POLLUTION CONTROL DIVISION

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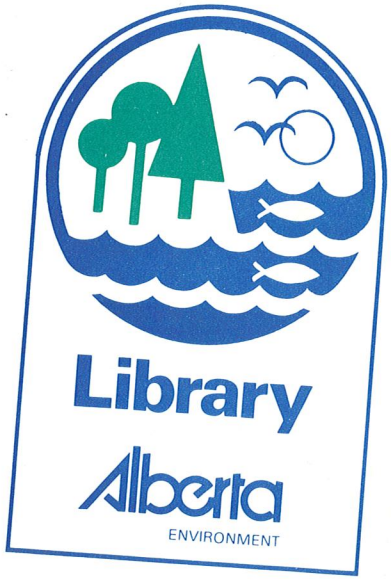
EFFLUENT WATER QUALITY REPORT

CANADIAN SALT COMPANY, LTD.
Lindbergh, Alberta

SAMPLING SURVEY OF
JULY 22-25, 1975

ALBERTA ENVIRONMENT
POLLUTION CONTROL DIVISION
WATER QUALITY CONTROL BRANCH



DATE: January 16, 1976

PREPARED BY:

George A. Scammell
Env. Eng. Tech.

DATE: May 12, 1976

REVIEWED BY:

G.G. Chappell, P. Eng.

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SYNOPSIS

This report summarizes the results of the effluent sampling survey conducted at the Canadian Salt Company Ltd. plant at Lindbergh, Alberta from July 22 to July 25, 1975. The survey was part of the industrial monitoring program of the Water Quality Control Branch, Pollution Control Division.

The sampling survey consisted of identification of all effluent sources, composite sampling of these streams over 3 days, as well as grab sampling of Moosehills Creek upstream of the plant and the raw water intake from the North Saskatchewan River.

Analysis results for the samples taken of the discharges to Moosehills Creek indicated:

1. The Truck Wash effluent was found to contain a mean concentration of 31.9 mg/l of oil and grease and a Most Probable Number Index (MPN) of more than 2,400 for both total and fecal coliforms. The flow was intermittent and too low to be measured.
2. The Dust Collector effluent was found to contain mean concentrations of 24,800 mb/l of sodium chloride and 242 mg/l of non-filtrable residue. The flow was variable averaging 30,000 IGPD.
3. The Block Press effluent was found to contain a mean concentration of 12.7 mg/l of oil and grease, a Most Probable Number Index of more than 2,400 for total coliform and from 32 to more than 2400 for fecal coliform.
4. The Final Process effluent was found to contain mean concentrations of 2,777 mg/l of sodium chloride, 39.2 mg/l of potassium, a Most Probable Number Index of from 350 to more than 2,400 for total coliform and from 23 to more than 2,400 for fecal coliform. The flow was relatively constant at 3×10^6 IGPD providing an average loading of 83,300 pounds per day of sodium chloride to Moosehills Creek.

Examination of data obtained from April, 1972 to March, 1974 indicates that the median concentration of sodium chloride in the North Saskatchewan River increased from 15 mg/l above Lindbergh to 17 mg/l at the Saskatchewan Border. This increase is attributed to the operation of the Canadian Salt Company Ltd. plant.

In view of the report "Preliminary Water Quality Investigations at the Canada Salt Company, Lindbergh, Alberta, 1974" by Mr. R.G. Ruggles, indicating that the plant effluents had a detrimental effect on Moosehills Creek, the following recommendations were made:

Canadian Salt Company Ltd. should be requested to undertake a study to determine alternative disposal methods for the low volume, highly concentrated effluent wastewaters and to determine the feasibility of discharging the final process effluent directly to the North Saskatchewan River rather than to Moosehills Creek. Disposal of excess salt via the process effluent should be discontinued and an alternative disposal method determined.

INDUSTRIAL CATEGORY: Food & Beverages

COMPANY NAME: CANADIAN SALT COMPANY, LTD.

COMPANY ADDRESS: Lindbergh, Alberta

COMPANY PHONE NUMBER: 724-3745

CONTACT: J. D. Williams, K. Palamarek

WATER INTAKE: North Saskatchewan River

WATER DISCHARGE AND TREATMENT:

Source of Stream	Treatment
1. Truck Wash)	Natural retention pond
2. Dust Collector)	(Oxbow of Moosehill Creek)
3. Block Press)	overflows to Moosehill Creek
4. Main Process	None - discharged to Moosehill Creek

Ultimate disposition of waste water is to the North Saskatchewan River.

WASTEWATER CONTAMINANTS:

Sodium Chloride

PRODUCTS:

Salt

PRODUCTION RATE:

360 tons/day

RAW MATERIALS:

Salt

PROCESS:

Multiple stage evaporation of brine to produce salt product.

STATUS OF APPROVAL:

Provincial Board of Health Approval 52-S-1968 February 2, 1970

COMMENTS:

No application for Licence to Operate under The Clean Water Act as of January 16, 1976.

