



Public Involvement Meeting for the Bird Machine Co. Property

Presented by Baker Hughes Inc. and
AMEC Earth & Environmental, Inc.

October 25, 2011



Baker Hughes, Environmental Affairs

- Chris Clodfelter, Project Manager (713.439.8329)
- Dina Kuykendall, Director of Environmental Affairs (713.439.8789)

AMEC

- Kim Henry, Licensed Site Professional #7122 (978.392.5334)
- Marc Grant, Project Manager (978.392.5330)

- We're here to:
 - Provide an accurate picture of environmental status
 - Listen to community concerns and questions
 - There are no plans for future site development
- Extensive Voluntary Remediation to date demonstrates our commitment to protect:
 - Community Health and Safety
 - The Environment
- Project Funding is approaching \$9 Million

- Review Site History and Current Conditions
- Summarize the Draft (Phase III) Remedial Action Plan and receive comments from the Public
- Discuss Future Activities and Opportunities for Public Involvement

- Baker Hughes purchases Bird in June 1989
 - Initial investigations conducted with acquisition
 - Remediation of known issues conducted in 1990
- Extensive Site Investigation conducted in 2004
- Release Abatement Measures conducted between 2005 and 2011
- Source Removal and Majority of Remediation are now complete

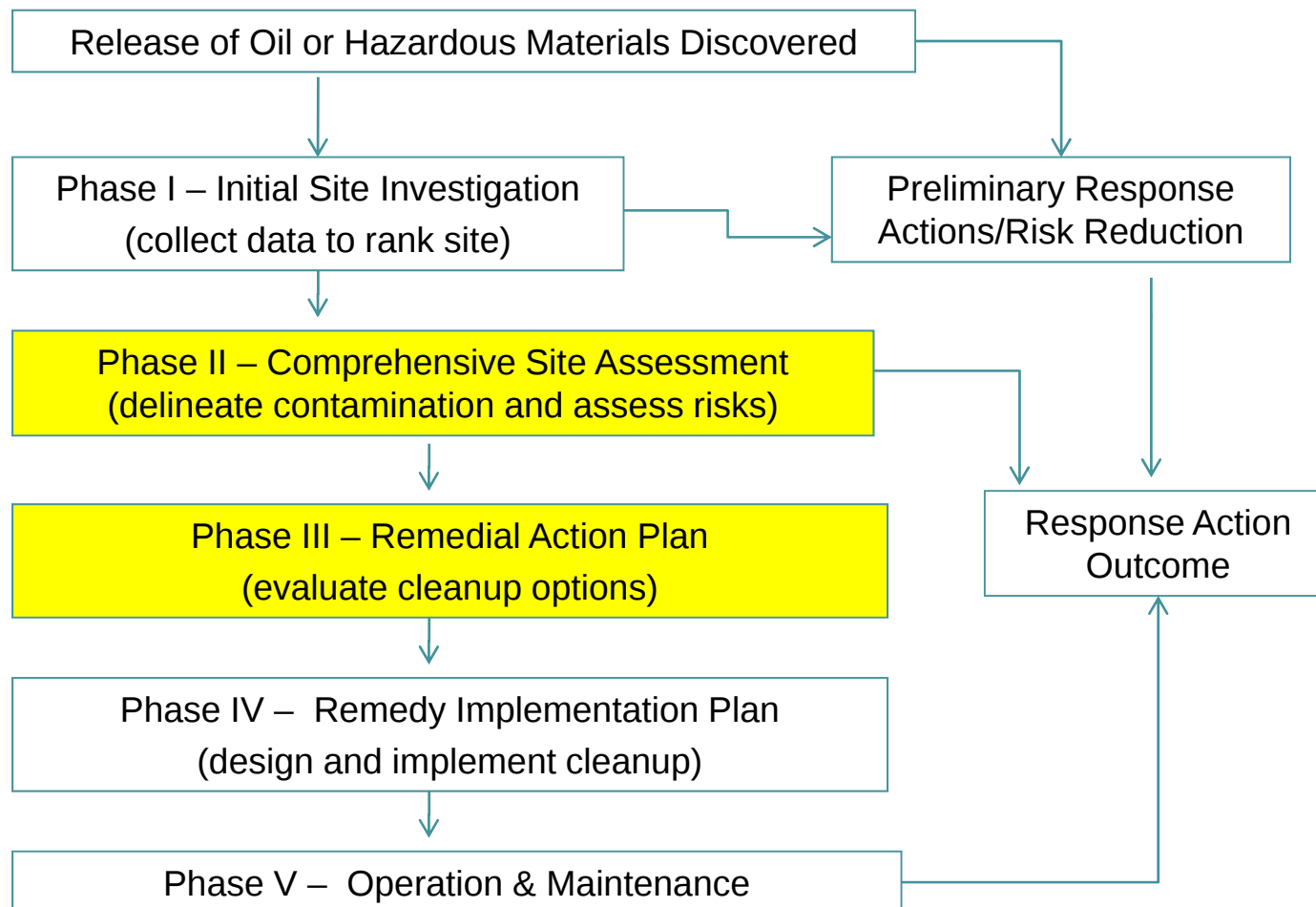
History of 100 Neponset Street



- 134 acres; 107 are wetlands, buffer zone, or water
