

FERNALD CLEANUP PROGRESS BRIEFING AUGUST 2003

Environmental Monitoring 2002 Program Summary

Opening Remarks	Cindy Tabor
Surface Water Monitoring	Frank Johnston
Groundwater Monitoring	Bill Hertel
On-Site Disposal Facility	Bill Hertel
Air Monitoring	John Byrne
Natural Resources Monitoring	Eric Woods

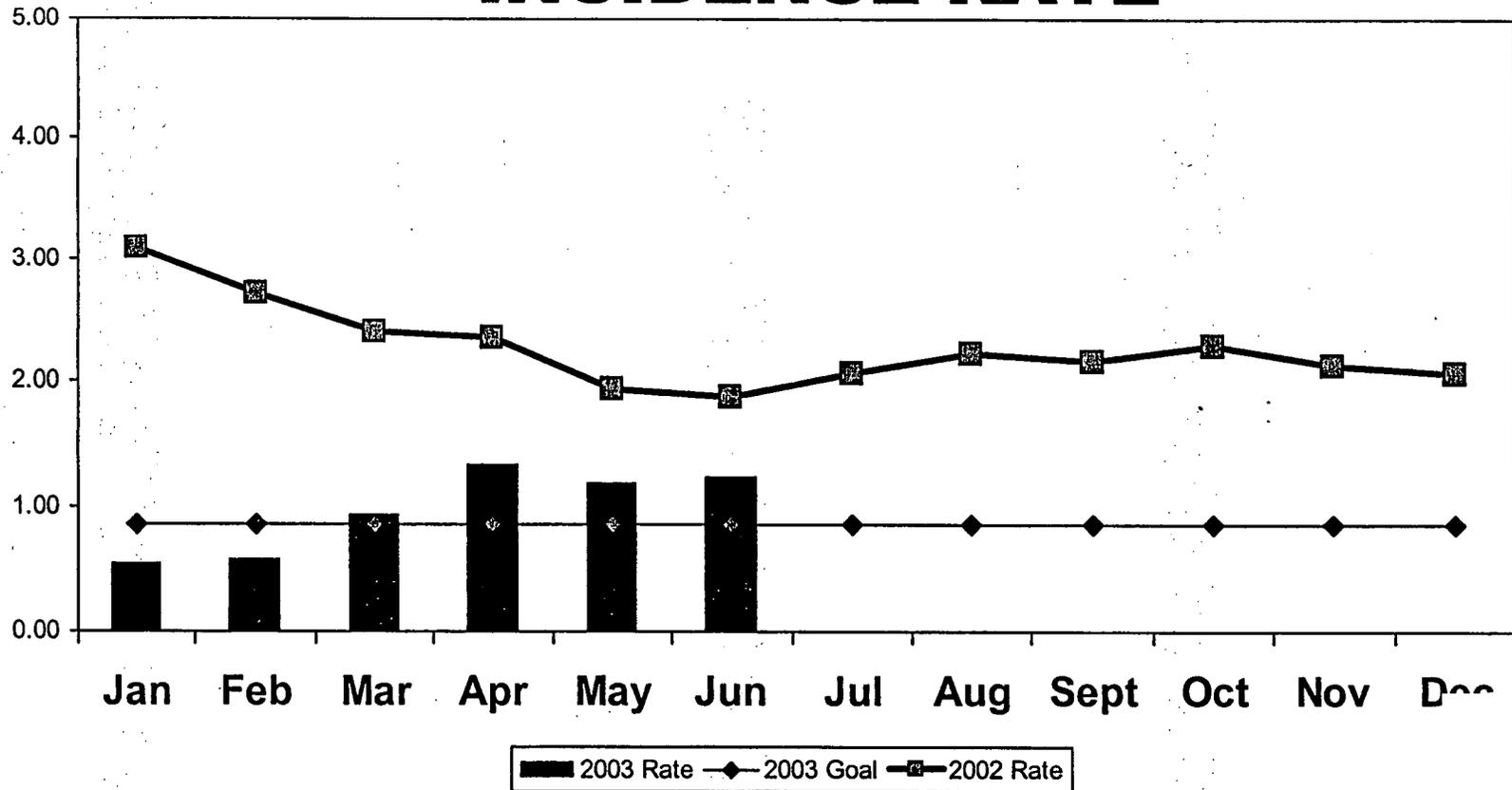
Question and Answer Session

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2002 - 2003 OSHA RECORDABLE INCIDENCE RATE



