

Final Report for USDA Forest Service Forest Products Laboratory

Evaluating the feasibility of using wood-framed building deconstruction  
for building removal at Badger Army Ammunition Plant



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**Disclaimer:** WasteCap Wisconsin does not endorse or otherwise sponsor any of the businesses listed here, nor does it claim that they comply with applicable laws or regulations. Any omissions are unintentional. The lists are not representative of all potential markets. For additions or corrections to this list, contact WasteCap Wisconsin at 414-961-1100 or [wastecap@wastecapwi.org](mailto:wastecap@wastecapwi.org).

## 1. DESCRIPTION OF SITE

The Badger Army Ammunition Plant (BAAP) occupies 7,354 acres in the predominantly rural countryside of Sauk County, Wisconsin. The Badger Plant was constructed in 1942 following the nation's entry into World War II. The Plant provided ammunition propellant for the duration of the war effort, and was again operative during the Korean and Vietnam Wars. It has approximately 1,400 buildings on the property. There are approximately 100 building types.

Most of the buildings are wood frame on concrete foundations. Almost all the buildings contain transite (asbestos & Portland cement) siding and some transite interior wall covering, as well as lead based paint. In addition, the interiors contain asbestos cement board and friable asbestos pipe insulation. The buildings have asphalt shingle roofs with only one layer of roofing – crews removed all old roofing material and inspected the roof before new shingles were installed.

Full-dimension Douglas fir lumber was used in many of the “temporary” structures – many of the buildings, constructed in the 1940’s, were not intended to last beyond 20 or 25 years. The last production run was in 1975, just after the Vietnam War ended. Since then, the installation has been in a caretaker state. The army stopped funding maintenance of the buildings in 1999.

Badger once produced a number of propellants for U.S. Army usage. These include smokeless propellant, ball powder, and rocket grains. Nitrocellulose production was a major component of the propellants manufactured at Badger. Many of the buildings were associated with its production. The nitrocellulose in its liquid form went into the floor cracks and absorbed into the wood. In its powder form, it went into walls and ceilings.

Most of the buildings receive a “XXX” rating as they probably contain explosive material, but it is not visible. Buildings rated “X” have visible explosive contamination (none of these are at Badger). Buildings rated “XXXXX” have been cleaned and are likely safe. Buildings rated “0” never encountered or contained explosive materials and are safe to deconstruct.

Buildings will be turned over to the new landowners (“as-is, where-is”) unless there are safety concerns due to structural problems or residual explosive contamination, in which case the Army will remove the building. Some of the most contaminated buildings are being burned. Visit <http://www.plexsci.com/prj/badger/index.shtml> for information on burning. Some deconstruction could possibly take place before a building was burned.

In early 2000, the Sauk County Board of Supervisors acted to establish a locally driven reuse planning process. Efforts to define a future for the Badger property proved challenging due to the site's unusually rich natural and cultural history, the wide range of potential reuse options, and the complexity of local, state, national, and tribal interests involved. With the assistance of U.S. Congresswoman Tammy Baldwin and funds provided by the U.S. Department of Labor, the Badger Reuse Committee (BRC) was convened. The 21-member BRC included representatives from neighboring communities, local, state, and federal governments, and the Ho-Chunk Nation. In its mission statement, the BRC charged itself with the task of developing "a common vision for the reuse of the Badger property that can be meaningfully considered and realistically implemented by the appropriate local, state, and federal agencies." Between July 2000 and

March 2001 the BRC met 16 times, with additional subcommittee meetings also held in this period. The Badger Reuse Plan can be found at <http://www.co.sauk.wi.us/data/badger/>

The BRC defined nine key values to guide consideration of future uses. A few of the values that are particularly applicable to the deconstruction process at BAAP include:

Value 2. The U.S. Army and/or the federal government complete the highest quality cleanup of the Badger property's contaminated land, water, building, and infrastructure in a timely manner. Unwanted buildings and infrastructure are removed. Any land transfers do not entail the transfer of unforeseen cleanup responsibilities or liabilities to any party other than the federal government.

Criterion 2.5: Cleanup activities should provide appropriate educational and research opportunities on the Badger property.

Criterion 2.6: Salvage operations should preserve materials having historical value and should emphasize recycling of all other materials.

Value 9: Uses and activities at the Badger property contribute to the area's economic stability and sustainability and have a positive impact on local municipalities.

## **2. WASTECAP WISCONSIN'S ROLE**

- A. Assist assessment of feasibility of using wood-framed building deconstruction for building removal at the Badger Army Ammunition Plant.
- B. Perform visual assessments of the buildings on site in cooperation with BAAP/Olin Corporation staff.
- C. Collect information and identify potential reuse or recycling markets for building materials.
- D. Develop web site and list serve to share information, especially among the project team, on the feasibility of using wood-framed building deconstruction for building removal at BAAP.

