

**ENVIRONMENTAL ANALYSIS AND DECISION ON THE NEED
FOR AN ENVIRONMENTAL IMPACT STATEMENT (EIS)**

Department of Natural Resources (DNR) Form 1600-8 Rev. 6-2001

Region or Bureau South Central Region
Type List Designation Type II action

NOTE TO REVIEWERS: This document is a DNR environmental analysis that evaluates probable environmental effects and decides on the need for an EIS. The attached analysis includes a description of the proposal and the affected environment. The DNR has reviewed the attachments and, upon certification, accepts responsibility for their scope and content to fulfill requirements in s. NR 150.22, Wis. Adm. Code. Your comments should address completeness, accuracy or the EIS decision. For your comments to be considered, they must be received by the contact person before 4:30 p.m.,
April 16, 2004

Contact Person:

Janet Battista, P.G. and
Mark Harder, P.E.

Title: Waste Management Hydrogeologist and
Waste Management Engineer

Address: P.O. Box 7921
Madison, WI 53707

Telephone Number

(608) 267-3533 and
(608) 275-3324

E-mail Address

Janet.Battista@dnr.state.wi.us and
Mark.Harder@dnr.state.wi.us

Applicant: U.S. Army Ammunition Plant

Address: 2 Badger Road, Baraboo, WI 53913-5000

Title of Proposal: Feasibility Report: Expansion of Landfill Capacity Project, Badger Army Ammunition Plant

Location: County: Sauk City/Town/Village: Merrimac Township

Township Range Section(s): SE ¼ of the NW ¼ and the SW ¼ of the NE ¼ of Section 7, T10N, R7E

PROJECT SUMMARY

1. *Brief overview of the proposal including DNR actions, public costs and funding*

The Badger Army Ammunition Plant (BAAAP) is a 7,354-acre property located in south-central Wisconsin between the cities of Baraboo and Sauk Prairie in Sauk County (see Map 1). A contractor-operated facility, BAAAP is owned by the Department of the Army (Army) and is operated by the Olin Corporation (Olin). BAAAP is roughly bordered by Devil's Lake State Park to the north, by U.S. Highway 12 to the west, and by State Highway 78 and Lake Wisconsin to the east and south, in a predominantly agricultural and recreational region. Mixed residential and commercial properties occur in a few areas near the plant. Developed and operated by the Army as a production facility for powder propellants between 1942 and 1975, the plant has been decommissioned and is now considered "surplus." The property contains approximately 1400 buildings, most of them abandoned, and extensive plant infrastructure including rail lines, a heating plant, roadways and bunkers.

In March 2003 the U.S. General Services Administration (GSA) published a Final Environmental Impact Statement (EIS), which proposes disposal of BAAAP. Negotiations are underway through GSA for transfer of the property to three separate entities: the Ho-Chunk Nation, the State of Wisconsin, and the Dairy Forage Research Branch of the United States Department of Agriculture (USDA).

On behalf of the Army, Olin has proposed to construct a 900,000-cubic-yard landfill approximately 150 feet north of an existing, active landfill known as BAAAP Landfill #6 (DNR License #3118). The proposed landfill is designed to accommodate all non-hazardous waste material that could be generated from the clean up and transfer of the BAAAP property to the future owners. The proposed landfill is located at the northeast corner of the East Rocket Area in the east-central portion of BAAAP. Most of the area that would be occupied by the landfill has undergone extensive grading and development for construction of the East Rocket Area and other plant infrastructure. In addition, at separate locations on BAAAP, one sand borrow area and up to three clay borrow areas would be excavated for material needed to construct the landfill. **See Map 2 illustrating locations of the three sites.**

In accordance with s. 1.11, Wis. Stats. and ch. NR150, Wis. Adm. Code, an Environmental Assessment (EA) is required for regulatory approval of the proposed landfill because its design capacity exceeds 500,000 cubic yards. Army regulation (AR) 200-3 also requires an Environmental Analysis of Army actions affecting human health and the environment.

The Army has committed to funding the construction and operating costs of the proposed landfill while the Army uses that landfill. Costs are estimated as follows: Design \$83,800; Preconstruction Tasks \$134,100, and Construction \$1,661,200. In addition, The Army will provide \$55,000 per year for five years for operation of the landfill.

The Army is preparing a separate EA for the proposed open burning of structures at BAAAP, as required under federal regulations. (See Appendix A for a discussion of the state-approved open-burning plan and state approval process for explosive decontamination and demolition.) The U.S. Environmental Protection Agency must complete an evaluation of the open-burning plan before the

Army's EA can be finalized, whereupon it will be published and a public information meeting will be held.

Future planning for the management and development of the property, once the land transfer is complete, will occur through the master planning process. The DNR has committed to leading the development of a joint master plan/management plan in cooperation with the USDA and the Ho-Chunk Nation. The Badger Reuse Plan will form the basis of the plan. A separate EA will be developed as part of this master planning process, which will focus on overall land protection, management, recreational use and facility development across the property.

This EA focuses on the environmental impacts directly or indirectly associated with the landfill. A number of additional activities are underway or planned at BAAAP. With the exception of the open burning EA required under federal law, these other activities do not require an EA. Nevertheless, information on all other activities is described in a set of appendices to provide full disclosure of the cleanup activities planned for BAAAP. This more comprehensive information on overall activities across the property is provided via Appendices A through K, listed below. References to appropriate appendices are given throughout the main body of the document.

- Appendix A: Air Quality at BAAAP
- Appendix B: Reuse of Construction Materials at BAAAP
- Appendix C: Hazardous Substance Releases at BAAAP
- Appendix D: Wastewater Treatment Plan for BAAAP
- Appendix E: Leases on BAAAP
- Appendix F: Status of Land Transactions at BAAAP
- Appendix G: Natural Resources at BAAAP
- Appendix H: Water Supply Systems at BAAAP
- Appendix I: Badger Reuse Plan
- Appendix J: Existing and Future Rail Uses within BAAAP
- Appendix K: Active and Closed Disposal Sites on BAAAP
- Appendix L: Agency Correspondence

Information Repositories

The substantial volume of information referenced but not attached to this Environmental Assessment is made available at the repositories that the Army maintains at the Prairie du Sac library, the Sauk City library and at the Badger plant itself. The repositories at the libraries can be viewed during normal library hours. The repository at the Badger plant may be viewed by appointment by calling 608/643-3361.

2. Purpose and Need

As the party responsible for cleanup of contamination at BAAAP, the Army must provide for safe disposal of those materials that might create liability for the Army in the future. After transfer of the property to new owners, most of the buildings and infrastructure at BAAAP would be owned by entities other than the Army. The landfill is designed to accommodate the building material disposal

needs of these subsequent owners as well as the disposal needs of the Army before the transfer. Olin predicts that it will take the Army five-to-six years to complete their portion of the demolition and disposal. Since the time frame for the other entities is unknown, it is difficult to anticipate the life of the proposed landfill.

In addition, numerous interested parties are pursuing recycling and reuse projects for useable materials, which could decrease the total volume of waste needing disposal (see Appendix B). To accommodate the prospect of a smaller volume of waste, the project design allows for landfill closure if the amount of waste turns out to be less than the maximum 900,000 cubic yards. Section NR 504.05(3), Wis. Adm. Code requires that landfills be designed for at least a 10-year, but not more than a 15-year life. It is anticipated that the life of the landfill would meet this requirement.

Badger Reuse Plan

The March 28, 2001 Badger Army Ammunition Plant Reuse Plan was developed by numerous environmental, governmental, tribal, business, landowner, and other parties interested in achieving a community-based plan for reuse of the ammunition plant (see Appendix I). The plan establishes nine overarching values, each with numerous criteria, for activities affecting the property. The landfill proposal addressed in this assessment relates specifically to Value 2, which directs the federal government to complete the highest quality cleanup of the Badger property in a timely manner. Value 2 of the Reuse Plan also directs the federal government to retain all cleanup responsibilities and liabilities associated with decommissioning of the plant. The landfill proposal conforms to this criterion by providing for environmentally sound disposal of the contaminated materials that will be generated by the decommissioning of the plant, as well as disposal of other plant materials after transfer of ownership.

The landfill proposal conforms to other applicable values and criteria of the Reuse Plan as well. As described elsewhere in this assessment, no historically significant buildings or infrastructure would be affected (Value 3), sustainable agriculture opportunities would not be affected (Value 6), and economic stability and sustainability in local municipalities would either be enhanced or would not be affected (Value 9). The proposal would affect criteria listed under Value 7 of the Plan, regarding protection and enhancement of the natural landscape and geological features, including visual impacts to the property. Upon closure, the landfill elevation could be as much as 60-70 feet above the natural terrain and would be visible from many parts of the property. Additional excavation in the existing sand borrow pit would further impact the end moraine, a significant geologic feature. The impacts would be localized. The DNR will require that final re-vegetation of all areas disturbed for construction of the landfill be made consistent with the eventual master plan for the property and with Department-approved workplans for restoration.

The Future Use Concept Map of the Reuse Plan (see map in Appendix I) indicates that the proposed landfill and the sand borrow area would be located within an area targeted for ecosystem restoration and conservation. The clay borrow areas would be within an area targeted for recreational and cultural use. The proposed landfill and excavation sites would be restored in accordance with an approved restoration plan that would be based upon the final uses proposed by the Reuse Plan.

3. *Authorities and Approvals (list local, state and federal permits or approvals required)*

Landfill and Borrow Sites

The Army must obtain a Department decision on the feasibility of the landfill before it can be built. The procedures for a feasibility determination include: a review of the completeness of the information supplied by the Army, the preparation of an environmental assessment (EA) requiring input from numerous programs within the Department, a determination about whether an environmental impact statement (EIS) is necessary, and an opportunity for public comment. Public comments are reviewed at any time, however after the public notice is issued, there is a formal 30-day public comment period. During this period, the public may request an informational hearing. Also during the comment period, the public may request a contested case hearing on the feasibility report approval for the landfill (but there is no such provision for the EA). Sections 289.26 and 289.27, Wis. Stats. describe the informational and contested case hearing provisions for a proposed landfill. For this project, an information meeting is planned with the specific date yet to be determined.

After the comment period and review of public comments, the Department decides whether to approve the feasibility report. If the feasibility report is approved, the Army would need Department approval of a Plan of Operation Report, which is the next step in the siting process. The Plan of Operation Report provides the technical specifications of the landfill based on criteria established by the feasibility review. The Plan of Operation also contains restoration/reclamation plans for soil borrow areas. Department staff will inspect the landfill during its construction, and afterward, approval of a construction documentation report is required before any waste can be placed in a new landfill. The Feasibility Report and the Plan of Operation Report are required under ss. 289.23 and 289.30, Wis. Stats.

For the BAAAP landfill proposal, the Department has granted exemptions from several requirements for a feasibility study. These include the number of exploratory borings necessary, the number of groundwater monitoring wells and the amount of water quality testing that need to be completed for a new landfill. The exemptions were based on the significant amount of information previously collected for the nearby active landfill. The Department has granted BAAAP a conditional approval for disposal of asbestos-containing material in the active landfill. The same requirements for asbestos disposal at the active landfill would be included in any Plan of Operation approval issued for the proposed landfill. (See Sections 7 and 16 below.)

