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LABORATORIES' REPORT ERP/ERL 75-51(IR)

INDEX OF COMMERCIAL FLOCCULANTS - 1974

by

H.A. Hamza and J.L. Picard

"This report relates essentially to the samples as received.
The report and any related correspondence shall not be used
in full or in part for publicity or advertising purposes."

April 1975

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ABSTRACT

The primary aim of this Index is to assist the worker in selecting a broad range of flocculants for laboratory evaluations so as to optimize solid-liquid separation applications: by applying the principle of pre-screening, the number of bench tests required to cover the range can be reduced to a minimum.

Information contained in the tables was acquired from the manufacturers, directly and through technical bulletins, and was supplemented by additional data as reported in the literature or obtained from bench-scale evaluation tests carried out in the Western Research Laboratory.

It is anticipated that a survey of new developments in the industry will be maintained and that periodic revisions of the Index will be issued.

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INTRODUCTION

With the rapidly increasing numbers of new flocculants available from various sources, routine laboratory evaluation for a given application in solid-liquid separation requires a great many man-hours devoted to bench testing and analysis of results. The possibility exists of highly suitable products being overlooked due to the time and costs involved in carrying out a thorough screening within the laboratory. The same would apply if the material were sent to a specific manufacturer for evaluation since it is to be expected that only that firm's particular product(s) would be tested.

This Index was compiled to allow pre-screening for selection of a range of flocculants that would stand the best chances of success according to known characteristics of the system to be treated and known or reported characteristics and capabilities of the flocculants. Pre-screening thus permits a broad spectrum of reagents to be evaluated while reducing to a minimum the number of tests required. This procedure has been checked and employed successfully in the Western Research Laboratory (WRL). It will be noted however, that much information is lacking for some of the reagents listed and in these cases there exists a possibility of overlooking effective flocculation reagents. Supplementary information found in the literature and from results of bench testing in the WRL has been included where possible.

This is the first attempt at an orderly presentation to fulfill the aims mentioned above for the mining and other industries. It is realized that many flocculants have likely been omitted due to oversight and it is hoped that with the cooperation of the manufacturers, periodical updating with revisions and additions will be possible. To this end also, information and suggestions are invited from the reader.

Flocculants in the Index have been listed alphabetically according to manufacturer and trade designation and for present purposes, no distinction has been made between flocculants and coagulants as such. Separate lists of sources and trade names have been included for easy reference. Abbreviations and symbols are explained in a listing immediately preceding the Tables.

The inclusion of any product in this Index does not imply endorsement in any way by the Department of Energy, Mines and Resources, nor does the Department accept responsibility for the accuracy of the data obtained from

the manufacturer.* The information contained herein is intended for laboratory reference only and is not to be used in whole or in part as publicity or advertising matter.

* Please note however that in the existing general economic situation, prices here as elsewhere may be subject to sometimes rapid change and for this reason, some manufacturers declined to quote prices. The approximate flocculant costs given in the tables are probably not those existing at the time of publication and are included only to allow rough comparison.

PRE-SCREENING

Pre-screening procedure employed in the WRL consists essentially of a 3-way match-up of pH of the pulp, desired separation process, and the particular field of application as given in the Tables that follow. This procedure is admittedly open to many refinements which would depend upon having a good understanding of flocculation and upon the degree of familiarity with the flocculants themselves acquired through usage, through characterization in the laboratory, or through information supplied by the manufacturer.

Flocculation is influenced by many factors including pH of the system, solids content, nature of the solids and size distribution, nature of the liquid including dissolved ions, temperature, zeta-potential and others, some of which, may be difficult to define. For this reason, every system is normally considered as being unique for formulating a treatment. For practical purposes therefore, and in the present frame of reference, the simple approach described above is probably quite adequate.

Information headings under "Characteristics", "Process", and "Fields of Application" in the Tables are on the whole self-explanatory. It remains only to point out that due to space limitations, some of these are rather broad in scope: for example "Dewatering" (row 12) is a broad classification which includes filtration, centrifugation, etc. In rows 7 and 8, "Specific Gravity" is given in units g/ml and "Shelf Life" is expressed in months.

LIST OF TRADE NAMES/DESIGNATIONS

Number in parenthesis preceding page no. refers to Sources given in the list immediately following:

Aerofloc (10), 22	Nalco (1), 8, 9
Alchem (1), 8	Nalcolyte (1), 9, 10
Alfloc (1), 2	Natron (21), 39
Alum (2), 11	Pearl Starch (25), 43
Aquafloc (11), 26	PEI (12), 28
Arquad (4), 14	Percol (3), 12, 13
Bozefloc (18), 36	Poly-floc (6), 16
Burtonite (7), 17	Polyhall (26), 44, 45
CA (8), 18	Polymer (6), 16; (28), 47
Cartaretin (24), 42	Polyox (28), 47
Cat-Floc (8), 19	PQ N-Sol (20), 38
Dow Strength Resin (12), 30	Primafloc (23), 41
Duomac (4), 14	Purifloc (12), 28
Ferric Chloride (22), 40	Reagent (10), 24
Ferri-floc (9), 21	Sandofix (24), 42
Flocs (17), 35	Sedipur (5), 15
Gantrez AN (15), 33	Separan (12), 29
Good-Rite (14), 32	SPX (16), 34
Guartec (13), 31	Superfloc (10), 24, 25
Hamaco (25), 43	TR (27), 46
Hercofloc (16), 34	Tydex (12), 30
Jaguar (26), 44	Vinrez (26), 45
Kelco (19), 37	WT (8), 19, 20
Kelgin (19), 37	XD (12), 30
Kelzan (19), 37	
Klar-Aid (11), 27	
M (8), 19	
Magnifloc (10), 22-24	
MRL (26), 44	

LIST OF SOURCES

Source No.