## **3. ASSESSMENTS AND PRESENTATIONS**

- A. November 21, 2002 – WasteCap held a site visit/waste assessment at Badger Army Ammunition Plant with Brad Guy from the University of Florida and Bill Wolf of Olin Corporation to assess feasibility of deconstruction and identify potential materials for reuse or recycling.
- B. March 12, 2003 – WasteCap held a site visit/waste assessment at Badger Army Ammunition Plant with the goal to identify potential reuse or recycling markets for building materials. Eighteen attendees representing Wisconsin DNR, the Construction Material Recycling Association, USDA Forest Service Forest Product Lab and potential reuse and recycling markets for building materials from BAAP attended. See Appendix A. WasteCap Wisconsin Site Visit to Badger Army Ammunition Plant.
- C. May 29, 2003 – WasteCap site visit/waste assessment at Badger Army Ammunition Plant and joint presentation with USDA Forest Service Forest Products Lab for The

Sauk Prairie Conservation Alliance. See Appendix B. Power Point Presentation: Building Deconstruction, Material Salvage, and Recycling at BAAP.

- D. July, 2003 – Site visit/waste assessment at Badger Army Ammunition Plant. Obtained GIS information about the site, buildings, and material in the buildings and researched several buildings and materials to determine potential for reuse or recycling.
- E. July 29, 2003 – Badger Study Team Meeting in Madison, WI with the team to discuss deconstruction feasibility study project progress. See Appendix C. Power Point Presentation: WasteCap Wisconsin, Inc. Badger Army Ammunition Plant Reuse and Recycling Markets and Regulations
- F. September 16, 2003 – Site visit/waste assessment at Badger Army Ammunition Plant and meeting with several business leaders who may be able to be or locate businesses able to deconstruct or reuse or recycle materials from BAAP.

#### 4. LIST SERVE AND WEB SITE

**List Serve:** [badgerdecon@wastecapwi.org](mailto:badgerdecon@wastecapwi.org) is the address for the Badger Army Ammunition Plant List Serve. The purpose of this list serve is to be able to send information quickly between the project partners working on the study of the feasibility of deconstruction of BAAP. The list serve may also be able to be used in the future to send information quickly between project partners working on the deconstruction at BAAP. Anyone may send to the list serve. Names can be added or removed to the BAAP listserve by contacting WasteCap Wisconsin at 414-961-1100 or [wastecap@wastecapwi.org](mailto:wastecap@wastecapwi.org). Currently signed up on the list serve are:

- Bill Bowman, Director of Deconstruction, Austin Habitat for Humanity RE-store
- Steve Cosper, US Army Construction Engineering Research Lab, Environmental Process Branch
- Steve Cramer, Professor, Department of Civil & Environmental Engineering, University of Wisconsin
- Robert H. Falk, Research Engineer, USDA Forest Products Laboratory
- Brad Guy, Associate Director, Center for Construction and Environment, University of Florida
- Joan Kenney, Badger Army Ammunition Plant
- Jenna Kunde, Executive Director, WasteCap Wisconsin, Inc.
- Thomas R. Napier, Research Architect, U.S. Army Corps of Engineers, CERL
- Beau Sanders, UW-Madison
- Ken Sandler, Environmental Protection Specialist, US EPA
- David C. Tilotta, Professor, University of North Dakota
- Bill Wolf, Chief Facilities Support Engineer, Olin Corporation

**Web site:** As of September, 2003, the BAAP web site is currently under construction. It will be live as of the end of 2003.

**Goal of BAAP web site:** to share information, especially among the project team, on the feasibility of using wood-framed building deconstruction for building removal at the Badger

Army Ammunition Plant in Baraboo, WI. A future role of the web site may be to provide an opportunity for those interested in materials from BAAP to view materials and inform project partners of their interest.

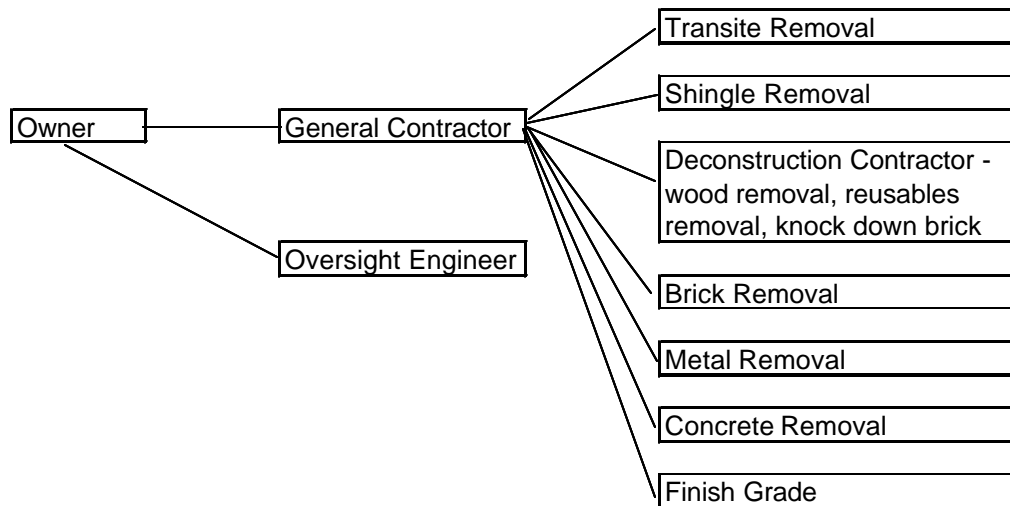
The web site will contain the final report from this project, list all project partners, describe the roles of the partners, and provide detailed information related to the feasibility of building deconstruction at BAAP and links to resources which relate to building deconstruction at BAAP.

## 5. RECOMMENDATIONS FOR SUCCESSFUL RECYCLING AND REUSE

There are many potential models for successful reuse of building materials. Military bases around the US have successfully deconstructed buildings for reuse. Following is one model.

