The Atlas Tack Site: Enhanced Wetland Mitigation as Part of a Superfund Remedy

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Site Background

- Atlas Tack Corporation operated from 1901 to 1985
- Site is comprised of approx. 48 acres
- Manufactured wire tacks, steel nails, rivets, bolts, and similar items
- The facility's operations included electroplating, acid-washing, enameling and painting

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Site Background (con't)

- From 1940 to 1980, wastewater was discharged into floor drains, on-site lagoon and adjacent wetland
- Solid and liquid wastes were disposed of on-site and also filled in a portion of the wetland

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Contaminants of Concern

- Metals:
  cadmium, chromium, copper, nickel, lead and zinc
- Cyanide
- PCBs (in soils)
- sVOCs – mainly PAHs (in groundwater)
- VOCs – mainly toluene (in groundwater)
- Pesticides (low concentrations)

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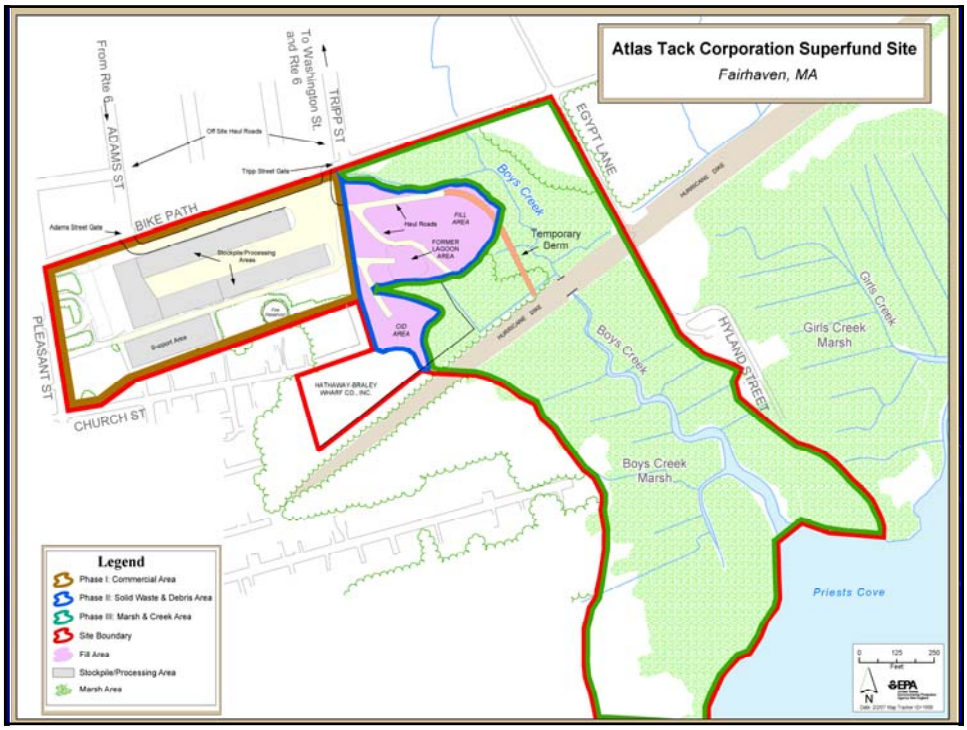

Phase I: Specific Buildings

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Phase II: Solid Waste and Disposal Area – 9 acres

- Excavation and off-site disposal of approx. 38,000 cubic yards of contaminated soil and debris in the Solid Waste and Disposal Area
- Contaminated soil and debris disposed off-site
- Cost $14,000,000
- Completed April 2007

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Phase III: Marsh Area – 5.4 acres

- Excavation of 36,400 cy contaminated marsh soil and creek bed sediment
- Restoration of the marsh
- Cost $5,300,000

Environmental Risks

- Movement of contamination to groundwater, surface water and creek sediment from Commercial Area, Solid Waste & Disposal Area, and marsh surface soil
- Exposure of biota to contaminated surface soil & sediment in Solid Waste & Disposal Area and Marsh Area and to contaminated Boys Creek surface water & sediment.