- (1) Alchem Limited, P.O. Box 5002, Burlington, Ont.
- (2) Allied Chemical Canada, Ltd., 100 North Queen St., P.O. Box 55, Toronto, Ont. M8Z 5N3. (Rep. Canada Colors and Chemical Ltd., Toronto, Ont.)
- (3) Allied Colloids (Canada) Ltd., 101 Duncan Mill Road, Don Mills, Ont. M3B 1Z3
- (4) Armour Industrial Chemicals Ltd., 100 University Ave., Toronto, Ont. M5J 1V6
- (5) BASF Canada Ltd., 5850 Cote de Liesse Rd, Town of Mount Royal, Que.
- (6) Betz Laboratories Ltd., 75 Hymus Blvd, Pointe Claire, Que.
- (7) The Burtonite Co., Inc., Nutley, N.J., U.S.A. (Rep. Van Waters and Rogers Ltd.)
- (8) Calgon Canada, 185 Eileen Ave., P.O. Box 69, Station D, Toronto, Ont.
- (9) Canada Colors and Chemicals Ltd., Toronto, Ont.
- (10) Cyanamid of Canada Ltd., 1 City View Drive, Rexdale, Ont.
- (11) Dearborn Chemical Co. Ltd., 3451 Erindale Station Rd, Mississauga, Ont. L5A 2YB
- (12) Dow Chemical of Canada Ltd., Modeland Road, P.O. Box 1012, Sarnia, Ont. N7T 7K7
- (13) General Mills Chemicals, Inc., Tucson, Arizona, U.S.A.
- (14) B.F. Goodrich Chemical Canada, Kitchener, Ont.
- (15) GAF Corporation, New York, Y.Y., U.S.A. (Rep. Chemical Developments of Canada Ltd., 104 Doyon Ave., Pointe Claire, Que.)
- (16) Hercules Canada Ltd., 1980 Sherbrooke St., W., Montreal, Que. (Rep. Harrisons & Crosfield (Canada) Ltd., Toronto, Ont.)
- (17) Hodg International S.A., Inc., Skokie, Illinois, U.S.A.
- (18) Hoechst Chemicals, Montreal, Que.
- (19) Kelco Company, Clark, N.J., U.S.A. (Rep. Charles Tennant & Company (Canada) Ltd., 34 Clayson Rd, Weston, Ont.)
- (20) National Silicates Ltd., P.O. Box 69, Toronto 14, Ont.
- (21) National Starch & Chemical Co. (Canada) Ltd., 2125 Remembrance St., Lachine, Que.
- (22) Pennwalt of Canada Ltd., 700 Third Line, Oakville, Ont.
- (23) Rohm and Haas Canada Ltd., 2 Manse Road, West Hill, Ont., M E 3T9
- (24) Sandoz Colours and Chemicals, P.O. Box 385, Dorval, Que.
- (25) A.E. Staley Mfg Co., Decatur, Illinois, U.S.A.

Source No.

- (26) Stein-Hall Ltd., West Hill, Ont.
- (27) Tar Residuals Ltd., Cheadle Heath, Stockport, Cheshire, Eng.,
(Rep. Bate Chemical Co. Ltd., 160 Lesmill Rd, Don Mills, Ont.)
- (28) Union Carbide Canada Ltd., Toronto, Ont.

EXPLANATION OF ABBREVIATIONS AND SYMBOLS USED IN TABLES

A	= Anionic compound	QAC	= Quaternary Ammonium compound
A/C	= Amphoteric compound	VH	= Mol Wt: 5×10^6 - 15×10^6
ADA	= Alkyl diamine acetate	vh	= very high degree of charge
C	= Cationic compound	VL	= Mol Wt: $< 10^3$
EH	= Mol Wt: $> 15 \times 10^6$	vl	= very low degree of charge
h	= high degree of charge	x	= successful application reported
H	= Mol Wt: 10^5 - 5×10^6	-	= not applicable
IN	= Inorganic	*	= potable water grade available
Ind.	= Indefinite shelf life		
L	= Mol Wt: 10^3 - 10^4	N.B.	a blank indicates information is unknown or unavailable
LI	= Supplied in liquid form		
lo	= Low degree of charge		
MVE	= Methyl Vinyl Ether-Maleic Anhydride co - polymer		
M	= Mol Wt: 10^4 - 10^5		
m	= Medium degree of charge		
N	= Non-ionic compound		
NACS	= Sodium Cellulose Sulfate		
P	= Supplied in powder form		
Pa	= Supplied in paste form		
PA	= Polyamine type		
PAA	= Polyacrylic Acid		
PAC	= Polyacrylate		
PAM	= Polyacrylamide		
PAN	= Polyacrylonitrile		
PEI	= Polyethyleneimine		
PEO	= Polyethylene Oxide		
PS	= Polysaccharide		
PS+	= Modified polysaccharide		
PVP	= Polyvinyl Pyrrolidone		

			ALCHEM LTD.			Alfloc						Nalco			
			Alchem			Alfloc						Nalco			
			600	633 HD	636 HD	4150	4151	4153	4154	4155	8863	82070	603	623	
1	CHARACTERISTICS	Charge	C	A	C	N	A	A	A	A	A	N	C	A	
2		Activity	h	lo	lo	-	vh	vh	vh	vh	vh	-	h	vh	
3		Type	PA		PAM	PAM	PAM	PAM	PAM	PAM	PAM	PAM	PEI	PAM	
4		Mol. Weight			H		H				VH	H	M		
5		Form	LI	P	P	P	P	P	P	P	LI	LI	LI	LI	
6		pH	8.5	7.8	6.8	8.5	8.2	8.2	7.8	7.8	8.2	6.7	6.5	7.2	
7		Sp. Gravity	1.07	0.70	0.83	0.80	0.66	0.88	0.77	0.77	1.04	1.01	1.18	1.02	
8		Shelf Life	Ind.	12	12	12	12	12	12	12	6	6	12	6	
9	PROCESS	pH Range	4-10		4-10	6-12	0-7	6-14	6-14	8-14	6-14	0-7	4-9	4-10	
10		Clarification	x			x	x	x	x	x	x	x	x	x	
11		Thickening					x	x	x	x	x	x	x	x	
12		Dewatering	x	x	x	x	x	x	x	x	x	x	x	x	
13		C.C.D.	-	-	-		x					x	-	-	
14	FIELDS OF APPLICATION	Brines				x	x	x	x	x	x	x			
15		Chem. Plant	x	x		x		x	x	x	x	x	x		
16		Clay											x		
17		Coal						x	x		x				
18		Food													
19		Ind. Minerals							x	x					
20		Mining	General				x	x	x			x			
21			Ferrous		x		x					x	x	x	
22			Non-Ferrous	x			x	x	x	x		x	x	x	
23		Oil Refinery	x												
24		Paint/Pigment													
25		Phosphate									x	x			
26		Pulp/Paper	x	x	x									x	x
27		Sewage	x											x	
28	Silica														
29	Steel Mill	x			x		x	x	x	x	x	x	x		
30	Tannery/Textile												x		
31	Water	General	x			x	x	x	x	x	x	x	x		
32		Potable	-		-	-	-	-	-	-	-	-	-		
33	~	Cost, \$/lb	0.70	1.00	1.25	0.93	1.14	1.08	1.30		0.90	0.90	0.74	0.82	