SAMPLING SURVEY:

Date: July 22-25, 1975

Conducted by: D. Dowhaniuk and G. A. Scammell
Water Quality Control Branch

DESCRIPTION OF SAMPLING LOCATIONS:

Location of Sample	Type & Number of Samples	
North Saskatchewan River at Lindbergh - intake water	Grab - 3	
Moosehill Creek - above Canadian Salt	Grab - 3	
Truck Wash Effluent	Grab - 2	
Dust Collector Effluent	Grab - 3	Composite (24-hr) - 3
Block Press Effluent	Grab - 3	Composite (24-hr) - 3
Pond Effluent	Grab - 3	
Final Process Effluent	Grab - 3	Composite (24-hr) - 3

Source of Effluent Streams (see attached map)

Truck Wash Effluent - Periodic overflow from the sump in the truck washing bay of the garage.
- Periodic overflow from septic tank for toilet in shop.

Dust Collector Effluent - Water from dust collector and floor drain.

Block Press Effluent - Water and oil from block press floor drain.
- Overflow from septic tank for the laboratory toilets and showers.

Pond Effluent - Combined water from the truck wash, dust collector, block press and surface runoff.

Final Process Effluent - Process water from barometric condenser for evaporators, overflow from domestic water tank, overflow from septic tank for the office toilet and surface runoff.
- Also spilled salt from storage areas dumped to open process sewer.

PRODUCTION RATE AND VOLUME FLOW RATES FOR SAMPLING PERIOD:

Daily average production rate: 360 tons/day

Daily average volume flow rate of the process effluent: 3×10^6 IGPD

Above figures supplied by Canadian Salt Co., Ltd.

Daily average volume flow rate from the dust collector: 30,240 IGPD

Daily average volume flow rate from the block press : 5,760 IGPD

Above figures are approximate values based on field measurement.

TABLE I

CHARACTERISTICS OF INDIVIDUAL WASTE EFFLUENTS

Sample Location	Parameter	Type of Sample	Mean Concentration mg/l	Mean Loading lbs/day	Mean Loading lbs/ton of Product
TRUCK WASH EFFLUENT	Oil & Grease	Grab	31.9	-	-
	Total Coliform MPN/ 100 ml	"	2,400+		
	Fecal Coliform MPN/ 100 ml	"	2,400+	-	-
DUST COLLECTOR EFFLUENT	Conductivity (us)	Comp. (24-hr)	39,300	-	-
	Chloride	"	15,179	-	-
	Sodium	"	9,692	-	-
	Total Residue	"	27,839	-	-
	N.F.R.	"	242	-	-
BLOCK PRESS EFFLUENT	Total Coliform MPN/ 100 ml	Grab	2,400+	-	-
	Fecal Coliform MPN/ 100 ml	"	32 - 2,400+	-	-
	Oil & Grease	"	12.7	-	-
POND EFFLUENT	Conductivity (us)	Grab	24,730	-	-
	Chloride	"	8,596	-	-
	Sodium	"	5,692	-	-
	Oil & Grease	"	27.6	-	-
	Total Residue	"	14,685	-	-
	Total Coliform MPN/ 100 ml	"	2,400+	-	-
	Fecal Coliform MPN/ 100 ml	"	2,400+	-	-
FINAL PROCESS EFFLUENT	Conductivity (us)	Comp. (24-hr)	5,447	-	-
	Chloride	"	1,733	51,990	144
	Sodium	"	1,044	31,320	87
	Potassium	"	39.2	1,176	3.3
	Total Residue	"	3,300	99,000	275
	Total Coliform MPN/ 100 ml	Grab	350 - 2,400+	-	-
	Fecal Coliform MPN/ 100 ml	"	23 - 2,400+	-	-

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COMPLIANCE WITH APPROVAL

Provincial Board of Health Approval No. 52-S-1968 requires that "any substances with a high toxicity shall be effectively controlled so that none are released to the North Saskatchewan River."

Since no bioassay samples were taken during this survey, the toxicity of the effluent streams could not be determined by actual test.

Evaluation of the chemical analysis results for the effluents indicates that salinity is the major toxicity concern but the concentrations present in these samples would probably not be acutely toxic to rainbow trout.

The high oil and grease concentration of the pond effluent (mean concentration 27.6 mg/l) could become toxic in conjunction with natural low dissolved oxygen values in Moosehills Creek.

Heavy metal analyses could not be performed accurately due to interference caused by the high concentrations of sodium and chloride in the samples.

