

**Welcome to the Ravenna AAP  
July 2005**




**Informational Tour**

**Proposed Removal  
of**

**Explosively Contaminated Buildings**

**Ravenna AAP.....**  
**An Evolving National Security Asset**  
An Important Past



An Important Future

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**The Challenge**

**Safely**  
**Desensitize the residual explosives**  
**and**  
**demolish the structures**  
**to permit transfer to the Ohio National Guard**  
**for training**

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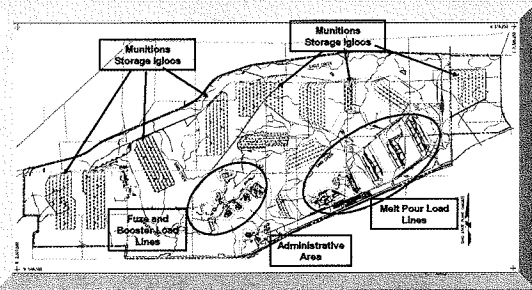
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**Ravenna Facility Map**



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## Ravenna Provides... National Security

- **Past**
  - Loaded and Packed Thousands of Tons of Munitions and Components
    - 456,000,000 shells, bombs and components during World War II
    - 237,000,000 shells, mines and components during the Korean War
    - 105,000,000 Projectiles and Components for Vietnam
    - 3,000,000 Mmunition Components Disassembled



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## Ravenna Supports... Training of our Soldiers

- **Current and Future**
  - More time spent in training at Ravenna means less traveling to other states for training.
  - Better trained Ohio Guard soldiers will be better skilled in accomplishing their missions and returning safely to their Ohio homes.
  - In 1998, National Guard Bureau (Washington, DC) identified Ravenna as the best in-state mechanized training land for Ohio National Guard soldiers.

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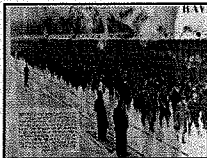
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## Ravenna Supports... Jobs and the Local Economy

- **Past**
  - Ravenna has continuously provided good paying jobs and income to the local community from its inception in 1940.
  - Employment has ranged from 18,000 full-time workers during peak production to approximately 50 full-time workers today.



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## Ravenna Supports ... Jobs and the Local Economy

### • Today

- The Ohio Army National Guard (OHARNG) continues to construct new facilities.
- The OHARNG conducts 80,000 to 100,000 training days per year, all year, every year for our soldiers which brings over \$ 10 million in goods & services in our community. This is expected to exceed 200,000 training days with the completion of additional facilities



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## Ravenna Supports ... Jobs and the Local Economy

- The Army is dedicated to restoring this land in a safe and environmentally acceptable manner.
- The Army has committed funding for the removal of unused structures and restoration so all land at Ravenna will be a safe training site for OHARNG soldiers.



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## Ravenna Supports... Environmental Responsibility

### • Past



- Over 60% of the installation was identified and is managed as wetlands.
- Ravenna is the home of the Osprey, Bobcat and the Mountain Brook Lamprey, an Ohio endangered species.
- The Army, the Ohio National Guard and MKM Engineers have worked closely with the Ohio EPA and the U.S. EPA to comply with all environmental laws and regulations.

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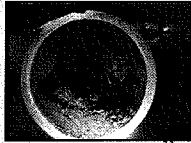
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## Ravenna Supports... Safe Removal of Buildings

### • Past

- Explosives are dangerous. Even though standard procedures were followed, eleven RVAAP workers were killed in a tragic March 1943 munitions explosion.
- At Joliet AAP in Illinois, one worker was killed from the detonation of hidden explosive residue.
- To manage the explosive safety risk during demolition, in 1997 the Army implemented safety procedures to thermally treat or burn buildings with known hidden explosives, removing the risk of explosion prior to demolition.



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## Ravenna Supports... Safe Removal of Buildings

### • Today

- Re-inspect the buildings attempt to reduce the number of buildings that require burning. Recent success in these inspections has reduced the number of buildings identified for burning from 121 to 6.
- Continue to explore better and more cost effective ways to safely demolish unused structures, protect the environment, and restore the installation for use by the Ohio National Guard.

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## In Summary....



The Army, the Ohio Army National Guard, Ohio EPA, USEPA and MKM Engineers are committed to the continued cleanup of the Arsenal. This will be accomplished in the safest and most cost effective manner for the taxpayer, while complying with all environmental regulations, and providing the best possible protection for our neighbors, our workers, and our military personnel.