- A. Determine which **buildings to target for deconstruction**
- B. **Include criteria for deconstruction and materials reuse and recycling** in contract documents

Contract Administration - Possible Scenario  
 (Adapted from chart from Tom Bennwitz, Wisconsin DNR)



- C. **Select a coordinator** – designate a staff member (typically general contractor project manager with the cooperation of the site superintendent) to manage the reuse and recycling program.
- D. **Inventory potential materials for reuse and recycling** through photographs, measurements, tests if needed (e.g. sending sample of shingles to test for asbestos and sending brick samples to potential markets).
- E. **Identify target materials** at the job site that can be recovered from the waste stream.
- F. **Offer materials to the Badger History Group.** Due to the strong history of this property, materials should be evaluated for their potential historical significance and reuse by the Badger History Group or other groups that will preserve the historical heritage of the property.

- G. **Solicit potential end markets for the materials.** This can be done using the contacts in this report, through advertising materials through photos on web sites, through the local newspapers, through email lists, etc. Viewings may be held to show potentially-interested parties the materials. Based on the recommendations of the Badger Reuse Plan, it is recommended that preference be given to local use of the materials from the site. Generate a list of potential-interested parties and the potential end uses (e.g. Metal separated for recycling will be handled differently than metal items separated for reuse). The contractor may want to obtain specific agreements for the reuse or recycling of specific materials (for example, if a company wants to purchase a certain amount of lumber from the site, the lumber can be pre-sold).
- H. **Write a Deconstruction Waste Management Plan.** The contractor will write a plan based on the information gathered during solicitation of potential end markets. The plan will include the following:
- a. Description of building, site, and deconstruction waste management plan manager
  - b. Description of waste management goals
  - c. Meetings to be held with job site crews to discuss waste management
  - d. Identification of materials that will be separated for reuse or recycling
  - e. Identification of proposed market for each recyclable material (e.g. brick separated for reuse as brick vs. use as clean fill)
  - f. Description of materials-handling, separation and storage requirements for recycling and reuse
  - g. Description of waste auditing and documentation procedures
- I. **Select subcontractors** based on the solicitation of end markets. For example, if brick is to be separated for reuse, a subcontractor to handle the brick reuse would be named.
- J. **Deconstruct**, following the deconstruction waste management plan. Recyclables should be taken either to a location on site for future recycling (e.g. shingles & concrete) or to an end market (e.g. metals). Reusable items should either be set aside for possible sale (e.g. wood, fixtures, signs) or set aside for those organizations that have purchased or to whom the item(s) are being donated.
- K. **Hold an on site auction or sell on line** those items that have been separated for reuse and not yet sold.
- L. **Document Deconstruction Results.** Document cost and savings to the project as a result of deconstruction. Document the project through: photographs, interviews, and written documentation. Obtain weight, volume and cost information from hauler(s), general contractor, subcontractors, and track progress. Calculate end-of-project reuse rates, recycling rates and landfill rates. Calculate the economic impact of the deconstruction with the following data:
- a. The projected cost of disposing all project waste in the landfill
  - b. The amount of material landfilled from the project, and the total disposal cost by weight and volume
  - c. The amount of each material reused and recycled, the cost to reuse and recycle each item by weight and volume, revenue from or cost of recycled or salvaged material
  - d. The net total cost or savings of reuse and recycling

- M. **Celebrate Success.** Develop materials related to the project to share this story and its results. Provide information and education through a web site, distributing press releases to local and statewide media, trade associations, and other military institutions.

## **6. MATERIAL-SPECIFIC RECOMMENDATIONS**

### **A. Badger Army Ammunition Plant WasteCap Wisconsin Market Report – Wood**

#### **Badger Army Ammunition Plant:**

Wood-framed construction is the dominant construction method used at Badger Army Ammunition Plant. Many of the buildings contain long, straight, large timbers and 2x lumber of Douglas fir and other high-value woods. Much of the interior wood is unpainted, but some buildings contain extensive surfaces with lead based paint on wood including the high-value timber which poses a reuse challenge. Wood outside that is not used for building construction is treated wood, likely treated with a creosote. As Badger Army Ammunition Plant has done an excellent job of keeping up the buildings as much as allowed by law and budget, much of the wood is still in very good condition, although some of it is water damaged or damaged in some way.

#### **Regulatory Issues:**

Wisconsin state law prohibits the sale or transfer of any fixture or other object containing lead-bearing paint that might be placed upon any surface of a dwelling ordinarily accessible to children. Lead paint (LBP) use was discontinued in 1978. Wood at Badger Army Ammunition Plant can be tested for the presence of lead, or it can simply be assumed that any painted surface contains lead.

#### **Processing Options:**

Preference is given first to reuse, then to recycling, then to landfilling or burning with energy recovery. In order to reuse the wood, deconstruction rather than demolition is required. If the wood has LBP on it, as the USDA Forest Service Forest Products Lab has shown, the wood may be able to be milled for reuse. Any work to remove LBP from wood should be coordinated closely with the Wisconsin DNR and other regulatory agencies, so as not to violate Wisconsin state law pertaining to LBP.

