People & Technology Creating a Safer, Cleaner Environment

CleanHarbors®

Clean Harbors Env. Services, Inc.
Rumery Road Facility, South Portland, ME
Central Waste Treatment Facility

October 27, 2016

Complementary Networks

Clean Harbors

- Waste Management Facilities
- Landfill
- Solvent Recycling or Oil Recovery
- Treatment, Storage & Disposal Facility
- Transformer Processing Facility
- Wastewater Treatment
- Incineration
- Environmental Service Locations
- Energy & Industrial Services Locations
- Lodging Services Locations

Safety-Kleen

- Branch Service Centers
- Recycling Centers
- Manufacturing/Reconditioning
- Distribution Centers
- Accumulation Centers
- Oil Collection/Processing
- Oil Refineries
- Established EFS Hubs


WASTE WATER
WASTE WATER
RECLAIMED
RECLAIMED

Central Waste Treatment Facilities Subcategories

- A. Metals Bearing Waste
- B. Used/Waste Oil Bearing Waste
- C. Organics Bearing Waste
- D. Mixed Waste - Multiple Wastestreams

Oils Subcategory Determination

- Used Oil; Oil-Water Emulsions; Oil Spill Cleanup
- Lubricants; Coolants; Machine Cutting Oils
- Petrol Contaminated Groundwater ; Bilge Water
- Separator Waste; Oily Parts Cleaning

- **Analysis**: Total O&G > 100 mg/l

Metals Subcategory Determination

- Electroplating Baths; Metal Finishing Rinsewater
- Air Pollution Blowdown; Incineration Wastewater
- Waste Acids & Bases; Acidic/Basic Parts Wash
- Vibratory Deburring Wastewater

- **Analysis:**
- If Total O&G < 100 mg/l
- Cd > 0.2 mg/l; Cr > 8.9 mg/l; Cu > 4.9 mg/l
- Ni > 37.5 mg/l

Organics Subcategory Determination

- Landfill Leachate; Non-Petrol Cont. Groundwater
- Paint Wash water; Solvent Bearing Wastewater
- Adhesive/epoxy wastewater
- Chemical Production wastewater

- **Analysis**:

  Total O&G < 100 mg/l

  Metals Concentration < Metal SubCat Waste

WASTE MATERIAL PROFILE SHEET

Clean Harbors Profile No. CH1247156B

A. GENERAL INFORMATION

GENERATOR EPA ID #/REGISTRATION # ***NHD999999998*** GENERATOR NAME: [redacted]

GENERATOR CODE (Assigned by Clean Harbors) [redacted] CITY ***Manchester*** STATE/PROVINCE ***NH*** ZIP/POSTAL CODE ***03101***

ADDRESS [redacted]

PHONE: **(207) 947-7345**

CUSTOMER CODE (Assigned by Clean Harbors) [redacted] CUSTOMER NAME: [redacted]

ADDRESS [redacted] CITY ***Manchester*** STATE/PROVINCE ***NH*** ZIP/POSTAL CODE ***03101***

B. WASTE DESCRIPTION

WASTE DESCRIPTION: ***Oil and Water with sediment***

PROCESS GENERATING WASTE: **Elevator Shaft Cleanout**

IS THIS WASTE CONTAINED IN SMALL PACKAGING CONTAINED WITHIN A LARGER SHIPPING CONTAINER ? **No**

C. PHYSICAL PROPERTIES (at 25C or 77F)

PHYSICAL STATE

- SOLID WITHOUT FREE LIQUID
- POWDER
- MONOLITHIC SOLID
- [x] LIQUID WITH NO SOLIDS
- LIQUID/SOLID MIXTURE
  - % FREE LIQUID ***10.00 - 50.00***
  - % SETTLED SOLID ***30.00 - 70.00***
  - % TOTAL SUSPENDED SOLID ***10.00 - 30.00***
- SLUDGE
- GAS/AEROSOL

NUMBER OF PHASES/LAYERS

1 [x] 2 3

% BY VOLUME (Approx.)

TOP ***70.00***

MIDDLE ***0.00***

BOTTOM ***30.00***

VISCOSITY (If liquid present)

- [x] 1 - 100 (e.g. Water)
- 101 - 500 (e.g. Motor Oil)
- 501 - 10,000 (e.g. Molasses)
- > 10,000

COLOR

varies

ODOR

- [x] NONE
- MILD
- STRONG

Describe:

BOILING POINT °F (°C)

- <= 95 (<=35)
- 95 - 100 (35-38)
- 101 - 129 (38-54)
- [x] >= 130 (>54)

MELTING POINT °F (°C)

- < 140 (<60)
- 140-200 (60-93)
- [x] > 200 (>93)

TOTAL ORGANIC CARBON

- <= 1%
- 1-9%
- [x] >= 10%

FLASH POINT °F (°C)

- < 73 (<23)
- 73 - 100 (23-38)
- 101 -140 (38-60)
- 141 -200 (60-93)
- [x] > 200 (>93)

pH

- <= 2
- 2.1 - 6.9
- [x] 7 (Neutral)
- 7.1 - 12.4
- >= 12.5

SPECIFIC GRAVITY

- < 0.8 (e.g. Gasoline)
- 0.8-1.0 (e.g. Ethanol)
- [x] 1.0 (e.g. Water)
- 1.0-1.2 (e.g. Antifreeze)
- > 1.2 (e.g. Methylene Chloride)

ASH

- < 0.1
- 0.1 - 1.0
- 1.1 - 5.0
- 5.1 - 20.0
- > 20
- [x] Unknown

BTU/LB (MJ/kg)

- < 2,000 (<4.6)
- [x] 2,000-5,000 (4.6-11.6)
- 5,000-10,000 (11.6-23.2)
- > 10,000 (>23.2)

Actual:

D. COMPOSITION (List the complete composition of the waste, include any inert components and/or debris. Ranges for individual components are acceptable. If a trade name is used, please supply an MSDS. Please do not use abbreviations.)

CHEMICAL	MIN	--	MAX	UOM
HYDRAULIC OIL	10.0000000	--	30.0000000	%
SEDIMENT	40.0000000	--	80.0000000	%

E. CONSTITUENTS

Are these values based on testing or knowledge? ☑ Knowledge ☐ Testing

If based on knowledge, please describe in detail, the rationale applied to identify and characterize the waste material. Please include reference to Material Safety Data Sheets (MSDS) when applicable. Include the chemical or trade-name represented by the MSDS, and or detailed process or operating procedures which generate the waste.

customer chemical and process knowledge and review of material labels

Please indicate which constituents below apply. Concentrations must be entered when applicable to assist in accurate review and expedited approval of your waste profile. Please note that the total regulated metals and other constituents sections require answers.