- Early 1800's started manufacturing using water power
- 1920 Bird Machine started operations
- 1989 Baker Hughes purchased Bird Machine
- 2004 Manufacturing was discontinued



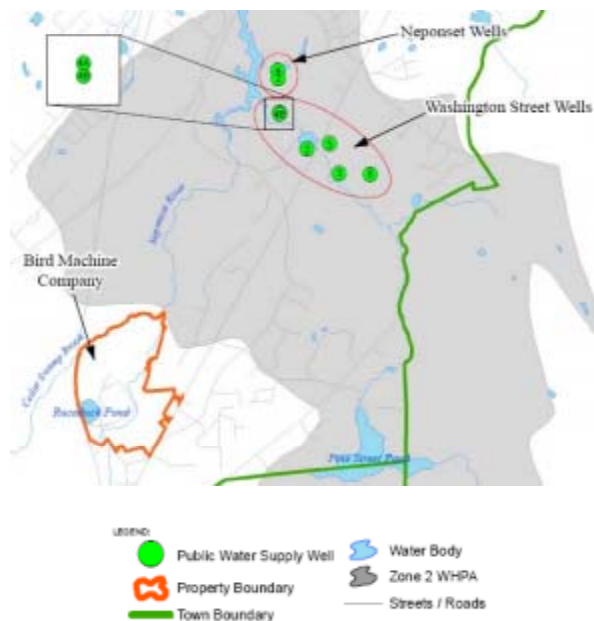
Massachusetts Contingency Plan Process



Site Groundwater Classification



The Site is in what the Massachusetts Contingency Plan defines as a Potential Drinking Water Source Area based on Town by-law designation



- Site is in a town-designated Primary Recharge Area.
- However, the nearest Public Zone II is more than 800 ft from Site contaminants
- Site groundwater is not used or likely to be used for drinking, but cleanup must achieve drinking water quality (GW-1 classification)

Groundwater Risk Results



Area	Medium	Condition of No Significant Risk Exists for			
		Human Health	Environment	Public Welfare	Safety
South Rail Spur	Soil	Yes	Yes	Yes	Yes
	Groundwater	Yes	Not Applicable		
Lead Release Area 3	Soil	Yes	Yes	Yes	Yes
	Groundwater	Yes	Not Applicable		
Manufacturing Building Area	Soil	Yes	Yes	Yes	Yes
	Groundwater	No	Not Applicable		
Neponset River	Sediment	Yes	Yes	Yes	Yes
	Surface Water	Yes	Yes		

- Source remediation has achieved a condition of No Significant Risk in soil, sediment, and surface water.
- Potential risk posed by groundwater will be addressed in Phases III to V through selection, design, and implementation of a remedy.