Two deviations from the standard landfill design required by ch. NR 504, Wis. Adm. Code are proposed. The first is to allow one leachate headwell per phase instead of two as normally required by s. NR 504.09(2)(i), Wis. Adm. Code. The second is to allow gas probes to be placed on two sides of the landfill instead of one on each of the four sides, as normally required by s. NR 504.08(3), Wis. Adm. Code. The same deviations were allowed for the existing active landfill. Additional inspection and monitoring requirements for the leachate system are proposed and it is expected that minimal gas will be generated by the proposed site. Therefore, these deviations from the standard design are not expected to result in any environmental impact.

The proposed landfill meets all the locational requirements specified by s. NR 504.04(3), Wis. Adm. Code for the siting of a landfill because it lies beyond the following regulatory boundaries:

- ◆ 1200 feet of any public or private water supply well,
- ◆ 1000 feet of a navigable lake, pond or flowage,

- ◆ 300 feet of a navigable river or stream,
- ◆ a floodplain,
- ◆ 1000 feet of the right-of-way of any state trunk highway, interstate, federal aid primary highway,
- ◆ 1000 feet of an existing public park,
- ◆ 200 feet of a fault that has had displacement in Holocene (recent) time,
- ◆ a seismic impact zone,
- ◆ any other geologically unstable area.

In addition, the landfill would not contain putrescible waste, and therefore, would not be a bird hazard to aircraft.

As this document will discuss, the proposal has the potential to meet the performance standards for a solid waste landfill specified by ch. NR 504.04(4), Wis. Adm. Code for the following reasons:

Landfill Site

- (1) If the landfill is designed, operated and monitored to approved Department standards there would be no reasonable probability that significant deleterious impacts would occur to wetlands, surface water quality, or groundwater quality or quantity.
- (2) Because the expansion would not contain putrescible waste there would be little or no explosive gas available for migration away from the waste.
- (3) Required ongoing monitoring would reduce or eliminate the possibility that air emissions of any hazardous air contaminant would exceed standards without Departmental action.
- (4) No historical or archaeological artifacts or sites, and no critical habitat occur at the site.

Clay and sand borrow areas

Clay and sand borrow material for construction of the landfill would be excavated from four areas at BAAAP; up to three clay borrow areas and one sand borrow area could be used during the life of the landfill. The sand borrow area is an existing borrow area that would be expanded for the proposed project. Clay Borrow Site (CBS) area 1 would be excavated first. If additional clay is needed, CBS area 2 would be excavated next, followed by CBS area 3. Neither the proposed clay borrow excavations nor the sand borrow excavation would harm wetlands, surface water or critical habitat, and do not contain historical or archaeological artifacts or sites, thereby meeting the regulatory requirements for the siting of non-commercial borrow areas.

For aspects of the proposal that concern restoration of the landfill and the clay and sand borrow areas, the Waste Management Program will require that the Army conform to any guidance and approved workplans developed for restoration of each site. Reclamation and restoration activities will be required to conform as well to the Badger Reuse Plan, to the BAAAP master plan when it is developed, and to requirements of ch. NR 135 Wis. Adm. Code, concerning the restoration of nonmetallic mine sites.

Additional Permits and Approvals

Air

Fugitive Dust air emissions are regulated under s. NR 415.04, Wis. Adm. Code, which states that no person may allow any materials to be handled or transported without taking precautions to prevent particulate matter from becoming airborne. Nor may a person allow a structure or road to be used, constructed, altered, repaired, or demolished without taking such precautions.

Given that this landfill is intended only for inorganic, non-hazardous demolition material and will not contain putrescible waste, no organic air emissions are expected.

Aside from fugitive dust emissions (estimated at less than 6.0 tons per year), which are already addressed by s. NR 415.04, Wis. Adm. Code, there are no other significant air emissions expected from this landfill and therefore it would not be subject to permitting requirements under the Air Program.

Water

Erosion control and stormwater management coverage are required according to ch. 283, Wis. Stats., and ch. NR 216, Wis. Adm. Code.

No water regulation permits will be needed for the clay borrow, sand borrow, or landfill sites according to ss. 30.123, 30.19, 30.195 and 30.20, Wis. Stats. No jurisdictional wetlands will be affected and no federal Section 404 Army Corps Permit or Section 401 Water Quality Certification will be required.

No Wisconsin Pollutant Discharge Elimination System (WPDES) Permit per ch. 283, Wis. Stats., is required for the landfill if leachate is discharged to the wastewater treatment plant, as planned.

Endangered Resources

No incidental take of federal or state endangered or threatened species is expected to occur through this project, therefore no state or federal incidental take permits are required.

Local Approvals

As required by s. 289.22, Wis. Stats., BAAAP has contacted the two affected local municipalities, Sauk County and the Town of Merrimac. Based on the responses BAAAP received, there are no applicable local approvals required for the proposed landfill.

PROPOSED PHYSICAL CHANGES

4. Manipulation of Terrestrial Resources (include relevant quantities - sq. ft., cu. yard, etc.)

The new landfill facility, as proposed by Olin, would significantly increase the landfill capacity of the BAAAP site from the approximately 90,000 cubic yards remaining at the active landfill today by an additional 900,000 cubic yards.

The proposed landfill will require the excavation of approximately 14 acres to a depth of approximately 20-25 feet. The landfill footprint would be rectangular in shape with dimensions of approximately 600 feet by 1000 feet. Additional areas around the landfill would be disturbed for environmental monitoring wells and equipment, soil stockpiles, piping, and access roads. All together, the active landfill, proposed landfill, and infrastructure supporting both landfills, would affect approximately 60 contiguous acres of the 7,354 acre BAAAP property. The maximum elevation of the landfill when closed is expected to be 958 feet above mean sea level (MSL), which would be approximately 60-70 feet above the nearby terrain.

In separate locations on the BAAAP property, three clay borrow areas totaling approximately 17 acres and a sand borrow area of up to 30 acres would be excavated. These areas would provide soil material needed for the construction and closure of the landfill. Clay Borrow Site (CBS) Area Number 1 would be excavated first. If additional clay is needed, CBS Area Number 2 would be excavated next, followed by CBS Area Number 3. Chapter NR 512.15(1), Wis. Adm. Code, requires an applicant for a new landfill to identify a borrow source that contains enough clay that meets the required clay specifications to enable the construction of the liner and cap of the first phase of a proposed landfill. Olin has estimated that approximately 21,300 cubic yards of clay is needed to close the existing landfill and approximately 44,400 cubic yards of clay is needed to construct and cap the first phase of the proposed landfill. The 17 acres of the proposed clay borrow area is estimated to contain 182,000 cubic yards of clay of the necessary quality. The area designated as "Area 3" has yet to be fully investigated, however; soil borings are needed in this area. If additional clay is needed for the landfill, potential borrow locations may be available both on the BAAAP property and off site within the nearby area. Any additional borrow areas would be reviewed for compliance with ch. NR 512.15, Wis. Adm. Code.

Overall, the two landfills (active landfill #3118 and the proposed landfill) with associated soil borrow areas would affect approximately 107 acres of the 7,354 acre BAAAP property.

Landfill Use and Design

Generally, waste going into the proposed landfill would be similar to that currently disposed of in the active landfill. The primary waste material for disposal (approximately 80-90%) would consist of construction and demolition debris from the various buildings and structures on the property, including treated and painted wood, and shingles, with some of the materials possibly containing minute amounts of propellant residues. Secondary waste streams would consist of friable and non-friable asbestos products (approximately 5-10%), and up to 5% waste soil and other materials generated by on-site remediation activities, reinforced concrete, waste ash from burned buildings and waste-activated carbon.

Some piping has been found on the property with paint that contained some polychlorinated biphenyls (PCBs). Materials that contain PCBs are regulated under the Federal Toxic Substances Control Act (TSCA) and not by the solid waste or hazardous waste program. The materials coated with PCB-containing paint are defined as “PCB bulk product waste” per 40 CFR (Code of Federal Regulations), Section 761.3. Bulk product wastes are allowed to be disposed of in a licensed municipal or non-municipal non-hazardous landfill per 40 CFR, Section 761.62(b)(i). The proposed landfill would be a non-municipal non-hazardous waste landfill. No hazardous waste material would be disposed of at the facility. BAAAP will not be allowed to dispose of any putrescible waste, such as cafeteria waste, that is not associated with demolition, deconstruction or other remedial operations.

The proposed landfill is designed to be a total containment facility, having a five-foot liner of compacted clay and an engineered leachate collection system, similar in design to the existing landfill. At the active landfill, leachate removed from the site by the leachate collection piping at the base of the landfill is collected in a tank located nearby, and then is trucked to an on-site sanitary wastewater treatment plant for treatment. Treated water from the wastewater plant is discharged to a ditch that is connected to a series of four settling and infiltration ponds. In contrast, the proposed landfill would have a pipeline to the nearest functional sewer line leading to the treatment plant, eliminating the need for trucking the leachate. The pipeline would be located along existing roads.

The landfill would be developed and closed in five phases from east to west as the site fills. Depending on the volume of waste, unnecessary phases may not be developed. The proposed final cover from bottom to top is: one foot of sand (grading layer and gas venting layer), two feet of compacted clay, one foot sand drainage layer, filter fabric, 18 inches of rooting zone and six inches of topsoil. Although landfill gas generation is expected to be minimal due to the non-putrescible waste material, the proposal does include a passive venting system designed to prevent any gas generated by decomposition of the waste from becoming concentrated within the landfill.

5. *Manipulation of Aquatic Resources (include relevant quantities - cfs, acre feet, MGD, etc.)*

The 17 acres proposed for clay excavation occur east of the BAAAP water filtration plant and south of the BAAAP reservoirs, in a region of naturally poor drainage at the base of the Baraboo Bluffs. Soil borings in the area indicate that up to about 14 feet of clay exist in the subsurface across the region where previous soil excavations have created artificial ponds and wetlands. Water levels in the ponds are maintained by limited infiltration through their clay base, by overflow from the BAAAP reservoirs, and from springs and seeps on the bluffs.

6. *Buildings, Treatment Units, Roads and Other Structures (include size of facilities, road miles, etc.)*

The proposed landfill would utilize existing BAAAP roads during its construction and operation, and no associated buildings would need to be constructed to service landfill activities. The only associated construction proposed would be a force main on the north side of the new landfill running west to an existing, functional sewer line. In the proposed design, leachate would be gravity drained out of the landfill site then transferred through the force main and discharged to the on-site wastewater treatment plant.

Reuse of Building Materials

Badger Army currently occupies 7,354 acres, and encompasses 157 miles of roadway, 60 miles of railroad, 116 miles of water lines, 110 miles of electrical lines, and approximately 1,400 buildings (Army). Many materials that have served their purpose during the production era now have the potential either to be reused or recycled, depending on the cost-effectiveness of retrieving them. The various building components that have potential for reuse include shingles, lumber, steel and concrete.