Nalcolyte															
634	635	680	81C09 ²⁾	110A	607	610	670	671	673	674	675H	8170	8172	8173	
C	A	A	A	N	C	C	N	A	A	A	A	N	A	A	1
h	h	-		-	h	h	-	lo	vh	h	vh	-	lo	vh	2
PA	PAM	IN ¹⁾	PAM	PS+ ³⁾	PA	PAM	PAM	PAM	PAM	PAM	PAM	PAM	PAM	PAM	3
		230		H		H	VH	VH	VH	VH		H		H	4
LI	P	P	LI	P	LI	P	P	P	P	P	P	P	LI	P	5
6.0	8.3	11.6	9.5	8.5	7.2	5.1	6.9	6.5	8.2	8.8	8.2	8.0	7.6	7.6	6
1.18	0.72	0.80		0.40	1.17	0.72	0.69	0.54	0.87			0.72	1.01	0.70	7
6	12	6		12	12	12	12	12	12	12		12	6	12	8
4-9	> 2	4-11		7-9	4-13	4-10	0-14	0-9	6-14			0-6	5-10	5-10	9
x		x		x	x	x	x	x	x			x	x	x	10
x					x	x	x		x	x					11
x	x			x	x	x	x	x	x		x	x		x	12
-	-	-		-	-	-	x	-	x			-	-	-	13
							x		x						14
							x		x						15
x															16
	x					x	x		x						17
		x		x											18
x							x								19
									x						20
									x						21
									x						22
															23
						x				x					24
															25
x	x	x					x								26
				x	x	x	x								27
x															28
				x											29
				x					x						30
x		x		x		x	x	x	x	x					31
-	-	x		x	x	-	-	x	-	x		x	x	x	32
0.54	2.00	0.31		0.70	0.80	2.58	1.50	2.48	1.90	2.25	1.87	1.95	1.06	2.00	33

1) Sodium Aluminum Trihydrate, 2) Developmental Reagent, 3) Modified Starch

		ALLIED CHEMICAL CANADA, LTD.									
		Alum									
1	CHARACTERISTICS	Charge	C								
2		Activity	-								
3		Type	IN ¹⁾								
4		Mol. Weight	594								
5		Form	P/LI								
6		pH	3.4								
7		Sp. Gravity	1.08								
8		Shelf Life	Ind.								
9	PROCESS	pH Range	5-8 ²⁾								
10		Clarification	x								
11		Thickening	x								
12		Dewatering	-								
13		C.C.D.	-								
14	FIELDS OF APPLICATION	Brines									
15		Chem. Plant									
16		Clay									
17		Coal	x								
18		Food	x								
19		Ind. Minerals									
20		Mining	General	x							
21			Ferrous	x							
22			Non-Ferrous								
23		Oil Refinery									
24		Paint/Pigment									
25		Phosphate									
26		Pulp/Paper	x								
27		Sewage	x								
28		Silica									
29		Steel Mill	x								
30		Tannery/Textile	x								
31		Water	General	x							
32	Potable		x								
33	Cost, \$/lb	(0.03)									

1) $Al_2(SO_4)_3$
 2) Also pH > 10.5

		ALLIED COLLOIDS (CANADA) LTD.												
		Percol												
		139	140	155	156	292	351	352	388	455	511	728		
CHARACTERISTICS	1	Charge	A	C	A	A	C	N	C	C	C	A	C	
	2	Activity	vl	lo	lo	m	m	-	lo	h	vl	h	m	
	3	Type	PAM	PAM	PAM	PAM	PAM	PAM	PAM	PA	PAM		PAM	
	4	Mol. Weight	H	H	VH	VH	H	VH	VH	L	VH	EH	VH	
	5	Form	P	P	P	P	P	P	P	LI	P	P	P	
	6	pH	4.6	5.0	6.2	6.8	5.0	5.3	5.9	4.0	5.5	6.2	5.5	
	7	Sp. Gravity	0.56	0.56	0.56	0.56	0.56	0.56	0.50	1.04	0.56	0.56	0.56	
	8	Shelf Life	Ind.	Ind.	Ind.	Ind.	Ind.	Ind.	Ind.	12	Ind.	Ind.	Ind.	
PROCESS	9	pH Range	7-12	1-12	7-12	7-12	1-12	1-12	1-12 ¹⁾	1-12	1-12	7-12	1-12	
	10	Clarification	x	x	x	x	x	x	x	x	x	x		
	11	Thickening	x	x	x	x		x	x		x		x	
	12	Dewatering	x	x	x	x	x	x	x	x	x	x		
	13	C.C.D.		-					x	-				
FIELDS OF APPLICATION	14	Brines				x		x						
	15	Chem. Plant												
	16	Clay						x						
	17	Coal				x		x	x		x			
	18	Food												
	19	Ind. Minerals												
	Mining	20	General											
		21	Ferrous	x					x	x				
		22	Non-Ferrous	x	x	x	x		x	x		x	x	
	23	Oil Refinery												
	24	Paint/Pigment												
	25	Phosphate				x		x	x					
26	Pulp/Paper		x		x	x	x		x					
27	Sewage											x		
28	Silica	x												
29	Steel Mill							x						
Water	30	Tannery/Textile												
	31	General	x	x	x	x	x	x	x	x				
	32	Potable	-	*	*	*	*	*	*	-	-	-	-	
33	~ Cost, \$/lb	1.10	1.40	1.10	1.10	1.30	1.10	1.10	0.40	1.10	1.32	1.60		

* Equivalent Potable Water Grade Available

1) Especially acid range

		BASF CANADA LTD.										
		Sedipur										
		KA	T1	TF2	TF5	TF7	TF Solid					
1	CHARACTERISTICS	Charge	C	A	A	A	A	N				
2		Activity		h	m	h		-				
3		Type	PEI	PAM	PAM	PAM	PAM	PAM				
4		Mol. Weight	M									
5		Form	LI	P	P	P	P	P				
6		pH	6.7	8.2	7.2	8.0	8.1	6.4				
7		Sp. Gravity										
8		Shelf Life										
9	PROCESS	pH Range	7-14	7-14	7-14	7-14	7-14	0-14				
10		Clarification	x	x		x	x	x				
11		Thickening						x				
12		Dewatering						x				
13		C.C.D.										
14	FIELDS OF APPLICATION	Brines						x				
15		Chem. Plant										
16		Clay							x			
17		Coal			x		x	x				
18		Food			x							
19		Ind. Minerals		x		x		x				
20		Mining	General									
21			Ferrous			x	x	x				
22			Non-Ferrous			x			x			
23		Oil Refinery							x			
24		Paint/Pigment										
25		Phosphate							x			
26		Pulp/Paper	x									
27		Sewage										
28	Silica											
29	Steel Mill			x	x	x	x					
30	Tannery/Textile	x	x		x							
31	Water	General	x	x		x		x				
32		Potable	-	-	-	-	-	-				
33	Cost, \$/lb	0.65	1.30	1.30	1.30	1.30	1.30					

