MEETING MINUTES

RESTORATION ADVISORY BOARD
For
PLUM BROOK ORDNANCE WORKS

Meeting Date: September 11, 2002
Meeting Time: 7:00 p.m.
Meeting Location: BGSU Firelands
Meeting Attendees:

Mark Bohne, RAB Community Co-Chairperson
Rick Meadows, RAB USACE Co-Chairperson
Gil Steinen, RAB
John Blakeman, RAB
Lee Yeckley, RAB
Peg Kingsley, RAB
Jan Bohne, RAB
George Parker, RAB
Lisa Humphreys, USACE
Linda Ingram, USACE
Lannae Long, USACE
Jim Beaujon, USACE
Archie Lunsey, OEPA
Robert Lallier, NASA
Dave Kessler, Shaw
Steven Downey, Shaw
Mikael Spangberg, PES
Helen Owens, ICI

- Prior to the RAB meeting, a Public Meeting was conducted to present the Interim Removal Action at the Pentolite Redwater Ponds. The Public Meeting reviewed the removal action and established the 30-day public comment period.

- The RAB Meeting was held on Wednesday September 11, 2002 at BGSU- Firelands, located in Huron, Ohio. Mr. Mark Bohne, RAB Community Co-Chairperson and Mr. Richard Meadows, RAB USACE Co-Chairperson opened the meeting.

  A moment of silence was observed in honor of those who perished in the attacks of September 11, 2001.

  The agenda for the meeting included the following topics:
  - Schedule two dates for TNT Area B Interim Soil Removal Site Visit
  - Update on Sitewide Groundwater Investigation
  - Update on the Composting Alternative in TNT Areas A and C
  - Open discussion

- The removal action is currently underway in TNT Area B. There were two dates selected for the RAB members to visit the site while work is being done. The dates are Wednesday September 18 and Wednesday September 25, 2002. RAB members signed-up for the date that they wanted to attend. The names of those individuals will be forwarded to NASA so they can access the site the evening of the visit. RAB members who were not in attendance are being notified by the RAB support contractor of the dates scheduled for the site visit.

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Memorandum

To: Plum Brook Ordnance Works - RAB

From: Helen Owens, International Consultants, Inc.

Date: 10/10/2002

Re: RAB Meeting Minutes Omission

Enclosed is the presentation material that Mr. Steve Downey (Shaw) provided at the RAB meeting on September 11, 2002. This material should have been included with the minutes which were mailed earlier in the week.

I apologize for the inconvenience.

Regards,
Helen Owens
International Consultants, Inc.
RAB Support Contractor
(937) 252-0341
howens@iciinc.biz

Composting Considerations for TNTA and TNTC Plum Brook Ordnance Works Sandusky, Ohio