Concrete is the most reusable material at the facility, with estimates of available material as high as 300,000 tons. The Press Houses (44 Buildings) in the Rocket Range have over 100,000 tons available for reprocessing and reuse. As a part of the recycling effort the concrete would need to be excavated, hauled, and crushed into a sub-base, or base-course material before reuse.

The market for the material, once processed, could be one of two road projects: The first is State Highway (STH) 78, which is scheduled for construction in 2007, and the second is U.S. Highway (USH) 12, scheduled for 2011. The STH 78 project involves reconstruction of approximately 8.6 miles of roadway from County Highway Z to the Village of Merrimac. Sections of the roadway will be relocated within the BAAP property boundary to correct dangerous curves. A considerable quantity of unconsolidated fill will be needed for the new roadway. Clean concrete milled to aggregate size or larger may be available from demolition work at the facility. However, reuse of this material must be economically feasible and an adequate supply of the material must be available when the highway is under construction.

A short section of USH 12 adjacent to BAAP will be realigned in 2011. A substandard curve will be corrected and the roadway will be shifted slightly to the east within the BAAP boundary. Waste concrete from demolition at BAAP could be used in this project if economically and logistically feasible.

There are 26 miles of useable railway within the BAAAP property. (See Appendix J for discussion of future rail uses within BAAAP.)

See Appendix B for a complete discussion of reuse of all facilities and materials at BAAAP.

7. *Emissions and Discharges (include relevant characteristics and quantities)*

The primary air contaminant expected is particulate matter in the form of fugitive dust, generated from truck traffic and soil handling. Maximum theoretical emissions of fugitive dust are estimated to be less than 6.0 tons per year. Owners and operators are required by s. NR 415.04, Wis. Adm. Code, to take precautions to minimize fugitive dust. Such precautions shall include, but not be limited to:

- Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, or construction operations.
- Application of asphalt, water, suitable chemicals or plastic covering on dirt roads, material stockpiles and other surfaces which can create airborne dust, provided such application does not create a hydro-carbon, odor or water pollution problem.
- Covering or securing of materials likely to become airborne while being moved on public roads, railroads or navigable waters.
- The paving or maintenance of roadway areas so as not to create air pollution.

Particulate matter emissions other than fugitive dust would not be significant, and given that this landfill is intended primarily for inorganic, non-hazardous demolition material, it will not contain putrescible waste, so no significant organic air emissions are expected.

Overall, the maximum theoretical emissions of any one pollutant would not be significant enough to make the proposed landfill subject to permitting requirements under the Air Program.

There is a potential for asbestos emissions from both the asbestos removal and landfilling. Asbestos removal is regulated by ch. NR 447, Wis. Adm. Code and is required to be done in a manner that minimizes emissions. The disposal of asbestos-containing material in the existing landfill is regulated by conditions contained in the July 31, 2003 Plan of Operation Approval Modification issued by the Department. The majority of asbestos material is expected to be transite siding, which is not expected to release any asbestos unless broken. The current approval requires that this material be covered with at least one foot of soil prior to compaction to minimize the release of any asbestos. Friable material is required to be covered as soon as it is placed in the landfill and covered with at least three feet of soil prior to compaction. These same procedures would likely be proposed by Olin in the Plan of Operation for the new landfill or would be included as conditions by the Department.

8. *Other Changes*

none

9. *Identify the maps and figures attached*

- Map 1: Topographic Map of BAAAP Area
- Map 2: Proposed Landfill and Borrow Sites
- Map 3: Wetland Inventory Map of BAAAP
- Map 4: Map of Contaminated Sites at BAAAP
- Map 5: Active and Former Disposal Sites at BAAAP
- Map 6: Current Vegetative Cover at BAAAP

AFFECTED ENVIRONMENT

10. Information Based On (check all that apply):

Literature/correspondence (specify major sources)

- The Department's follow-up waterway permit determination letter dated December 12, 2003
- The Department's Waterway Determination letter dated December 4, 2003
- Feasibility Report Addendum No. 1, received November 6, 2003
- The Department's Endangered Resources Review letter dated October 30, 2003
- Feasibility Report, "Feasibility Report: Expansion of Landfill Capacity Project, Badger Army Ammunition Plant" and associated plan sheets, received August 4, 2003 - includes endangered resources and archaeological survey information
- July 31, 2003 Plan of Operation Approval Modification for the Disposal of Asbestos Containing Material at the Badger Army Ammunition Plant Landfill (Lic. No. 3118)
- "Endangered Resources Management Plan, Expansion of Landfill Capacity Project," Badger Army Ammunition Plant. Olin Corporation, July 2003
- Environmental Assessment Project I.D. 5630-03/04-00 STH 78, Prairie Du Sac - Merrimac Road, July 2003
- 2003 Badger Army Ammunition Plant Groundwater Narrative Summary; Olin Corporation; May, 2003
- Alternate Geotechnical Program Exemption (DNR Response letter, dated April 2, 2003)
- Initial Site Report, received February 6, 2003 (DNR Opinion letter, dated April 2, 2003)
- Final Environmental Impact Statement, Disposal of Badger Army Ammunition Plant, Wisconsin, U.S. General Services Administration, March 2003
- Initial Site Inspection, conducted December 12, 2002 (DNR Response letter, dated February 6, 2003)
- U.S. Army Corps of Engineers Draft Groundwater Investigation Report Deterrent Burning Ground, Stone & Webster, January 3, 2003

- Mossman, M.J. 2003. "Breeding Birds of the Badger Army Ammunition Plant," Sauk County, WI. Unpubl Report to U.S. Army and DNR.
- U.S. Fish & Wildlife Service. 2001. Wetlands Inventory of Badger Army Ammunition Plant Sauk County, Wisconsin.
- The Department's Endangered Resources review letter dated June 27, 2001
- March 28, 2001, Badger Army Ammunition Plant Reuse Plan – Final Report
- "The Prairie-Forest Border Ecoregion: A Conservation Plan," Wisconsin Chapter of The Nature Conservancy, 2001
- "Preliminary Ecological Restoration Plan for 1300 Acres of the BAAAP, Baraboo, Wisconsin," prepared by Charlie Luthin, April 1999
- "Biological Inventory and Investigations Conducted at the Badger Army Ammunition Plant in 1998," Aldo Leopold Chapter of the Society for Conservation Biology, 1998.
- U.S. Center for Health Promotion and Preventive Medicine. 1996. Ecological Risk Assessment no. 39-EJ-1410-96, Settling ponds and rocket paset area, Badger Army Ammunition plant, Baraboo, Wisconsin, 9-25 July 1996. 61pp.+
- "The Biological Inventory of the Badger Army Ammunition Plant," Nature Conservancy Wisconsin Chapter; September, 1993
- "Geology of Sauk County, Wisconsin," Wisconsin Geological and Natural History Survey Information Circular 67; 1990
- Feasibility Report Addendum No. 2, dated February 12, 2004, received February 17, 2004

Air Quality Information Sources

- "Initial Submission Document," Badger Army Ammunition Plant, Sauk County, Wisconsin, Explosive Decontamination and Demolition Process Information, September 2002, Plexus Scientific Corporation.
- "Air Permit Application," Badger Army Ammunition Plant, Sauk County, Wisconsin, November 2002, Plexus Scientific Corporation.
- "Analysis, Preliminary Determination And Draft Plan For Plexus Scientific Corporation Acting For Badger Army Ammunition Plant Located At 2 Badger Road, Baraboo, Sauk County, Wisconsin, On The Explosive Decontamination And Demolition At BAAAP" dated February 25, 2003, prepared by Barbara N. Pavliscak, Wisconsin Department of Natural Resources Permit Engineer.
- Memo, SUBJECT: Recalculations Due To Errors Found During Public Comment Period Pertaining To The Explosive Decontamination And Demolition (Open Burning) At BAAAP, dated April 18, 2003, to File, from Barbara Pavliscak.

- Letter, SUBJECT: Public Comments on Preliminary Analysis and Determination to Allow Open Burning at Badger Army Ammunitions Plant, dated April 18, 2003, to Melissa K. Scanlan, Esq., Midwest Environmental Advocates , from Barbara N. Pavliscak, Permitting Engineer, Dodgeville Service Center, WDNR.
- Memo, SUBJECT: Air Dispersion Analysis for Badger Army Ammunition - Sauk Prairie, dated May 13, 2003, to Barb Pavliscak - SCR (Dodgeville), from John Roth - AM/7.
- Letter, SUBJECT: Second Set of Public Comments on Preliminary Analysis and Determination to Allow Open Burning at Badger Army Ammunitions Plant, dated May 15, 2003, to Melissa K. Scanlan, Esq., Midwest Environmental Advocates, from Barbara N. Pavliscak, Permitting Engineer, Dodgeville Service Center, WDNR.
- Memo, SUBJECT: Dispersion Modeling Analysis and Inhalation Risk Screening for Hazardous Air Pollutant Emissions from Badger Army Ammunition Explosive Decontamination - Sauk Prairie (Sauk County), dated May 13, 2003, to Barb Pavliscak - SCR (Dodgeville) and Jeff Myers - AM/7, from John Roth - AM/7
- Memo, SUBJECT: Responsiveness Summary for Comments Received on the Explosive Decontamination and Demolition (Open Burning) at BAAAP, dated April 20, 2003, to File, from Barbara Pavliscak.
- Approved Air Pollution Control Plan issued to Plexus Scientific Corporation on the Explosive Decontamination and Demolition at BAAAP, dated April 21, 2003, signed by Lloyd L. Eagan, Director, Bureau of Air Management.¹ “Initial Submission Document,” Badger Army Ammunition Plant, Sauk County, Wisconsin, Explosive Decontamination and Demolition Process Information, September 2002, Plexus Scientific Corporation.
- “Air Permit Application,” Badger Army Ammunition Plant, Sauk County, Wisconsin, November 2002, Plexus Scientific Corporation.
- “Analysis, Preliminary Determination And Draft Plan For Plexus Scientific Corporation Acting For Badger Army Ammunition Plant Located At 2 Badger Road, Baraboo, Sauk County, Wisconsin, On The Explosive Decontamination And Demolition At BAAAP” dated February 25, 2003, prepared by Barbara N. Pavliscak, Wisconsin Department of Natural Resources Permit Engineer.
- Memo, SUBJECT: Recalculations Due To Errors Found During Public Comment Period Pertaining To The Explosive Decontamination And Demolition (Open Burning) At BAAAP, dated April 18, 2003, to File, from Barbara Pavliscak.
- Letter, SUBJECT: Public Comments on Preliminary Analysis and Determination to Allow Open Burning at Badger Army Ammunitions Plant, dated April 18, 2003, to Melissa K. Scanlan, Esq., Midwest Environmental Advocates , from Barbara N. Pavliscak, Permitting Engineer, Dodgeville Service Center, WDNR.
- Memo, SUBJECT: Air Dispersion Analysis for Badger Army Ammunition - Sauk Prairie, dated May 13, 2003, to Barb Pavliscak - SCR (Dodgeville), from John Roth - AM/7.
- Letter, SUBJECT: Second Set of Public Comments on Preliminary Analysis and Determination to Allow Open Burning at Badger Army Ammunitions Plant, dated May 15, 2003, to Melissa K.