			BETZ LABORATORIES LTD.											
			Poly-floc								Polymer			
			1100	1110	1120	1130	1140	1150	1160	1170	1175	1190	LC-5	
CHARACTERISTICS	1	Charge	A	A	A	A	N	C	C	C	C	C	N	
	2	Activity	lo	m	vh		-		h	h	h	h	-	
	3	Type	PAM	PAM	PAM	PAM	PAM	PAM	PAM	PA	PA		PAM	
	4	Mol. Weight	VH	VH	EH	H	H	VH	VH	H	H		VH	
	5	Form	P	P	P	P	P	P	P	LI	LI	LI	P	
	6	pH	7.0	6.9	7.8		5.4	8.3	6.9	8.7	8.8	6.4	7.1	
	7	Sp. Gravity	0.58	0.58	0.58	0.58	0.61	0.45	0.45	1.04	1.08	1.11	0.58	
	8	Shelf Life	12	12	12	12	12	12	12	3	3	6	12	
PROCESS	9	pH Range	wide		7-14	7-14	6-7	0-7	0-7					
	10	Clarification	x	x	x	x	x	x	x	x	x	x	x	
	11	Thickening	x	x	x	x	x	x	x	x		x		
	12	Dewatering					x	x	x	x	x			
13	C.C.D.													
FIELDS OF APPLICATION	14	Brines	x	x										
	15	Chem. Plant		x										
	16	Clay			x		x							
	17	Coal	x		x		x						x	
	18	Food												
	19	Ind. Minerals			x									
	20	Mining	General											
	21		Ferrous	x	x									x
	22		Non-Ferrous	x	x				x	x				x
	23	Oil Refinery												
	24	Paint/Pigment												
	25	Phosphate			x									x
26	Pulp/Paper					x	x	x						
27	Sewage	x	x				x	x			x	x		
28	Silica													
29	Steel Mill	x	x			x							x	
30	Tannery/Textile	General	x	x										
31		Potable	x	x	x	x	x	x		x	x	x	x	
32	Water							x						
33	~	Cost, \$/lb	1.65	1.65	1.65	1.65	1.82	1.82	1.82	0.52	0.65	0.83	1.82	

			CALGON CANADA											
			CA											
			18	233	243	253	2254	2256	2260	2270	2300	2350	2400	2425
1	CHARACTERISTICS	Charge	A	N	A	A	C	C	C	C	N	A	A	A
2		Activity	lo	-	vh	m	h	h	m	lo	-	m	h	vh
3		Type	IN. 1)	PAM	PAM	PAM	PA	PAM	PAM	PAM	PAM	PAM	PAM	PAM
4		Mol. Weight	L											
5		Form	P	P	P	P	LI	P	P	P	P	P	P	P
6		pH	9.6	7.0	7.0	7.0	6.8	6.4	6.7	7.3	7.0	7.0	7.0	7.0
7		Sp. Gravity	1.00	0.36	0.36	0.36	1.02	0.36	0.36	0.36	0.36	0.36	0.36	0.36
8		Shelf Life												
9	PROCESS	pH Range	wide	wide			wide	wide	wide	wide	wide			
10		Clarification	x	x	x	x	x	x	x	x	x	x	x	x
11		Thickening												
12		Dewatering					x							
13		C.C.D.	-											
14	FIELDS OF APPLICATION	Brines												
15		Chem. Plant												
16		Clay												
17		Coal												
18		Food												
19		Ind. Minerals												
20		Mining	General											
21			Ferrous											
22			Non-Ferrous											
23		Oil Refinery												
24		Paint/Pigment												
25		Phosphate												
26		Pulp/Paper												
27		Sewage												
28		Silica												
29		Steel Mill												
30	Tannery/Textile													
31	Water	General	x				x	x	x	x	x	x	x	
32		Potable	x	x	x	x	-	-	-	-	-	-	-	
33	Cost, \$/lb													

1) Processed clay

		CANADA COLOURS AND CHEMICLAS LTD.									
		Ferri-Floc									
1	CHARACTERISTICS	Charge	C								
2		Activity	-								
3		Type	IN. 1)								
4		Mol. Weight	454								
5		Form	P								
6		pH									
7		Sp. Gravity									
8		Shelf Life	Ind.								
9	PROCESS	pH Range	0-14								
10		Clarification	x								
11		Thickening									
12		Dewatering									
13		C.C.D.	-								
14	FIELDS OF APPLICATION	Brines									
15		Chem. Plant	x								
16		Clay	x								
17		Coal									
18		Food	x								
19		Ind. Minerals									
20		Mining	General								
21			Ferrous								
22			Non-Ferrous								
23		Oil Refinery	x								
24		Paint/Pigment									
25		Phosphate									
26	Pulp/Paper	x									
27	Sewage	x									
28	Silica										
29	Steel Mill										
30	Tannery/Textile										
31	Water	General	x								
32		Potable									
33	Cost, \$/lb	0.10									

1) $Fe_2(SO_4)_3 \cdot 3 H_2O$

		CYANAMID OF CANADA LTD.												
		Aerofloc			Magnifloc									
		550 ¹⁾	3425	3453	521-C	560-C	573-C	575-C	577-C	579-C	581-C	820-A	835-A	
1	CHARACTERISTICS	Charge	A	A	A	C	C	C	C	C	C	A	A	
2		Activity	vh	vh	h					h	h	m	h	
3		Type	PAN	PAN	PAM	PA	PAM	PA	PA	PA	PA	PA	PAM	PAM
4		Mol. Weight	M	M	VH	M		M	M	M	M	M	VH	EH
5		Form	P	P	P	LI	P	LI	LI	LI	LI	LI	P	P
6		pH	7.3			4.8		7.0	7.0	6.5	6.5		3.6	7.0
7		Sp. Gravity				1.16		1.16		1.16				
8		Shelf Life	12			6	12	6		6			12	12
9	PROCESS	pH Range	5-12	5-12	3-10	wide	3-10	4-10	wide	wide		wide	wide	
10		Clarification	x	x		x	x	x	x	x	x	x	x	x
11		Thickening	x	x	x	x	x	x	x	x	x	x	x	x
12		Dewatering	x	x	x	x	x	x	x	x	x	x	x	x
13		C.C.D.	x											
14	FIELDS OF APPLICATION	Brines												
15		Chem. Plant	x			x		x	x	x	x	x		
16		Clay												x
17		Coal	x	x	x								x	x
18		Food	x			x		x	x	x	x			
19		Ind. Minerals	x	x										
20		Mining	General	x	x		x							
21			Ferrous	x	x	x	x						x	
22			Non-Ferrous	x	x	x							x	
23		Oil Refinery				x	x	x	x	x	x	x		
24		Paint/Pigment												
25		Phosphate												
26	Pulp/Paper													
27	Sewage	x			x	x	x	x	x	x	x	x	x	
28	Silica													
29	Steel Mill											x	x	
30	Tannery/Textile													
31	Water	General				x	x	x	x	x	x	x	x	
32		Potable	-	-	-	x	-	x	x	x	x	-	-	
33		Cost, \$/lb	0.60			0.24	1.78	0.33	0.26	0.36	0.27	0.42	2.26	1.52