Groundwater remediation is required because the GW-1 designation results in identification of a potential risk, based on a comparison to drinking water standards. Requirements for a Permanent Solution include:

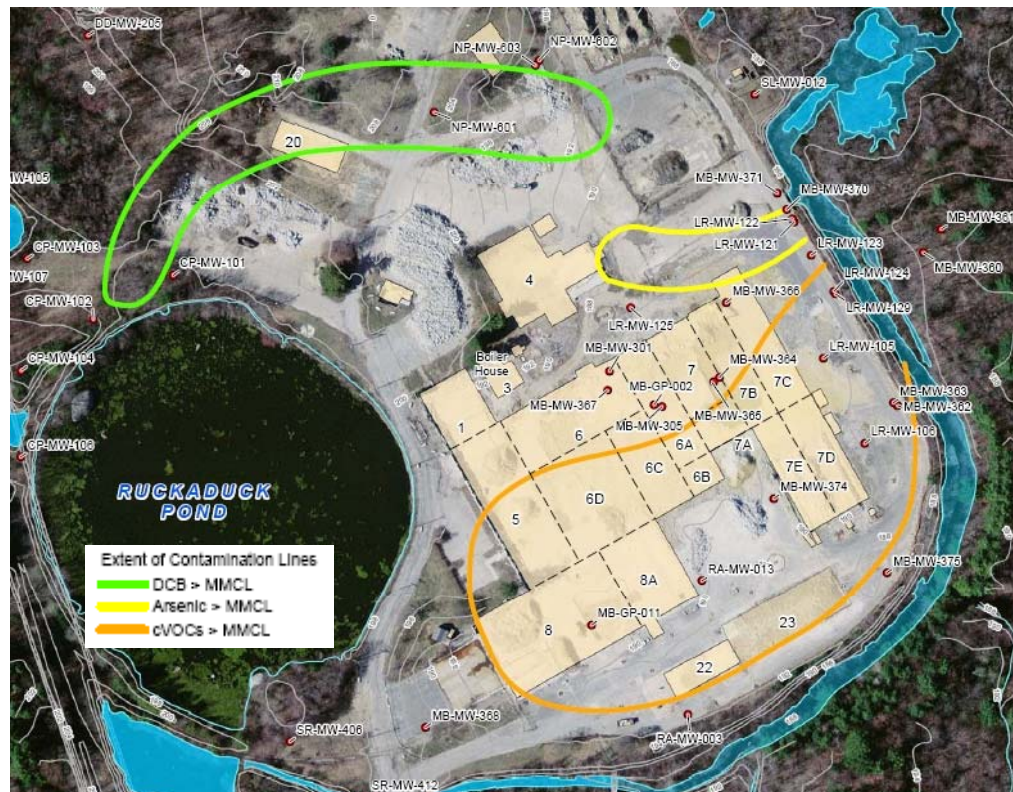
- Achieve a condition of No Significant Risk by reducing groundwater concentrations below drinking water standards or background.
- Eliminate or control any source material which could result in an increase in concentrations in the environment.
- To the extent practicable, reduce levels of site groundwater contaminants to those that achieve or approach background.

Manufacturing Building Groundwater Areas for Remediation



The Site Aquifer is 25 feet of sands over bedrock

- Groundwater contaminants include metals, solvents, & chlorobenzenes
- Groundwater discharges to the Neponset River flowing to the northeast



Groundwater Contaminant Areas
Conservative illustration of plume size

- Alternative 1: Monitored Natural Attenuation (MNA)
 - Naturally-occurring Physical (dispersion, diffusion, dilution, sorption, volatilization), Chemical (oxidation or reduction), Biological processes destroy contaminants or reduce concentrations in the aquifer
- Alternative 2: In Situ Chemical Oxidation (ISCO) for organic contaminants – dichlorobenzene (DCB) and chlorinated volatile organic compounds (cVOCs) – and MNA for arsenic
 - Oxidant injection to destroy organic contaminants in the aquifer
- Alternative 3: Pump-and-Treat (P&T) for organic contaminants and MNA for arsenic
 - Pump contaminated groundwater out of the aquifer, treat it to remove contaminants, and discharge cleaned water to the river

Requirements for MNA to be effective:

■ Source Removal

- Demolition of Buildings to access contamination and remove structural pathways
- 13 Release Abatement Measure excavations and 18,000 tons of contaminated soil moved off-site since 2007