#### **Marketing Methods for Wood Reuse:**

1. The owner can consider offering all materials first to the owners, and then to the Badger History Group before anything is marketed. (Badger Reuse Plan Value 2, Criterion 2.6. “Salvage operations should preserve materials having historical value and should emphasize recycling of all other materials.”)
2. The owner can consider offering materials next to local businesses and current and former employees of BAAP (Badger Reuse Plan Value 9. “Uses and activities at the Badger property contribute to the area’s economic stability and have a positive impact on local municipalities.”)

3. The company that deconstructs the building(s) may be able to use and/or sell much of, if not all of the wood. (see deconstruction contacts below) Note that deconstruction contracts should contain specification language to reuse and recycle targeted materials.
4. The owner, WasteCap Wisconsin, a broker, contractor, others, or a collaborative effort of several of these options can market whatever wood is left for reuse and then recycling. Alternatively, the wood could be auctioned off. WasteCap has experience marketing reusable materials from deconstruction projects. Steps:
  - a. Determine location to store usable wood
  - b. Ensure that deconstruction results in neat stacks of like-size wood
  - c. Inventory available wood – number of pieces, dimensions of each piece, condition
  - d. Take photos
  - e. Market to WasteCap contacts (see “some wood markets,” below), through email, the project web site, newspaper, radio, etc.
  - f. Set up (a) time(s) to allow potential buyers to view the wood for sale
  - g. Consider public sale on site
  - h. Sell wood via auction, on site sale, web contact, phone

**Recycling:** After all timber able to be sold is sold (as determined by the owner or seller), if timber is untreated and unpainted, with DNR approval it can be ground for use as landscape mulch (see recycling markets below)

**Deconstruction Contacts.** These companies may be able to deconstruct wood-framed buildings at Badger Army Ammunition Plant:

Kevin Darrah  
**Darrah/Barns, General Contractor**  
104 N. Prairie St.  
Rockton, IL 61072  
(815) 624-4434

Roxanne Seeliger  
**Deconstruction, Inc.**  
1010 Walsh Road  
Madison, WI 53714  
(608) 244-8759

Michael Krause  
**The Green Institute**  
2801 21st Ave. South, Suite 110 Minneapolis, MN 55407  
(612) 278-7110  
michaelk@greeninstitute.org

Bill Bowman  
**Habitat for Humanity RE-store**  
310 Comal, Ste. 101  
Austin, TX. 78702

Office: (512)478-2165 x201 Mobile: (512)743-5105 Fax: (512)478-9477  
**bowmanlax23@aol.com**, billrestore@aol.com

Jen Voichick  
**Habitat for Humanity ReStore**  
208 Cottage Grove Rd.  
Madison, WI 53716  
(608) 661-2813 Fax: (608) 661-2840  
www.habitatdane.org

**Bob or Jeff Mast**  
Marquette County, WI  
Bob: (920) 394-3072

Liz Covey  
**Murco Recycling Enterprises**  
(708) 352-4111

**Veit out of Minneapolis**  
(763) 428-6738  
They deconstruct buildings for reuse

**Bob Samuelson**  
(312) 271-4296  
Chicago Demolition Contractor that deconstructs for reuse

**Some Wood Reuse Markets.** These companies may be interested in obtaining some of the wood, particularly the timbers, from deconstructed buildings at Badger Army Ammunition Plant for reuse in other buildings. It is likely that local companies and individuals that typically would not be considered “wood markets” may be interested in obtaining some of the wood from Badger for reuse. Also, many of the people who worked at BAAP may be interested in obtaining a “piece” of this historically-significant site.

Steve Quick  
**Barn Again Furniture Company**  
(715) 835-5105  
They take wood from old Wisconsin barns and make it into furniture.

**Dell's Architectural Antiques**  
121 Maple Street, Eau Claire, WI 54703  
(715) 834-8872

Lou Host Jablonski  
**Design Coalition**  
2088 Atwood Avenue  
Madison, WI 53704

(608) 246-8846

Fax: (608) 246-8846

**contact@designcoalition.org**

Construct homes and other buildings with many sustainable materials, including reused wood.

Tom Holmes

**Glenville Timberwrights**

602 Lake Street

Baraboo, WI 53913

(608) 356-9095 (office)

(608) 355-9950 (shop)

Construct timber frame structures with reused wood. Local company, extremely knowledgeable contact on wood, wood reuse, markets. Many of these market contacts came from him. Familiar with Badger Army Ammunition Plant.

**Hearthstone Timber Frame dealer**

Richard Merlie

E4827 Horseshoe Road

Spring Green, WI 53588

Phone: (608) 588-2851

FAX: (608) 588-9181

Email: [rlmerlie@execpc.com](mailto:rlmerlie@execpc.com)

<http://www.rlmerlie.com>

Brice Goelke

**Interstate Lumber**

Neshkoro, WI

(920) 293-4004

They purchase reclaimed wood and use it for products including flooring.

Brett Reichard

**Midwest Reclaimed Lumber**

Beloit, WI

(608) 361-0168

**Normerica's Builder/Dealer Program**

150 Ram Forest Road, Gormley, Ontario, Canada L0H 1G0

1-905-841-3161

Canada & U.S. 1-800-361-7449

Fax: (905) 841-9061

e-mail: **info@normerica.com**

Emile Smith

**Sebastian Specialty Hardwoods**

(608) 734-3157

**David Suutala**

(888) 492-4652

Timber framer who purchases reclaimed wood and uses it to build new buildings.

