So the Limitamp ground fault protection did not operate.
3. The ground continuity did not operate because the undervoltage relay on the main substation breaker could not operate owing to the following:
 - A. the plunger was stuck up in the undervoltage relay;
 - B. the undervoltage coil was burned out;
 - C. the fuse on the PT was blown; this would have taken the supply off the continuity control relay rectifier. (This had happened during a thunderstorm a week or so prior to the accident. The breaker tripped, but they were unable to close it, and the undervoltage plunger may have been wedged.)
4. The ground check-system had no test button. One is now being fitted and tested once a week.

The International Nickel Company of Canada Limited

No. 633

A small fire of electrical origin occurred on the 450-foot level at the Murray mine at 12:10AM 5 October. No one was injured, and damage was confined to a locomotive battery.

The fire in the charging station was discovered by a stope crew on their way to the station at quitting time. The charging station is situated in an airlock between two ventilation doors; they found the airlock filled with heavy smoke when they attempted to pass through. Because the level is under positive pressure they retreated, and one of their number proceeded to the 600-foot level where he reported the fire to senior supervision on surface. Mine-rescue men were equipped with breathing apparatus and sent to the 450-foot level. They passed through the airlock and escorted the remaining men in the stope crew to the 600-foot level and from there to surface. The mine-rescue crew then returned to the 450-foot level, pulled the charging plug, and extinguished the fire in the battery which had been on charge.

Investigation indicated that the fire was due to a short circuit in the battery.

**The Algoma Steel Corporation, Limited
(Algoma Ore Properties Division)**

No. 634

A small fire occurred in a compressor at the Sir James mine on 18 October. The shift inspector started the Jaeger rotary compressor as an airbooster at approximately 11:55PM, and then proceeded underground at the Sir James mine. At about 12:15AM 19 October he smelled smoke and noticed a drop in airpressure. He returned to the compressor and, finding it aflame, shut it down at 12:20AM. The flames were extinguished with a twenty-pound dry-chemical fire extinguisher. This compressor had been tested under full load for two hours 18 October and had operated perfectly.

It has been suggested that the compressor was being run with low air-pressure in the receiver, thus resulting in hot dry air being forced through the oil separator, causing it to ignite.

Total damage was confined to the discharge hose and the oilfilter element.

Dome Mines Limited

No. 635

A fire occurred at Dome Mines Limited in No. 7 regrind motor on the mill at 3:45PM 1 November, when the stator lead insulation burned down into the conduit and the wood flooring around the motor caught fire.

No. 7 regrind motor is a 150hp wound rotor 550-volt motor that drives the regrind mill. A wooden floor surrounds the motor and regrind mill and is the working platform.

The operator smelled smoke and on investigation discovered fire in the motor leads as well as in the flooring and joists where the leads came up through the wooden floor in rigid conduit. He and the shiftboss immediately used extinguishers on the fire. The circuit breaker had tripped the motor off, and the mill had been stopped when the fire was discovered. A sprinkler under the floor had also operated, dousing the underside of the floor with water.

Leads from starter to motor, rubber-insulated in conduit, were renewed and two floor joists were renewed.

Heavier damage was prevented by the sprinkler system and by the alertness of the mill operators. It is possible that one motor terminal with a mechanical type connector had worked loose. Also it is suspected that moisture may have been in the conduit from a launder spill earlier in the week. Corrective measures were taken. The connections from the starter to the motor terminals were checked and a new cover was installed over the motor terminals to minimize danger from spill.

Dravo of Canada Limited

No. 636

A fire broke out around 5:45AM, 5 November in the deckman's shack in the International Nickel Company of Canada Limited, Stobie No. 9 headframe, where sinking operations were being carried out by Dravo of Canada Limited. The fire is suspected to have been caused by heat lamps being too close to the burlap that was used as insulation.

Extensive fire damage was caused to the upper half of the headframe timber and to the muck bin, and the fire totally gutted the deckman's shack.