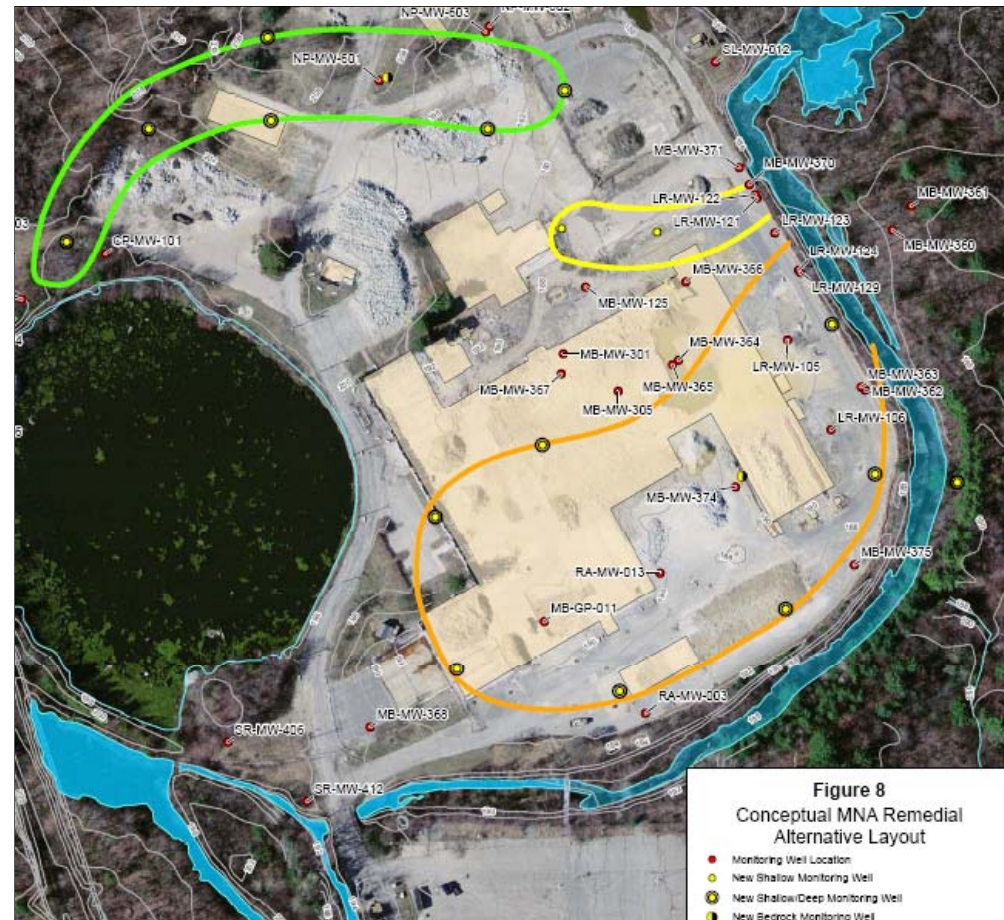
■ Plume Control

- Plume is not expanding and River provides barrier to migration
- Monitoring wells across the River are clean
- A condition of No Significant Risk exists for the River