TABLE II

BACKGROUND DATA ON THE NORTH SASKATCHEWAN RIVER

Maximum, minimum and median values of selected parameters from sample analysis results for the North Saskatchewan River above Lindbergh and at Lloydminster Ferry:

PARAMETER	LINDBERGH (April 1, 1972 to March 31, 1974)			LLOYDMINSTER (April 1, 1972 to March 31, 1974)		
	Max	Min	Median	Max	Min	Median
CONDUCTIVITY µmhos/cm	750	325	380	525	350	400
SODIUM mg/l	15	6	9	19	8	10
CHLORIDE mg/l	11	2	6	14	3	7

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GENERAL REMARKS

The concentrations of sodium chloride in the North Saskatchewan River upstream of Lindbergh were small when compared to the sodium chloride concentrations found in the process effluent. Therefore, the loadings shown in Table I are absolute loadings (include the intake concentrations of sodium chloride).

The sodium chloride loadings from the dust collector and the block press effluents were low when compared to the loadings from the process effluent, however, their concentrations of sodium chloride were much greater than those found in the process effluent. The levels of conductivity were high for these effluents; probably due to the corresponding high sodium chloride concentrations found.

The average loading to the river of sodium chloride was 83,300 lbs/day (based on composite samples) which represents a loss of 231 lbs per ton of product.

The evaporation pans were shut down for repairs and cleaning on July 23, 1975, resulting in a higher concentration of sodium and chloride in the grab sample for that day. This procedure occurs frequently and should be considered as part of normal operation.

The coliform bacteria count in the pond effluent was consistent and higher than that found in the final process effluent which was variable.

RECOMMENDATIONS

In view of the report "Preliminary Water Quality Investigations at the Canada Salt Company, Lindbergh, Alberta, 1974" by Mr. R.G. Ruggles indicating that the plant effluents had a detrimental effect on Moosehills Creek, the following recommendations were made:

1. Canadian Salt Company Ltd. should be requested to undertake a study to determine an alternate method of disposing of the waste water from the truck wash, block press and dust collector.
2. A study should be requested of the Company to determine the feasibility of discharging the final process effluent directly to the North Saskatchewan River.
3. Disposal of excess salt via the process effluent should be discontinued and an alternate method of disposal determined.
4. In future sampling surveys, the following should be considered:
   (a) A bioassay should be conducted to determine toxicity.
   (b) The disposition of domestic sewage from the company housing site should be determined.
   (c) Dilutions should be requested on the bacteriological samples suspected of having high coliform counts.

APPENDIX

TABLE III

CANADIAN SALT COMPANY - LINDBERGH

SPECIAL SURVEY JULY 22-25, 1975

NORTH SASKATCHEWAN RIVER AT LINDBERGH - INTAKE WATER

PARAMETER mg/l	July 23/75 Grab	July 24/75 Grab	July 25/75 Grab	MEAN	MEAN* BACKGROUND LEVEL lbs/day
pH (pH units)	8.1	8.2	8.3	8.2	-
CONDUCTIVITY (µs)	362	349	342	351	-
CHLORIDE	39	16	4	20	600
SODIUM	35	7	24	22	660
POTASSIUM	1.3	1.5	1.2	1.3	39
NITRITE & NITRATE	0.6	0.4	0.2	0.4	12
AMMONIA NITROGEN	< 0.2	< 0.2	< 0.2	0-0.2	0-6
B.O.D.	< 1	2.0	< 1	0.7-1.3	21-39
DISSOLVED OXYGEN	9.5	8.6	8.9	9.0	-
PHOSPHATE, T	0.2	0.4	0.3	0.3	9
T.D.S.	258	197	222	226	6780
OIL & GREASE	2.1	2.5	1.6	2.1	63
N.F.R.	106	56	59	74	2220
SURFACTANTS	0.07	0.11	0.11	0.10	3
TOTAL COLIFORM MPN/100 ml	2400+	920	350	>1220	-
FECAL COLIFORM MPN/ 100 ml	70.0	220	79.0	123	-

* Mean volume flow rate of intake water for lbs/day calculations is 3×10^6 I.G.P.D.

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TABLE IV

CANADIAN SALT COMPANY - LINDBERGH

SPECIAL SURVEY JULY 22-25, 1975

MOOSEHILL CREEK ABOVE CANADIAN SALT CO.

PARAMETER mg/l	July 23/75 Grab	July 24/75 Grab	July 25/75 Grab	MEAN
pH (pH units)	8.1	8.1	8.0	8.1
CONDUCTIVITY (µs)	461	443	435	446
CHLORIDE	29	1	3	11
SODIUM	42	16	6	21
POTASSIUM	2.3	2.7	2.3	2.4
NITRITE & NITRATE	< 0.1	< 0.1	0.1	0-0.1
AMMONIA NITROGEN	0.2	0.3	< 0.2	0.2
B.O.D.	< 1	< 1	1.6	0.5-1.2
DISSOLVED OXYGEN	7.9	8.2	7.0	7.7
PHOSPHATE, T	0.3	< 0.1	0.2	0.2
T.D.S.	304	251	216	257
OIL & GREASE	2.4	4.2	1.6	2.7
N.F.R.	20	27	< 10	16-19
SURFACTANTS	0.18	0.14	0.09	0.14
TOTAL COLIFORM MPN/100 ml	350	250	350	320
FECAL COLIFORM MPN/100 ml	240	13	170	140