Presented To:
Restoration Advisory Board
September 11, 2002

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Amendment Spreadsheet

MIX #1									
Ingredient	Qty. (CY)	Qty. (lbs.)	% Carbon	% D.M.	Carbon (lbs.)	% Nitrogen	Nitrogen (lbs.)	C:N Ratio	Cost ($/Ton)
Straw	33	6,600	0.4240	0.88	2,462.59	0.0123	71.44	34.47	$65
Chicken Manure		0	0.1870	0.88	0.00	0.0558	0.00	3.35	$25
Alfalfa		0	0.3290	0.85	0.00	0.0314	0.00	10.48	$165
Cow Manure	12	17,100	0.3820	0.21	1,371.76	0.0257	92.29	14.86	$22
Vegetable Waste		0	0.4000	0.30	0.00	0.0140	0.00	28.57	$100
Saw Dust		0	0.6000	0.61	0.00	0.0008	0.00	750.00	$20
Wood Chips		0	0.6000	0.88	0.00	0.0008	0.00	750.00	$20
Soil	15	33,000							
Totals	60	56,700							
	Mix Density (lbs/CY) =		945		3,834.35		163.73	23.42	
	Mix Unit Cost ($/CY) =		$6.71						
MIX #2									
Ingredient	Qty. (CY)	Qty. (lbs.)	% Carbon	% D.M.	Carbon (lbs.)	% Nitrogen	Nitrogen (lbs.)	C:N Ratio	Cost ($/Ton)
Straw	43.25	8,650	0.4240	0.88	3,227.49	0.0123	93.63	34.47	$65
Chicken Manure	1.75	2,538	0.1870	0.88	417.57	0.0558	124.60	3.35	$25
Alfalfa		0	0.3290	0.85	0.00	0.0314	0.00	10.48	$165
Cow Manure		0	0.3820	0.21	0.00	0.0257	0.00	14.86	$22
Vegetable Waste		0	0.4000	0.30	0.00	0.0140	0.00	28.57	$100
Saw Dust		0	0.6000	0.61	0.00	0.0008	0.00	750.00	$20
Wood Chips		0	0.6000	0.88	0.00	0.0008	0.00	750.00	$20
Soil	15	33,000							
Totals	60	44,188							
	Mix Density (lbs/CY) =		736		3,645.06		218.23	16.70	
	Mix Unit Cost ($/CY) =		$5.21						

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What is Windrow Composting?

- Compost mix (soil + amendments) formed into long piles called windrows (6' H x 14' W x 300' L)
- Windrows mixed periodically by special equipment called a windrow turner
- Turning windrows provides oxygen to compost pile to promote aerobic biodegradation
- Water periodically added to windrow to maintain optimum moisture content
- Windrow composting typically conducted inside a temporary, fabric-covered structure to prevent rainfall from saturating compost pile

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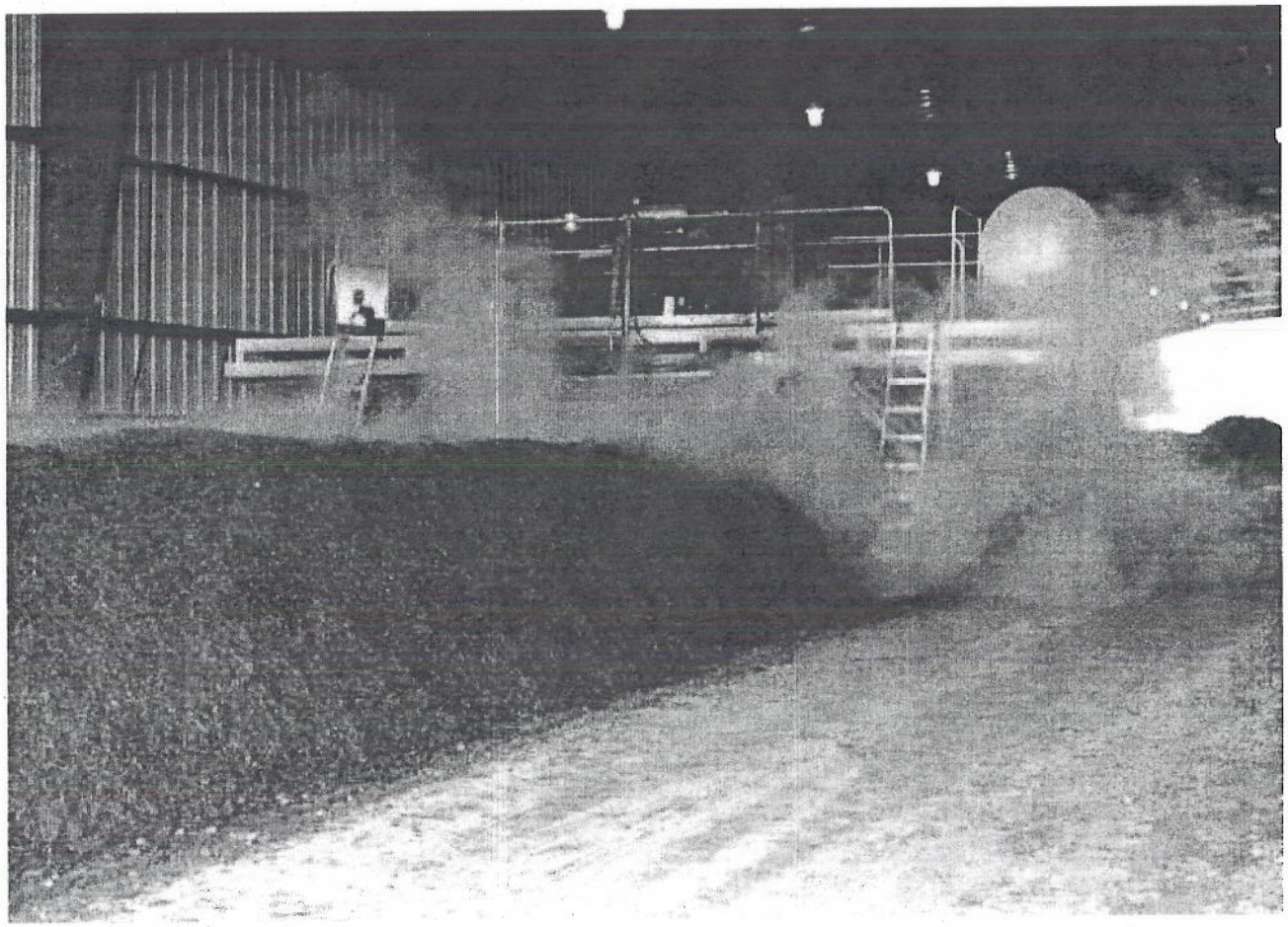
Windrow Turner