Scanlan, Esq., Midwest Environmental Advocates, from Barbara N. Pavliscak, Permitting Engineer, Dodgeville Service Center, WDNR.

- Memo, SUBJECT: Dispersion Modeling Analysis and Inhalation Risk Screening for Hazardous Air Pollutant Emissions from Badger Army Ammunition Explosive Decontamination - Sauk Prairie (Sauk County), dated May 13, 2003, to Barb Pavliscak - SCR (Dodgeville) and Jeff Myers - AM/7, from John Roth - AM/7
- Memo, SUBJECT: Responsiveness Summary for Comments Received on the Explosive Decontamination and Demolition (Open Burning) at BAAAP, dated April 20, 2003, to File, from Barbara Pavliscak.
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Personal Contacts (list in item 26)

Field Analysis By: Author Other (list in item 26)

Past Experience With Site By: Other (list in item 26)

11. Physical Environment (topography, soils, water, air)

Geology

The BAAAP property straddles a region where glacial ice stagnated and receded at the end of the last glacial advance in Wisconsin. The glacier advanced over thick, fairly uniform outwash sand that had built up in front of the advancing ice in a deep bedrock depression, so that when the glacier retreated, BAAAP was left with two distinct regions of thick sediment separated by glacial end-moraine. The eastern two thirds of the property contains the undulating “kettle and knob” terrain where the stagnating ice left inter-bedded, irregular layers of sandy, silty glacial till mixed with more uniform layers of sand and gravel.

The western third of the property contains more level terrain where the uniform outwash sand layers escaped reworking by glacial ice. After the ice retreated, wind deposited 2-10 feet of silt and clay (loess) over the entire property. Post-glacial streams reworked the loess and concentrated the clay in quiet backwater areas, for example at the north edge of the property near bluffs of the Baraboo Range.

The site of the proposed landfill is located within undulating topography on the east side of BAAAP. Borings taken at and near the site reveal the discontinuous, inter-bedded layers of gravel, sand, silt and glacial till, typical of the morainal areas at BAAAP, with more uniform sand and gravel outwash below. Viewed from the land surface downward, soils at the proposed landfill site typically consist of approximately 5-10 feet of silt and clay derived from loess, followed by approximately 50-70 feet of

inter-bedded silt, silty sand and clean sand originating as glacial moraine, and beneath that, 80 feet (or more) of stratified sand and gravel, deposited as glacial outwash.

The proposed clay borrow areas, located on the north side of the property, occur where postglacial streams deposited clay in quiet backwater areas at the base of the Baraboo bluffs. The clay varies from approximately 2-14 feet in thickness. The proposed sand borrow area, located in the north central part of BAAAP, is located along the glacial end moraine, where excavation has exposed clean sand in a region of undulating topography.

Based upon information from the drilling of deep, high capacity water supply wells at BAAAP, the uppermost bedrock in the subsurface is mainly glauconitic sandstone of the Cambrian Eau Claire formation. The sandstone is likely to be located more than 200 feet below the ground surface at the site of the proposed landfill. The irregular bedrock surface becomes more shallow towards the north edge of the BAAAP property, where the sandstone thins out and quartzite of the south flank of the Baraboo Hills rises above the land surface.

Surface water and wetlands

There are numerous depressional areas in the knob and kettle topography of the eastern two-thirds of the BAAAP property. The Department has conducted map searches and field verification of surrounding waterways and wetlands, and determined that there are no surface water bodies or wetlands near the proposed landfill or the sand borrow area. Weigand's Bay, located about 2800 feet east of the landfill site, is the water body closest to the landfill site. The 100-year floodplain of the Wisconsin River would be more than 1700 feet away at the closest point. Weigand's Bay, Lake Wisconsin, and the present banks of the Wisconsin River east and southeast of BAAAP are the result of a dam located at Prairie du Sac. The undammed river banks would be located considerably farther east than at present.

An unnamed, intermittent runoff stream occurs at a distance of about 200-300 feet from the southeast portion of the proposed Clay Borrow Site Number 1. This non-navigable stream system is dry during the summer and fall in most years. However, a railroad embankment is located between the stream-bed and the borrow area, so excavation would not impact this intermittent stream.

See Map 3 (Wetland Inventory map) and Appendix G for a description of wetlands and waterbodies across the entire property.

Groundwater

BAAAP Property:

Groundwater at BAAAP generally flows from northwest to southeast across the property at all depths, from the topographic high of the Baraboo Hills to the Wisconsin River depression. However, the dominant southeast flow is shifted to the south and southwest over the southern third of the property by inflowing groundwater from the Wisconsin River. This inflow is the result of an approximate 50-foot head of water that exists at the Prairie du Sac dam at the base of Lake Wisconsin. Except for localized areas, groundwater flows more or less horizontally across the BAAAP property, without a significant upward or downward flow component. The numerous wetlands and ponds that exist on the east side of BAAAP result mostly from perched groundwater in glacial kettle depressions.

There are five high-capacity water supply wells on the BAAAP property, only two of which could provide potable water. The other three wells are part of a system that includes numerous cross-connections to process water and sanitary sewers and they are not serviceable.

An agreement to provide standby fire protection to the Bluffview development has been discussed, however there is no connection to Bluffview's water system.

See Appendix H for more information on the water supply system at BAAAP.

At Landfill Site:

At the site of the proposed landfill, groundwater is found at approximately 100 feet below the land surface in glacial outwash sediment (sand and gravel). As is the case elsewhere in the glacial moraine at BAAAP, inter-bedded layers of silt and clay beneath the proposed landfill footprint likely support perched lenses of groundwater. Groundwater flows primarily in a horizontal manner beneath the landfill site, as it generally does across the entire property.

There are no water supply wells located within 1200 feet of the proposed landfill, therefore no well variances would be necessary to site the landfill. The closest water supply well is located at the Groth residence, approximately 2000 feet east of the proposed site. Approximately 33 additional private water supply wells are located within a one-mile radius of the proposed site, all of them located off BAAAP property. Based on groundwater flow directions, the Groth well and residences at Weigand's Bay, more than 2000 feet to the east, are generally side-gradient from the proposed landfill site. Residences at the Summer Oaks subdivision, located approximately 4000 feet southeast of the landfill site, would be down-gradient.

The closest well located on BAAAP property is Well #2, a high capacity water supply well approximately 1.3 miles northwest of the proposed landfill site, which is up-gradient from the landfill site.

Groundwater Contamination:

Three releases caused by dumping or spills are known to have caused groundwater contamination at Badger. The three areas include the Deterrent Burning Ground (DBG), the Propellant Burning Ground (PBG) and the fuel oil release near the powerhouse.

1. Deterrent Burning Ground (DBG)

The DBG is located in the northeast section of the Badger plant. This area was initially used as a soil borrow pit. Located immediately adjacent and to the west of the DBG is a coal ash disposal site. There were three pits into which waste deterrent was dumped during the Vietnam active period. Deterrent is an organic liquid mixture of benzene, di-nitro toluene (DNT) and chlorinated compounds.

Soil samples collected from beneath the DBG show high levels of DNT remaining in the subsurface. Groundwater monitoring data indicates that the contaminants DNT, and some chlorinated compounds such as trichloroethane are present beneath and adjacent to

the DBG. The groundwater data also indicate that the contaminants have not migrated very far from the DBG, generally just a few hundred feet or less.

2. Propellant Burning Ground (PBG)

The PBG is located in the west-central part of the Badger plant. Deterrent was dumped into three pits during the Korean and Vietnam active periods. This dumping has created a groundwater contaminant plume that stretches for several miles from the PBG, almost to the Wisconsin River below the Prairie du Sac dam. The contaminants include DNT, carbon tetrachloride, trichloroethylene (TCE) and chloroform.

3. Fuel oil release at the powerhouse

Powerhouse #2 is located in the western part of the Badger plant, just east and a little north of the main gate. Located adjacent to this power plant is a large above-ground fuel oil tank. In the mid-1990s it was discovered that a transfer line between the tank and the power plant had leaked, releasing fuel oil to the soil and groundwater. Data from monitoring wells indicated that free-product fuel oil was present on the water table.

Other Contaminant Findings

Groundwater sampling conducted in December 2003 detected DNT in two homes south of the Badger plant, and in monitoring wells located in the southeast part of the property. This is the first detection of DNT at these locations. The Army has begun an investigation into the source of and extent of the DNT. This study will include sampling additional private wells and monitoring wells. The results should be available by late 2004.

In the summer of 2001, approximately 90,000 cubic yards of sediment contaminated with metals including mercury, lead, copper and zinc were removed from Grubers Grove Bay. The contamination originated from the wastewater treatment plant. In February 2003, sediment sampling in Grubers Grove Bay indicated that elevated levels of metals remain in at least a portion of the bay. The Army has re-sampled the entire part of the bay that had been dredged. This data will be used to determine the extent and volume of contaminated sediment remaining in the bay, and also to determine whether additional dredging will need to take place.

See Appendix C for a summary of contaminant and remediation actions across the entire property, and see Map 4 illustrating the locations of environmental restoration sites. See also Map 5 for locations of existing and former disposal areas within BAAAP.

12. Biological Environment (dominant aquatic and terrestrial plant and animal species and habitats including endangered resources; wetland amounts, types and hydraulic value)

BAAAP Property

Prior to European Settlement, BAAAP was part of a large prairie and oak savanna known as Sauk Prairie. Since that time, most of the property has been significantly altered and very little of the original prairie-savanna vegetation remains. Today the vegetation at BAAAP is composed mainly of old field, cropland, pasture, conifer plantations, and scattered woodlots (see Map 6, vegetative cover of BAAAP). A small portion of the property at the north end extends into the Baraboo Bluffs.

In 1993, the Wisconsin Chapter of the Nature Conservancy (TNC) conducted a comprehensive biological inventory of the property. Biologists identified 16 remnant natural communities on the property, and a number of rare plant and animal species (Endangered, Threatened, or Special Concern). One Federally Threatened plant species was identified. Additional biological surveys were conducted in 1998 through the Aldo Leopold Chapter of the Society for Conservation Biology. This study documented a highly significant breeding bird community comprising approximately 100 species, including many rare, threatened or declining birds characteristic of grassland, shrubland and savanna habitats (Mossman 2003).

Other findings included a significant population of Cope's gray treefrog, three additional locations of an endangered plant, and a micro-crustacean from one of the ponds in the southeastern part of the property that was previously known only from tropical and sub-tropical regions. In 1999, the Army funded rare species surveys for updated location information on species found by TNC in 1993. In 2002, the Army funded a study of grassland bird use of grazed vs. ungrazed habitats, which also resulted in additional bird species data.

See Appendix G for a complete summary of the natural resources of the entire BAAAP property, including wildlife, forestry and fishery resources.