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Screening Quick Reference Table for Inorganics in Sediment

These tables were developed for internal use for screening purposes only; they do not represent official NOAA policy and do not constitute criteria or clean-up levels.
All attempts have been made to ensure accuracy; however, NOAA is not liable for errors. Values are subject to changes as new data become available.

Analyte		Freshwater Sediment									Marine Sediment						
All concentrations in parts per billion unless specified otherwise		"Background"	ARCS *H. azteca* TEL [a]	Consensus TEC [c]	TEL [b]	LEL [g]	Consensus PEC [c]	PEL [b]	SEL [g]	UET	T20 [c]	TEL [d]	ERL [f]	T30 [c]	PEL [d]	ERM [f]	AET [h]
Aluminum (%)	Al	0.26%	2.55%														1.8% N
Antimony	Sb	160								3,000 M	630			2,400			9,300 E
Arsenic	As	1,100	10,798	9,790	5,900	6,000	33,000	17,000	33,000	17,000 I	7,400	7,240	8,200	20,000	41,600	70,000	35,000 B
Barium	Ba	700										130,100#					48,000 A
Cadmium	Cd	100-300	500	990	596	600	4,900	3,530	10,000	3,000 I	300	600	1,200	1,400	4,210	9,600	3,000 N
Chromium	Cr	7,000-13,000	36,286	43,400	37,300	26,000	111,000	90,000	110,000	95,000 H	49,000	52,300	81,000	141,000	160,000	370,000	62,000 N
Cobalt	Co	10,000				50,000+											10,000 N
Copper	Cu	10,000-25,000	28,012	31,600	35,700	16,000	149,000	197,000	110,000	86,000 I	32,000	18,700	34,000	94,000	108,000	270,000	390,000 MO
Iron (%)	Fe	0.99-1.8 %	18.84%			2%			4%	4% I							22% N
Lead	Pb	4,000-17,000	37,000	35,800	35,000	31,000	128,000	91,300	250,000	127,000 H	30,000	30,240	46,700	94,000	112,000	218,000	400,000 B
Manganese	Mn	400,000	630,000			460,000			1,100,000	1,100,000 I							260,000 N
Mercury	Hg	4-51		180	174	200	1,060	486	2,000	560 M	140	130	150	480	700	710	410 M
Nickel	Ni	9,900	19,514	22,700	18,000	16,000	48,600	36,000	75,000	43,000 H	15,000	15,900	20,900	47,000	42,800	51,600	110,000 EL
Selenium	Se	290															1,000 A
Silver	Ag	<500				500 +				4,500 H	230	730	1,000	1,100	1,770	3,700	3,100 B
Strontium	Sr	49,000															
Tin	Sn	5,000										48 *					> 3,400 N
Vanadium	V	50,000															57,000 N
Zinc	Zn	7,000-38,000	98,000	121,000	123,000	120,000	459,000	315,000	820,000	520,000 M	94,000	124,000	150,000	245,000	271,000	410,000	410,000 I
Lead 210 ^{210}Pb dpu						0.5 ^			< 9.7 ^								
Polonium 210 ^{210}Po dpu						0.6 ^			< 8.7 ^								
Radium 226 ^{226}Ra dpu						0.1 ^			< 13 ^								
Sulfides										130,000 M							4,500 MO

- Based on SLC approach using sensitive species HC5%; ES&T 2005 39(14):5148-5156.
* - Based upon EQp approach using current AWQC CCC
^ - Based on SLC approach to derive LEL and SEL; Env'al Monitor & Ass'ment 2005 110:71-85
+ - Carried over from Open Water disposal Guidelines; treated as if LEL for management decisions.
I – Infaunal community impacts
Bioassay endpoints: M – Microtox; B – Bivalve; E – Echinoderm larvae; O – Oyster larvae; A – Amphipod;

a EPA 905-R96-008
b Arch ET&C 2000, 39(1)20- Also known as Canadian ISQGs and PELs
c ET&C 2002, 21(9)1993-
d Ecotox. 1996, 5(4):253-
e EPA 905/R-00/007
f Env'al Mang 1995, 19(1):81-
g Guidelines for the protection and management of aquatic sediment quality in Ontario Aug 1993

$$\text{ERM-Q} = \frac{1}{n}\sum_{i=1}^{n}\frac{COC_i}{ERM_i}$$

Toxic Data Set (mg/kg)