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Thank you



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## REGULATORY INVOLVEMENT IN THE PAST AND PROPOSED REMOVAL OF EXPLOSIVELY CONTAMINATED BUILDINGS AT RAVENNA ARMY AMMUNITION PLANT

### US ENVIRONMENTAL PROTECTION AGENCY:

- Jurisdiction over the Toxic Substances Control Act (TSCA) and PCBs - 40 Code of Federal Regulations (CFR) Parts 700-766
- Review of TSCA - related issues is the first step in the process which is iterative, open to public input, and thorough

### AKRON REGIONAL AIR QUALITY MANAGEMENT DISTRICT (ARAQMD):

- Delegated Agency of Ohio EPA - Portage County is within the ARAQMD
- Issues/denies burn permits under Ohio Revised Code (ORC) 3704.11.2.D

### OHIO ENVIRONMENTAL PROTECTION AGENCY (OHIO EPA):

- Numerous personnel have been involved with this project since inception - from the District level to the Director's Office
- Past involvement has included:
  - reviewing and commenting on dried applied paints sampling plan; split sampling paints; and, evaluating data packages
  - reviewing and commenting on workplans, environmental safety submissions and health and safety plans
  - assisting in the development of standard operating procedures (SOPs) for building preparation (including items such as transite, peeling paint, animal debris, mercury switch, etc. removal)
  - reviewing and commenting on emission calculations
  - conducting a pre-inspection of buildings at Load Lines (LL) 6 and 9 and the Wet Storage igloos (including checking to make sure floor drains were plugged and transite was removed, checking where thermocouples were placed, etc.)
  - being on-site during all thermal treatment activities
  - conducting "post burn" inspections to check for any environmental issues
  - providing key input into all ash containerization, characterization, and disposal option decisions
  - reviewing and commenting on Remedial Investigation (RI) sampling plans where soil and groundwater are collected and tested to determine the nature and extent of any potential contamination; oversight of field work; and, split sampling
  - participating in public relations activities
- Current/future involvement includes:
  - many of the same above activities
  - reviewing and commenting on the "Draft, Request for Trial Burn"
  - reviewing the "full-blown" risk assessment when prepared
  - helping to coordinate the involvement of the various regulatory Agencies - USEPA, ARAQMD, Portage County Health Department (PCHD)
  - providing input into the air monitoring program if a trial burn is approved
  - being on-site as often as scheduling permits

**BUILDING THE  
RAVENNA  
ORDNANCE PLANT**



**A JOB HISTORY**



BUILDING THE  
RAVENNA ORDNANCE PLANT



A JOB HISTORY



*Edited by*  
LORRAINE LEPERE McDOWELL

vania Turnpike Tunnels, the day the first concrete traversed the railroads with truck mixers mounted on flat cars and transferred their charges to the narrow gauge tracks and into the swamps on the dinky cars; the first snow and cold weather, the hundreds of oil stoves and thousands of tarpaulins, the twenty-four hours every day in snow, rain and freezing weather with never an hour lost all winter; not one yard of concrete frozen; the roads impassable, rock from the railroad and load line excavations piled into the muddy road bottoms, thousands of tons of slag by truck from Youngstown; the gradual rise out of the bog with new roads daily coming into being; the winning fight with nature becoming more apparent each day; the hunt for locomotives to haul our incoming materials; the camp completed, the dormitories filled to capacity and more new ones started; the problem of transporting men from the camp area to the ever widening scope of new construction; the broadcasting system for dispatching and governing the movements of 16,000 men; the first special trains from Akron and Youngstown, the railroad wreck in March with the finest piece of relief work and evacuation of wounded ever recorded; the ever recurring collection of money for some unfortunate's family, the spirit of cooperation and mutual interest in one man for the other; the strikes, the adverse publicity, the black eye of Ravenna in the minds of Washington; the business agents, the demands for higher wages, the gradual return of labor peace, the quiet, consistent and unstoppable progress of the construction; the rumors of other plants being ready to load shells before Ravenna, the day the first load line went into production and never stopped, the fact that Ravenna after all was the first plant to load; the scarcity of materials, the priorities, the expeditors to all corners of the country; the Navy and small arms plants commanding our materials by higher priorities; the distribution of the thousands of items to the places where they were needed over an area of thirty square miles; the ever increasing expansion of the plant and its facilities; waiting and waiting for plans to be drawn, checked and blueprinted; the handling of sub-contracts; the organization of constantly increasing gangs and crews; the almost self-organized athletic teams, the sign painters bank, the orchestra, the Ravenna Ordnance Plant players with their own little theatre in the Bolton Horse Barn; the Flag Day parade in the town of Ravenna with floats passing for four straight hours while hot rivets were being driven and logs sawed on the main street of Ravenna; the trade dinners in the commissary; the bricklayers and the ironworkers on each other's tails and the rivalry between all trades and the pride of the worker in his own profession; the complete abolition of labor troubles from the daily program of effort to get the plant built; the clambake, the kidnapping of the bartender; the pool games and bar in the recreation room; the lay-off period and the diminishing of forces finally arriving, the exodus of men to who knows where; the Fuze & Booster weekly paper; the boomtown camp at the plant entrance, the trailer camps, the good record of off work behavior reported by police in surrounding towns; the interest and constant efforts of Col. Chavin toward morale among the men, Mrs. Chavin's tireless efforts to make the life on the reservation pleasant for the workers' wives; the ever moving spirit of making the job at Ravenna pleasant and one never to