The men from underground got the blaze under control by using the 1½-inch firehose available nearby. The Sudbury Fire Department added a pumper and an aerial ladder truck, and the fire was completely extinguished.

Cleaning up and dismantling of the headframe was started Monday 7 November, and within a week the timbers were replaced. At present the headframe is being enclosed, and normal production is underway.

A boiler is being installed to heat the plant as a preventative measure against the dangers of haphazard heating methods.

Madsen Red Lake Gold Mines Limited

No. 637

An underground fire occurred on 7 November at 10:50AM in the 23-32 stope service raise.

The crew in 23-32 stope had proceeded to move the electric slusher under its own power for backfill preparation. After the slusher had been moved about 3 feet the power kicked out. One man went up the service raise to investigate the power panel. Climbing up the raise, he arrived at a spot about 60 feet above the stope, where the No. 6 neoprene 550-volt cable used to be joined with two plugs. These plugs and approximately five feet of the cable were found burned and still smoking. The raise is upcast and the crew below was not aware of the smoke that had been created. Men working above were driven out of their working places for a short time.

It is assumed that moisture in the plugs was responsible for the short. The cable has been spliced now to prevent any re-occurrence.

The International Nickel Company of Canada Limited

No. 638

A fire broke out at the Creighton mine in the 4800-foot-level charging station at 1:30AM 22 November.

Smoke was noted on No. 6 shaft deck and a report was made to surface. A shift electrician cut off the power to the charging unit and all men above the 4800-foot level returned to the refuge stations. The divisional foreman in charge and the safety engineer investigated and found a charging cable burning. The fire was extinguished and the cable was disconnected from the battery. Damage was confined to the cable.

Investigation indicated that the fire was caused by negligence when a motor crew left a battery locomotive on-charge with the locomotive parked on the cable. The fire started at this point. Work on the redesigning of the charging stations has been going on for some time with a view to ensuring that batteries must be removed from the locomotives and placed on stands before recharging can begin. This work had not begun on 4800-foot level.

Tribag Mining Company Limited

No. 639

A fire occurred at No. 1 boiler in the powerplant building on 22 December.

The fuel line under the gun sprang a leak that ignited and burned for about five minutes before being extinguished. The gun motor and pump, stack limit-switch, pressure gauge, and all wiring were replaced.

The low-water fuel cut-off, the pressure limit, and the safety valve were checked for proper operation and were found to be working properly.

Renabie Mines Limited

No. 640

A fire occurred in the crusherhouse at Renabie Mines Limited on 26 December at 10:20AM.

A mechanic was cutting old bolts from a dillon screen and did not keep a close watch on where they were falling. One hot bolt fell onto the conveyor and set fire to the top covering of belt. The fire climbed into a rubber-lined pebble chute above the belt, a distance of approximately six feet.

The fire was put out at approximately 10:40AM and damage was very small.

The top covering of belt was burned over approximately three square feet; also the rubber lining in the chute was burned for three feet.

DUST AND RADIOACTIVITY

Dust Control in Mines

Semi-annual dust surveys are required at all mines and ore treatment plants except at uranium mines where the surveys are made quarterly. The dust counts in working places are continuing and the records are being made available to the Ontario Department of Mines engineers. The efforts made by the operators to reduce the dust concentrations below the limits prescribed by the American Conference of Governmental Industrial Hygienists is commendable. It is expected that further efforts will lower the dust counts to an even more desirable level.

Radioactivity in Uranium Mines

Although the number of uranium mines has decreased in the past few years, the program of control and the reduction of radioactivity in and at uranium mines has continued. Radiation levels in all working places were measured at regular intervals by the mine staff and recorded. Both the methods used to take the measurements and the records are subject to checks by Ontario Department of Mines engineers. Frequent consultation on the results is held with the staff of the Department of Health.

The levels of radioactivity in mines are controlled by adequate ventilation to the tolerance established by the American Standards Association for radiation protection in uranium mines and mills. In cases where the levels are in excess of the accepted standard, procedures are set up at once to reduce them to the standard or better.