Landfill and Borrow Sites

Based on soil types, topography, and original land survey records (Lange 1990), the pre-settlement vegetation at the landfill and sand borrow areas would most likely have been oak savanna. The clay borrow areas at the north end of the property were historically at the savanna-woodland edge, and may have been sedge meadow or wet-mesic prairie. None of the original oak savanna and prairie that once existed at these proposed locations remains

The proposed landfill would be located in an area on the northeast side of the East Rocket Production area containing roadways, foundations and other infrastructure. Currently, the site is highly disturbed, consisting of planted and non-native vegetation including old-field Eurasian grasses and weeds, conifer plantings and old-field native deciduous trees and shrubs as shown below:



Landfill Site

The vegetation existing at the sand borrow area consists primarily of old-field Eurasian grasses, and old-field native trees and shrubs. The majority of the interior area is excavated soils surrounded by soil banks covered with grass and some trees, as shown in this photo:



Sand Borrow Site

Vegetation at the footprint locations of the proposed clay borrow areas consists predominantly of old-field Eurasian grasses and weeds, some old-field native and non-native invasive woodland, and a 5-15 year old plantation of pines as shown below:



Clay Borrow Site

Two older clay borrow excavations, now ponds, are located between the eastern and western proposed clay borrow areas. Both planted and volunteer native wetland vegetation now occupies the area surrounding the existing ponds.

Endangered Resources

In a January 22, 2003 letter, the DNR's Bureau of Endangered Resources (BER) provided information on known locations of endangered resources within a two-mile vicinity of the proposed landfill and borrow areas, based upon data in its Natural Heritage Inventory data files (see Appendix L for correspondence). The following endangered (E), threatened (T) or Special Concern (SC) species were identified:

Mammal

Prairie vole (SC)

Birds

Bell's vireo (T)

Grasshopper sparrow (SC)

Upland sandpiper (SC)

Orchard oriole (SC)

Red-headed woodpecker (SC)

Dicksissel (SC)

Western meadowlark (SC)

Reptile

Timber rattlesnake (SC)

Plants

Prairie bush clover (Fed. T, State T)

Woolly milkweed (T)

Purple milkweed (E)

Drooping sedge (T)

Upland boneset (SC)

Small forget-me-not (SC)

Purple-stem cliff brake (SC)

Other rare species identified in the 1993 TNC Inventory as occurring or likely to occur in the general vicinity of the clay borrow sites include the black rat snake (SC), pickerel frog (SC), four-toed salamander (SC), and a Special Concern caddisfly. These species would occur in and surrounding Pine Glen and Pine Glen Creek, which was found to contain a very good aquatic insect fauna. In addition, the Reservoir pond was found to support a highly unusual population of neotenic tiger salamanders (meaning they breed in the larval stage and do not completely metamorphose into adults). The unnamed intermittent stream flowing along the southeast side of Clay Borrow Area 1, referred to by TNC as the "Southeast Bluff Runoff Stream," supported a rich invertebrate fauna with excellent water quality that year, though it does not carry water during part or all of some years.

In its January 2003 letter, BER determined that given the highly disturbed condition of the proposed sites, it is unlikely that they would support the rare plant species described above. Recommendations were provided on how to avoid potential impacts to rare animal species (see Section 17, below).

Critical habitat

Critical habitat is defined in s. NR 500.03(55) Wis. Adm. Code, as any habitat determined by the Department to be critical to the continued existence of any endangered or threatened species. The locations of the proposed landfill and borrow areas do not contain critical habitat, therefore meet the location requirements for siting a landfill and associated borrow areas.

Forest Resources

A four-acre non-native red pine plantation planted in 1989 occurs at the proposed Clay Borrow site. These red pines had been proposed for removal for the prairie restoration plan, and have no commercial value.

Wildlife and Fishery Resources

The near-vertical sand banks located at the sand borrow area support nesting rough-winged and bank swallows, as well as kingfishers.

The proposed landfill and borrow sites are used by white-tailed deer, wild turkey, rabbit, coyote, fox, striped skunk and pheasants.

13. Cultural Environment

a. Land use (dominant features and uses including zoning if applicable)

Current land use across the property is industrial and agricultural. Access is restricted, with a chain link fence enclosing 95-percent of the installation. Surrounding land use consists of agricultural, commercial, industrial, recreational and residential uses. See the Final EIS on disposal of the property for a discussion of county and town zoning policies and provisions on and around the BAAAP property.

Once the property is transferred, land use will be recreational and agricultural with some historical preservation. Specific uses for state-owned land would be determined during the master planning process, which will follow the Reuse Plan as closely as possible. The DNR uses master plans to establish authorized management and development on its properties, and has committed to leading a joint master planning effort with the USDA and Ho-Chunk. This planning effort will also be done in conjunction with the Badger Oversight and Management Board.

b. Social/Economic (including ethnic and cultural groups)

A number of public and private activities are underway at BAAAP. These include scheduled times for public hunting for deer and turkey, and farming and grazing on leased parcels of land (see Section 14 below, and Appendix E). There is a sportsman's club on the post. Ongoing private activities at BAAAP include the offices and laboratory of the Olin Corporation, rental of warehouses by the Flambeau Corporation, and research activities by the Orbitech Corporation conducted near the Ballistics Pond. The Madison Police Department and the Madison Area Technical College conduct training sessions at BAAAP, and the Army Corps of Engineers and staff from other Army installations use BAAAP facilities for meetings and training purposes. The Badger History Group also rents office space in the Administration Building. See Section 14, below, for a description of use by the U.S. Dairy Forage Research Center.

c. Archaeological/Historical

BAAAP Property

Archaeological investigations dating back to the mid-1800s have reported a number of cultural resources on the BAAAP property, including Native American effigy mounds. While modern agricultural and industrial land uses have destroyed much surface evidence, there are historical mound sites on the property with potential for subsurface human remains. Formal archaeological studies began in 1983 and continued through 2001. A total of 32 Native American and Euroamerican archaeological sites have been recorded within the property. None of these sites has been determined eligible for listing in the National Register of Historic Places, however three Native American and three Euroamerican cemeteries are protected by state law (s. 157.70, Wis. Stats.). In addition, the Ho-Chunk Nation has strong interest in the preservation of mound cemeteries, Traditional Cultural Properties, and traditional village locations. The GSA is in ongoing consultation with the Ho-Chunk Nation regarding preservation of specific resources on the BAAAP property.

The entire plant is considered historically significant because of its role in U.S. industrial mobilization during World War II. Collectively, the buildings represent a distinct historic environment and retain their 1940s character.

The Badger Reuse Plan recognizes the cultural history of the property and includes recommendations to memorialize this history and preserve significant sites and structures (see Appendix I).

Landfill and Borrow Sites

The locations of the proposed landfill, all three proposed clay borrow areas and the sand borrow area were investigated by a private consultant hired by BAAAP to conduct a field inspection for historical or cultural resources. No archaeological artifacts or sites, and no significant historical artifacts or sites were found at the locations proposed for landfill development. The Wisconsin State Historical Society concurs with these findings. Investigations by the Badger History Group confirmed the absence of pre-1945 farmstead remains at all of the proposed sites (M. Mossman, per comm).

14. Other Special Resources (e.g., State Natural Areas, prime agricultural lands)

Natural Areas

The forested hills adjoining the north boundary of BAAAP have a number of designations, reflecting the area's very high ecological and biological significance. The Baraboo Range is the largest contiguous block of upland forest in southern Wisconsin and is designated by the National Park Service as a National Natural Landmark and by The Nature Conservancy as one of its "Last Great Places" for conservation priority. The Baraboo Hills region and the adjoining Wisconsin River corridor also are designated by The Nature Conservancy as "Ecologically Significant Areas" of the Prairie-Forest Border Ecoregion (see Appendix H).

This area of the Baraboo Range bordering BAAAP to the north is within Devil's Lake State Park, and is also designated a State Natural Area (SNA) known as "South Bluff and Devil's Nose." This SNA encompasses a large forested expanse of the southern flank of the Baraboo Hills, which is mostly southern mesic and dry-mesic forest, and includes Pine Glen in the southwestern portion. Pine Glen is a deep gorge cut into the quartzite bluff, from which the headwaters of Pine Glen Creek emerge just to the north. This pine relic features white pine and other northern plant species able to persist in its cool micro-climate. The South Bluff and Pine Glen support a large population of forest interior songbirds, including several that are Threatened or Endangered.

The Department's SNA Program protects the highest quality examples of native biological communities and significant geological features. A number of other SNAs occur in the larger area around BAAAP, including Devil's Lake Oak Forest, East Bluff State Natural Area, Parfrey's Glen, and Baxter's Hollow.

Agricultural Lands

A 1400-acre dairy research farm of the U.S. Dairy Forage Research Center occupies the southeast portion of BAAAP. The Center is a cooperative effort between the U.S. Department of Agriculture, the University of Wisconsin-Madison, and other land-grant universities. It focuses on problems national in scope that limit effective and efficient use of forage for milk production. The Center includes 2.5 acres of buildings, 300 acres of pasture, 400 acres of perennial forage, 400 acres of corn, 200 acres of soybeans, and 75 acres of small grains. Its livestock facilities house 340 milking cows and replacement stock with a total herd numbering 660 heads. The field facility is visited by people throughout the world.

The majority of leases held at BAAAP are agricultural leases, used for row crops, forage crops and pasture. See Appendix E for more information on leases at BAAAP.

ALTERNATIVES

15. Briefly describe the impacts of no action and of alternatives that would decrease or eliminate adverse environmental effects. (Refer to any appropriate alternatives from the applicant or anyone else.)

The applicant provided several alternatives in the Feasibility Report:

- 1. No action** – All contaminated buildings at the BAAAP property must be removed before the property can be transferred to new owners, to limit the Army's liability. In addition, waste generated during deconstruction of the remaining buildings will require disposal. If the landfill were not built the contaminated waste would have to be transported off-site. Recycling and reuse of material is being investigated by numerous parties and will be done to the greatest extent possible. However, significant quantities of material from the buildings, such as transite siding, and asbestos shingles, cannot be recycled.
- 2. Off-site Disposal** – the Army has dictated that for liability reasons, the non-hazardous waste that is generated on site, must remain on the site. However, there are numerous other reasons for eliminating this option. The most likely acceptable off-site location for the construction and demolition waste is the Waste Management Wisconsin-Madison Prairie Landfill since this landfill is designed to safely contain construction and demolition waste, including asbestos. However, this option would require a significant amount of truck traffic to haul the waste (a substantial cost), and would increase costs due to the tipping fees at the landfill. The truck traffic would generate air pollution from burning diesel fuel, increase the risk of a spill if there were an accident, and contribute to highway road wear.
- 3. On-Site Disposal** – this is the course of action dictated by the Army, and has also been determined to be the most economical.