## CHAPTER XV

# STAGGERING STATISTICS

**W**E realize that men who worked at Ravenna will tell the story of this job in terms of such vast quantities that unbelieving ears and skeptical minds will attempt to make liars of the most truthful men. This chapter, therefore, is devoted to the establishment of a permanent recording of statistics relative to the Ravenna Ordnance Plant and Depot.

This is the record, but please bear in mind that the Ravenna job is *not* completed as this book goes to press, so that many of the following quantities will be appreciably increased when the contractor moves out:

### ASPHALT, HOT MIXED

160,000 tons produced on the reservation, enough to produce a base and top course for 60-odd miles of roads.

### ASBESTOS ROOFING

32,000 squares or enough to cover an area of 85 acres. 6,000,000 accessories — bolts, clips and washers. 300 tons of side and end lap asphalt and caulking.

### BRICK AND TILE

10,000,000 common brick, or enough to pave a road 20 feet wide for a distance of 21 miles. 1,300,000 tile, 250,000 cement block, 80,000 bags of cement, and 11,300 cubic yards of sand, making a total of 961 carloads of materials used in masonry construction.

### CEMENT FINISHING

6,000,000 square feet of finished areas or enough to make a sidewalk 25 feet wide and 45 miles long. 8,600 concrete products manufactured at the pre-cast plant.

### CONCRETE

300,000 cubic yards or enough to build a sidewalk 3 feet wide and 4 inches thick a distance of 1,530 miles — which would extend from Cleveland to Brownsville, Texas, on the Mexican border. If hauled in 3-yard trucks, this would require 100,000 trucks. If by train, it would require 12,000 cars to haul it at 50 tons to the car, or 240 train loads at 50 cars to the train. Concrete aggregate totals are: 450,000 barrels of cement, 220,000 tons of slag, 260,000 tons of sand, 6,300 tons of silica gravel, 900 tons of possolith.

2,595,905 gallons, is enough to propel one automobile 51,918,100 miles or around the earth 2,076 times, or enough to wear out 519 automobiles, assuming each ran 100,000 miles. 130,000 gallons of motor oil. 240,281 pounds of chassis grease, 243,189 pounds of transmission lubricant, 15,000 gallons of anti-freeze.

## LANDCLEARING

4,000 acres cleared, averaging 50 to 200 stumps per acre.

## LUMBER

25,000,000 board feet of new lumber delivered by truck and train. 7,000,000 board feet of native timber sawed on reservation. 32,000,000 board feet (total), if reduced to a single plank 12 inches wide and 1 inch thick, would extend 6,000 miles or would cover 744 acres.

## MISCELLANEOUS

18,685 tons of coal or 370 carloads. 1,087,200 pounds of dynamite. 665,000 blasting caps. 45 acres of tarpaulin. 4,000 oil stoves and salamanders. 15,000 pairs of boots. 15,000 raincoats. 75 oxo-acetylene cutting torches. 309,212 feet of wire rope or 58½ miles. 25,000,000 sanitary drinking cups. 28 teams of horses. 300 miles of underground electric cable. 60 miles of open drainage ditches.

## MONEY

A total expenditure of about \$57,000,000, averaging a weekly expenditure of \$1,000,000. Highest payrolls, approximately \$750,000 weekly, and pro-rated over the total population of the United States, this would amount to 43 cents per person.

## NAILS

18,000 kegs or 30 carloads. This is equal to 225,800,000 6-penny nails.