PROSECUTIONS

Regina vs. William Casselman

A charge was laid against William Casselman, an employee of Canada Talc Industries Limited, as follows:

That William Casselman of Madoc, Ontario, on or about the 25th day of November, 1966, did unlawfully enter upon the mining property of Canada Talc Industries Limited under the influence of liquor, contrary to Section 596 of the Mining Act of Ontario.

Casselman was found guilty before Magistrate R. C. Jackson at Madoc on 22 December 1966. A fine of \$10.00 and costs of \$3.50 were imposed and paid.

Regina vs. Joseph Duguay

A charge was laid against Joseph Duguay, an employee at Levack Mine of The International Nickel Company of Canada Limited, as follows:

That Joseph Duguay at the Town of Levack in the District of Sudbury on or about the 24th day of December, 1966, was unlawfully found in an intoxicated condition while upon the property of The International Nickel Company, to wit Levack Mine, contrary to Section 596 of the Mining Amendment Act, 1961-62.

Duguay pleaded guilty before Magistrate W. F. Woodliffe at Sudbury on 12 January 1967. A fine of \$10.00 and costs or 5 days was imposed.

Regina vs. E. Johnson

A charge was laid against Edward Johnson, a hoistman at Dickenson Mines Limited, for violation on 27 May of section 596 of the Mining Act of Ontario which states:

No person under the influence of or carrying intoxicating liquor shall enter a mine or be in the proximity of a working place on the surface or near machinery in motion.

Johnson pleaded guilty. A fine of \$50.00 was imposed. The fine and costs amounting to \$57.00 were paid.

Regina vs. Jacques Henry Laporte

A charge was laid against Jacques Henry Laporte an employee at Creighton Mine of The International Nickel Company of Canada Limited, as follows:

That Jacques Henry Laporte, at the Village of Creighton Mine in the District of Sudbury on or about the 14th day of December, 1966, was unlawfully found in an intoxicated condition on the mining property of the International Nickel Company, to wit: Number 5 Shaft Changehouse, Creighton Mine, contrary to Section 596 of the Mining Amendment Act, 1961-62.

Laporte pleaded guilty before Magistrate W. F. Woodliffe at Sudbury on 9 February 1967. A fine of \$10.00 and costs or 5 days was imposed. The fine and costs totalling \$13.00 was paid.

Regina vs. Joseph Richard Mulligan

A charge was laid against Joseph Richard Mulligan as follows:

That Joseph Richard Mulligan at the Village of Creighton Mine in the District of Sudbury on or about the 6th day of December 1966, was unlawfully found in an intoxicated condition on the mining property of The International Nickel Company of Canada Limited, to wit; No. 3 Dry, Creighton Mine, contrary to Section 596 of the Mining Amendment Act, 1961-62.

Mulligan pleaded guilty before Magistrate W. F. Woodliffe at Sudbury on 7 December, and was fined \$10.00 and costs of \$3.00 or 5 days in jail. The fine and costs totalling \$13.00 was paid.

Regina vs. Sheldon Sherman Thompson

A charge was laid against Sheldon Sherman Thompson as follows:

That Sheldon Sherman Thompson at the Town of Copper Cliff in the District of Sudbury on or about the 21st day of January, 1966, was unlawfully found upon the property of The International Nickel Company of Canada Limited, to wit the Copper Cliff Smelter, while in an intoxicated condition, contrary to Section 596, Part 9 of the Mining Act of Ontario.

Thompson pleaded guilty before Magistrate W. F. Woodliffe at Sudbury on 3 February. A fine of \$10.00 and costs or 5 days was imposed. The fine and costs totalling \$13.00 was paid.

Regina vs. Robert C. Traynor

A charge was laid against Robert C. Traynor an employee at Levack Mine of The International Nickel Company of Canada, Limited, as follows:

That Robert C. Traynor at the Town of Levack in the District of Sudbury on or about the 23rd day of December, 1966, was unlawfully found in an intoxicated condition while upon the property of The International Nickel Company, to wit: Levack Mine, contrary to Section 596 of the Mining Amendment Act, 1961-62.