Various on-site disposal options were considered by Olin:

- a) Several small landfills around the site: this option was rejected due to the disturbance over a larger area, the potential negative impact on the new owners and cost.
- b) Single landfill located in a different area of the BAAAP property: other sites were rejected for aesthetic reasons (visibility of waste mound if located in areas with flat terrain), desire to avoid the Baraboo Hills due to the environmental sensitivity of the area and to avoid removal of significant number of trees. In addition, another location could also increase costs associated with excavation and daily cover, and would require additional geological investigation and landfill infrastructure (monitoring wells, roads, etc.).
- c) Landfill expansion connected to current active landfill: this option was rejected due to design complications involved in connecting the old and new landfill areas. These include problems 'keying' a new clay liner into the existing clay liner, and potential future maintenance issues caused by this design. This option would have resulted in a slightly smaller footprint of the total landfill area; however, the problems were considered to outweigh this benefit.

- d) Landfill adjacent to active landfill but not connected: this is the Army's preferred alternative as proposed in this document.

The Army chose the separate landfill in the proposed location, as described in the Feasibility Report, in order to keep similar waste types in one area of the BAAAP property, to minimize transportation costs, to minimize the amount of land disturbed and for aesthetic reasons.

The Army chose the proposed design to minimize maintenance costs and to reduce engineering complexity. The applicant develops the proposed footprint and height of a landfill. Planners must consider the balance between the amount of material to be excavated and the amount needed for daily cover, other soil needs during the life of the landfill, and cost of construction.

In addition, s. NR 506.08(3)(c), Wis. Adm. Code dictates allowable slopes for closed landfills. Slopes must be at least 5 % but not more than 25% (4:1). The slopes are designed to allow any rainwater to drain off the waste site as quickly as possible, so typical designs have 25% slopes for most of the site. Rainwater running down a side slope can cause erosion problems. To minimize erosion damage to the landfill cap, designs typically include diversion berms to direct rainwater into "down-slope flumes" or channels.

Phasing Options

Alternative phasing plans could be proposed in the Plan of Operation.

d- i) Vertical Phasing: The initial phasing plan proposed by BAAAP would fill the landfill from east to west, with each phase being capped as soon as possible after it has reached final grades. This proposal would result in the landfill reaching the final expected maximum elevation after Phase II is closed. Under this plan, if the volume of waste is less than expected, then the landfill footprint could be reduced.

d - ii) Horizontal Phasing: The waste could be placed horizontally across all five phases of the entire proposed footprint at less than the proposed heights. Then, if the total final volume of waste is less than currently expected, the final elevation of the site would be reduced. However, this scenario would result in a much larger open waste area and increased leachate generation during the active life of the site. It is standard risk management practice in landfill design to keep open waste areas as small as possible, to minimize the area of rainwater collection and infiltration into the waste.

The presence of asbestos presents an additional operational constraint. Waste could not be moved to meet slope requirements once it is deposited in a given spot because it would risk exposing the asbestos material.

ENVIRONMENTAL CONSEQUENCES

16. Physical (include visual if applicable)

The proposed landfill design is consistent with the design requirements for a large-sized construction and demolition waste landfill except for a reduction in the number of required leachate head-wells and gas probes, discussed below. The design incorporates a five-foot liner made of compacted clay and a leachate collection system designed to minimize the hydraulic head of liquid on the liner. Because this type of waste would generate little or no landfill gas, a passive, rather than active, gas collection system is proposed as part of the final cover system when the site is closed. The passive system design includes a one-foot layer of sand over the top of the waste with perforated pipe within the sand that connects to a solid pipe that would vent to the atmosphere. Any gas that is generated can move through the permeable sand to exit the site without building to dangerous concentrations. The exit pipes would be located near the high points of the site, as landfill gas typically is lighter than air and would tend to migrate up. The rest of the final cover includes, from bottom to top: two feet of compacted clay, a one-foot sand drainage layer, filter fabric, 18 inches of rooting zone and six inches of topsoil.

One deviation from the Wisconsin Administrative Code design requirements is a proposal to install one leachate head-monitoring well in each phase instead of the required two and to have gas probes on two sides of the landfill instead of four. The leachate head wells are intended to indicate if leachate is not draining properly and is building up in the site. Because no putrescible waste will be allowed and a gravity drain system will be used, it is unlikely that there would be obstructions created or mechanical failures to stop the flow of leachate. In addition, leachate volume is monitored monthly and unexpected reductions in volume would indicate a potential operational problem. The Department intends to allow the use of one leachate head well per phase, but will require some additional monitoring requirements in the Plan of Operation for the leachate collection system to ensure proper operation. As discussed, the gas generation is expected to be minimal. If gas generation is determined to be a problem based on the monitoring of the passive vents, additional gas probes can easily be added.

The landfill leachate at BAAAP has been tested and poses no problems for the wastewater treatment plant (WWTP). Sludge produced by the WWTP is stored, dried, tested for heavy metals and pathogens to make sure it is below permit limits, and then applied to approved fields for beneficial reuse on BAAAP property. The ultimate fate of the remaining liquid leachate is seepage into a drainage ditch and seepage pond. The groundwater extraction wells along the southwest boundary of the property then draw up groundwater for additional treatment in a system known as the Modified Interim Remedial Measures (MIRM). This system is designed to minimize the possibility of contaminated groundwater leaving the BAAAP property. Ultimate discharge of MIRM effluent is to Lake Wisconsin. See Appendix D for a more complete discussion of the wastewater treatment facilities at BAAAP.

Surface water that runs off the proposed landfill, as at the active landfill, would be channelized and gravity-drained via ditches to a sedimentation/infiltration basin located just east of the southern end of the proposed landfill. Any overflow from the sedimentation/infiltration basin would infiltrate into the subsurface through the sandy morainal soils before leaving BAAAP property.

The final use of the landfill would be coordinated with conservation plans for the entire BAAAP property.

Groundwater monitoring at the landfill

The proposed landfill would be located approximately 150 feet north of existing BAAAP Landfill #6 (DNR Lic. # 3118) and would be similar in design, with a five-foot clay liner and a leachate collection system. The existing landfill has 19 groundwater monitoring wells that have undergone routine groundwater monitoring since 1987. BAAAP submits environmental monitoring data electronically to the Department semiannually, and in hard copy annually. This data includes the results of laboratory analyses of groundwater, leachate and lysimeter samples collected at the landfill. Based on the analytical data from the existing monitoring wells, there is no evidence of significant groundwater impacts. Analytical data showing exceedances of groundwater standards for methylene chloride and bis 2-ethylhexyl phthalate are sampling and/or laboratory artifacts. Exceedances of nitrate (measured as total nitrogen) appear to be associated with background groundwater conditions, independent of the landfill. The most likely source of the nitrate exceedances in groundwater at the landfill is the migration of nitrogen-based fertilizers from leased agricultural fields located throughout the property.

The groundwater monitoring wells that currently monitor the active landfill, combined with those that are planned for the proposed landfill, would provide sufficient spatial coverage to enable detection of leakage away from both landfills. Groundwater monitoring wells located between the new and old landfills would allow investigators to distinguish which landfill is the source, if any groundwater contamination were to be found in the future. A groundwater monitoring well that has been installed up-gradient of the proposed landfill would allow comparisons between background groundwater quality and the quality of groundwater after it had passed beneath the landfill.

Groundwater Remediation

As discussed in Section 11, above, groundwater is contaminated at the Deterrent Burning Ground (DBG), the Propellant Burning Ground (PBG), at Powerhouse #2 (see Map 4 for locations). In addition, DNT has been detected recently at two private wells south of the property and two monitoring wells within the southern part of the property. The site of the proposed landfill is approximately 4500 feet down-gradient of the Deterrent Burning Ground (DBG) and two closed landfills near the DBG (landfill #3 and landfill #5). Groundwater contamination associated with the DBG and the two closed landfills appears to be fairly stable, and to extend less than 500 feet from the DBG. Because of their positions with respect to groundwater flow directions and/or their distance from the landfill site, it is unlikely that any of the potential significant contamination sources at BAAAP could influence groundwater quality at the proposed landfill.

The Army recently has completed investigations of production areas within BAAAP. The results are available in two reports submitted to the DNR in February and March, 2004. DNR is currently reviewing these reports with recommendations provided by the Army.

See Appendix C for a description of the remedial actions underway at these sites and numerous other activities related to hazardous substance release and remediation.

Information Sources

Full information regarding the various areas at Badger undergoing remedial action and groundwater treatment can be found in the information repositories that the Army maintains at the Prairie du Sac library, the Sauk City library and at the Badger plant itself. The repositories at the libraries can be viewed during normal library hours. The repository at the Badger plant may be viewed by appointment by calling 608/643-3361

Air Contaminants

The primary air contaminant expected is particulate matter in the form of fugitive dust, generated from truck traffic and soil handling. Maximum theoretical emissions of fugitive dust are estimated to be less than 6.0 tons per year.

Because of the type of waste that would be contained in the proposed landfill, landfill gas generation is expected to be negligible.

There is a potential for asbestos emissions from both the asbestos removal and landfilling. Asbestos removal is regulated by ch. NR 447, Wis. Adm. Code and is required to be done in a manner that minimizes emissions. The disposal of asbestos-containing material in the existing landfill is regulated by conditions contained in the July 31, 2003 Plan of Operation Approval Modification issued by the Department. The majority of asbestos material is expected to be transite siding which is not expected to release any asbestos unless broken. The current approval requires that this material be covered with at least one foot of soil prior to compaction to minimize the release of any asbestos. Friable material is required to be covered as soon as it is placed in the landfill and covered with at least 3 feet of soil prior to compaction. These same procedures would likely be proposed by Olin in the Plan of Operation for the new landfill, or would be included as conditions by the Department.

Malodorous emissions are regulated by ch. NR 429, Wis. Adm. Code. Due to the type of waste, minimal odors are expected from the operation of the landfill. In addition, the requirements for daily cover would reduce any odors that may be present.

Wetlands

The Department conducted a map search and field verification of surrounding waterways and wetlands and consulted with the U.S. Army Corps of Engineers (USCOE) in December 2003. Based upon its review, the Department and the USCOE have determined that there will be no impacts to wetlands, or to perennial and intermittent streams in the areas of the proposed landfill and borrow sites. There should be no impacts to the former clay borrow sites now holding open water.

Because no construction will occur in wetlands or waters of the United States, a U.S. Army Corps Section 404 permit is not required for the project. See letter of determination dated Dec. 9, 2003 from the U.S. Army Corps of Engineers in Appendix L. After excavation of the clay, the Army will grade and shape the proposed clay borrow area so that surface runoff is captured, creating conditions that may improve the surrounding areas of wetland.

The wetlands and ponds would be maintained by drainage into the area from the surrounding landscape, and from springs and seeps on the bluffs to the north. To reduce drainage out of the area, some of the clay soil would be left in place to form a natural barrier to drainage. Presently, some wetland vegetation has become established at the existing ponds and waterfowl frequent the area. Restoration of the clay borrow areas has potential to further increase the overall biodiversity of the property.

Visual Impacts

The final height for the landfill would be 958 feet above mean sea level (MSL). The area to the north and east of the proposed landfill has an average elevation of approximately 880 feet MSL, and the area to the south has elevations around 900 feet MSL. The landfill would be visible from the wider areas of level outwash plain to the west, particularly on the BAAAP property. Most of the facility would be screened from private residences east of STH 78 by the local terrain and vegetation. When the landfill is near final grade, filling and construction activities also may be visible from a few locations along STH 78. Appropriate restoration and potential public use of the area would be determined by subsequent owners of the landfill in conformance with the master plan for the property.