Swan Timber Frames

4420 Plover Road (Hwy 54) Wisconsin Rapids, WI 54494

Phone (715)424-1161 | Fax (715)424-8353

[swantmber@tznet.com](mailto:swantmber@tznet.com)

Robert Leith

**Timber Construction, Inc.**

9107 E. Highway 13

South Range, WI 54874

Phone (715) 364-2801

email: lake-side@centurytel.net

[www.timberpeg.com](http://www.timberpeg.com)

Russ

**Traditional Woodworks**

Sommerset, WI

(800) 882-2718

They purchase reclaimed wood and use it for products including flooring.

**Trillium Dell Timberworks**

1277 Knox Rd. 1600 North

Knoxville, IL 61448

cell: 309.221.9380

fax: 309.289.7921

[info@trilliumdell.com](mailto:info@trilliumdell.com)

Timber framer. Uses reclaimed timbers.

Jim Green

**Urban Evolutions**

Fox Valley Area, WI

(920) 380-4149

**Listed below are possible recycling markets for wood:** Wood not able to be sold for reuse may be able to be reclaimed for use as landscape mulch. As with wood sold for reuse, wood sold for recycling must be free of lead based paint and other contaminants. Treated wood is not recyclable. Most processors can handle some nails. The grinder must ensure that a magnet is used to remove all metal. Wood can be ground and used at BAAP as landscape mulch (likely to be the lowest-cost option) or hauled and marketed off site.

**Grinders:** There are many companies that offer grinding services. The local yellow pages can assist. Listed below are companies that provide grinding service that WasteCap Wisconsin has had direct experience with.

Todd Lehman, Vice President Recycling Division

**BTL Pallet Corporation**

3310 W. Elm Road

Franklin, WI 53132

(414) 761-0220

Cell: (414) 801-8446

Fax: (414) 761-3566

todd@btlpallet.com

Grind and market scrap wood for landscape mulch.

Kevin Peterson

**Construction Debris Management**

W11340 740th Avenue

Prescott, WI 54021

(715) 377-6717

kmpeters@presenter.com

Grind scrap wood and other recyclable products (bricks, shingles, etc.).

Ken Patterson or Cynthia Poselenzy

**Packer Industries**

5800 Riverview Road

Mableton, GA 30126

(800) 818-2899

packerind@aol.com

Experience with grinding a variety of construction and demolition products for recycling, including wood as landscape mulch.

Scott Eifler

**Resource Recovery Systems, Inc.**

1117 Western Drive

Hartford, WI 53027

(262) 673-6801

(800) 569-6813

scott@rrsinc.net

www.rrsinc.net

Grind scrap wood for landscape mulch.

Dave Pellitteri

**Pellitteri Waste Systems**

7035 Raywood Rd, PO Box 259426

Madison, WI 53725-9426

(608) 257-4285

davidp@pellitteri.com

www.pellitteri.com

Can haul scrap wood and have it ground for landscape mulch.

**Wisconsin Recycling Markets for Wood:**

**Certified Products**

1900 W. Lincoln Ave  
New Berlin, WI 53146  
(262) 542-2270

**Cornerstone of Wisconsin, Inc.**

Contact: Mark Hanley  
Waukesha, WI  
(262) 206-8668

**Country Recycling**

Contact: Orlando Olson  
Withee, WI  
(715) 229-2342

**Diamond Star**

Contact: Robert Walters  
Poynette, WI  
(608) 635-4200

**Ener-Con**

Contact: Jerry Gruber  
Hartford, WI  
(262) 673-8025  
Make colored mulch.

**Helt Farm**

Contact: Tom Helt  
Waunakee, WI  
(608) 831-4224 or  
(608) 698-4225

**Pallet One of Wisconsin**

Contact: Jeff Mathwig  
(920) 478-2082 ext. 23

**Mobile Reduction Specialists**

Contact: Timothy Hoeffert  
Sturtevant, WI  
(262) 886-6777

**Norman Arendt**

Contact: Norman Arendt  
Middleton, WI  
(608) 831-5899

**Norske Woodworks**

Contact: Harald Norslien

Black Earth, WI

(608) 767-3994

**Renewed Resources LLC**

Contact: Wayne or Pat

West Bend, WI

(262) 677-3650

**Tri Star Pallet**

Contact: Vic

Dodgeville and Madison

(608) 576-3590

**Waste Management, Milwaukee**

Contact: Anthony Jones

Franklin, WI

(414) 761-2100

The National Wood Recycling Directory from the American Forest and Paper Assn. also lists these companies as accepting untreated lumber for recycling.

Johnson Timber Company

Bass Lake, WI (in Sawyer County)

(715) 634-4843

Weyerhaeuser Paper Company

Rothschild, WI (in Marathon County)

(715) 359-3101

Additional resources for reuse of wood:

Wood Web Lumber Exchange: [www.woodweb.com](http://www.woodweb.com)

Business Materials Exchange of Wisconsin: [www.bmex.com](http://www.bmex.com)

**B. Badger Army Ammunition Plant WasteCap Wisconsin Market Report - Concrete**

**Badger Army Ammunition Plant:**

Nearly all of the buildings at Badger Army Ammunition Plant have concrete foundations. These foundations, including those where the buildings have been removed by the army, will be transferred to the new owners. In addition, there are concrete buildings, and other concrete structures and walls on the property.