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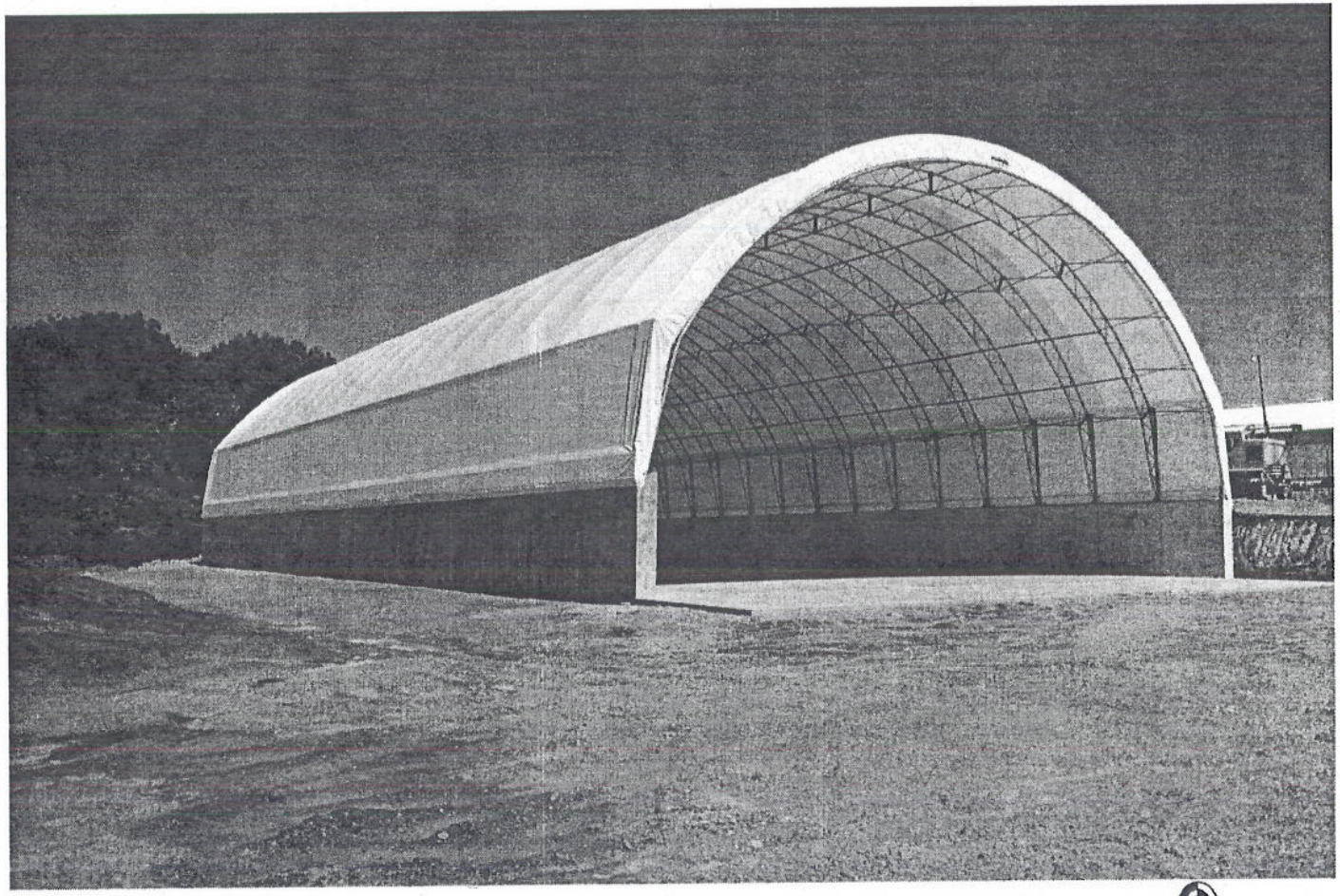
Temporary Structure