RCRA	REGULATED METALS	REGULATORY LEVEL (mg/l)	TCLP mg/l	TOTAL	UOM	NOT APPLICABLE
D004	ARSENIC	5.0				☑
D005	BARIUM	100.0				☑
D006	CADMIUM	1.0				☑
D007	CHROMIUM	5.0				☑
D008	LEAD	5.0				☑
D009	MERCURY	0.2				☑
D010	SELENIUM	1.0				☑
D011	SILVER	5.0				☑

	VOLATILE COMPOUNDS	
D018	BENZENE	0.5
D019	CARBON TETRACHLORIDE	0.5
D021	CHLOROBENZENE	100.0
D022	CHLOROFORM	6.0
D028	1,2-DICHLOROETHANE	0.5
D029	1,1-DICHLOROETHYLENE	0.7
D035	METHYL ETHYL KETONE	200.0
D039	TETRACHLOROETHYLENE	0.7
D040	TRICHLOROETHYLENE	0.5
D043	VINYL CHLORIDE	0.2

	SEMI-VOLATILE COMPOUNDS	
D023	o-CRESOL	200.0
D024	m-CRESOL	200.0
D025	p-CRESOL	200.0
D026	CRESOL (TOTAL)	200.0
D027	1,4-DICHLOROBENZENE	7.5

OTHER CONSTITUENTS	MAX	UOM	NOT APPLICABLE
BROMINE			☑
CHLORINE			☑
FLUORINE			☑
IODINE			☑
SULFUR			☑
POTASSIUM			☑
SODIUM			☑
AMMONIA			☑
CYANIDE AMENABLE			☑
CYANIDE REACTIVE			☑
CYANIDE TOTAL			☑
SULFIDE REACTIVE			☑

HOCs	PCBs
☑ NONE	☑ NONE

F. REGULATORY STATUS

YES ☑ NO USEPA HAZARDOUS WASTE?

YES ☑ NO DO ANY STATE WASTE CODES APPLY?

Texas Waste Code

YES ☑ NO DO ANY CANADIAN PROVINCIAL WASTE CODES APPLY?

YES ☑ NO IS THIS WASTE PROHIBITED FROM LAND DISPOSAL WITHOUT FURTHER TREATMENT PER 40 CFR PART 268?

LDR CATEGORY: ***Not subject to LDR***
VARIANCE INFO:

YES ☑ NO IS THIS A UNIVERSAL WASTE?

☑ YES NO IS THE GENERATOR OF THE WASTE CLASSIFIED AS CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR (CESQG)?

YES NO IS THIS MATERIAL GOING TO BE MANAGED AS A RCRA EXEMPT COMMERCIAL PRODUCT, WHICH IS FUEL (40 CFR 261.2 (C)(2)(II))?

YES ☑ NO DOES TREATMENT OF THIS WASTE GENERATE A F006 OR F019 SLUDGE?

YES NO IS THIS WASTE STREAM SUBJECT TO THE INORGANIC METAL BEARING WASTE PROHIBITION FOUND AT 40 CFR 268.3(C)?

YES ☑ NO DOES THIS WASTE CONTAIN VOC'S IN CONCENTRATIONS >=500 PPM?

YES ☑ NO DOES THE WASTE CONTAIN GREATER THAN 20% OF ORGANIC CONSTITUENTS WITH A VAPOR PRESSURE >= .3KPA (.044 PSIA)?

YES ☑ NO DOES THIS WASTE CONTAIN AN ORGANIC CONSTITUENT WHICH IN ITS PURE FORM HAS A VAPOR PRESSURE > 77 KPA (11.2 PSIA)?

YES ☑ NO IS THIS CERCLA REGULATED (SUPERFUND) WASTE ?

YES ☑ NO IS THE WASTE SUBJECT TO ONE OF THE FOLLOWING NESHAP RULES?

Hazardous Organic NESHAP (HON) rule (subpart G) Pharmaceuticals production (subpart GGG)

YES NO IF THIS IS A US EPA HAZARDOUS WASTE, DOES THIS WASTE STREAM CONTAIN BENZENE?

YES NO Does the waste stream come from a facility with one of the SIC codes listed under benzene NESHAP or is this waste regulated under the benzene NESHAP rules because the original source of the waste is from a chemical manufacturing, coke by-product recovery, or petroleum refinery process?

YES NO Is the generating source of this waste stream a facility with Total Annual Benzene (TAB) >10 Mg/year?

What is the TAB quantity for your facility? Megagram/year (1 Mg = 2,200 lbs)

The basis for this determination is: Knowledge of the Waste Or Test Data Knowledge Testing

Describe the knowledge :

G. DOT/TDG INFORMATION

DOT/TDG PROPER SHIPPING NAME:

NON DOT REGULATED MATERIAL, (OIL, WATER)

H. TRANSPORTATION REQUIREMENTS

Pretreatment Standards – CWT Limits Technology Basis

- Metals Treatment
  - Primary Precipitation; Solids Separation; 2nd Precipitation;
  - Clarification & Sand Filtration
- Oils Treatment
  - Emulsion Breaking; Gravity Separation & DAF
- Organics Treatment
  - Equalization & Biological Treatment.

Clean Harbors
ENVIRONMENTAL SERVICES

Rumery Road Facility
Wastewater Discharge Limitations

	South Portland Limits	South Portland Limits	CWT Limits Monthly Avg	CWT Limits Daily Max	Frequency	Sample Type
Sample Point	SP002	SP002	SP001	SP001		
Parameter	lbs/day	mg/l	mg/l	mg/l		
Antimony			0.206	0.249	Biannual	Comp
Arsenic	0.01	*0.024	0.104	0.162	Monthly	Comp
Cadmium		0.13	0.0962	0.474	Monthly	Comp
Chromium		4.7	0.487	0.947	Monthly	Comp
Cobalt			0.124	0.192	Biannual	Comp
Copper		0.89	0.301	0.405	Monthly	Comp
Lead		0.33	0.172	0.222	Monthly	Comp
Mercury		0.0024	0.000739	0.00234	Monthly	Comp
Molybdenum	5.05	*12.1			Monthly	Comp
Nickel		0.72	1.45	3.95	Monthly	Comp
Silver		0.30	0.0351	0.12	Monthly	Comp
Tin			0.120	0.409	Biannual	Comp
Titanium			0.0618	0.0947	Biannual	Comp
Vanadium			0.0662	0.218	Biannual	Comp
Zinc		1.30	0.641	2.87	Monthly	Comp
pH		5.0 - 12.0			Monthly	Grab
Flash Point		> 140'			Monthly	Grab
Cyanide		0.12			Monthly	Grab
Flouride		81.0			Monthly	Comp
Ammonia		120			Monthly	Comp
COD					Monthly	Grab
BOD	3000	*7194			Monthly	Comp
TSS		none	none	none	Monthly	Comp
Oil&Grease		100			Monthly	Grab
VOA Volatile Organic Analysis (624)					Biannual	Grab
SVOA Semi Volatile Organic Analysis (8270 & 625)			see list	see list	Biannual	Comp
Cyanide - Sample Point SP003			500	178	Biannual	Grab

*Maximum Concentration at Maximum Daily Discharge Volume(50,000 gal/day)