1) Also available as 20% solution

836-A	837-A	845-A	846-A	847-A	860-A	865-A	870-A	875-A	900-N	901-N	902-N	905-N	971-N	972-N	
A	A	A	A	A	A	A	A	A	N	N	N	N	N	N	1
m	lo				lo	lo	vh	vh	-	-	-	-	-	-	2
PAM	PAM				PAM	PAM	PAN	PAN	PAM	PAM	PAM	PAM	PAM	PAM	3
EH	EH				H	H	M	M	H	VH	VH	EH	VH	H	4
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	5
6.8	5.4				4.1	3.8	7.5	7.5	4.8	4.8	4.8	6.3	5.0	5.0	6
					0.54	0.54			0.48			0.46	0.48	0.48	7
12	12				12	12	12	12							8
wide	wide				3-10	3-10	5-12	wide	3-10			3-10	3-10	3-10	9
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	10
x	x	x	x		x	x	x	x	x	x	x	x			11
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	12
															13
									x						14
									x						15
x	x	x	x	x					x						16
x	x	x	x	x					x						17
		x	x	x	x				x	x	x	x	x	x	18
					x										19
															20
															21
									x						22
															23
									x						24
					x				x	x	x		x	x	25
															26
x	x														27
									x						28
x	x	x	x	x	x	x	x	x							29
x	x														30
x	x								x	x	x	x			31
-	-	x	x	x	x	-	-	-	-	-	-	-	x	x	32
1.52	1.52	1.82	1.82	1.82	1.92	1.56	0.78	0.76	1.36			1.86			33

			CYANAMID OF CANADA LTD. (cont.)											
			Magnifloc			Reagent			Superfloc					
			985-N	990-N	E323A	S3731	S3732	S3757	16	20	84	127	202	206
1	CHARACTERISTICS	Charge	N	N	C				N	N	N	N	A	A
2		Activity	-	-				-	-	-	-	-	m	h
3		Type	PAM	PAM	PA				PAM	PAM	PAM	PAM	PAM	PAM
4		Mol. Weight	VH	H				H	VH	VH	EH	VH	EH	
5		Form	P	P	LI	P	LI	LI	P	P	P	P	P	
6		pH	5.0	5.0		6.3	8.3	8.5	4.5	6.6	6.6	6.3	3.5	
7		Sp. Gravity	0.46	0.48	1.00				0.48			0.46		
8		Shelf Life			5								12	12
9	PROCESS	pH Range	3-10	3-10				2-10	3-10	3-10	3-10	wide	wide	
10		Clarification	x	x	x			x	x	x	x	x		
11		Thickening	x	x	x			x	x	x	x	x		
12		Dewatering	x	x				x	x	x	x	x		
13		C.C.D.	-					x		x	x			
14	FIELDS OF APPLICATION	Brines												
15		Chem. Plant						x	x	x	x			
16		Clay						x						
17		Coal	x			x		x	x	x	x	x		
18		Food	x	x				x	x					
19		Ind. Minerals												
20		Mining	General	x							x	x		
21			Ferrous						x		x	x	x	x
22			Non-Ferrous			x			x	x	x	x	x	
23		Oil Refinery												
24		Paint/Pigment												
25		Phosphate	x					x	x	x	x			
26	Pulp/Paper	x	x											
27	Sewage			x			x	x						
28	Silica						x							
29	Steel Mill						x			x	x			
30	Tannery/Textile													
31	Water	General						x	x	x		x	x	
32		Potable	x	x				x	x	x	x	-	-	
33	~ Cost, \$/lb		2.21	1.67	0.08				1.18	1.18	1.22	1.22	1.18	

210	212	214	220	310	330	A100	A110	A130	A150	C100	C110	N100			
A	A	A	A	C	C	A	A	A	A	C	C	N			1
lo	m	h	m			lo	m	h	h			-			2
PAM	PAM	PAM	PAM	PA	PA	PAM	PAM	PAM	PAM	PAM	PAM	PAM			3
EH	EH	EH	VH	M	M			H							4
P	P	P	P	LI	LI	P	P	P	P	P	P	P			5
5.4	6.8	7.0	6.6	4.8	7.0	6.1	6.8	7.7	7.8	9.0	8.4	5.8			6
				1.16	1.16										7
12	12	12		6	6		12	12	12			12			8
wide	wide	wide	0-10		4-10	4-10	4-10	4-10	4-10	acid	acid	0-14			9
				x	x	x	x	x	x	x	x	x			10
x	x	x	x	x	x	x	x	x	x	x	x	x			11
x	x	x		x	x	x	x	x	x	x	x	x			12
				-						x		x			13
x															14
			x	x	x							x			15
x	x	x													16
x	x	x	x			x			x			x			17
				x			x		x						18
															19
				x		x									20
			x	x				x							21
x			x			x	x			x	x	x			22
				x	x										23
															24
			x						x	x	x	x			25
															26
		x		x	x	x			x	x	x				27
						x									28
		x	x			x									29
						x			x						30
x	x	x		x	x	x	x	x	x	x	x	x			31
-	-	-		-	-	*	*	*	*	*	*	*			32
	1.25	1.22	1.06	0.36	0.36	0.88	0.88	0.88	0.88	0.88	0.88	0.88			33

			DOW CHEMICAL OF CANADA, LTD.												
			PEI			Purifloc									
			600	1000	1090	N11	N12	N17	N20	A22	A23	C31	C32	C41	
CHARACTERISTICS	1	Charge	C	C	C	N	N	N	N	A	A	C	C	C	
	2	Activity				-	-	-	-	m	m				
	3	Type	PEI	PEI	PA	PAM	PAM	PAM	PAM	PAM	PAM	PEI	PEI	PAM	
	4	Mol. Weight	M	M	M	H	H	H	H	H	H	M	M	H	
	5	Form	LI	LI	LI	P	P	P	P	P	P	LI	LI	LI	
	6	pH	10.0	9.8	7.6	7.3	7.8	6.8	8.0	10.3	10.1	8.0	9.0	8.5	
	7	Sp. Gravity	1.05	1.06	1.14	0.51	0.51	0.50	0.50	0.62	0.74	1.16	1.07	1.00	
	8	Shelf Life			12	12	12	12	6	12	12	12		6	
PROCESS	9	pH Range	0-8.5	0-8.5	0-8.5	0-14	1-14	1-14	1-14	6-14	6-12	0-8.5	0-8.5	0-8.5	
	10	Clarification	x	x	x	x	x	x	x	x	x	x	x	x	
	11	Thickening	x	x	x	x	x	x		x	x	x			
	12	Dewatering	x	x	x	x	x	x		x	x	x	x	x	
	13	C.C.D.													
FIELDS OF APPLICATION	14	Brines				x									
	15	Chem. Plant				x	x	x		x	x	x			
	16	Clay					x	x						x	
	17	Coal				x	x	x			x				
	18	Food			x					x		x			
	19	Ind. Minerals					x	x				x			
	20	Mining	General			x				x					
	21		Ferrous												
	22		Non-Ferrous				x	x	x	x		x			
	23	Oil Refinery						x		x		x			
	24	Paint/Pigment					x	x							
	25	Phosphate				x	x								
	26	Pulp/Paper	x	x	x		x	x		x		x	x	x	
	27	Sewage	x	x	x		x				x	x	x	x	
28	Silica														
29	Steel Mill								x						
30	Tannery/Textile								x		x				
31		General	x	x	x	x	x			x	x	x	x		
32	Water			x			x	x	x	*	x				
33	~	Cost, \$/lb				1.48	2.00	2.08		1.65	1.85	0.40	0.95	0.10*	