17. Biological (including impacts to threatened/endangered resources)

Endangered Resources

In response to the letter from DNR's Bureau of Endangered Resources (BER) regarding the potential to impact several rare animal species and its recommendations on how to avoid them, Olin Corporation, on behalf of BAAAP, developed an Endangered Resources Management Plan for the proposed landfill and borrow sites in July 2003 (see Appendix L). Habitat at the sites was evaluated in the field, and provided to BER. The summary of vegetation at the sites that is provided in Section 12, above, is consistent with the findings in the Olin Corporation's July 2003 report. No native plant community remnants are located within the proposed areas.

In a subsequent letter dated October 30, 2003, BER agreed that the following measures should avoid impacts to any rare animal species (see Appendix L):

Birds: To address the concern that nesting grassland birds may be affected by excavation activities, the Army has proposed to begin excavation of the landfill and borrow areas between September 1 and May 1, which is outside of the nesting season. If funding, weather or other unforeseen factors should preclude vegetation and topsoil stripping, then plowing may be used as a quicker method to disturb the area prior to the nesting period and render it unsuitable for breeding birds.

Other rare animals: Excavation of the clay borrow areas would occur before the end of May and thereby will avoid potential impacts to the timber rattlesnake.

The prairie vole, preferring a prairie or oldfield habitat above sandy soil, is unlikely to be present at the clay borrow area. It may occur in the disturbed sand borrow and landfill areas, and if these areas are restored appropriately, could eventually occupy them for the long term.

The Army would be required to contact BER if the configuration of the proposed clay borrow sites were to change.

Native Vegetation: Any documented remnants of native plant communities occurring in areas that may be impacted by surrounding demolition activity and equipment will be clearly mapped and delineated in the field prior to demolition of the buildings, so that they are protected from heavy equipment and construction damage.

Contingencies

The BAAAP has stated that if endangered resources are identified during preparation or work activities, it will be documented and BER will be contacted immediately. This is an unlikely scenario, however, based upon all the reasons given above.

For all the proposed sites targeted for landfill development and soil excavation, any restoration of vegetation and/or screening activities, including seed mixes, trees planted, etc. would be required to be consistent with the Department's master plan for BAAAP, and with Department-approved workplans for restoration of the borrow areas.

Wildlife

The near-vertical sand banks located at the sand borrow area support nesting rough-winged and bank swallows, as well as belted kingfishers. The Army proposal indicates that excavation would focus on the interior of the sand-borrow area, would avoid the primary nesting season, and would not occur into these banks. Should lateral excavation into the banks be proposed, the DNR would be contacted first. Any lateral excavation impacting bird nesting habitat would be timed to avoid the nesting period.

Occasionally coyotes, badgers, and woodchuck have been observed digging in the sand borrow area, but there are no known inhabited dens at this location.

Avoiding excavation and disturbance activities at the three proposed sites during the bird-nesting season will avoid impacts to a number of birds beyond just those that are rare.

Forestry

A red pine plantation at the proposed Clay Borrow site would be cut. This site is within a larger area of high priority for prairie-savanna restoration, which would include removal of non-native plantations. Removal would benefit grassland birds known from the area, such as Sedge Wren. The red pine is of no commercial value.

18. Cultural

a. Land Use (including indirect and secondary impacts)

On the BAAAP property itself: During the periods of landfill construction and filling operations, ecological restoration efforts would be deferred until project completion. No impacts to agricultural lands or dairy forage research operations would occur.

Since the waste that would be placed in the landfill is exclusively from the clean up and closure of the BAAAP property, it is not expected that the landfill would change any regional conditions.

In the long-run, the establishment of the landfill would allow demolition and cleanup activities to proceed so that plans for future ecosystem restoration and conservation across the tract may be carried out.

All of the land use scenarios expected for the property in the future will result in very limited exposure by humans, wildlife, and the physical environment to areas where soil contamination is present. Access to the plant is restricted, which will continue into the near future (3-5 years). Current and future agricultural activity does not and will not occur on lands where uptake of contaminants in the soils is a risk.

b. Social/Economic (including ethnic and cultural groups, and zoning if applicable)

No adverse changes to the regional social or economic conditions are expected as a result of the construction, operation, and long-term presence of the landfill. Indirectly, the presence of the landfill would facilitate the demolition and disposal of the more than 1000 abandoned buildings at BAAAP, and may benefit the transfer of the property to the new owners. The ultimate removal of the abandoned buildings and transfer of the property likely would have beneficial social and economic impacts in the area.

Because the waste would not need to be shipped off site, there would be no adverse impacts to the community from increased truck traffic, road dust, or road degradation. Property values in the area of BAAAP are unlikely to be negatively affected if the landfill is constructed at the location proposed.

Although a number of public and private activities are underway at BAAAP, none would be significantly affected by the landfill or by excavation activities at the proposed borrow areas.

In recent years the Army has harvested and sold white and red pine trees from pine plantings around BAAAP, however the small plantation of pines that would be eliminated at the proposed clay borrow area has no commercial value.

c. Archaeological/Historical

No archaeological artifacts or sites, and no significant historical artifacts or sites were found at the locations proposed for landfill development. The Wisconsin State Historical Society concurs with these findings.

19. Other Special Resources (e.g., State Natural Areas, prime agricultural lands)

No direct impacts to the nearby State Natural Areas, State Park, or Baraboo Hills National Natural Landmark are expected. No impacts to agricultural resources would occur. The only likely indirect impact would be visual. The final landfill mound would likely be visible from certain portions of these areas along the north boundary of the BAAAP property.

20. Summary of Adverse Impacts That Cannot Be Avoided (more fully discussed in 15 through 18)

The proposed new landfill and clay borrow areas would be unavailable for future development projects or excavations. Further impacts to the end moraine would occur at the sand borrow site. Some grassland bird habitat (e.g., for Sedge Wren) will be destroyed through clay borrow excavation, however if restored properly, the area could provide better habitat in the long term. The landfill at final grade would be visibly prominent from viewing points both on and off the property. Tree plantings at strategic locations on the property could help to visually screen the landfill as seen from certain locations.

DNR EVALUATION OF PROJECT SIGNIFICANCE

21. Environmental Effects and Their Significance

- a. Discuss which of the primary and secondary environmental effects listed in the environmental consequences section are long-term or short-term.*

The environmental impacts from the construction and operation of the landfill would be minimized by the Department's regulations on locational criteria, performance standards and design requirements in ch. NR 504, Wis. Adm. Code. The short- and long-term environmental impacts of the proposed facility are expected to be minimal and confined to the area in the immediate vicinity of the landfill and the separate clay and sand borrow areas.

Because of the regulatory requirements regarding landfill design, construction, operations, and monitoring, the proposed landfill is not expected to cause any appreciable impact to either the quality or quantity of groundwater available for use. The performance of the existing landfill provides additional evidence that the proposed landfill would not harm either human health or the environment due to release of contaminants to groundwater.

The 14-acre landfill would be permanently unavailable to future development projects or excavations. However, the landfill and its immediate surroundings, and the proposed borrow areas, all have the potential to be restored to wildlife habitat compatible with the Badger Reuse Plan.

- b. Discuss which of the primary and secondary environmental effects listed in the environmental consequences section are effects on geographically scarce resources (e.g. historic or cultural resources, scenic and recreational resources, prime agricultural lands, threatened or endangered resources or ecologically sensitive areas).*

Overall, the remaining native animal and bird populations at BAAAP are likely to benefit significantly from the increased habitat provided by the demolition and disposal of the BAAAP buildings and infrastructure.

For all the proposed sites targeted for landfill development and soil excavation, any vegetation restoration, including seed mixes, trees planted, etc. would be required to be consistent with the Department's master plan for BAAAP, the Reuse Plan, and Department-approved workplans for restoration of the borrow areas. The Department also intends to establish a work group comprised of appropriate biologists and other experts to develop guidance for the ultimate reclamation of these sites, so that they offer the greatest potential to support breeding birds and other desirable native plants and animals

c. Discuss the extent to which the primary and secondary environmental effects listed in the environmental consequences section are reversible.

Regulatory controls over landfill design and construction in chs. NR 500 to 538, Wis. Adm. Code and groundwater quality regulations in ch. NR 140, Wis. Adm. Code should prevent significant impacts to the groundwater from the operation of the proposed landfill. Both sets of regulations are enforceable, and if violated, would necessitate action to seek restoration of groundwater quality to within acceptable limits. If a significant asbestos release occurs, the owner or operator would be responsible for clean up.

Disturbance at all three sites would be temporary and most of the disturbed areas could be restored to meet future ecosystem design considerations for the property.

22. Significance of Cumulative Effects

Discuss the significance of reasonably anticipated cumulative effects on the environment (and energy usage, if applicable). Consider cumulative effects from repeated projects of the same type. Would the cumulative effects be more severe or substantially change the quality of the environment? Include other activities planned or proposed in the area that would compound effects on the environment.

Leachate

The proposed new landfill would be located approximately 150 feet from the existing landfill. If the new landfill is constructed while the old landfill is still being operated or during closure, there would be increased truck and equipment traffic in the area and increased noise and dust. Once the active landfill is closed, the amount of traffic, noise and dust would be approximately the same as at present.

Currently, leachate from the existing active landfill is hauled to the existing wastewater treatment plant on the BAAAP property. The amount of leachate generated by both the proposed and existing landfills will change depending on weather, the type of cover in place and the amount of open area in each landfill. The total amount of leachate generated by both landfills would be greater than the amount that would be generated by the existing site alone.

Section NR 512.12(3), Wis. Adm. Code includes the default leachate generation rates of four inches per-year per-acre for open areas without composite liners and three inches per-year per-acre for areas with clay caps. Olin used the actual leachate generation data from the last four years to determine that the average leachate generation rate has been higher than the default values in the Code. As a worst case, the maximum annual leachate generation of 1,576,000 gal/year for the existing site will be used to calculate the loading to the wastewater treatment plant (WWTP).

The surface area of the total existing landfill is twice the size of each phase of the proposed landfill and the leachate generation rate is proportional to the surface area. Therefore, to estimate the leachate generation from an open phase of the proposed landfill, half of the maximum annual leachate generation rate of the active landfill, or 788,000 gal/year will be used.

Closed phases of a landfill have decreasing leachate generation over time, so leachate generation rates from closed areas cannot easily be estimated. As an approximation, leachate generation from closed

phases will be assumed to be half of the leachate generation rate of an open phase. This approximation results in a high estimate of leachate volume, and the high bias increases over time. However, as a rough estimate of the worst case loading to the wastewater treatment plant, this method will be used.