Traynor pleaded guilty before Magistrate W. F. Woodliffe at Sudbury on 9 February 1967. A fine of \$10.00 and costs or 5 days was imposed. The fine and costs totalling \$13.00 was paid.

MINE RESCUE STATIONS

General

Mine-rescue stations are maintained and operated by the Ontario Department of Mines in the seven major mining areas of the province: Sudbury, Timmins (Porcupine), Kirkland Lake, Elliot Lake, Geraldton (Thunder Bay), Red Lake, and Cobalt. A resident Mine-Rescue Station Superintendent is in charge of each station, except Sudbury, where two superintendents are employed because of the amount of training involved and the extra repairs of delicate equipment.

The following table shows the location and staff of all mine-rescue stations and substations, the number of trainees, and the quantity of breathing apparatus owned and maintained by the Department.

STAFF AND EQUIPMENT OF MINE-RESCUE STATIONS, 1966

RESCUE STATION	SUPERINTENDENT	PIECES OF APPARATUS ²	TRAINEES				Total	
			Active	Trained Supervisors	Apparatus Men ³	Reserve ⁴		
Sudbury ¹	H. G. Moorhouse } J. C. Hallows }	36	210	54	27	...	291	
Levack.....		12	...	...	...	...	...
Falconbridge.....		12	...	...	...	...	...
Kirkland Lake ¹	G. E. Wilson.....	21	34	25	12	...	71	
Kerr-Addison.....		6	...	...	...	...	...
Timmins ¹	A. K. Graham.....	33	110	19	10	4	143	
Elliot Lake ¹	R. Eveson.....	26	91	82	...	16	189	
Algoma Ore Div. (Wawa).....		13	...	...	...	...	...
Renabie.....		12	...	...	...	...	...
Geraldton ¹	A. Wilson.....	16	63	32	...	...	95
Steep Rock.....		13	...	...	...	...	...
Geco-Willroy.....		18	...	...	...	...	...
North Coldstream.....		6	...	...	...	...	...
Red Lake ¹	C. S. Culbert.....	31	62	...	...	...	62
Gordon Lake.....		10	...	...	...	...	...
Cobalt ¹	J. W. Armstrong..	18	29	...	...	5	34
Gowganda.....		12	...	...	...	...	...
Temagami.....		12	...	...	...	...	...
Sifto Salt.....		2	...	19	...	...	19
Canadian Rock Salt.....		2	...	9	...	...	9
			311	599	240	49	25	913

NOTES:

¹Main Stations with respective substations listed beneath.

²Include Drager BG 174 Oxygen Breathing apparatus and Scott Air Paks, 157 additional gas masks.

³Apparatus Men, specialists; e.g.: hoistmen, mechanics, electricians, etc., trained mainly in wearing breathing apparatus.

⁴Reserve Men, those who have completed a course of training, and are used to fill in for absentees at training classes. Available also in emergencies.

Eleven mine-rescue substations are situated in remote areas, or at locations some distance from the main station. At each substation sufficient breathing apparatus and auxiliary equipment is maintained to enable local mine-rescue teams to begin operations in case of a mine fire or other emergency, while additional equipment is enroute from the main station. Former substations at Pickle Crow and McKenzie Island were closed in October 1966, following cessation of mining operations there. Substation equipment from Dome and Hallnor mines was moved to the central station at Schumacher.

Regular training of some 900 men, normally employed underground, is conducted by the Mine-Rescue Station Superintendents. This consists of at least one full day's training every two months in the wearing of various types of breathing apparatus, together with practical experience in gas detection, rescue operations, first aid, and control of underground fires.

The Rescue Station Superintendent prepares his own training problems, and prepares and conducts an annual District Mine-Rescue Competition to select a team to represent his area in the Provincial Mine-Rescue Competition. Every producing underground metal mine in Ontario is required by the Mining Act to provide one or more five-man teams, with the final decision as to the number being the responsibility of the District Engineer of Mines.