## PIPE

30,408 lineal feet of concrete pipe. 366,170 lineal feet of vitrified sewer pipe. 125 carloads of cast iron water pipe. 50 carloads of steel pipe for steam mains.

## RAILROADS

130 miles of standard gauge trackage. 43,394,632 pounds of rail or 420 fifty-ton carloads. 1,299,700 pounds of spikes. 397,852 ties. 8,864,440 pounds of tieplates. 408 turnouts or switches. 1,330,403 board feet of switch ties. 440,000 tons of slag ballast.

# RVAAP Production for WW II

Period of Operation: 1941-1945		
LL 1	75mm C/R	24,416,749
	76mm C/R	2,354,073
	4.5" Projectile	1,463,769
	155mm Projectile	1,030,497
	8" M103 Projectile	42,684
LL 2	4.5" Projectile	65,865
	155mm Projectile	5,100,830
	6" Projectile	32,879
	8" Projectile	666,499
	240mm Projectile	109,518
	Bomb, 100 lb	48,415
LL 3	155mm Projectile	73,701
	8" Projectile	582,586
	240mm Projectile	73,100
	Bomb, 100 lb	293,670
	Bomb, 500 lb	131,862
	Bomb, 1000 lb	13,309
	Bomb 2000 lb	91,536
LL 4	8" Projectile	70,168
	Bomb, 500 lb	12,482
	Bomb, 1000 lb	9,320
LL 5 thru 11	Misc Fuzes	19,257,297
	Misc Boosters	44,297,485
	Misc Primers	50,660,725
	Misc Detonators	79,580,576
	Percussion Elements	226,387,306
LL 12	Ammonium Nitrate (Grained)	39,544,000
	Ammonium Nitrate (Reworked)	26,818,090

Total Shells  
36,082,918

Total Bombs  
600,594

Total  
Components  
420,183,389

## RVAAP Production for the Vietnam War

LL 2	(1969-71)	175mm Projectile, TNT	372,803
LL 3	(1969-71)	155mm Projectile, Comp B	2,275,695
LL 7	(1969-70)	40mm Projectile	16,000,000
LL 11	(1969-71)	MR ZA4 Fuze	7,000,000
LL 12	(1969-71)	M54 Primer	80,000,000

**INFORMATION SHEET**  
**for the**  
**Ravenna Informational Tours**  
**Ravenna Army Ammunition Plant**

**July 12-13, 2005**

1. The top priority for the Army and MKM Engineers is the safety of local residents and the work force.
2. The U.S Army Technical Center for Explosive Safety (USATCES) is the Army's expert agency that conducted an inspection of buildings in the load lines April 5 & 6, 2005.
3. USATCES has approved the re-evaluation of the 121 explosively contaminated buildings at the RVAAP for demolition using armored equipment except the six (6) melt pour buildings. This potentially reduces the number of buildings to be burned by 115.
4. The final inspection of each building will include opening the walls with heavily armored equipment in high risk areas of the buildings to determine if there are any accumulated explosives. High risk areas are those areas within a building where large volumes of explosives were handled and may have accumulated inside the walls or between the floors and the floor coverings.
5. A building will only be re-considered for engineered burning if during the final inspection, explosive conditions are found that cannot be safely handled with the heavily armored equipment. This effort will be coordinated with all interested parties.
6. Demolition, using armored equipment, of unburned explosively contaminated buildings is more dangerous to the workers.
7. The RVAAP and MKM Engineers continue to work with the USEPA, Ohio EPA, and Akron Regional Air Quality Management District to determine the most appropriate method of demolition.
8. Comments on the proposed air model for the engineered trial burn have not been received from the USEPA.
9. The decision by the regulators for an engineered burn is not expected for 1 – 1½ years.