**Regulatory Issues:**

It is unclear whether or not concrete with lead based paint on it may be recycled or if it must be disposed in a landfill. The owner or general contractors should work with Wisconsin Department of Natural Resources on this issue.

**Processing/Markets:**

Concrete is a highly-recyclable material and can be ground and reused as aggregate in new concrete, as sub base, back fill, etc. It is most cost-efficient for as much concrete as possible to be processed at one time. The Hwy. 78 Road Project, adjacent to the site, provides a market for most of the concrete on the site. The owner needs to follow up with the Department of Transportation to coordinate the use of the concrete in the Hwy 78 road project before March 1, 2005. Road builders will arrange for the crushing, transportation and recycling of the concrete. Any concrete not used in the Hwy 78 project may be able to be used in other highway projects (Hwy 12 or other), for road building (if any) on the BAAP property, for sub base or fill on site.

**C. Badger Army Ammunition Plant WasteCap Wisconsin Market Report – Bricks**

**Badger Army Ammunition Plant:**

Although few buildings (perhaps as few as five -- one on each production line) at BAAP are made of brick, brick walls were commonly constructed as fire walls within buildings. In addition, the two power plants (one not in operation) contain large boilers lined in brick.

**Regulatory Issues:**

Bricks may be reused or recycled under Wisconsin law. However, if there is lead based paint on the bricks, state law prohibits the sale or transfer of any fixture or other object containing lead-bearing paint that might be placed upon any surface of a dwelling ordinarily accessible to children.<sup>1</sup>

**Processing:**

In order to assess the reuse value, a brick recycler would need a sample of the brick and an estimate of quantity of brick available. Bricks that can be sold for reuse are solid and are a common brick like Chicago Pink or Watertown brick. Brick walls simply need to be knocked down before a brick recycler comes in. Brick recyclers will clean the mortar off of the brick, stack and transport the bricks for reuse. Bricks will be sold for reuse. Some brick recyclers will pay \$40 - \$60 per 1000 bricks. Approximately 500 bricks fit on a pallet. Bricks can also be chipped and sold as brick chips for landscape use. Bricks may also be crushed by a concrete recycler as used as aggregate in concrete or sub base.

**Wisconsin Markets:**

**Antique Brick & Granite Company**

Milwaukee, WI 53202

414-355-7940

They can assess the value of bricks, and come in after the brick wall is knocked down to clean the brick, stack, transport and market it for reuse.

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<sup>1</sup> Pre-Demolition Environmental Checklist. DNR Publication WA-651-03. Bureau of Waste Management

Art Leinweber  
**The Brickyard, Inc.**  
3352 S. Clement Avenue  
Milwaukee, WI  
414-481-9600  
fax: 414-481-2770

They took the bricks from the old Milwaukee County Stadium when it was taken down. They can assess the value of bricks, and come in after the brick wall is knocked down to clean the brick, stack, transport and market it for reuse.

**Gavin Historical Bricks**  
2050 Glendale Rd.  
Iowa City, IA 52245  
Authentic antique brick suppliers.

**Van Ness Stone**  
10500 Kinsman Road  
Newberry, OH 44065  
440-338-4444  
[www.vannesstone.com](http://www.vannesstone.com)

**Other markets:**

The Used Building Material Association has a Brick and Block Exchange where brick can be listed for reuse: <http://build.recycle.net/a/view/0110.html>. Brick yards may be interested in reuse of the brick.

**D. Badger Army Ammunition Plant WasteCap Wisconsin Market Report – Asphalt Roofing Shingles**

**Badger Army Ammunition Plant:**

Asphalt shingles are used on all roofs at BAAP except for those in the Ball Powder Production Area. All of the buildings in the Ball Powder Production Area (approx. 40 bldgs) have concrete asbestos roofs. They have been extremely diligent at Badger Army Ammunition Plant about removing all old roofing material when a new roof is put on, so all roofs are single-layer. Additionally, Olin Corporation has maintenance records of when each roof was re-roofed.

**Regulatory Issues:**

Between 1963 and the mid 1970s, some manufacturers used asbestos in the fiber mat of shingles. In addition, asbestos was commonly used during this time in other asphalt roofing materials.<sup>2</sup>

The disturbance of asbestos is regulated in part by Chapter NR 544, WI Admin Code. Prior to beginning a demolition or renovation project, the owner/operator of a structure is required to have the structure inspected for the presence of asbestos.<sup>3</sup>

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<sup>2</sup> [www.shinglerecycling.org](http://www.shinglerecycling.org)

<sup>3</sup> Pre-Demolition Environmental Checklist. DNR Publication WA-651-03. Bureau of Waste Management.

In Wisconsin, every homogeneous sample must be tested for the presence of asbestos before the shingles can be recycled. This means that there must be at least one sample from each building. If there is more than one type of shingle on a roof, then each type of shingle must be tested.<sup>4</sup> There are three local labs available who can test shingles for the presence of asbestos:

John Yakish

**Micro Analytical, Inc.**

11521 W. North Avenue

Milwaukee, WI 53226

414-771-0855

fax: 414-771-6570

\$15 per sample

Resealable container (like a ziplock bag)

5 business day turn around time

John Knight

**Wisconsin Occupational Health Lab (State Lab)**

2601 Agricultural Drive

Madison, WI 53718

608-263-6326

**EMSL**

14375 23<sup>rd</sup> Avenue North

Plymouth, MN 55447

763-449-4922

fax: 763-449-4924

Fees and turn around times vary. Fees run between \$15 and \$50 per sample and turn around time varies from 24 hours to 10 days. Contact the labs for specific information. Samples should be sent in a resealable container (like a ziplock bag).