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TABLE V

CANADIAN SALT COMPANY - LINDBERGH

SPECIAL SURVEY JULY 22-25, 1975

SAMPLE #1 - TRUCK WASH EFFLUENT

PARAMETER mg/l	July 24, 1975 Grab	July 25, 1975 Grab	Mean
pH (pH units)	7.3	7.7	7.5
CONDUCTIVITY (µs)	900	1920	1410
CHLORIDE	30	165	98
SODIUM	143	342	243
POTASSIUM	27.8	37.0	32.4
NITRITE & NITRATE	<0.1	0.1	0.1
AMMONIA NITROGEN	97.7	45.7	71.7
CHEMICAL OXYGEN DEMAND	607	957	782
PHOSPHATE, T	15.5	32.4	24
TOTAL DISSOLVED SOLIDS	523	962	743
OIL & GREASE	24.0	39.8	31.9
SURFACTANTS	0.62	1.40	1.01
TOTAL RESIDUE	638	1226	932
N.F.R.	104	200	152
N.F.R.F.	12	112	62
HYDROCARBONS	50.715	-	-
TOTAL COLIFORM MPN/100 ml	2400+	2400+	2400+
FECAL COLIFORM MPN/100 ml	2400+	2400+	2400+

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TABLE VI

CANADIAN SALT COMPANY - LINDBERGH

SPECIAL SURVEY JULY 25-25, 1975

SAMPLE #2 - DUST COLLECTOR EFFLUENT

PARAMETER mg/l	July 22-23/75		July 23-24/75		July 24-25/75		MEAN		MEAN* LOADING	
	Grab	Comp. (24-hr)	Grab	Comp. (24-hr)	Grab	Comp. (24-hr)	Grab	Comp. (24-hr)	Grab	Comp (24-hr) (lbs/day)
pH (pH units)	8.2	7.6	8.2	7.7	8.5	7.8	8.3	7.7	-	-
CONDUCTIVITY (µs)	45,000	44,800	25,900	35,000	24,500	38,100	31,800	39,300	-	-
CHLORIDE	17,216	17,265	8,930	14,064	8,565	14,208	11,570	15,179	3,471	4,554
SODIUM	10,000	11,500	4,687	8,375	5,500	9,202	6,729	9,692	2,019	2,908
POTASSIUM	21.9	12.6	6.3	17.3	6.9	11.3	11.7	13.7	3.5	4.1
NITRITE & NITRATE	0.6	0.6	0.5	0.5	0.2	0.2	0.4	0.4	0.1	0.1
AMMONIA NITROGEN	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0-0.2	0-0.2	0-0.1	0-0.1
C.O.D.	571	1,047	828	1,288	1,932	1,932	1,110	1,422	333	427
PHOSPHATE, T	2.7	1.0	2.5	1.4	3.0	13.3	2.7	5.2	0.8	1.6
T.D.S.	28,282	29,169	13,948	23,116	14,303	23,694	18,844	25,326	5,653	7,598
OIL & GREASE	2.4	-	3	-	1.6	-	2.3	-	0.7	-
SURFACTANTS	2.6	3.1	2.6	2.6	1.6	2.6	2.3	2.8	0.7	0.8
TOTAL RESIDUE	28,206	35,724	15,060	24,604	14,188	23,190	19,151	27,839	5,745	8,352
N.F.R.	140	308	98	268	88	150	109	242	33	73
N.F.R.F.	-	256	74	210	62	120	68	195	20	59
TOTAL COLIFORM MPN/ 100 ml	130	-	27	-	140	-	99	-	-	-
FECAL COLIFORM MPN/ 100 ml	31	-	9.3	-	33	-	24	-	-	-

*Mean volume flow rate for loading calculations is 30,240 I.Gal/day.