The Inspector of Mine-Rescue Training, stationed in Toronto, is responsible for the co-ordination of training and the standardization and inspection of equipment used throughout the province. He is also the liaison, in matters relating to mine-rescue training, between the Ontario Department of Mines and other government or industrial agencies. Upon request, he will conduct Advanced, Supervisory, and Management courses in mine-rescue.

Mine-Rescue Competitions

Seven mine-rescue teams, each representing a different mine-rescue training area, competed in the Provincial Mine Rescue Competition held in June. This was the seventeenth successive year of such competitions.

The Provincial Mine-Rescue Trophy, supplied for annual Competition by the Mine Safety Appliances Company, was presented to the team representing MacLeod-Cockshutt Gold Mines Limited, Geraldton, by the Hon. G. C. Wardrope, Minister of Mines. Cash prizes or other gifts or trophies were presented to all teams winning District Competitions.

A team representing the Agnico mine in the Cobalt District won the Cobalt District Competition, but due to their use of a different type of breathing apparatus, were unable to compete in the Provincial Competition. In 1967 however, it is hoped that a team from Cobalt will be entered in the Provincial Competition.

The table on p. 77 is a summary of the District and Provincial winners for the last seventeen years of competition.

The number of trainees who have passed the required examinations during 1966 and who were granted their certificates and other awards, is shown in the table following:

Rescue Station	Basic Certificate	Standard Seal	Advanced Seal
Sudbury	42	1	..
Timmins	33	28	21
Elliot Lake ¹	18	..	..
Kirkland Lake	7	..	..
Geraldton ²	19	9	4
Red Lake ³	8	4	..
Cobalt	..	..	..
	<hr/> 127	<hr/> 42	<hr/> 25

NOTES

¹Elliot Lake, figures include A.O.D. and Renabie substations.

²Geraldton figures include Steep Rock, Geco and North Coldstream substations.

³Red Lake figures include Pickle Lake and Gordon Lake substations.

The management Course in Mine Rescue was enlarged and continued in 1966 with 9 of the senior staff of Canadian Rock Salt Company attending for the first time. To date 336 senior staff including managers, superintendents, and department heads have taken part in this course since its inception in 1958.

Introduction of the Drager BG 174 Breathing Apparatus to Ontario Mine Rescue Training

During the underground fire at McIntyre Porcupine Gold Mines Limited, in February, 1965, it was realized that under certain circumstances, where one or more winze hoists were necessary in order to permit rescue crews to reach distant underground locations, the present 2-hour breathing apparatus did not provide sufficient reserve time to allow for travelling and for a safety margin on the return trip.

Following a meeting of the directors of the Ontario Mining Association and of the Mines Accident Prevention Association of Ontario, the Department of Mines was asked to conduct a survey of available self-contained breathing apparatus with a duration of four hours protection.

Three types of apparatus, each claimed by the manufacturer to provide protection for four hours, were studied. Results of testing by Government agencies in West Germany, South Africa, and Australia have been accepted as factual. Each of the three apparatus carries its oxygen supply in a two-litre cylinder, compressed to 200 atmospheres. Disposable regenerator cartridges are used, and they too are identical and interchangeable.

It was decided to hold some tests. The determining factor in accepting one apparatus over the others for these tests is the difference in weight of the equipment to be carried. The Drager BG 174 has a total weight, with charged cylinder and regenerator in place, of 27.12 pounds, versus approximately 37 pounds for each of the other two.

Six units of the BG 174 were obtained on loan for these tests. Two types of tests have been carried out: (a) an endurance test, where the apparatus was worn by mine rescue teams while performing continuous work or travel underground for a full four hours; (b) a heat test where the apparatus was worn by mine rescue crews subjected to elevated temperatures, reaching as high as 156 degrees F.

Both series of tests proved satisfactory, and consequently it was decided to retire the McCaa apparatus, which has been adequate for 35 years, and replace it with the new longer-lasting Drager BG 174 equipment.

Two hundred and forty-five units were ordered, together with six high-pressure oxygen transfer pumps capable of producing 3000 psi. At year end all the breathing apparatus had been received and training with it is well under way.