Chemical = Station	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	ER-M Quotient
ER-M =	9.6	370	270	218	52	410	
N-24 (a)	1.94	384	1800	465	104	2340	17.8/6 = 3.0
L-34 (a)	4.88	138	903	303	72	1150	9.8/6 = 1.6
P-22 (b)	0.5	627	2450	640	75	1670	18/6 = 3.0
L-18 (b)	0.3	80	730	173	30	405	5.4/6 = 0.9
P-18 (b)	0.4	158	611	179	37	509	5.5/6 = 0.9
Q-29 (c)	4.79	156	944	221	94	1300	10.4/6 = 1.7
L-31 (c)	6.71	64	364	117	88	872	6.6/6 = 1.1
M-31 (c)	13.50	127	1040	215	109	1220	11.8/6 = 2.0

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Non-Toxic Data Set (mg/kg)

Chemical = Station	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	ER-M Quotient
ER-M =	9.6	370	270	218	52	410	
S-25 (d)	1.5	27.1	291	216	21.8	228	3.2/6 = 0.5
R-24 (e)	0.32	277	458	349	42	627	6.4/6 = 1.1
S-09*	0.87	2.7	3.6	27	2.1	26.9	0.35/6 = 0.06
S-05*	1.46	6.6	8.2	9.8	5.7	17.3	0.45/6 = 0.08
S-04*	1.43	15.7	76.8	118	10.8	54.1	1.32/6 = 0.22

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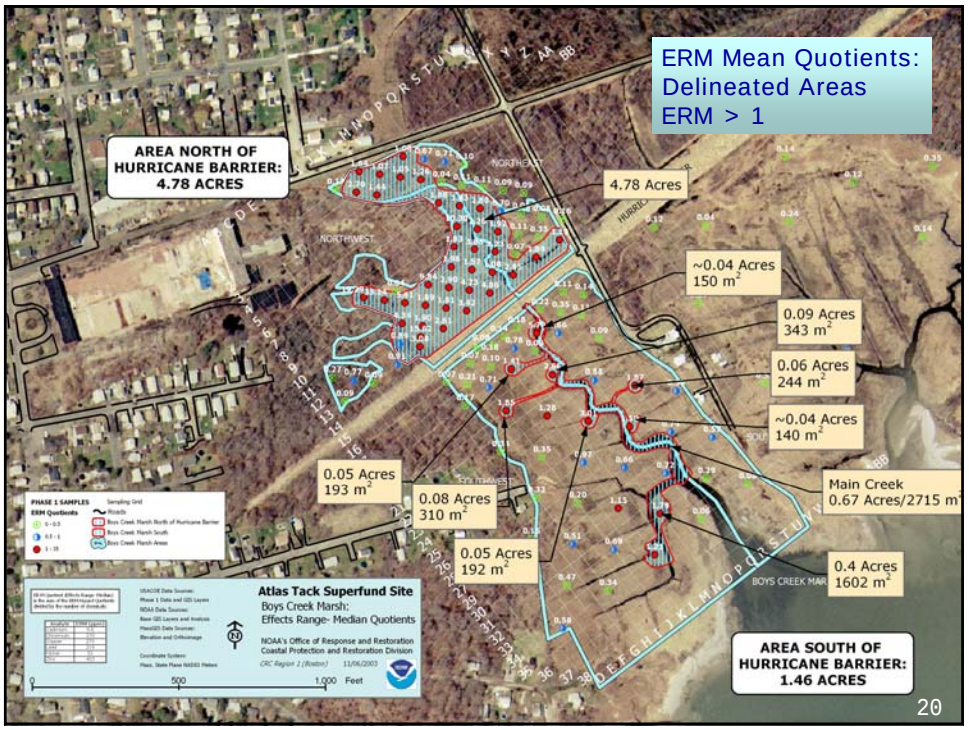
NORTHEAST
NORTHWEST
SOUTHEAST
SOUTHWEST
HURRICANE BARRIER
BOYS CREEK MARSH
Atlas Tack Superfund Site
Boys Creek Marsh:
Effects Range- Median Quotients
NOAA's Office of Response and Restoration
Coastal Protection and Restoration Division
500
1,000 Feet