*Mass Limit - pounds per day

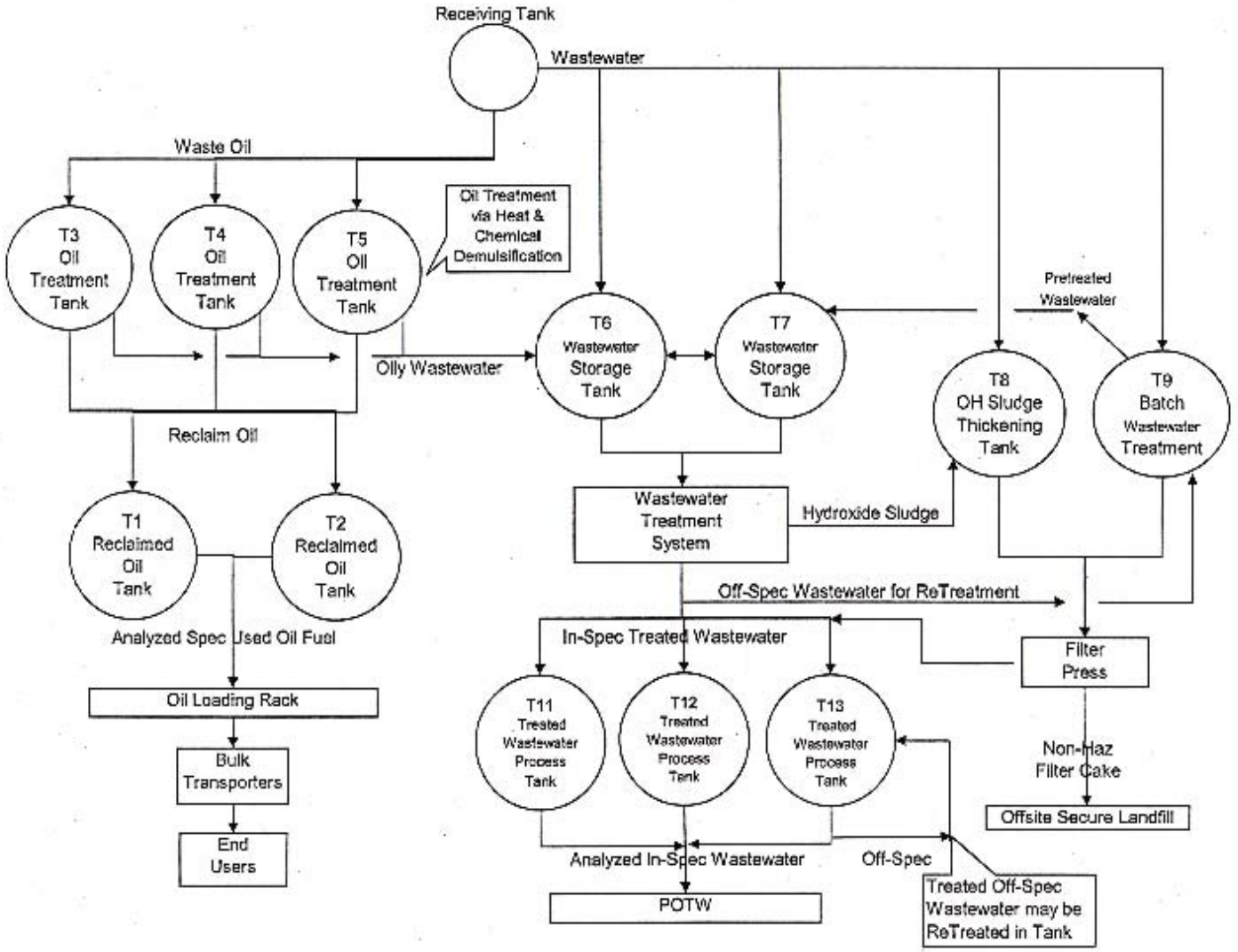
CWT Organic Limits

CleanHarbors ENVIRONMENTAL SERVICES®

Rumery Road Facility
Wastewater Discharge Limitations

Sample Point 001	CWT Mixed Waste Limits		
		Daily Max	Monthly Avg
		mg/l	mg/l
Bis[2-ethylhexyl]phthalate		0.267	0.158
Carbazole		0.392	0.233
o-Cresol	2-Methylphenol	1.92	0.561
p-Cresol	4-Methylphenol / 2	0.698	0.205
n-Decane *	CAS 124-18-5	5.79	3.31
Fluoranthene		0.787	0.393
n-Octadecane *	CAS 593-45-3	1.22	0.925
2,4,6-Trichlorophenol		0.155	0.106

Oil Reclamation Process




XXX
XXXXXX
XXXXXX

Clean Harbors Env.Services, Inc., Rumery Road Facility, Prequalification Analysis

Generator	
Location	
Profile	
Sample Description	

Date:	
RU Prequal ID	
CHESI Contact:	
Analyst:	

		Units	Description
%Oil		%	
%Water		%	
%Sediment		%	
% Rag		%	

Treatability	
Chelator	
Treated Solids	% Settled
	% Centrifuged

Total Halogens		ppm
PCB's		ppm
Flash Point		Deg F
pH		S.U.
Cyanide Screen		Pos/Neg
Sulfide Screen		Pos/Neg
Ammonia Screen		ppm
Fluoride Screen		ppm
Acid Reaction		Pos/Neg
Base Reaction		Pos/Neg
COD		ppm

Comments

				Units
Sample Phase				
Metals Prep				
Antimony				mg/l
Arsenic				mg/l
Cadmium				mg/l
Chromium				mg/l
Cobalt				mg/l
Copper				mg/l
Lead				mg/l
Mercury				mg/l
Molybdenum				mg/l
Nickel				mg/l
Silver				mg/l
Tin				mg/l
Titanium				mg/l
Vanadium				mg/l
Zinc				mg/l
Iron				mg/l
Barium				mg/l
Selenium				mg/l

Treatability

Jar Number	Volume	pH
	150ml	
Spike Solution	5 mls	
Sulfuric	drops	
PAC (1lb/gal)	5 mls	
Gen Coag 10%	2 mls	
Lime (1lb/gal)	mls	
Polymer	2 mls	

Supernate Color
Supernate Clarity
Sludge Filterability

Notes:

For CHESI use only.

Analysis for internal facility acceptance screening.

ND = Not Detected

N/A = Not Applicable or Not Analyzed


12 PCS.
FLINT
S/S JAR
16 OZ.
12 PCS.
FLINT
S/S JAR
16 OZ.
12 PCS.
FLINT
S/S JAR
16 OZ.
12 PCS.
FLINT
S/S JAR
16 OZ.
S/S JAR
16 OZ.
Lucerin


5890


DURICON
SAFETY STORAGE CABINET
NITRIC ACID


CARCINOGEN


2118
CleanHarbors
7500 GALS
1179
4015
P827301


CleanHarbors
CleanHarbors
OIL RECYCLING DIVISION
310E

Drum Number	Scanned	FC & Pump

CleanHarbors
ENVIRONMENTAL SERVICES®

Fleet #_____
Front Middle Back

Clean Harbors Environmental Services, Inc.
37 Rumery Road
South Portland, ME 04106
(207) 772-2201
MED980672182

CleanHarbors

Manifest #	Profile #	CH Sales Driver #	Date

Generator Site	Generator EPA ID Number / Waste Codes	CWT Category: Metals Oils Organics Final Code: A31 A32 B26 CNOS

Transporter & EPA ID Number		Driver	Sampler
Clean Harbors Environmental Services, Inc.	MAD039322250		

Sample Physical Description:

Sample Phase Breakdown

Sample	Oil%	Water%	Sediment%	Rag%
Centrifuge				
BS&W				

Estimated Truck Heal

Sampling	Offloading	Post Rinse
Inches	gals	gals

Offloading Activity

Total Gallons	Oil	Tank#	Aqueous	Tank#	Solids	Activity: Steam Offload Rinse	Operator