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How Windrow Composting Degrades TNT

- TNT degrades through a combined anaerobic/aerobic process
- Anaerobic biodegradation occurs in the absence of oxygen
- Aerobic biodegradation occurs in the presence of oxygen
- Anaerobic biodegradation promotes reduction of nitro groups on the TNT molecule

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How Windrow Composting Degrades TNT *(continued)*

- Aerobic biodegradation promotes the humification of the reduced TNT metabolites
- Compost pile in aerobic stage after windrow is turned.
- As oxygen in pile is utilized, pile turns anaerobic until turned again

Critical Processing Characteristics in Windrow Composting

- Porosity
- Free air space
- Moisture content
- Particle size
- Temperature
- Carbon to nitrogen ratio
- pH

Successful Remediation Using Windrow Composting

- Umatilla Depot - Hermiston, Oregon
- Naval Surface Warfare Center - Crane, Indiana
- Joliet Army Ammunition Plant - Elwood, Illinois
- U.S. Naval Submarine Base - Bangor, Washington

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Primary Factors Affecting Cost of Windrow Composting

- Treatment building size controls volume of soil that can be treated at one time (batch size), and therefore, time required to complete remediation
- Optimum remediation cost is a trade-off between major fixed and variable costs
- Major fixed costs include temporary treatment building and contact water management system
- Major variable costs include equipment rental and operating labor

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Advantages/Disadvantages of Using Windrow Composting

- **Advantages**
  - » Satisfies CERCLA statutory preference for treatment via biodegradation and humification
  - » Treated compost may be returned to site as a soil amendment
- **Disadvantages**
  - » Composting will not treat inorganic contaminants at site such as lead
  - » High fixed costs make composting cost-effective for larger volumes of contaminated soil
  - » Treated compost is not suitable as structural backfill

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Potential Opportunities of Cost Savings

- USACE-Huntington is preparing to implement windrow composting for a site at WVOW
- Treatment building purchased for WVOW may be disassembled for reconstruction at PBOW, lowering fixed costs for PBOW remediation projects
- Other equipment purchased for WVOW might also be used at PBOW

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