**Taking Samples:** NR 477 requires that the structure be inspected for the presence of asbestos by an asbestos inspector licensed by the WI Department of Health and Family Services. The DHFS maintains a list of licensed inspectors for the public's review.

**Processing Options:**

During deconstruction, shingles must be separated from other components such as wood and paper. Waste shingles are typically ground using a horizontal mill, although tub grinders have been used in some applications. The ground shingles are usually screened to achieve a uniform product size (depending on the market) typically 2". The ground shingles must be passed under a magnet to remove nails.

**Wisconsin Markets:**

Several potential markets exist for asphalt shingles. These include hot mix asphalt, cold patch, aggregate road base, and use for dust control on farmers' properties. At Badger, shingles could

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<sup>4</sup> Tom Stibbe. Wisconsin DNR, Western Region.

be hauled to an off site market for processing and marketing. Alternatively, the shingles could be ground to 2", nails removed, and the ground shingles stored until such time as they are needed for road building. In particular, up to 50% ground shingle content could be used as a base layer under Hwy 78 when it is constructed. Key date: 3/1/05<sup>5</sup>. 5 – 10% shingle content can be used in the manufacture of new hot mix asphalt for roads.

**Some Market Contacts:** The companies listed below have experience with shingle recycling. Local asphalt road builders may be able to recycle shingles as well.

Roxanne Seeliger

**DeConstruction, Inc.**

1010 Walsh Road

Madison, WI 53714

(608) 244-8759

fax: (608) 244-8981

deconstruct@mailbag.com

They deconstruct buildings and recycle a variety of items. May be able to take shingles for recycling.

**Gasser D L Construction**

S4383 Us Highway 12

Baraboo, WI 53913

(608) 356-3311

They construct roads and have contacted Tom Bennwitz, DNR, about the possibility of accepting the shingles, processing and using them.

Brian Tippetts

**La Crosse County Solid Waste Department**

6500 State Road 16

LaCrosse, WI 54601

(608) 785-9572

fax: (608) 785-6160

btip@aol.com

LaCrosse Co. Solid Waste Dept. accepts shingles, processes and markets them.

Bernie Wenzel

**Resource Recovery Team**

206 W. Walnut St.

Stratford, WI 54484

(715) 551-4621

berniewenzel@hotmail.com

Resource Recovery Team accepts shingles, processes and markets them.

**Other Shingle Recycling Resources**

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<sup>5</sup> Tom Bennwitz. Wisconsin DNR, Southern Region.

<http://www.moea.state.mn.us/lc/purchasing/shingles.cfm>. Information about shingle recycling, a tool kit of resources, fact sheets, research findings and contacts are posted on the MOEA web site

[www.shinglerecycling.org](http://www.shinglerecycling.org). This site contains a compilation of all testing for asbestos on shingles that show it to be minimal, a markets directory and other resources.

## **E. Badger Army Ammunition Plant WasteCap Wisconsin Market Report – Metal**

### **Badger Army Ammunition Plant**

There is extensive use of metal equipment at BAAP. It is likely that through any means of building removal -- burning, demolition, or deconstruction -- most ferrous metal will be able to be recovered. We recommend offering materials first for reuse and then for recycling. There are strong local reuse and recycling markets available for metal.

### **Regulatory Issues**

Before removal of metal equipment, potential contamination will need to be carefully assessed. Additionally, any efforts to reuse metal that has lead based paint on it should be coordinated with the Department of Health and Family Services and the Wisconsin Department of Natural Resources.

### **Processing Options:**

Preference is given first to reuse, then to recycling. In order to reuse the metal, potential end markets for the materials must be solicited (see Recommendations for successful recycling and reuse. Also see Marketing Methods for Wood Reuse).

Removal of metal equipment should be completed as part of an overall building removal contract. Due to the large size of many of the metal pieces of equipment, if the equipment is removed before deconstruction crews remove wood, it is likely that most usable wood will be destroyed in the process of removing the metal equipment. The contractor will remove the metal and then it can be offered/sold for reuse or recycling.

### **Markets:**

There are several local markets for metal, including Delaney's Salvage and Dr. Evermore which are directly across the street from BAAP. Check the local yellow pages or the Wisconsin Recycling Market Directory at <http://www.dnr.state.wi.us/org/aw/wm/Markets/> for scrap metal recyclers.

## **F. Badger Army Ammunition Plant WasteCap Wisconsin Market Report - Reusable Items**

### **Badger Army Ammunition Plant**

Unique light fixtures, hand-painted signs, ammunition boxes, furniture, lockers, and many other relatively-small, reusable, historically-significant and interesting items are contained within the buildings at BAAP. It is recommended that these materials be salvaged for reuse and that they be offered first to Badger History Group or other organizations that will preserve their historical heritage.

## **Regulatory Issues**

No contaminated materials should be sold or given away for reuse. Regulatory challenges may include codes (electrical codes, for example), contamination, lead based paint, and issues of who is allowed to remove items for reuse. Work with the Department of Health and Family Services and Wisconsin Department of Natural Resources to address the issue of lead based paint on some reusable items.