		DOW CHEMICAL OF CANADA LTD. (Cont.)												
		(1)	Tydex	XD										
		87D	12	1183	1629.3	8256.02	8256.03	8315.01	8317.01	8318				
CHARACTERISTICS	1	Charge	A	C	A	N	C	C	N	N	A			
	2	Activity	lo			-			-	-	vh			
	3	Type	PAM	PEI	PAC	PAM			PAM	PAM	PAM			
	4	Mol. Weight	M	M	VH	H			H	H	H			
	5	Form	LI	LI	P	P	P	P	P	P	P			
	6	pH	7.0	9.6										
	7	Sp. Gravity	1.07	1.07										
	8	Shelf Life	6+	12										
PROCESS	9	pH Range	4-5	5-8	6-14	0-14			4-12	1-14	6-14			
	10	Clarification				x				x				
	11	Thickening								x	x			
	12	Dewatering	x	x						x	x			
	13	C.C.D.								x				
FIELDS OF APPLICATION	14	Brines								x				
	15	Chem. Plant								x				
	16	Clay								x				
	17	Coal								x	x			
	18	Food												
	19	Ind. Minerals										x		
	20	Mining	General							x	x			
	21		Ferrous				x			x	x			
	22		Non-Ferrous							x				
	23	Oil Refinery												
	24	Paint/Pigment												
	25	Phosphate								x	x			
	26	Pulp/Paper	x	x						x				
	27	Sewage		x										
28	Silica													
29	Steel Mill													
30	Tannery/Textile													
31	Water	General		x		x				x	x			
32		Potable	-	-		-				-	-			
33	Cost, \$/lb													

(1) Dow Strength Resin

		GENERAL MILLS CHEMICALS, INC.									
		Guartec									
		1018	FXM								
1	CHARACTERISTICS	Charge	N	N							
2		Activity	-	-							
3		Type	Guar	Guar							
4		Mol. Weight	M	M							
5		Form	P	P							
6		pH	6.9	6.8							
7		Sp. Gravity	0.82	0.82							
8		Shelf Life		6							
9	PROCESS	pH Range	1-12	1-12							
10		Clarification	x	x							
11		Thickening	x	x							
12		Dewatering									
13		C.C.D.									
14	FIELDS OF APPLICATION	Brines		x							
15		Chem. Plant	x	x							
16		Clay		x							
17		Coal		x							
18		Food									
19		Ind. Minerals									
20		Mining	General	x							
21			Ferrous								
22			Non-Ferrous	x	x						
23		Oil Refinery	x	x							
24		Paint/Pigment									
25		Phosphate									
26	Pulp/Paper		x								
27	Sewage										
28	Silica										
29	Steel Mill										
30	Tannery/Textile										
31		Water	General								
32	Potable		x	x							
33	Cost, \$/lb	0.42	0.35								

		B.F. GOODRICH CHEMICAL CANADA									
		Good-Rite									
		K-702	K-705	K-708	K-714	K-716	K-718				
1	CHARACTERISTICS	Charge	A	A	A	A	A	A			
2		Activity									
3		Type	PAA	PAC	PAC	PAA	PAC	PAC			
4		Mol. Weight	M	M	M	M	M	M			
5		Form	LI	LI	LI	LI	LI	LI			
6		pH	2.0	8.0	8.4	2.0	8.0	8.0			
7		Sp. Gravity	1.09	1.10	1.14	1.05	1.04	1.03			
8		Shelf Life			6			6			
9	PROCESS	pH Range	4-12	4-12	4-12	5-11	4-12	4-12			
10		Clarification									
11		Thickening									
12		Dewatering									
13		C.C.D.									
14	FIELDS OF APPLICATION	Brines									
15		Chem. Plant	x			x					
16		Clay									
17		Coal									
18		Food									
19		Ind. Minerals									
20		Mining	General	x			x				
21			Ferrous								
22			Non-Ferrous								
23		Oil Refinery									
24		Paint/Pigment									
25		Phosphate									
26		Pulp/Paper	x			x					
27		Sewage									
28	Silica										
29	Steel Mill										
30	Tannery/Textile										
31	Water	General	x	x	x	x	x	x			
32		Potable									
33	~ Cost, \$/lb	1.20	1.10	1.10	1.20	1.10	1.10				

		GAF CORPORATION									
		Gantrez AN									
		149	169	PVP							
1	CHARACTERISTICS	Charge	A	A	N						
2		Activity			-						
3		Type	MVE	MVE	PVP						
4		Mol. Weight	M	H	M						
5		Form	P	P	P/LI						
6		pH	2.4	2.4							
7		Sp. Gravity	0.32	0.32							
8		Shelf Life	Ind.	Ind.							
9	PROCESS	pH Range	7-14	7-14	1-10						
10		Clarification	x	x	x						
11		Thickening									
12		Dewatering	x	x							
13		C.C.D.									
14	FIELDS OF APPLICATION	Brines									
15		Chem. Plant	x	x							
16		Clay	x	x							
17		Coal									
18		Food	x	x	x						
19		Ind. Minerals	x	x							
20		Mining	General	x	x						
21			Ferrous								
22			Non-Ferrous	x	x						
23		Oil Refinery	x	x							
24		Paint/Pigment									
25		Phosphate	x	x							
26		Pulp/Paper	x	x							
27	Sewage										
28	Silica										
29	Steel Mill	x	x								
30	Tannery/Textile										
31	Water	General	x	x							
32		Potable	-	-							
33	Cost, \$/lb	1.55	1.58	1.25							