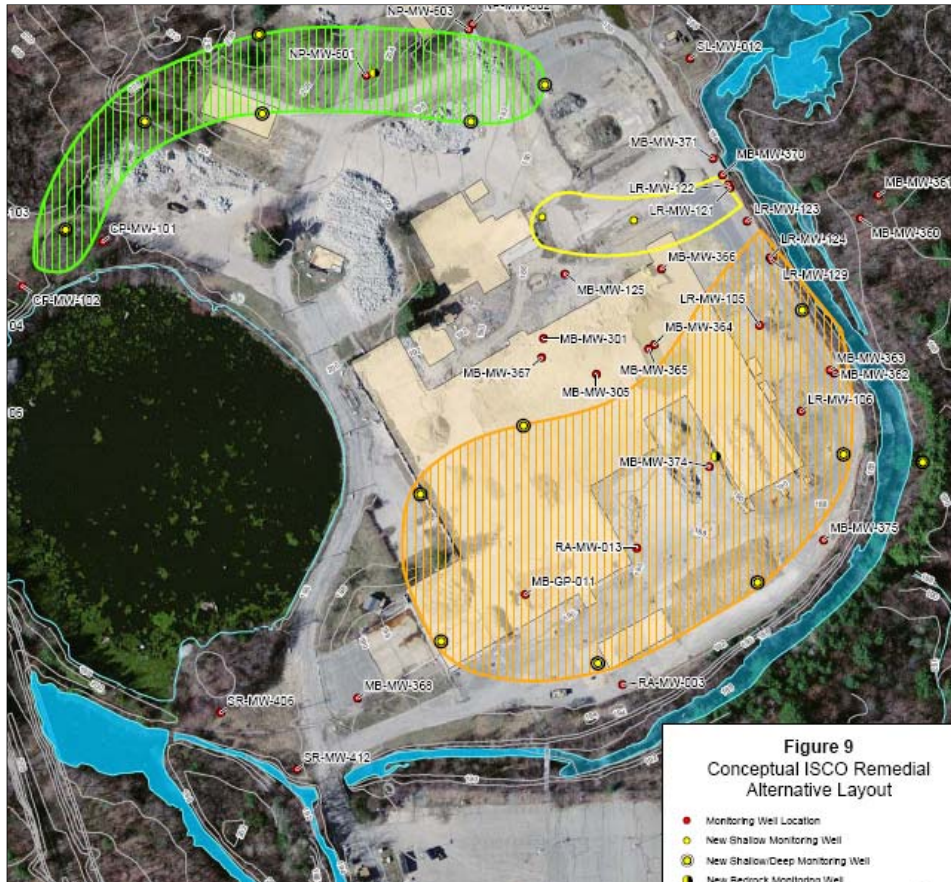
Requirements for MNA,
continued:

- Groundwater Monitoring
 - Conceptual design has 18 new locations for shallow, deep, or bedrock wells
- Contingency Remedy
 - In Situ Treatment (e.g. bioremediation) if MNA is not effective or timely