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TABLE VII

CANADIAN SALT COMPANY - LINDBERGH

SPECIAL SURVEY JULY 22-25, 1975

SAMPLE #3 - BLOCK PRESS EFFLUENT

PARAMETER mg/l	July 22-23/75		July 23-24/75		July 24-25/75		MEAN		MEAN* LOADING	
	Grab	Comp. (24-hr)	Grab	Comp. (24-hr)	Grab	Comp. (24-hr)	Grab	Comp. (24-hr)	Grab (lbs/day)	Comp. (24-hr)
pH (pH units)	7.8	7.5	7.3	7.4	7.1	7.1	7.4	7.3	-	-
CONDUCTIVITY (µs)	855	1710	2290	1225	2000	2900	1715	1945	-	-
CHLORIDE	29	390	586	174	594	778	403	447	24.2	26.8
SODIUM	238	351	413	227	535	578	395	385	23.7	23.1
POTASSIUM	8.1	8.4	42.6	17.8	7.6	15.6	19.4	13.9	1.2	0.8
NITRITE & NITRATE	0.5	<0.1	<0.1	<0.1	0.1	<0.1	0.2	0-0.1	0.01	0-0.01
AMMONIA NITROGEN	1.6	7.5	9.2	14.5	4.9	9.6	5.2	10.5	0.3	0.6
C.O.D.	85	238	202	276	37	331	108	282	6.5	17
PHOSPHATE, T	3.0	0.9	3.0	23.9	2.0	2.9	2.7	9.2	0.2	0.6
T.D.S.	701	935	1302	645	1335	1583	1113	1054	67	63
OIL & GREASE	13.3	-	11.8	-	12.9	-	12.7	-	0.8	-
SURFACTANTS	0.27	0.54	0.34	0.43	0.34	0.5	0.32	0.49	0.02	0.03
TOTAL RESIDUE	414	1052	1222	722	1124	1556	920	1110	55	67
N.F.R.	30	118	64	46	34	60	43	75	2.6	4.6
N.F.R.F.	-	46	-	<10	-	32	-	26-29	-	1.6-1.7
TOTAL COLIFORM MPN/ 100 ml	2400+	-	2400+	-	2400+	-	2400+	-	-	-
FECAL COLIFORM MPN/ 100 ml	2400+	-	2400+	-	32	-	>1610	-	-	-

*Mean volume flow rate for loading calculations is 5,760 I.gal/day

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TABLE VIII

CANADIAN SALT COMPANY - LINDBERGH

SPECIAL SURVEY JULY 22-25, 1975

POND EFFLUENT

PARAMETER mg/l	July 23/75 Grab	July 24/75 Grab	July 25/75 Grab	MEAN
pH (pH units)	7.7	7.4	7.2	7.4
CONDUCTIVITY (µs)	23,800	25,500	24,900	24,730
CHLORIDE	8,203	8,870	8,714	8,596
SODIUM	5,366	5,772	5,937	5,692
POTASSIUM	5.9	9.4	9.3	8.2
NITRITE & NITRATE	0.6	0.2	0.1	0.3
AMMONIA NITROGEN	1.3	0.3	1.5	1.0
C.O.D.	723	1,508	1,325	1,185
PHOSPHATE, T	1.5	0.9	1.3	1.2
T.D.S.	13,810	15,004	14,896	14,570
OIL & GREASE	24.2	40.1	18.6	27.6
SURFACTANTS	1.8	2.3	1.7	1.9
TOTAL RESIDUE	14,408	14,772	14,874	14,685
N.F.R.	164	148	58	123
TOTAL COLIFORM MPN/100 ml	2,400+	2,400+	2,400+	2,400+
FECAL COLIFORM MPN/100 ml	2,400+	2,400+	2,400+	2,400+

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TABLE IX

CANADIAN SALT COMPANY - LINDBERGH

SPECIAL SURVEY JULY 22-25, 1975

FINAL PROCESS EFFLUENT

PARAMETER mg/l	July 22-23/75		July 23-24/75		July 24-25/75		MEAN		MEAN* LOADING	
	Grab	Comp. (24-hr)	Grab	Comp. (24-hr)	Grab	Comp. (24-hr)	Grab	Comp. (24-hr)	Grab (lbs/day)	Comp (24-hr)
pH (pH units)	7.4	7.4	8.1	7.4	8.3	7.5	7.9	7.4	-	-
CONDUCTIVITY (µs)	1700	4290	21,900	6450	3290	5600	8963	5447	-	-
CHLORIDE	413	1407	7,351	2009	1029	1782	2931	1733	87,930	51,990
SODIUM	233	783	4,538	1250	553	1099	1775	1044	53,250	31,320
POTASSIUM	2.2	33.3	111.1	36.9	44.6	47.3	52.6	39.2	1,578	1,176
NITRITE & NITRATE	0.6	0.5	0.6	0.5	0.3	0.2	0.5	0.4	15	12
AMMONIA NITROGEN	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0-0.2	0-0.2	0-6	0-6
C.O.D	47	152	1,069	184	74	46	397	127	11,910	3,810
PHOSPHATE, T	0.5	0.8	0.4	0.4	0.3	0.4	0.4	0.5	12	15
T.D.S.	883	2528	12,556	3728	1965	3083	5135	3113	154,050	93,390
OIL & GREASE	<1.0	-	1.2	-	2.1	-	1.1-1.4	-	33-42	-
SURFACTANTS	0.32	0.65	1.3	0.57	0.32	0.5	0.65	0.57	19.5	17.1
TOTAL RESIDUE	944	2784	12,868	3592	1748	3524	5187	3300	155,610	99,000
N.F.R.	78	156	86	94	<10	64	55-58	105	1650-1740	3,150
N.F.R.F.	62	112	62	80	27	48	50	80	1,500	2,400
TOTAL COLIFORM MPN/ 100 ml	2400+	-	1,600	-	350	-	>1450	-	-	-
FECAL COLIFORM MPN/ 100 ml	2400+	-	23	-	27	-	> 816	-	-	-

* Mean volume flow rate for loading calculations is 3×10^6 IGPD.