Sample Analysis

Analysis Parameter	Oil Phase Result	Oil Phase Acceptance Limit	Aqueous Phase Result	Aqueous Phase Acceptance Limit	Units	Method	Analyst
Total Halogens		< 1000			ppm	EPA SW-846-9077	
Flash Point		>100°		>140°	°F	ASTM D-3278	
PCB's		< 2.0		<0.003	ppm	EPA PCB Report 600/4-81-045	
Cyanide Screen				**	Pos / Neg	Cyantesmo Paper	
Ammonia Screen				**	Pos/Neg/ppm	Test Paper or Quantofix	
pH Screen				2.0 - 12.5	Std Units	pH Paper/EPA 150.1	
Sulfide Screen				**	Pos / Neg	Lead Acetate Paper	
Total Sulfides				500	ppm	Hach Method 8131	
H2S Gas				100	ppm	CHESI SOP-61RD-601	
Metals Analysis	Yes / No	See Attached				EPA 200.7	

Notes: *This load is recommended for acceptance.* Initials

Offloading, Treatment, H&S Issues:

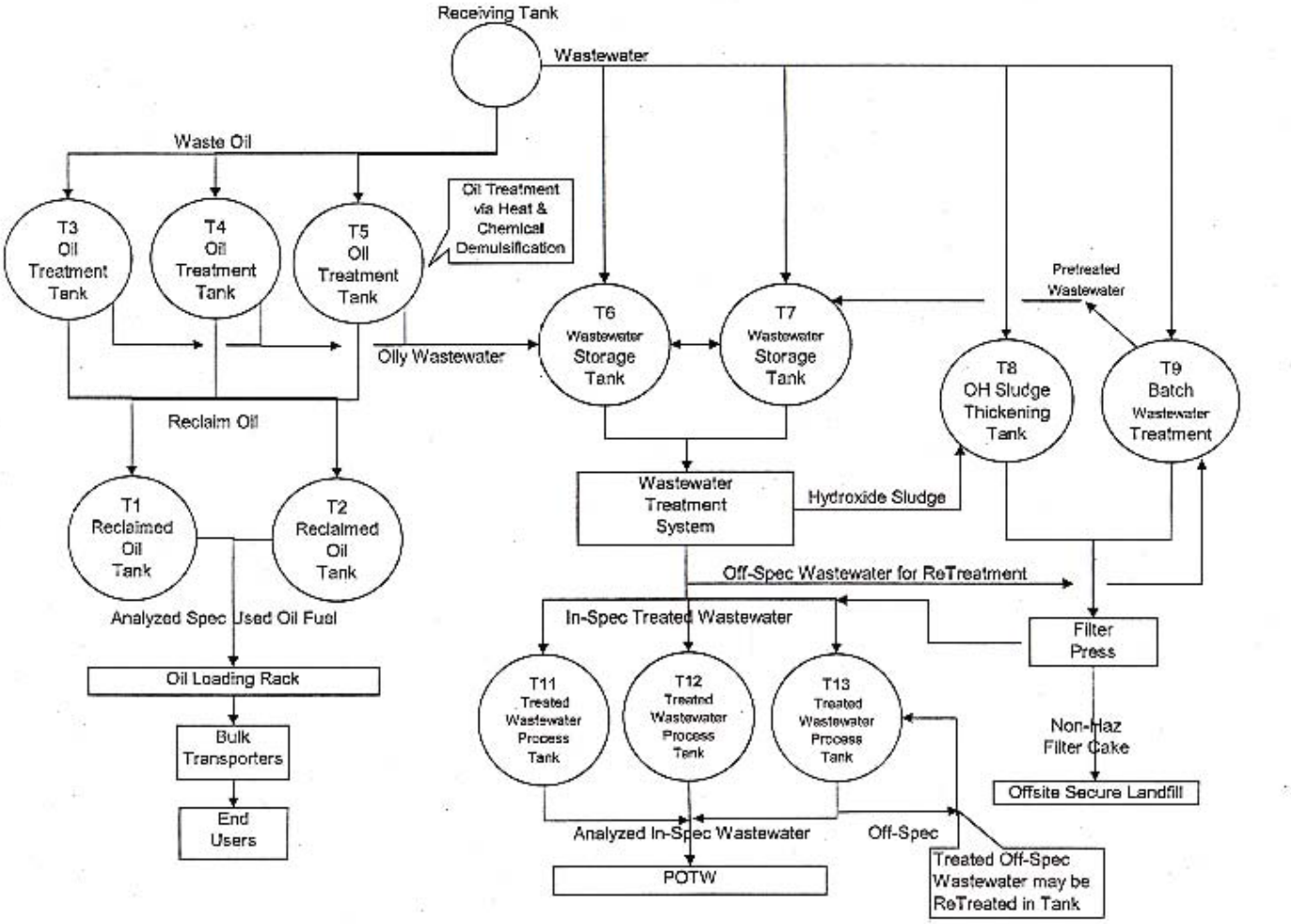
** Acceptance based upon Treatability and Health & Safety.

Billing Comments GM Init

	Minimum Charge:			Tank Wash:		XXX
	Steam:					$
	Heal Charge:	_____	Gals	X $ XXX /gal =		$
	Base Disposal Price:	_____	Gals	X $_____ / gal =		$
	Suspended Solids Surcharge:	_____	Gals	X $_____ / gal =		$
						$

Analysis results are for Clean Harbors Env. Services, Inc. internal use only.

Oil Reclamation Process




TANK
HEAT
VALVE
TREAT
INCOMING
RECLAIM LOADS
130'
ON
CLOSED
116028
10-21
2 10'
ON
OPEN
216028
10-21
3 10'6"
off
All H2O
Closed
4 20'10"
off
open
5 3'8"
ON/ON
Closed
Treated w/ 1/2 AS35 10/24
6 8'
open/open
EQUAL LINE
OPEN
7 8'
closed/CLOSED
8 rec <1/2
FILTER PRESS 70#
HO-CAN
TANK 9
5K BRUCIN
+r+d
Pressing
DISCHARGE
11 Dis
12 Full-TBD
13 Rec
BOILER
DATE oct 24, 2016
GALLO 3729
INCHE 68
RECLAIM LOADS
REJECTED DRUMS
LOAD
BOILER CLEANING TUESDAY AM