The stage when leachate generation is maximized, using the methodology described, occurs when the existing landfill and the first three phases of the proposed landfill are closed and two phases of the proposed landfill are open. The leachate generated is estimated to be:

Existing landfill - closed: $\frac{1}{2} \times 1,576,000 \text{ gal/year} = 788,000 \text{ gal/yr}$

Proposed landfill – 3 closed phases: $3 \times \frac{1}{2} \times 788,000 \text{ gal/year} = 1,182,000 \text{ gal/yr}$

Proposed landfill – 2 open phases: $2 \times 788,000 \text{ gal/year} = 1,576,000 \text{ gal/yr}$

Total leachate generation: 3,546,000 gal/yr

The current wastewater treatment plant (WWTP) has more than enough capacity to treat the leachate. The total (high end) estimated future leachate generation of 3,546,000 gallons/year (9,715 gallons/day) is only 1.9% of the WWTP design flow (and 17% of the current WTP flow) and can easily be treated at the WWTP. Refer to Appendix D for additional information on the WWTP.

Groundwater Contaminants

The most significant known source of groundwater contamination at BAAAP is the propellant burning ground, located in the east-central portion of the property. The plume of groundwater contamination from this site once migrated several miles south of the property, and recent well sampling detected DNT contamination in two private wells south of the plant, which the Army is now investigating. At this time, the source of the DNT in these private wells is undetermined. The proposed landfill would not contribute to this plume, nor to groundwater contamination arising from any of the other known BAAAP contamination sources.

The Army recently has completed investigations of production areas within BAAAP. The results are available in two reports submitted to the DNR in February and March, 2004. DNR is currently reviewing these reports and recommendations provided by the Army.

There are numerous other environmental activities going on at the BAAAP site. A list of the on-going projects and activities is found in Appendix C.

23. Significance of Risk

- a. Explain the significance of any unknowns that create substantial uncertainty in predicting effects on the quality of the environment. What additional studies or analysis would eliminate or reduce these unknowns?***

The environmental risks of solid waste disposal facilities have been well documented by the Department and in the scientific literature. The majority of the work has been done on municipal solid waste landfills because they are a larger potential risk than construction and demolition

landfills. The potential environmental effects from the proposed construction and demolition landfill include groundwater contamination, asbestos releases and fugitive dust emissions.

Olin estimates that the waste destined for disposal in the landfill would contain the following: approximately 80-90% C&D (construction & demolition) wastes, including treated and painted wood and shingles, with some of these materials containing minute amounts of propellant residues; 5-10% friable and non-friable asbestos products, and up to 5% waste soil and other materials from on-site remediation activities, reinforced concrete, waste ash from burned buildings, and waste-activated carbon. The chemical substances associated with these waste streams would include nitrocellulose, nitroglycerine and dinitrotoluene, from propellant residues; pentachlorophenol, creosote, chromium, copper and arsenic from treated wood, and arsenic, barium, cadmium, chromium, lead and PCBs from paint.

Contaminated soil may contain traces of any of the above substances and several additional Volatile Organic Compounds (VOCs), such as carbon tetrachloride. In addition to the above substances, leachate from C&D waste is likely to contain sulfate, nitrate, chloride, and manganese, and has the potential to increase the hardness, alkalinity, pH and specific conductance of the groundwater.

Leachate monitoring provides specific information on the types of chemicals that occur in the landfill's leachate. Groundwater monitoring for those substances occurring in leachate allows reviewers to require that the most appropriate methods be used in analyzing the groundwater samples. If the engineered structures of the leachate and liner system were to fail, most of the above substances, including the heavy metals, PCBs, asbestos, and creosote would be bound up in soils quite close to the landfill. VOCs, such as carbon tetrachloride, are the most likely substances to migrate a significant distance from the waste. However, because of the small volume of VOCs likely to be present in the waste stream, it is unlikely that they would pose a significant problem even if the liner, or the leachate lines, were to fail.

Early detection through the monitoring system will prevent any potential contamination from the landfill from interacting with existing areas of soil and groundwater contamination. There has been no known incident in Wisconsin where a modern landfill constructed with either a five-foot clay liner or a composite liner has failed (to date). However, if the liner were to fail at the proposed landfill the leak would be detected either by one of the lysimeters located under the landfill liner and/or by groundwater monitoring wells.

Unexpected areas of contamination could be found as buildings are deconstructed. The proposed landfill would likely be used to dispose of non-hazardous waste material generated by the remediation activities. The current active landfill (DNR Lic. #3118) is used for this purpose and no adverse environmental impacts have been detected.

The siting, design and construction requirements of chs. NR 500 to 538, Wis. Adm. Code, have been developed to minimize the potential environmental impacts of solid waste disposal facilities. In addition, Department staff will conduct routine on-site landfill inspections and routinely review environmental monitoring data to ensure that requirements are being met. If the required standards are met, the proposed new landfill is not expected to have an adverse effect on the environment.

All anticipated future land use scenarios for the property will result in very limited exposure by humans, wildlife, and the physical environment to areas where soil contamination is present. Investigation of these areas is still underway but most of the contaminated areas are known. An

extensive amount of information is available about manufacturing processes and the ultimate fate of hazardous materials at the facility. Access to the plant is restricted, which will continue into the near future (3-5 years). Current and future agricultural activity does not and will not occur on lands where uptake of contaminants in the soils is a risk.

b. Explain the environmental significance of reasonably anticipated operating problems such as malfunctions, spills, fires or other hazards (particularly those relating to health or safety). Consider reasonable detection and emergency response, and discuss the potential for these hazards.

Potential failures that could occur would be due to poor construction or operating practices or material failures. Areas of potential failure involve the leachate collection lines that exit the site. If these pipes failed, leachate could spill into the surrounding soil. However, once they leave the waste area, these pipes are required to be double walled to contain leaks and monitoring would indicate a spill relatively quickly. Any spill could be cleaned up with little environmental damage.

The Department has granted BAAAP a conditional approval for the disposal of asbestos-containing material in the active landfill. The same requirements for asbestos now in place for the active landfill would be included in any Plan of Operation approval issued for the proposed landfill. If asbestos-containing materials were not handled in accordance with the approval, it is possible that asbestos could become airborne, which would threaten people in the area near the landfill. The risk would decrease with distance from the release. Depending on the amount of asbestos released, the owner or operator could be responsible for the clean up.

If a significant release of contaminants to groundwater were to occur the Department would require a regulatory response as specified in ch. NR 140, Wis. Adm. Code. The nature of the response required would depend, among other factors, upon the concentrations of the contaminants present in groundwater, the distance the contamination has migrated, and whether and how the landfill has been closed and capped. A significant release of leachate to groundwater, due to liner or leachate line failure, could likely be corrected by standard groundwater remediation procedures before drinking water supplies or the Wisconsin River were at risk.

24. Significance of Precedent

Would a decision on this proposal influence future decisions or foreclose options that may additionally affect the quality of the environment? Describe any conflicts the proposal has with plans or policy of local, state or federal agencies. Explain the significance of each.

There are no new designs or other features of the proposed landfill that would set a precedent for future decisions.

25. Significance of Controversy Over Environmental Effects

Discuss the effects on the quality of the environment, including socio-economic effects, that are (or are likely to be) highly controversial, and summarize the controversy.

The Department is aware of some people who prefer that the landfill be sited off the BAAAP property. However, the costs associated with doing so would be very high. In addition, the concept of transferring BAAAP waste to another location thereby adding fill to another site is not practicable; the nearest suitable waste site is in Madison. The Army has dictated that the non-hazardous waste generated on site must remain on site for liability reasons. Questions have been raised about the choice of locations within the property as a whole. Reasons for the choice of location are described in the Feasibility Report, and are summarized above in Section 15 on Alternatives.

SUMMARY OF ISSUE IDENTIFICATION ACTIVITIES

26. List agencies, citizen groups and individuals contacted regarding the project (include DNR personnel and title) and summarize public contacts, completed or proposed).

<u>Date</u>	<u>Contact</u>	<u>Contact Summary</u>
August 16, 2003	Mark Davis, WDNR Air	Asbestos Issues
Various	Dean Free, Olin Corp.	Feasibility Report
Various	Steve Ales, WDNR R&R	Remediation Projects
August 21, 2003	Robert Speaker, BAAAP	Endangered Resources Issues
October 1, 2003	Gayle Fisher, BAAAP Pat Trochlell, WDNR	Activities at BAAAP Wetland Issues
October 9, 2003	Jean Unmuth, WDNR Water Reg	Clay Borrow/Intermittent Stream
October 13, 2003	Mark Acquino, WDNR Land	Master Plan, Badger Reuse Plan
October 23, 2003	Rick Livingston, WDNR Forestry	Forestry Activity at BAAAP
October 30, 2003	Bureau of Endangered Resources	Endangered Resources Impacts
Various	Dan Graff, DNR Solid Waste Legal	EA and clay borrow issues
December 4, 2003	Jean Unmuth, WDNR Water Reg.	Dredging Permit required
December 9, 2003	Bruce Norton, US Army Corps Eng	Wetland Impacts: none
December 12, 2003	Jean Unmuth, WDNR Water Reg.	No Chapter 30 permit required

Various	Mike Mossman, WDNR Research	Endangered Resources on BAAAP
Various	George Osipoff, WDNR Wastewater	Wastewater Systems at BAAAP
Various	Barb Pavliscak, WDNR Air Program	Open Burning at BAAAP
Various	Tom Bennwitz, WDNR Waste Mgmt	Reuse and Recycling at BAAAP
Various	Delbert Maag, WDNR Drinking Water	Water Systems at BAAAP
Various	Cathy Bleser, WDNR EA Program	Endangered Resources at BAAAP

DECISION (This decision is not final until certified by the appropriate authority)

In accordance with s. 1.11, Stats., and Ch. NR 150, Adm. Code, the Department is authorized and required to determine whether it has complied with s.1.11, Stats., and Ch. NR 150, Wis. Adm. Code.

Complete either A or B below:

A. EIS Process Not Required

The attached analysis of the expected impacts of this proposal is of sufficient scope and detail to conclude that this is not a major action which would significantly affect the quality of the human environment. In my opinion, therefore, an environmental impact statement is not required prior to final action by the Department.

B. Major Action Requiring the Full EIS Process

The proposal is of such magnitude and complexity with such considerable and important impacts on the quality of the human environment that it constitutes a major action significantly affecting the quality of the human environment.

Signature of Evaluator	Date Signed

Signature for U.S. Department of Army	Date Signed

Joan Kenney, Installation Director
Badger Army Ammunition Plant, Sauk County

Number of responses to news release or other notice:

Certified to be in compliance with WEPA	
Environmental Analysis and Liaison Program Staff	Date Signed

NOTICE OF APPEAL RIGHTS

If you believe that you have a right to challenge this decision, you should know that Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions must be filed.

For judicial review of a decision pursuant to sections 227.52 and 227.53, Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

To request a contested case hearing pursuant to section 227.42, Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. The filing of a request for a contested case hearing is not a prerequisite for judicial review and does not extend the 30-day period for filing a petition for judicial review.

Note: Not all Department decisions respecting environmental impact, such as those involving solid waste or hazardous waste facilities under subch. III of ch. 289, are subject to the contested case hearing provisions of section 227.42, Stats.