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TABLE X

DAILY ABSOLUTE LOADING TO THE NORTH SASKATCHEWAN RIVER

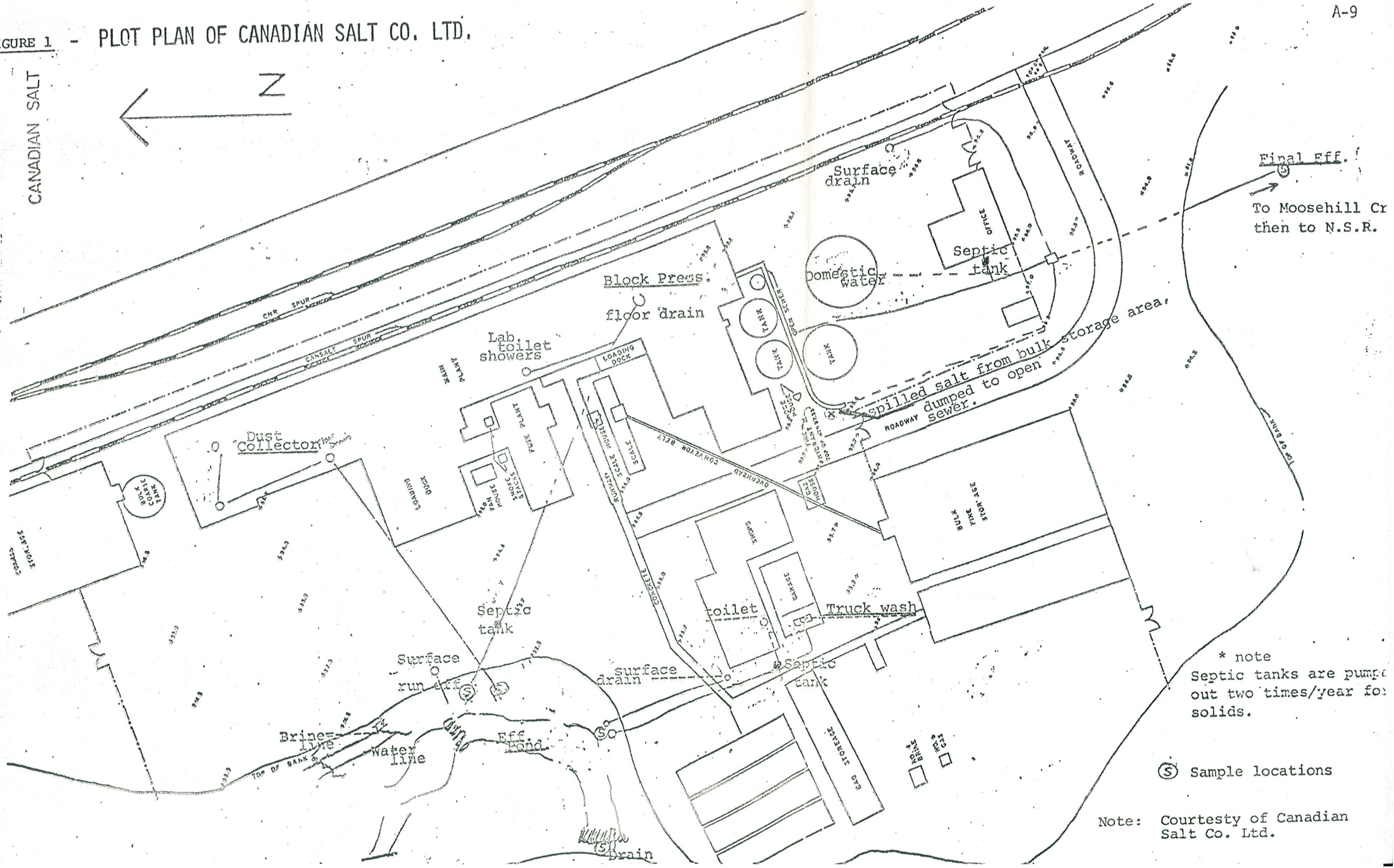
PARAMETER	MEAN LOADING lbs/ton of product	
	Grab Sample	Composite Sample (24 hr)
CHLORIDE	244	144
SODIUM	148	87
POTASSIUM	4.4	3.3
NITRITE & NITRATE	0.04	0.03
AMMONIA NITROGEN	0-0.02	0-0.02
CHEMICAL OXYGEN DEMAND	33	10.6
PHOSPHATE, T	0.03	0.04
TOTAL DISSOLVED SOLIDS	428	259
OIL & GREASE	0.09-0.1	-
SURFACTANTS	0.05	0.05
TOTAL RESIDUE	432	275
N.F.R.	4.6-4.8	8.8
N.F.R.F.	4.2	6.7

Mean Volume Flow Rate: 3×10^6 I.G.P.D.