		HERCULES CANADA LTD.												
		Hercofloc							SPX					
		813.3	817.2	819.2	824.3	829.3	832.1	833.2	1038	5022	5024			
1	CHARACTERISTICS	Charge	C	A	A	N	C	C	A	C	A	A		
2		Activity	lo	lo	h	-	m	vh	m	h	m	lo		
3		Type	PAM	PAM	PAM	PAM	PAM	PA	PAM	PAM	PAM	PAM		
4		Mol. Weight	H	H	H	H	H	H	H	H	H	H		
5		Form	P	P	P	P	P	LI	P	P	P	P		
6		pH	6.2	8.1	8.7	7.7	5.8	5.0	8.4	6.1	8.2			
7		Sp. Gravity	0.70	0.70	0.70	0.70	0.70		0.70		0.70			
8		Shelf Life	12	12	12	12	12	12	12		12			
9	PROCESS	pH Range	3-8	5-11	5-11	0-14	3-8	2-8	5-11		1-9			
10		Clarification	x	x	x	x	x		x	x	x	x		
11		Thickening	x	x	x	x	x		x	x	x	x		
12		Dewatering	x	x	x	x	x		x	x	x			
13		C.C.D.	-	-	-	-	-	-	-	-	-	-		
14	FIELDS OF APPLICATION	Brines												
15		Chem. Plant												
16		Clay												
17		Coal	x	x	x	x			x		x	x		
18		Food												
19		Ind. Minerals												
20		Mining	General											
21			Ferrous			x						x	x	
22			Non-Ferrous		x		x				x	x	x	
23		Oil Refinery												
24		Paint/Pigment												
25		Phosphate			x	x					x	x		
26		Pulp/Paper												
27	Sewage													
28	Silica													
29	Steel Mill													
30	Tannery/Textile													
31	Water	General	x	x	x	x	x							
32		Potable	-	-	-	-	-	-	-	-	-	-		
33	~	Cost, \$/lb	1.84	1.28	1.28	1.28	2.16	0.38	1.28	1.30	1.30	1.30		

		HODAG INTERNATIONAL S.A., INC.									
		Flocs									
		111	115								
1	CHARACTERISTICS	Charge	A	A							
2		Activity									
3		Type	PAM	PAM							
4		Mol. Weight	H	H							
5		Form	P	P							
6		pH	10.5	10.5							
7		Sp. Gravity									
8		Shelf Life	Ind.	Ind.							
9	PROCESS	pH Range	2-12	2-12							
10		Clarification	x	x							
11		Thickening									
12		Dewatering	x	x							
13		C.C.D.									
14	FIELDS OF APPLICATION	Brines									
15		Chem. Plant	x	x							
16		Clay									
17		Coal									
18		Food	x	x							
19		Ind. Minerals	x	x							
20		Mining	General	x	x						
21			Ferrous								
22			Non-Ferrous								
23		Oil Refinery									
24		Paint/Pigment									
25		Phosphate									
26		Pulp/Paper	x	x							
27	Sewage	x	x								
28	Silica										
29	Steel Mill										
30	Tannery/Textile										
31	Water	General		x							
32		Potable	x	-							
33	Cost, \$/lb	1.42	1.42								

		NATIONAL SILICATES LTD.													
		PQ N-Sol ¹⁾													
		A	B	C	D	E									
1	CHARACTERISTICS	Charge	A	A	A	A	A								
2		Activity	-	-	-	-	-								
3		Type	IN	IN	IN	IN	IN								
4		Mol. Weight													
5		Form	LI	LI	LI	LI	LI								
6		pH													
7		Sp. Gravity													
8		Shelf Life	Ind.	Ind.											
9	PROCESS	pH Range	4-9	4-9	4-9	4-9	4-9								
10		Clarification	x	x	x	x	x								
11		Thickening	x	x	x	x	x								
12		Dewatering	x	x	x	x	x								
13		C.C.D.													
14	FIELDS OF APPLICATION	Brines													
15		Chem. Plant													
16		Clay													
17		Coal													
18		Food	x	x	x	x	x								
19		Ind. Minerals													
20		Mining	General												
21			Ferrous												
22			Non-Ferrous												
23		Oil Refinery	x	x	x	x	x								
24		Paint/Pigment													
25		Phosphate													
26		Pulp/Paper	x	x	x	x	x								
27		Sewage	x	x	x	x	x								
28	Silica														
29	Steel Mill														
30	Tannery/Textile														
31		Water	x	x	x	x	x								
32		Potable	x	x	x	x	x								
33	~	Cost, \$/lb													

1) Activated Silica

		NATIONAL STARCH AND CHEMICAL CO. (CANADA) LTD.										
		Natron										
		88	6082									
1	CHARACTERISTICS	Charge	C	A/C								
2		Activity										
3		Type	PA									
4		Mol. Weight										
5		Form	LI	LI								
6		pH	2.8	2.5								
7		Sp. Gravity	1.09	1.05								
8		Shelf Life	6 +	6 +								
9	PROCESS	pH Range	4-8	0-6								
10		Clarification	x	x								
11		Thickening	x	x								
12		Dewatering	x	x								
13		C.C.D.	-	-								
14	FIELDS OF APPLICATION	Brines										
15		Chem. Plant										
16		Clay										
17		Coal										
18		Food	x									
19		Ind. Minerals										
20		Mining	General	x								
21			Ferrous	x								
22			Non-Ferrous									
23		Oil Refinery	x									
24		Paint/Pigment	x									
25		Phosphate										
26		Pulp/Paper	x	x								
27	Sewage	x										
28	Silica											
29	Steel Mill	x										
30	Tannery/Textile	x										
31	Water	General	x	x								
32		Potable	-	-								
33		Cost, \$/lb	0.26	0.17								

			ROHM & HAAS CANADA LTD.									
			Primaflow									
			A10	C3	C5	C7						
1	CHARACTERISTICS	Charge	A	C	C	C						
2		Activity	vh			h						
3		Type	PAA	PA	PA	PA						
4		Mol. Weight		M		H						
5		Form	LI	LI	LI	P						
6		pH	3.0		6.5	2.5						
7	Sp. Gravity	1.05	1.18	1.12	0.56							
6	Shelf Life											
9	PROCESS	pH Range	5-11	1-14	1-14	2-10						
10		Clarification		x	x	x						
11		Thickening		x		x						
12		Dewatering				x						
13		C.C.D.										
14	FIELDS OF APPLICATION	Brines										
15		Chem. Plant		x	x	x						
16		Clay										
17		Coal				x						
18		Food		x		x						
19		Ind. Minerals				x						
20		Mining	General				x					
21			Ferrous									
22			Non-Ferrous									
23		Oil Refinery										
24		Paint/Pigment										
25		Phosphate										
26	Pulp/Paper		x	x	x							
27	Sewage		x	x	x							
28	Silica											
29	Steel Mill											
30	Tannery/Textile					x						
31	Water	General		x	x	x						
32		Potable		-	-	-						
33	~	Cost, \$/lb	0.36	0.50	0.61	1.42						