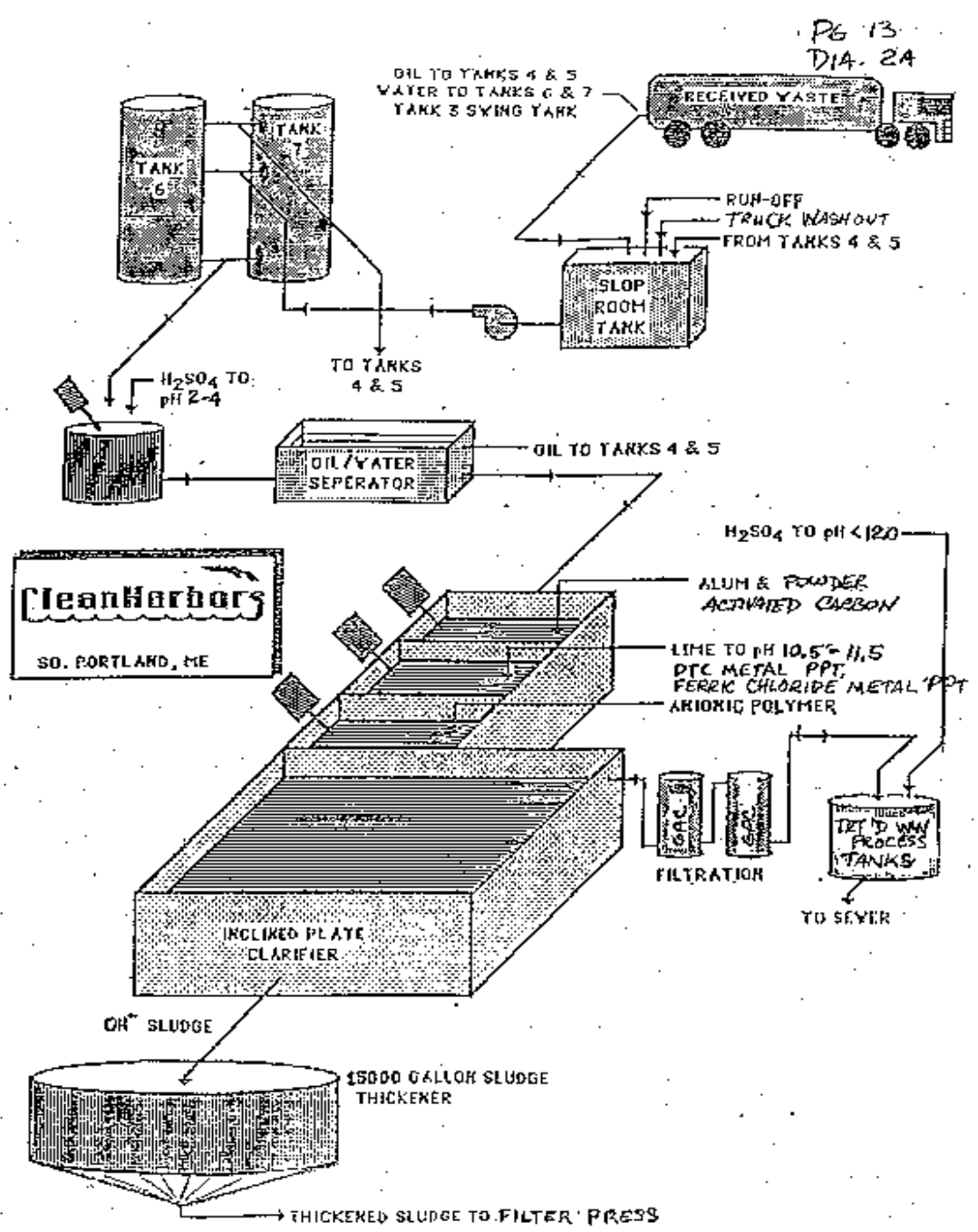

ATER
RECLAIMED OIL
1
RECLAIMED OIL
2


10-4
9-20
9-19
10-24
10-19
10-14
9-26
9-29
9-30
10-10
10-6
10-20
ThermoFisher
SCIENTIFIC


WASTE WATER
WASTE WATER
RECLAIMED
RECLAIMED

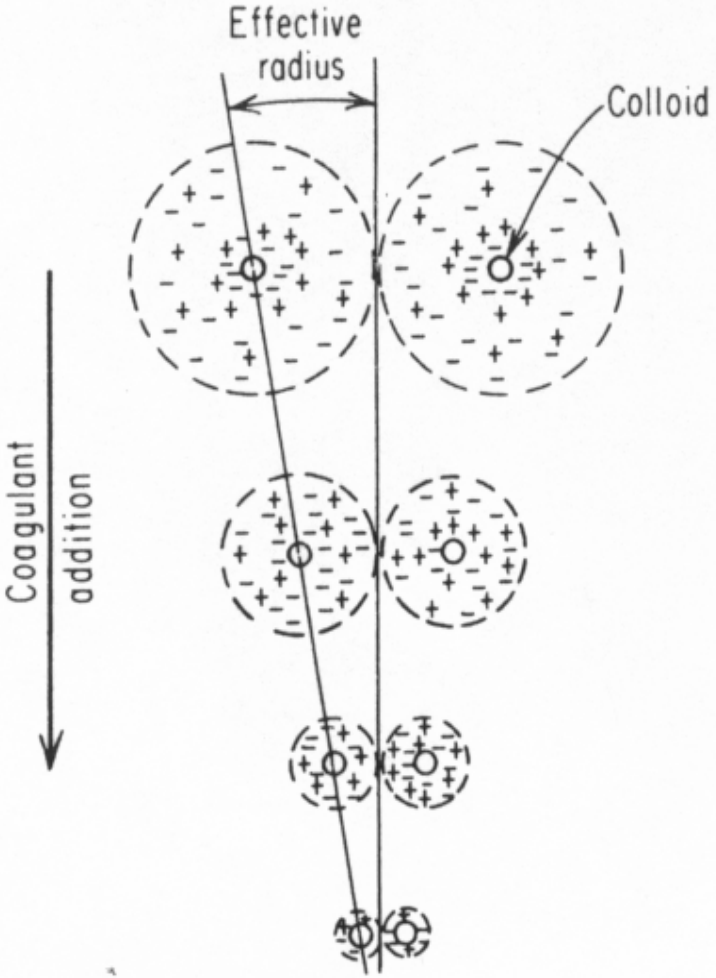
Central Waste Treatment Facilities Subcategories

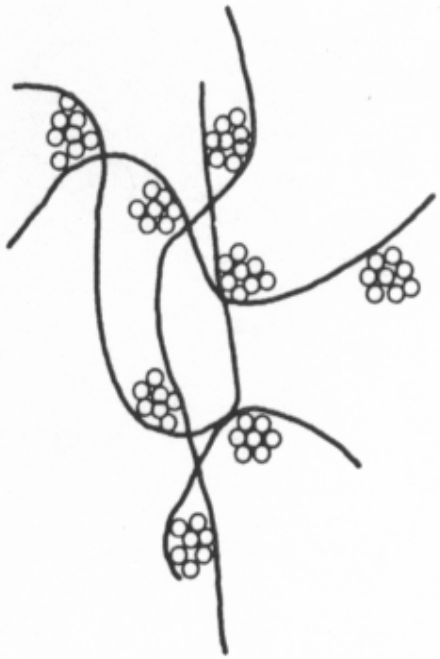
- A. Metals Bearing Waste
- B. Used/Waste Oil Bearing Waste
- C. Organics Bearing Waste
- D. Mixed Waste


Pg 13
Dia. 24
OIL TO TANKS 4 & 5
WATER TO TANKS 6 & 7
TANK 3 SWING TANK
RECEIVED WASTE
TANK 6
TANK 7
RUN-OFF
TRUCK WASHOUT
FROM TANKS 4 & 5
SLOP ROOM TANK
TO TANKS 4 & 5
H_2SO_4 TO pH 2-4
OIL/WATER SEPERATOR
OIL TO TANKS 4 & 5
H_2SO_4 TO pH <120
CleanHarbors
SO. PORTLAND, ME
ALUM & POWDER ACTIVATED CARBON
LIME TO pH 10.5-11.5
DTC METAL PPT.
FERRIC CHLORIDE METAL PPT
ANIONIC POLYMER
GAC
GAC
FILTRATION
TRT'D WW PROCESS TANKS
TO SEWER
INCLINED PLATE CLARIFIER
OR SLUDGE
15000 GALLON SLUDGE THICKENER
THICKENED SLUDGE TO FILTER PRESS


108971
DO NOT REMOVE
COM
CPU
PWR
22/10/16
02:38:06
FLOW VALVE IN MANUAL
5:14:44
WASTE WATER FEED
ACIDIFICATION TANK
SECOND STAGE REACTION
HEAD TANK
H_2O
H_2SO_4
$Ca(OH)_2$
H_2O
EMO
FLOW 59
2.47
12.48 pH
-0.63
2.63 DEVIATION
LOW LEVEL 10
3.10
9.85 SETPOINT
0.20
0.20 DEADBAND
1.00
7.00 LOW LEVEL
VALVE 55 %
7.00
13.50 HIGH LEVEL
FLOW SCALE GPM
100

THE NALCO WATER HANDBOOK





- Coagulation

Flocculation

Coagulation & Flocculation:

Coagulation:

The charge neutralization of colloidal matter. To destabilize the charge, usually negative, surrounding the colloid.