**RECOMMENDATIONS FOR SUCCESSFUL REUSE** Challenges to reuse include labor charges in the removal, the possibility of damaging items in their removal, time availability and liability concerns. However, many of the strategies below could be successfully utilized as long as these challenges are addressed.

**1. List reusable items on the Business Material Exchange of Wisconsin.**

For materials that may have value, try the Business Materials Exchange of Wisconsin. This a web-based service whereby companies can list and look up materials they would like to give away or acquire. 1-800-364-3233.

[www.bmex.org](http://www.bmex.org)

**2. Set up a reuse web site.**

WasteCap or others could assist you in the creation of a web site and auction. Photos can be placed on a website created for this project which depict the items available for reuse. Individuals or companies can bid for the items and then collect them on designated day(s).

**3. Set up a reuse auction.**

WasteCap or others could assist you in the creation of an auction for reusable items. An auction could be coordinated whereby time is set aside for people to look at items, bid on items, and remove the items. Liability and other safety issues need to be carefully researched and addressed for both the auction and web site.

**4. Utilize building materials reuse centers and architectural antiques dealers.**

- Attached is a list of Wisconsin Building Materials Reuse Contacts. Call for prices, hauling arrangements, and any requirements they may have. This list is not inclusive of all places that take materials for reuse in Wisconsin. Contact local antique dealers and advertise locally first.
- A new Habitat for Humanity ReStore for reusable building materials may be able to take and sell many of the materials. Contact Jen Voichick, 608-244-3928, for more information.
- Individuals from nearby Amish communities may be able to come and do the labor of removing items from the building. WasteCap can locate contacts in Wisconsin's Amish community who have experience with reusing materials.

**5. Set up site visit(s) with many of the potential reuse or recycling markets.**

WasteCap or others could arrange site visits for you which would bring together individuals representing reuse and recycling businesses who could bid on the materials from the building.

### **Building Materials Reuse Contacts**

#### **Pieter Godfrey**

1400 E. Park Place  
Milwaukee, WI 53211  
mobile: (414) 617-8405  
home office: (414) 332-8405

#### **Pete Gaitan**

##### **Architectural Antiques and Salvage**

P.O. Box 926  
Grayslake, IL 60030-0926  
(847) 343-1044  
fax: (847) 223-5775  
www.architectural-antqs.com

#### **Habitat for Humanity ReStore**

208 Cottage Grove Rd.  
Madison, WI 53716  
(608) 661-2813  
Fax: (608) 661-2840  
www.habitatdane.org

#### **HomeSource**

3701 W. Lisbon Avenue  
Milwaukee, WI 53208  
(414) 344-4142

#### **Habitat For Humanity**

Sheboygan, WI  
(920) 458-3399

#### **The IM Salvage Company**

P.O. Box 21621  
4025A Loomis Road  
Greenfield, WI 53221  
(414) 281-8733

#### **Lisbon Storm, Screen & Door, Inc.**

5006 W. Lisbon Avenue  
Milwaukee, WI 53216  
(414) 445-8899

#### **Ralph Middlecamp**

##### **St. Vincent De Paul Dig & Save Outlet**

1900 S. Park Street  
Madison, WI 53713-3230  
(608) 250-6370

#### **Tim Hansen**

##### **Salvage Heaven**

6633 W. National Avenue  
West Allis, WI 53214  
(414) 329-7170

#### **Jay Weiss**

##### **Weiss Brothers Architectural Salvage**

113 N. Ingersoll Road  
Madison, WI 53703  
(608) 256-4988  
jweiss@gnic.com

## 7. CONTACTS

### **Badger Army Ammunition Plan Contact Info. For Phase 1 Collaborators**

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Baraboo, Wisconsin 53913  
(608) 643-3361  
(608) 643-2674  
wjwfacil@midplains.net

### **Other Deconstruction Resources**

*Pre-Demolition Environmental Checklist.* Wisconsin DNR Publication. Bureau of Waste Management. WA-651-03.

Reuse Development Organization. [www.redo.org](http://www.redo.org)

Used Building Materials Association. [www.ubma.org](http://www.ubma.org)

US Environmental Protection Agency – Construction and demolition debris web site including deconstruction information and case studies. [www.epa.gov](http://www.epa.gov)

## **8. CONCLUSION**

There is strong potential for reuse and recycling of materials from some buildings at Badger Army Ammunition Plant including wood, concrete, brick, asphalt roofing shingles, metal and other reusable items such as signs and fixtures. Strong, economical reuse and recycling markets are available for many of the materials. Although some buildings do not lend themselves to deconstruction due to their small size, contamination, or other factors, at least 200 buildings may be suitable candidates for deconstruction. Commitment by the owner, the wording of the deconstruction contract, involvement of the local community, diligence in pursuing reuse and recycling markets, and close work with regulatory agencies on regulatory issues surrounding lead based paint, asbestos and chemical contamination will be key to ensuring successful reuse and recycling.

### **Appendix:**

- A. WasteCap Wisconsin Site Visit to Badger Army Ammunition Plant, March 12<sup>th</sup>, 2003
- B. Power Point Presentation: Building Deconstruction, Material Salvage, and Recycling at BAAP
- C. Power Point Presentation: WasteCap Wisconsin, Inc. Badger Army Ammunition Plant Reuse and Recycling Markets & Regulations