		A.E. STALEY MFG. CO.												
		Hamaco		Pearl Starch										
		267												
1	CHARACTERISTICS	Charge	N		N									
2		Activity	-											
3		Type	PS ¹⁾		PS ²⁾									
4		Mol. Weight												
5		Form	P		P.									
6		pH												
7		Sp. Gravity												
8		Shelf Life												
9	PROCESS	pH Range												
10		Clarification	x		x									
11		Thickening												
12		Dewatering												
13		C.C.D.												
14	FIELDS OF APPLICATION	Brines												
15		Chem. Plant												
16		Clay												
17		Coal												
18		Food												
19		Ind. Minerals												
20		Mining	General			x								
21			Ferrous											
22			Non-Ferrous											
23		Oil Refinery												
24		Paint/Pigment												
25		Phosphate												
26		Pulp/Paper												
27	Sewage													
28	Silica													
29	Steel Mill													
30	Tannery/Textile													
31	Water	General												
32		Potable	x		x									
33		Cost, \$/lb												

1) Potato Starch: 2) Corn Starch

		STEIN-HALL, LTD.													
		Jaguar							MRL		Polyhall				
		MD-7A	MDD	MRL 22A	42-A	333	387	444	730	201	332	40	44C		
1	CHARACTERISTICS	Charge	N	N	C	N	N	N	N	C	N	A	N	N	
2		Activity	-	-		-	-	-	-		-		-	-	
3		Type	Guar	Guar	Guar	Guar	Guar	Guar	Guar	Guar			PAM	PAM	
4		Mol. Weight	M	M	M				M						
5		Form	P	P	P				P						
6		pH		6.2	5.8				6.7						
7		Sp. Gravity		0.76	0.76				0.76						
8		Shelf Life	Ind.	Ind.	Ind.				Ind.						
9	PROCESS	pH Range		0-11	0-14			0-11							
10		Clarification	x	x	x	x	x	x	x	x	-	-	x		
11		Thickening	x	x	-	x	x	x	x	-	x	x	x	x	
12		Dewatering	x	x	-	x	x	x	x	x	x	-	-	x	
13		C.C.D.		-	-										
14	FIELDS OF APPLICATION	Brines													
15		Chem. Plant													
16		Clay													
17		Coal		x	x				x						
18		Food													
19		Ind. Minerals		x	x				x						
20		Mining	General										x		
21			Ferrous												
22			Non-Ferrous		x	x				x					
23		Oil Refinery		x	x										
24		Paint/Pigment													
25		Phosphate													
26		Pulp/Paper		x	x										
27		Sewage													
28		Silica													
29		Steel Mill													
30	Tannery/Textile														
31	Water	General	x	x	x	x	x	x	x	x	x	x			
32		Potable		x											
33		Cost, \$/lb		0.45	0.68			0.50							

											Vinrez				
59	295	296	297	320	402	430	540	630	650	TP41-7					
A	A	A	A	N	N	A	A	A	N	N					
	lo	m	h	-	-	-	m	lo	-	-					
PAM	PAM	PAM	PAM	PAM	PAM	PAM	PAM	PAM	PAM	PAM					
	H				H										
	P				P										
	7.5				5.2										
	0.56				0.44										
	5-12				0-11										
	x	-	-	x	x	x	x	x	x	-					
x	x	x	x	x	x	x	x	x	x	x					
	x	-	-	x		x	x	x	x	-					
					x										
	x				x										
	x														
	x														
	0.75				0.75										

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		TAR RESIDUALS LTD.												
		TR												
		11APR	25AP	90AP	91AP	93AP	95AP	80NP	80NPZ	11CPR	90CP	91CP	CLR	
1	CHARACTERISTICS	Charge	A	A	A	A	A	A	N	N	C	C	C	C
2		Activity	m	h	lo	m	h	vh	-	-	m	lo	m	h
3		Type	PAM	PAM	PAM	PAM	PAM	PAM	PAM	PAM	PAM	PAM	PAM	PA
4		Mol. Weight	H	H	VH	VH	VH	VH	VH	VH	H	VH	VH	
5		Form	P	P	P	P	P	P	P	P	P	P	P	LI
6		pH		8.5	6.8	7.2	8.0	8.9	6.7					
7		Sp. Gravity	0.65	0.56	0.65	0.88	0.65	0.65	0.68	0.55	0.65	0.58	0.58	1.00
8		Shelf Life	6	6	6	6	6	6	6	6	6	6	6	6
9	PROCESS	pH Range	4-12	4-12	4-12	4-12	4-12	4-12	2-12	2-12	3-8	3-8	3-8	3-8
10		Clarification		x	x	x	x	x	x	x		x	x	
11		Thickening			x	x	x	x	x	x				
12		Dewatering	x	x	x	x	x	x	x	x	x	x	x	x
13		C.C.D.							x					
14	FIELDS OF APPLICATION	Brines												
15		Chem. Plant												
16		Clay			x	x	x	x				x	x	
17		Coal		x	x	x		x	x					
18		Food					x							
19		Ind. Minerals			x	x	x	x				x	x	
20		Mining	General						x					
21			Ferrous		x				x					
22			Non-Ferrous						x	x				
23		Oil Refinery												
24		Paint/Pigment												
25		Phosphate		x				x	x					
26		Pulp/Paper	x		x	x	x	x	x		x	x	x	x
27		Sewage										x	x	
28		Silica										x	x	
29		Steel Mill												
30		Tannery/Textile												
31		Water	General		x	x	x	x	x			x	x	
32	Potable				*	*	*	*	*			*	*	
33	~	Cost, \$/lb						1.50	1.50					

			UNION CARBIDE CANADA LTD.										
			Polymer		Polyox								
			X-150		Coag- ulant								
1	CHARACTERISTICS	Charge	C		N								
2		Activity	h		-								
3		Type	PA		PEO								
4		Mol. Weight	L		H								
5		Form	LI		P								
6		pH	4.5										
7		Sp. Gravity	1.08		0.38								
8		Shelf Life	Several		12								
9	PROCESS	pH Range	1-12		2-10								
10		Clarification	x		x								
11		Thickening											
12		Dewatering	x		x								
13		C.C.D.											
14	FIELDS OF APPLICATION	Brines											
15		Chem. Plant			x								
16		Clay			x								
17		Coal			x								
18		Food											
19		Ind. Minerals											
20		Mining	General	x		x							
21			Ferrous										
22			Non-Ferrous			x							
23		Oil Refinery											
24		Paint/Pigment											
25		Phosphate				x							
26		Pulp/Paper	x		x								
27		Sewage			x								
28	Silica			x									
29	Steel Mill												
30	Tannery/Textile												
31	Water	General	x		x								
32		Potable	-		-								
33	~	Cost, \$/lb			1.25								