The stronger the repulsive forces the more stable the colloidal suspension, and the longer the particle will take to settle by gravity.

Colloid or Colloidal Particle:

Matter of very fine particle size. Colloids are suspensions, which give water a turbid or hazy appearance.

Flocculation:

The process of agglomerating coagulated particles into a settleable floc. "Floc Building Stage."

Coagulants:

-Iron Salts

Ferric Choride	$FeCL_3$
Ferric Sulfate	$Fe_2(SO_4)_2$
Ferrous Sulfate	$FeSO_4$

-Aluminum Salts

Aluminum Sulfate (Alum)	$Al_2(SO_4)_3$
Aluminum Chloride	$AlCl_3$

-Poly-Aluminum Chlorides PAC

-Lime $Ca(OH)_2$

-Polyelectrolytes

Charged Polymers

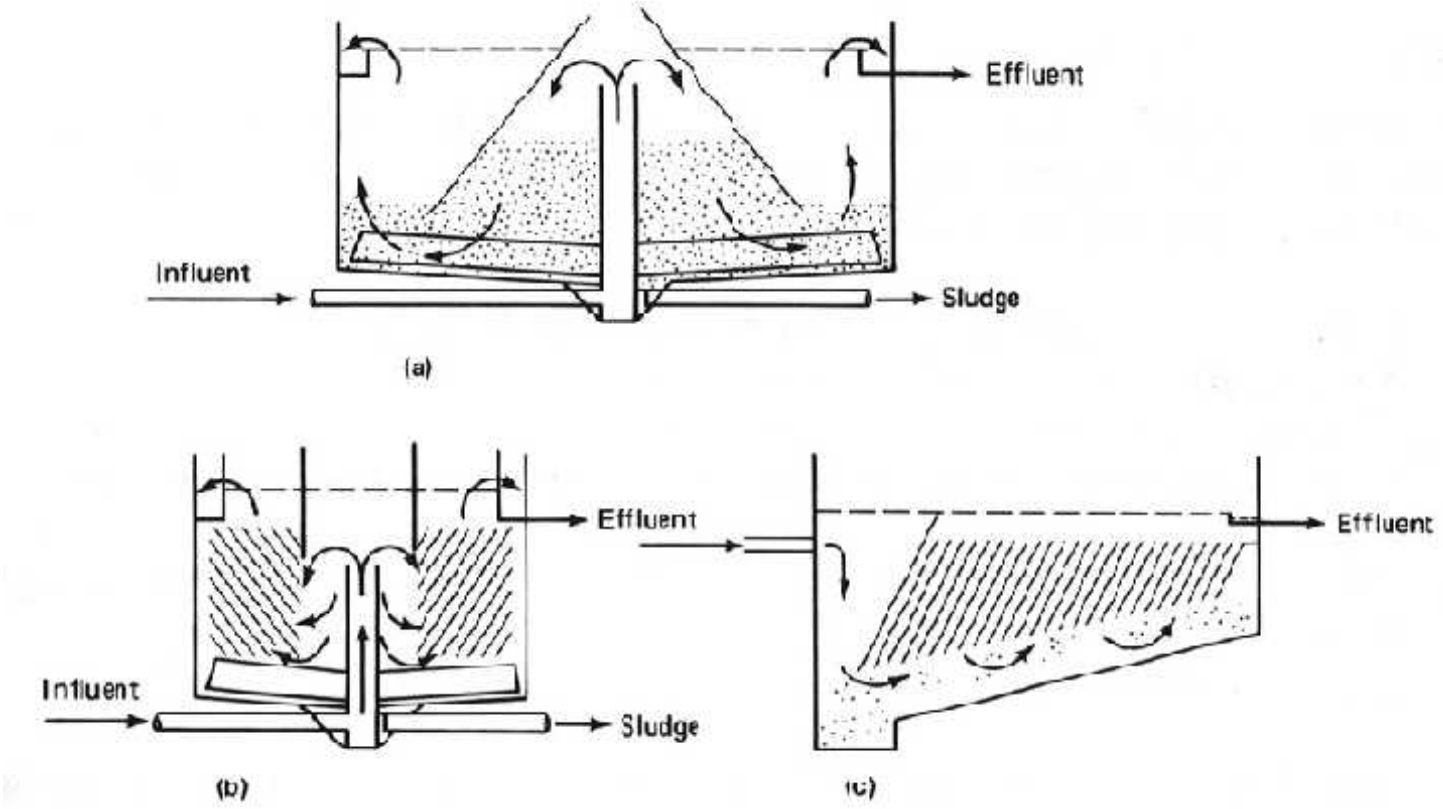

30yd
CHEM-CAL
OVERPACK

Metals Removal – Chemical Treatment

- Hydroxide Precipitation
  - Metal Hydroxide Floc = Insoluble
    - Lime: Calcium Hydroxide
    - Sodium Hydroxide
- Sulfide Precipitation
  - Metal Sulfide Precipitate. Less Solubility than OH
- Carbamate Precipitation
  - DiThioCarbamate - DTC
  - Chelate Breaker & Chelator!
    - May strip metals out of Filter Press or Carbon Contactors
- Iron Co-Precipitation
  - Ferric Chloride & Ferrous Sulfate
  - Molybdenum, Vanadium, Antimony