ERM Mean Quotients:
Delineated Areas
ERM > 1
AREA NORTH OF
HURRICANE BARRIER:
4.78 ACRES
4.78 Acres
~0.04 Acres
150 m²
0.09 Acres
343 m²
0.06 Acres
244 m²
~0.04 Acres
140 m²
Main Creek
0.67 Acres/2715 m
0.05 Acres
193 m²
0.08 Acres
310 m²
0.05 Acres
192 m²
0.4 Acres
1602 m²
AREA SOUTH OF
HURRICANE BARRIER:
1.46 ACRES
Atlas Tack Superfund Site
Boys Creek Marsh:
Effects Range- Median Quotients
NOAA's Office of Response and Restoration
Coastal Protection and Restoration Division
500
1,000 Feet
20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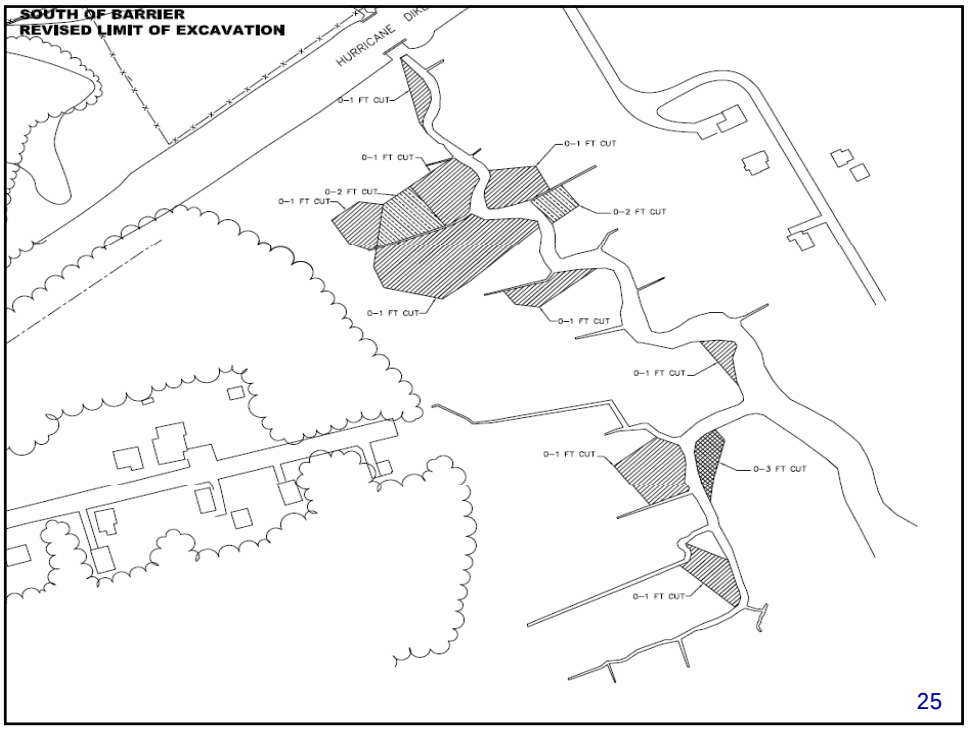
SOUTH OF BARRIER
REVISED LIMIT OF EXCAVATION
HURRICANE
0-1 FT CUT
0-1 FT CUT
0-1 FT CUT
0-2 FT CUT
0-1 FT CUT
0-2 FT CUT
0-1 FT CUT
0-1 FT CUT
0-1 FT CUT
0-1 FT CUT
0-3 FT CUT
0-1 FT CUT
25


26


27


34


17 8:53AM
28


19 9:38AM
31


20 1:42PM
30

Restoration Plan

- Fresh water wetland
- Salt water wetland
- Phragmites control
- Islands
- Man-made berm
- Spillways

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