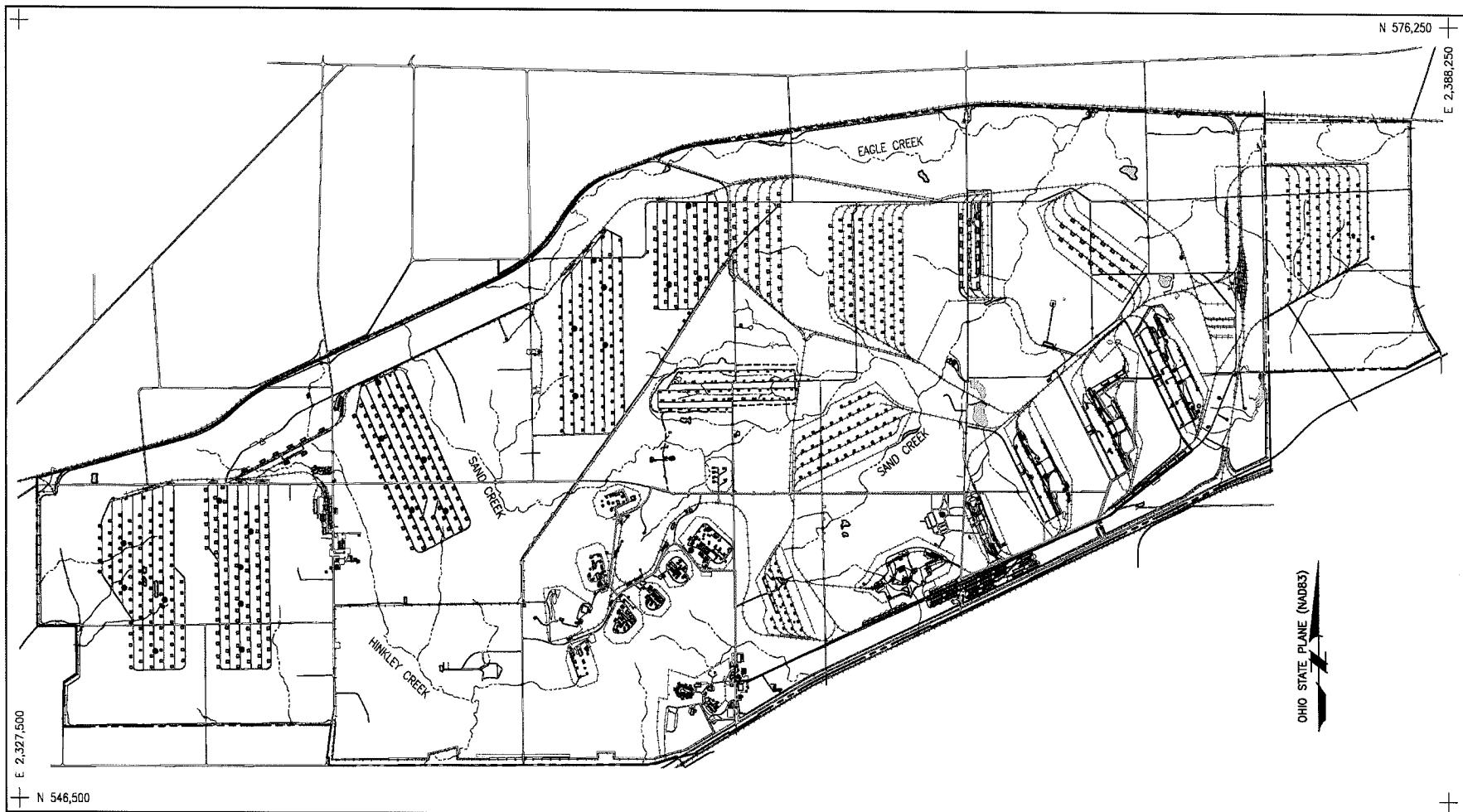
As more information is gathered it will be made available. We will post it on our web site and provide updates at the scheduled Restoration Advisory Board (RAB) meetings.

The point of contact for the RVAAP is:

Mark Patterson, Facility Manager  
8451 State Route 5,  
Ravenna, Ohio 44266  
330-358-7311  
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Christy Esler, RAB Administrator  
8451 State Route 5,  
Ravenna, Ohio 44266  
330-358-2920  
[Christy.Esler@mkmeng.com](mailto:Christy.Esler@mkmeng.com)


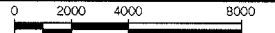
Web site: [www.RVAAP.org](http://www.RVAAP.org)



E 2,327,500  
N 546,500

N 576,250  
E 2,388,250

OHIO STATE PLANE (NAD83)

 <b>MKM Engineers, Inc.</b>				
<b>RAVENNA ARMY AMMUNITION PLANT</b> <b>RAVENNA, OHIO</b> <b>INSTALLATION MAP</b>				
DRAWN BY:	REVISED BY:	CHECKED BY:	DATE:	FIGURE:
P. HOLM	MD		21 AUG 02	1-2
			SCALE: 1"=4000'	

- +++++..... RAILROAD TRACKS
- FENCELINE
- PROPERTY BOUNDARY
- STREAM OR CREEK