Daily Average Production: 360 tons/day

ALBERTA ENVIRONMENT
Pollution Control Division

FIGURE 1 - PLOT PLAN OF CANADIAN SALT CO. LTD.

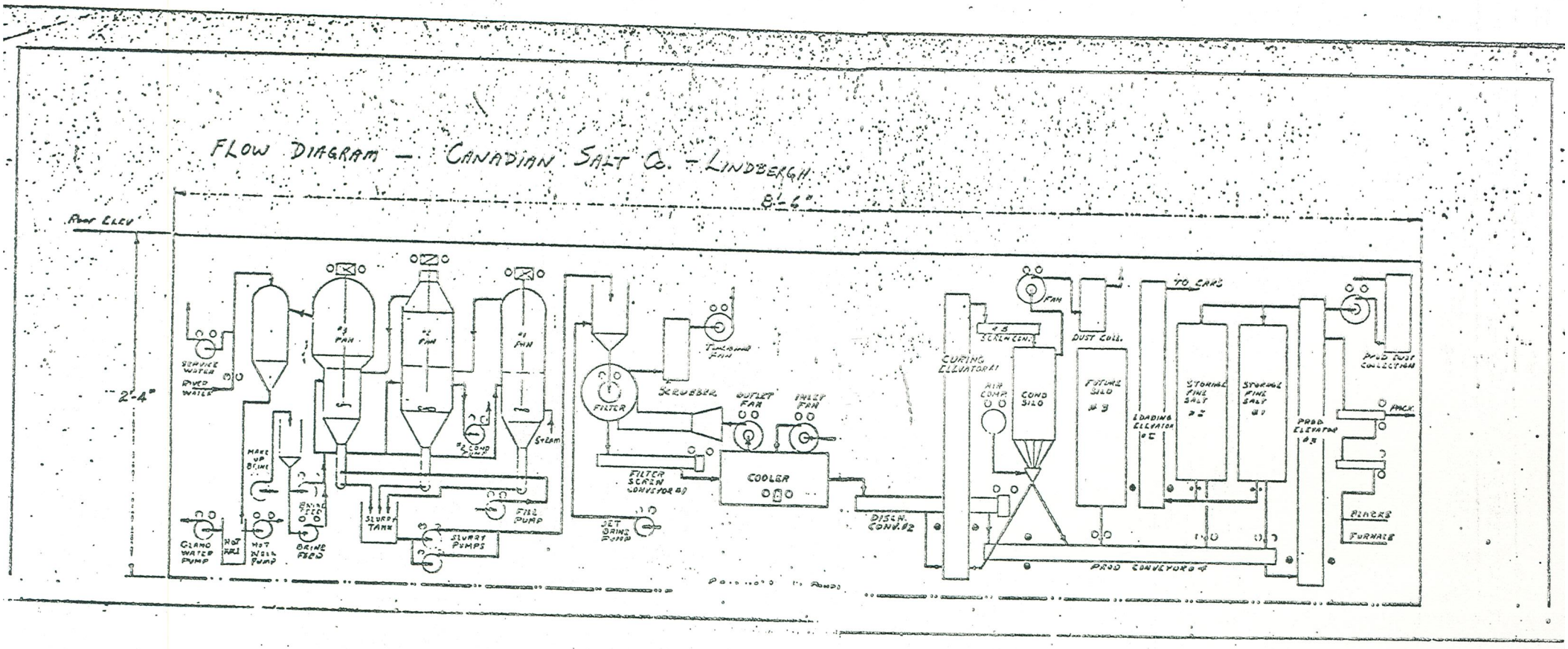


* note
Septic tanks are pump out two times/year fo solids.

Note: Courtesty of Canadian Salt Co. Ltd.