1
0
1
0

Incline Plates




SoftPull
RIDGID

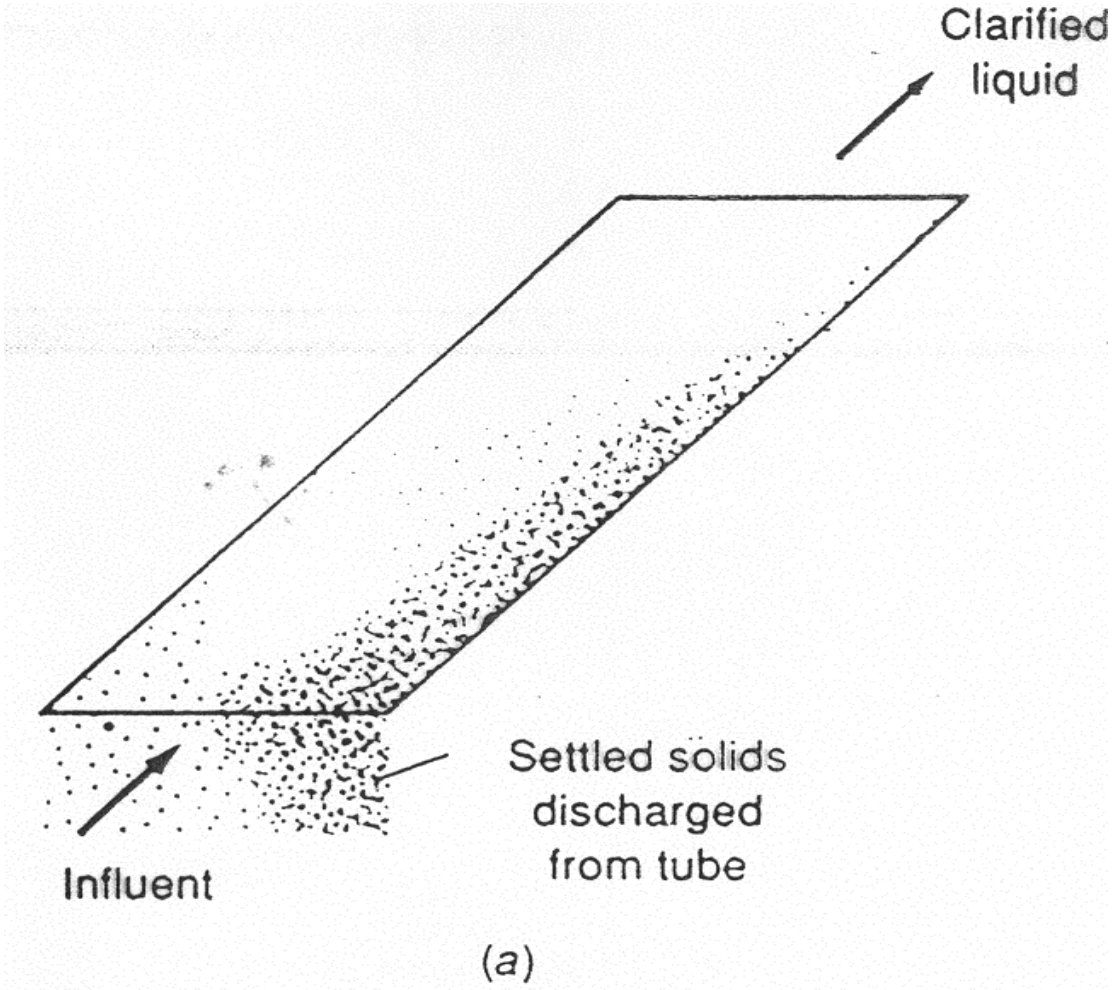


FIGURE 6-13
Typical inclined tube settler: (a) operation

From: WASTEWATER ENGINEERING, TREATMENT, DISPOSAL, AND REUSE, Third Edition, Metcalf and Eddy, Inc., 1979, McGraw-Hill Publishers


11
WATER
12


NON HAZ
8
NON HAZ
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JWI
INGERSOLL-RAND

CHESI Rumery Road Facility *Wastewater Discharge Analysis Log*

	South PortId Limits	South PortId Limits	CWT Limits Monthly Avg	CWT Limits Daily Max	Date							
					Time							
					Sample							
					Analyst							
Parameter	lbs/day	mg/l	mg/l	mg/l	Prep							
Antimony			0.206	0.249	**********							Sb
Arsenic	0.01	*0.024	0.104	0.162	**********							As
Cadmium		0.13	0.0962	0.474	**********							Cd
Chromium		4.7	0.487	0.947	**********							Cr
Cobalt			0.124	0.192	**********							Co
Copper		0.89	0.301	0.405	**********							Cu
Lead		0.33	0.172	0.222	**********							Pb
Mercury		0.0024	0.000739	0.00234	**********							Hg
Molybdenum	5.05	*12.1			**********							Mo
Nickel		0.72	1.45	3.95	**********							Ni
Silver		0.30	0.0351	0.12	**********							Ag
Tin			0.120	0.409	**********							Sn
Titanium			0.0618	0.0947	**********							Ti
Vanadium			0.0662	0.218	**********							V
Zinc		1.3	0.641	2.87	**********							Zn
pH		5.0 - 12.0			**********							
Flash Point		> 140'			**********							
Cyanide		0.12			**********							
Flouride		81.0			**********							
Ammonia		120			**********							
COD					**********							
BOD - est.	3000	7194			**********							
DTC Check					**********							
Color					**********							
Clarity					**********							
Discharge Thru Filter Bag (Yes/No)												
Comments												
Discharge Initials												
Discharge Date					**********							

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Day:_____ Date:_____

Daily Discharge Pounds Calculation Worksheet

Arsenic **Max Daily Discharge = 0.01 lbs**

Tank	Conc. (ppm)	X	Volume (gals)	÷	1,000,000	X	Weight of Water lbs/gal	=	Pounds per Tank	Total Pounds
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		

Molybdenum **Max Daily Discharge = 5.05 lbs**

Tank	Conc. (ppm)	X	Volume (gals)	÷	1,000,000	X	Weight of Water lbs/gal	=	Pounds per Tank	Total Pounds
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		

BOD **Max DailyDischarge = 3000 lbs**

Tank	Conc. (ppm)	X	Volume (gals)	÷	1,000,000	X	Weight of Water lbs/gal	=	Pounds per Tank	Total Pounds
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		
		X		÷	1,000,000	X	8.34	=		

Pounds = (Concentration) X (Volume MG) X (Water Density)

= (ppm) X (gallons) ÷ (1,000,000) X (8.34 lbs/gal)

Gals = $\frac{(\text{lbs}) \times (1{,}000{,}000)}{(\text{ppm}) \times (8.34)}$ = (lbs) ÷ (ppm) ÷ (8.34) X (1,000,000)