Other new equipment ordered in 1966 included six high-expansion foam generators, powered by a one-cylinder, 6 hp. diesel engine, and capable of producing 5000 cu ft. per minute of stable, wet, high-expansion foam. One will be kept at each of the large rescue stations, and all rescue trainees in the province will receive training in its use.

SUMMARY OF WINNERS OF ONTARIO MINE RESCUE COMPETITIONS, 1950 to 1966

Year	Porcupine	Kirkland Lake	Nickel		Thunder Bay	Cobalt and Gowganda	Red Lake	Elliot Lake and Algoma	Bancroft	Provincial Winner
			Falconbridge	Sudbury						
1950	Pamour	.....	.....	.....	.....	.....	.....	.....	.....	.....
1951	Hallnor	Lake Shore	Falconbridge	.....	.....	.....	.....	.....	.....	Hallnor
1952	Hollinger	Kerr-Addison	Falconbridge	.....	MacLeod-Cockshutt	.....	.....	.....	.....	Hollinger
1953	Aunor	Lake Shore	Falconbridge	.....	MacLeod-Cockshutt	LaRose	.....	.....	.....	Falconbridge
1954	Hollinger	Lake Shore	Falconbridge No. 5	.....	MacLeod-Cockshutt	Agaunico	Cochenour Willans	.....	.....	MacLeod-Cockshutt
1955	Hallnor	Kerr-Addison	Falconbridge No. 5	.....	Steep Rock	LaRose	Cochenour Willans	.....	.....	Kerr-Addison
1956	Dome	Lake Shore	Falconbridge East	.....	Steep Rock	Brady Lake	Campbell	.....	.....	Falconbridge East
1957	McIntyre	Macassa	Falconbridge No. 5	.....	Steep Rock	Silver-Miller	Madsen	.....	.....	Steep Rock
1958	Broulan Reef	Lake Shore	Falconbridge East	.....	Steep Rock	Castle-Siscoe	Campbell	Pronto	Bicroft	Steep Rock
1959	Broulan Reef	Macassa	Falconbridge East	.....	Geco	Langis Silver	New Dickenson	Algom Quirke	Bicroft	Algom Quirke
1960	Hollinger	Macassa	Falconbridge No. 5	.....	Geco	Siscoe	New Dickenson	Helen	Bicroft	Falconbridge No. 5
1961	Hollinger	Macassa	Falconbridge East	.....	Geco	Agnico	Dickenson	Algom Nordic	Bicroft	Algom Nordic
1962	Hallnor	Upper Canada	Hardy	.....	Willroy	Agnico	Cochenour Willans	Denison	.....	Willroy
1963	McIntyre	Macassa	Hardy	.....	MacLeod-Cockshutt	Castle	Cochenour Willans	A.O.P.	Faraday	Algoma Ore Properties
1964	McIntyre	Macassa	Hardy	Levack	Geco	Glen Lake Rix & Tem.	Cochenour Willans	Denison	.....	Cochenour Willans
1965	McIntyre	Upper Canada	Falconbridge East	Levack	MacLeod-Cockshutt	Glen Lake Silverfields	Cochenour Willans	Denison	.....	Denison
1966	Hallnor	Macassa	Onaping	Levack	MacLeod-Cockshutt	Agnico	Campbell	Denison	.....	MacLeod-Cockshutt

ONTARIO GOVERNMENT CABLE-TESTING LABORATORIES

Summary of Rope Tests, 1966

CLASSIFICATION	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
Tests for Ontario mines	24	31	33	11	32	22	31	31	34	31	30	20	330
Special informative tests	12	..	12	..	4	12	..	..	..	..	..	..	40
Tests for wire rope mfr's.	36	21	39	45	32	47	29	31	22	46	38	31	417
Tests for mines outside Ontario	54	52	62	71	63	61	48	38	63	56	72	55	695
Tests for industries other than mining	1	2	2	..	1	6
Other tests
Total	127	104	146	127	133	142	108	100	119	135	140	107	1,488

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