Figure II

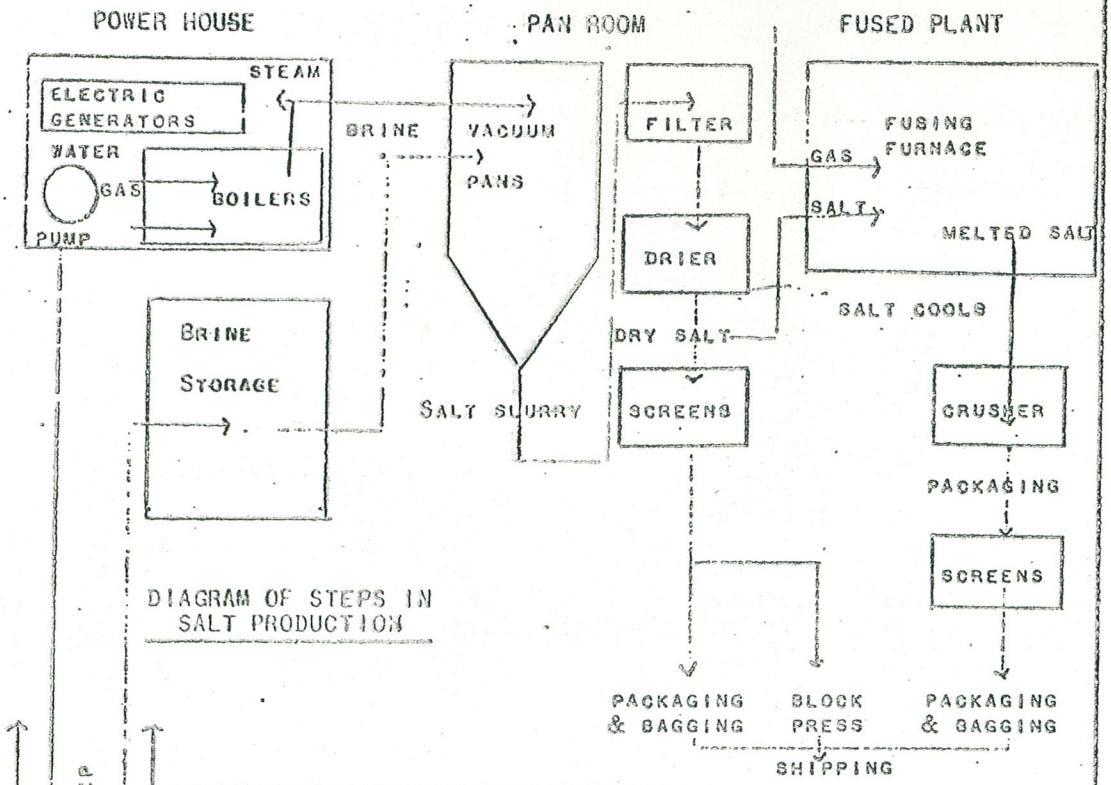
PROCESS FLOW DIAGRAM FOR CANADIAN SALT CO. LTD.



Note: Courtesy of
Canadian Salt Co. Ltd.

Figure III - DATA SHEET FOR CANADIAN SALT CO. LTD.

THE CANADIAN SALT COMPANY LIMITED -- LINDBERGH WORKS



FACTS ABOUT SALT PRODUCTION AT LINDBERGH

THE PLANT WAS BUILT IN 1947 AND PRODUCTION BEGAN FEBRUARY 1948.
50 TO 70 EMPLOYEES WORK AT THE PLANT.
220 TO 240 TONS OF SALT ARE PRODUCED EVERY 24 HOURS.
41 GRADES OF SALT PRODUCT, 6% IS HOUSEHOLD SALT.
SHIPMENTS ARE SENT TO BRITISH COLUMBIA, ALBERTA, SASKATCHEWAN MANITOBA & N.W.T. BY RAIL AND TRUCK.
5 MILLION GALLONS OF WATER PUMPED DAILY FROM RIVER.
200,000 GALLONS OF WATER AT 450 LBS. PRESSURE PUMPED DAILY TO SALT WELLS.
2,000,000 CU.FT. NATURAL GAS PRODUCED BY THE COMPANY'S 8 WELLS IN THE VICINITY ARE USED DAILY.
10,000 KILOWATT-HOURS OF ELECTRICITY PRODUCED DAILY.
1,000,000 LBS. STEAM PRODUCED DAILY IN BOILERS.
BRINE STORAGE CAPACITY IS 400,000 GALLONS.
FUSED PLANT MELTS 120 TONS DAILY AT 1600°F.
800 BLOCKS PRODUCED BY BLOCK PRESS EVERY 8 HOURS.
15,000 CELLOPHANE-WRAPPED 2 LB. CARTONS EVERY 8 HOURS.
EACH BAGGING MACHINE CAN BAG 1000 BAGS EVERY 8 HOURS.
WATER STORED IN 100,000 GAL. SETTLING TANK IS FILTERED, SOFTENED AND CHLORINATED BEFORE USE.
GAS WELLS VARY IN DEPTH FROM 1300 FEET TO 1600 FEET.
GAS WELL PRESSURE OF 300 LBS. IS REDUCED TO 50 LBS. FOR USE IN FUSED PLANT AND 10 LBS. FOR USE IN POWERHOUSE.
THREE SALT WELLS APPROXIMATELY 2700 FT. DEEP ARE IN USE.
SALT BED IS 1000 FEET THICK--ENOUGH FOR CANADA FOR 200 YEARS.
THE PLANT HAD ONE OF THE BEST SAFETY RECORDS IN ALBERTA.

SALT IS BASIC RAW MATERIAL FOR CHEMICAL INDUSTRY, INCLUDING MANUFACTURE OF SOAP, NYLON, GLASS, OILS, AND TARS, MEAT PACKING, CURING, AGRICULTURE, ETC.

COMPANY SALT PLANTS LOCATED AT WINDSOR, ONTARIO; OJIBWAY, ONTARIO; MALAGASH, NOVA SCOTIA; PUGWASH, NOVA SCOTIA; BELLE PLAINE, SASKATCHEWAN; AND LINDBERGH, ALBERTA.

Note: Courtesty of Canadian Salt Co. Ltd.