Expected MNA cost is \$1M



Alt. 2: In Situ Chemical Oxidation / MNA

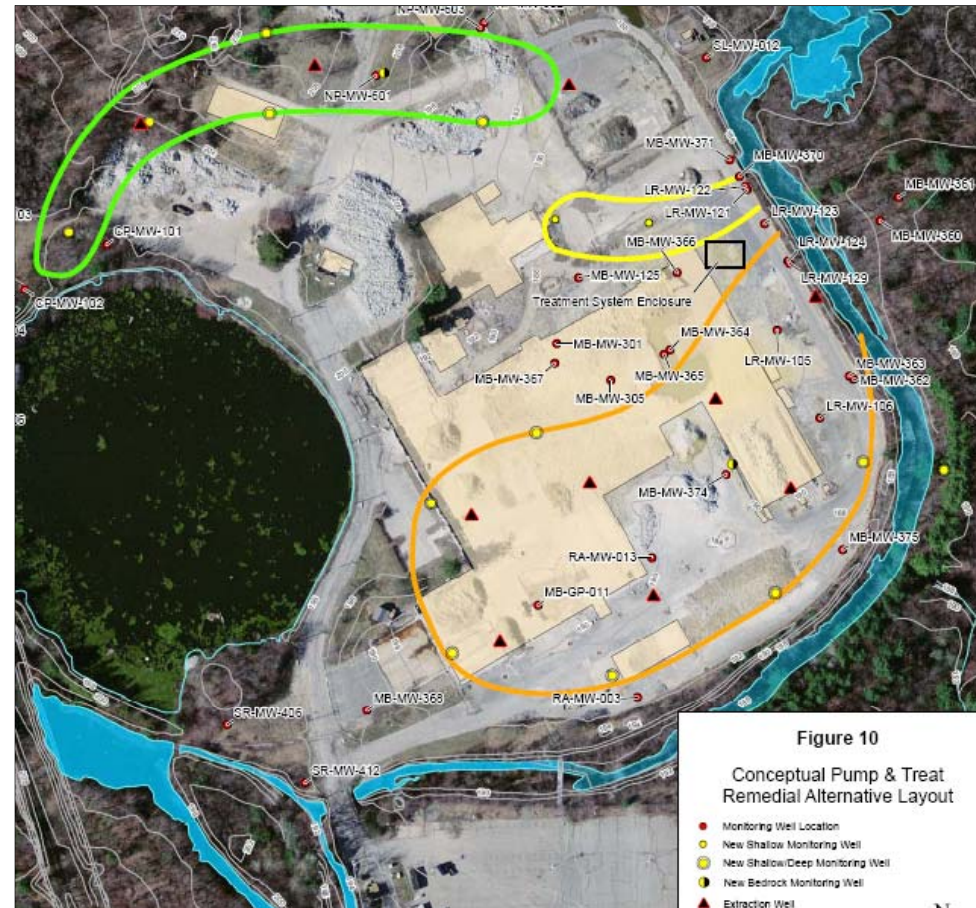


ISCO Injection Areas (hatched)

- Inject liquid oxidant (e.g. permanganate) into aquifer to destroy DCB and cVOCs
- MNA for arsenic
- ISCO injections and monitoring over 2-4 years; MNA 5-10 years
- Expected ISCO / MNA cost is \$9M

Alt. 3: Pump and Treat / MNA

- Extract groundwater containing DCB and cVOCs; treat above-ground; discharge treated water to Neponset River
- MNA for arsenic
- P&T over 4-8 years; MNA 5-10 years
- Expected P&T / MNA cost is \$6M



P&T Extraction Well Layout

Remedy Selection Process



Each Alternative is rated based on Massachusetts Contingency Plan criteria of: Effectiveness, Reliability, Implementability, Cost, Risk, Benefits, Timeliness, and non-Pecuniary Interests

Remedial Alternative	Score									
	Effectiveness	Short- and Long-Term Reliability	Implementability	Costs	Risks	Benefits	Timeliness	Non-Pecuniary Interests	Total Score	Estimated Cost (in Millions)
1. MNA for all contaminants	2	2	3	3	3	2	1	2	18	\$ 1.0
2. ISCO for organics and MNA for arsenic	2	3	2	1	2	2	3	2	17	\$ 9.3
3. P&T for organics and MNA for arsenic	2	3	1	2	1	2	2	2	15	\$ 5.8

Table 8. Scoring Summary (from Draft Phase III)

- Alternative 1 Monitored Natural Attenuation (MNA) is selected as the most feasible
 - MNA is expected to provide a Permanent Solution
 - When successful will achieve No Significant Risk
- Massachusetts Contingency Plan Remedy Selection is based on a benefit/cost analysis
 - The benefits of a remedy should be commensurate with costs
 - Remedies that are disproportionately expensive are not required to be selected.

Schedule for Phase IV Remedy Implementation



- December 2011 Submit Final Phase III Remedial Action Plan
 - Address and incorporate comments from this Public Meeting
- February 2012 Submit Draft Remedy Implementation Plan (RIP)
 - Provides the design details for the selected remedy
 - Includes placement, construction, and sampling frequency of monitoring wells.
 - Public Comment and Public Meeting to discuss the RIP design
- April 2012 Submit Final RIP and begin Construction
- June 2012 Complete Construction
 - Submit Final Inspection Report & Phase IV Completion Statement
 - Begin Phase V Remedy Operation, Maintenance, and Monitoring

- A Draft Addendum to the 2007 Risk Assessment and Remediation Plans (Phase II/III) for the Demolition Debris Area (DDA) is expected in November 2011
 - Ecological risks are assessed for the first time
 - The risk for human exposure to asbestos is evaluated in more detail
 - A condition of No Significant Risk (NSR) may already exist for DDA
 - Public Meeting on Tuesday December 6 to present the draft report
- A Response Action Outcome (RAO) Statement is expected this year
 - Marks completion of Phases II/III for the single remaining RTN at Bird Machine Company
 - Begin Phase IV Remedy Implementation

- Summary of the Presentation
 - Site History and Current Conditions
 - Alternatives for Groundwater Cleanup
 - Selecting a Feasible Permanent Solution
- Next Steps
 - Public Input on this Draft Phase III Report
 - Submit Draft Phase II/III Addendum for Demolition Debris Area
 - Submit Response Action Outcome Statement for this last remaining RTN
 - Begin Phase IV Remedy Implementation

**Please Provide Comments by
Monday October 31, 2011 to:**

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