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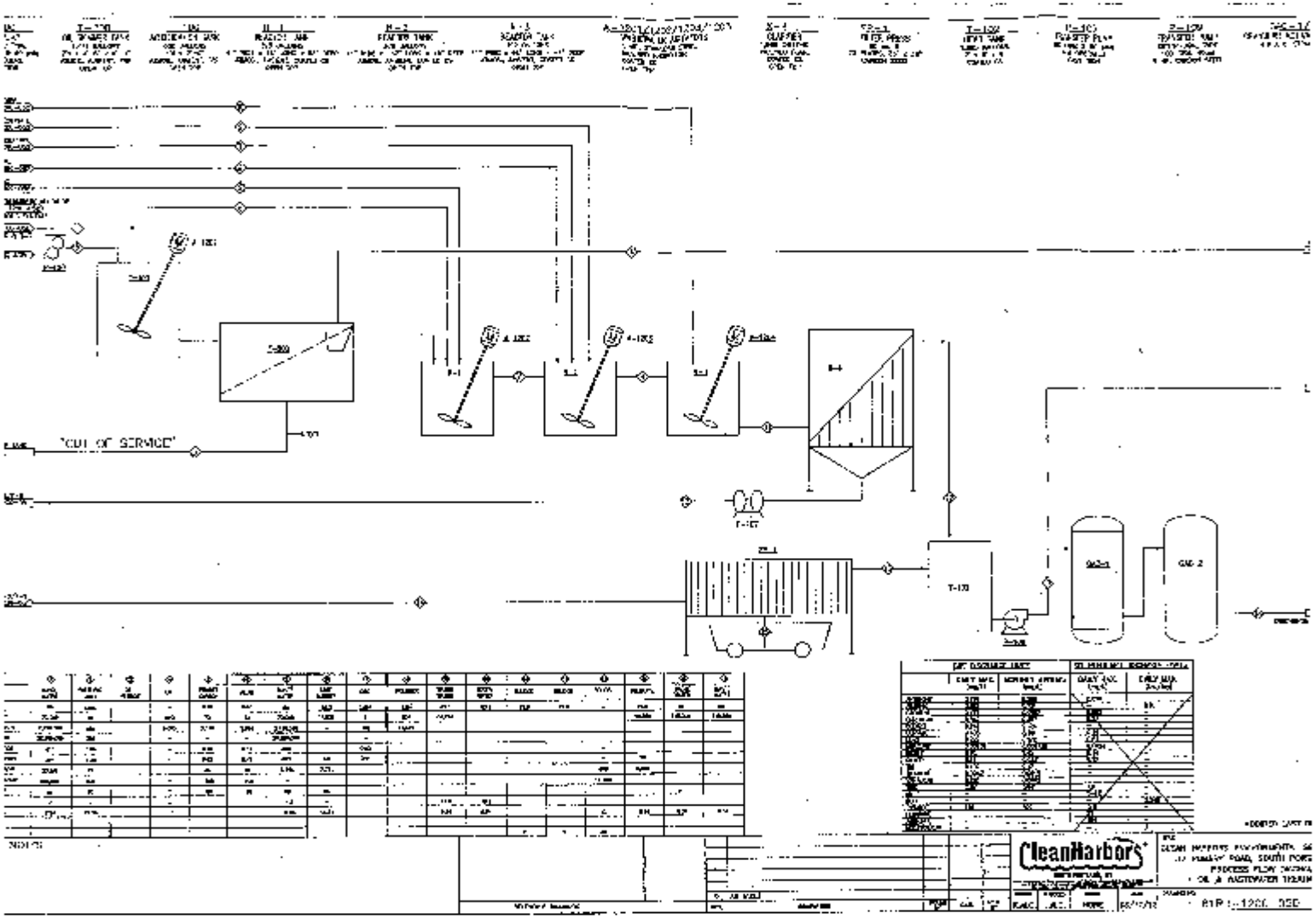
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A Sample Text & Picture Placement Slide

Use this area for graphics, such as photo images.

Delete this box and text before placing your graphic images.


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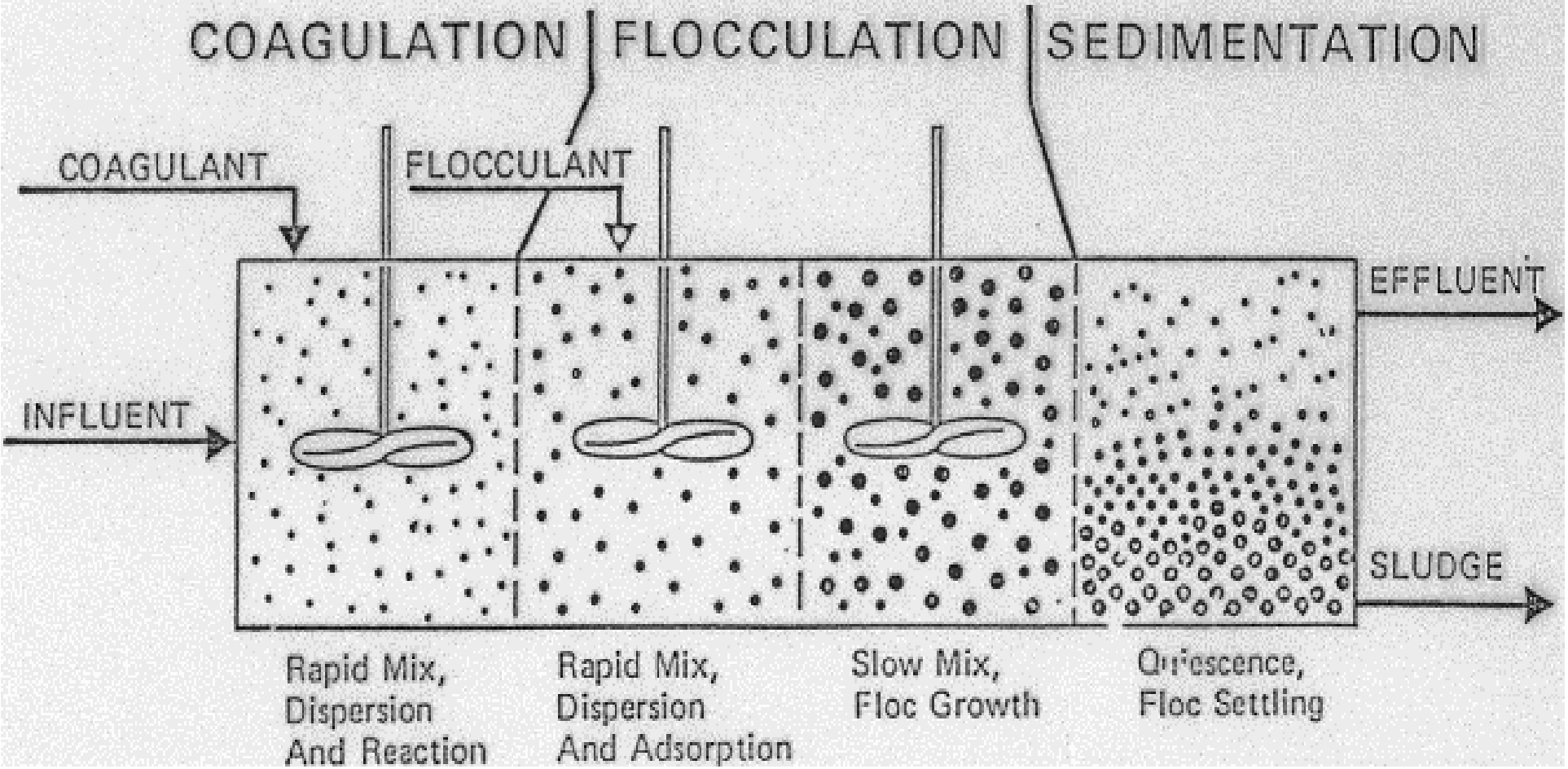
From: Industrial Wastewater Pretreatment Seminar, University of Toledo, given March30, 1995, at Somerville, MA

COAGULATION/FLOCCULATION PROCESS SEQUENCE



Settling Rates

Typical	mm	μm	Surface area (total)	Settling time, 1 m fall
Gravel	10.	10,000	3.14 cm^2	1 s
Coarse sand	1.	1,000	31.4 cm^2	10 s
Fine sand	0.1	100	314 cm^2	125 s
Silt	0.01	10	0.314 m^2	108 min
Bacteria	0.001	1.	3.14 m^2	180 hr
Colloidal matter	0.0001	0.1	31.4 m^2	755 days

NOTE: Particles larger than 100 μm are visible to the naked eye and are considered to be settleable solids. In the range of 10–100 μm, they are considered to be turbid. Below 10 μm they are considered colloidal. Particles larger than 0.1 μm are visible by light microscope; below 0.1 μm, the electron microscope is used for detection.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