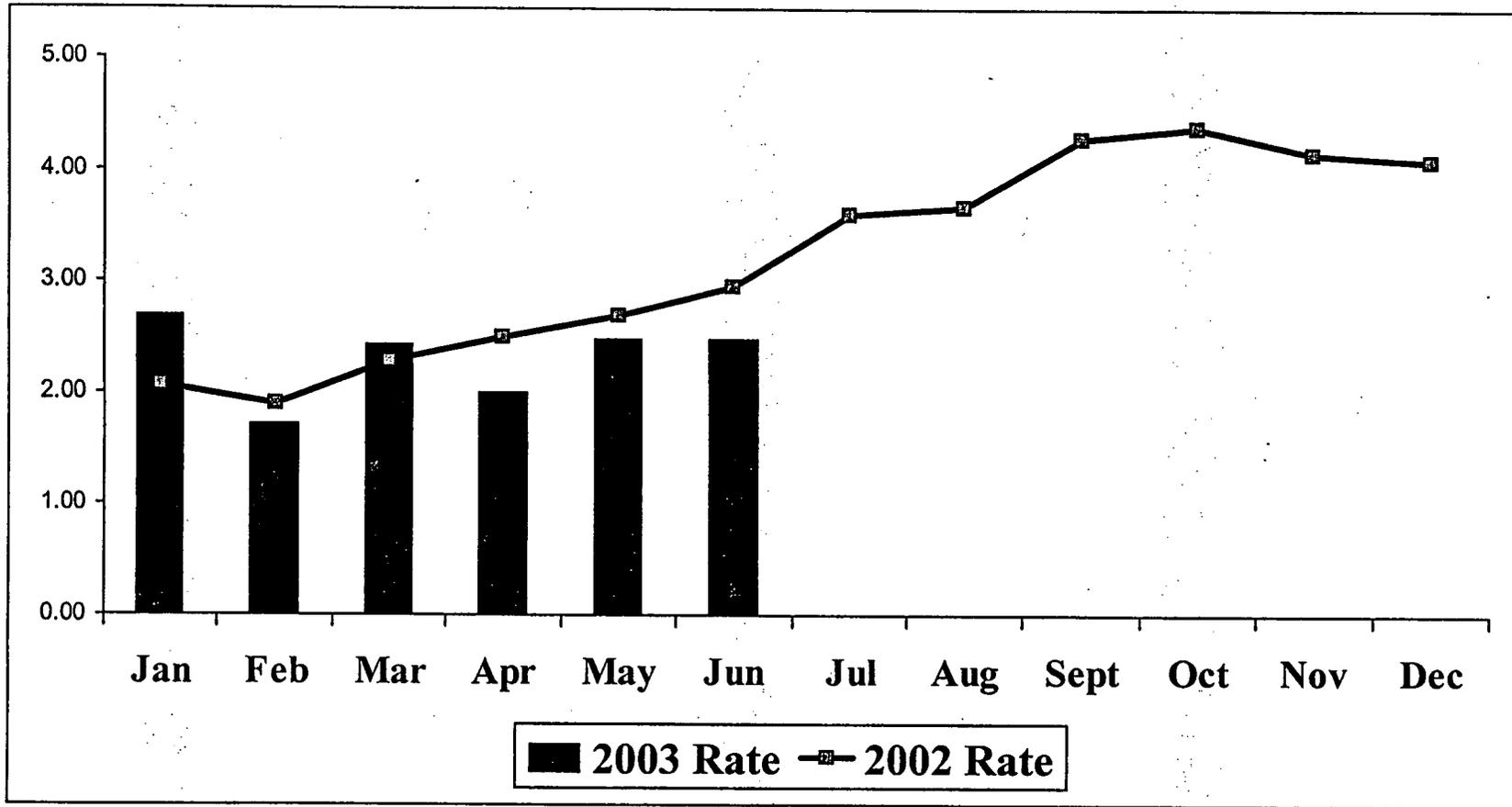
Graphics 7898-02 08/03

2003

ENVIRONMENTAL MONITORING PROGRAM

- **Ensure protection of public health**
- **Ensure compliance with regulatory limits**
- **Provide assessment and continuous feedback to remedial action projects**

2002-2003 FIRST AID INCIDENCE RATE



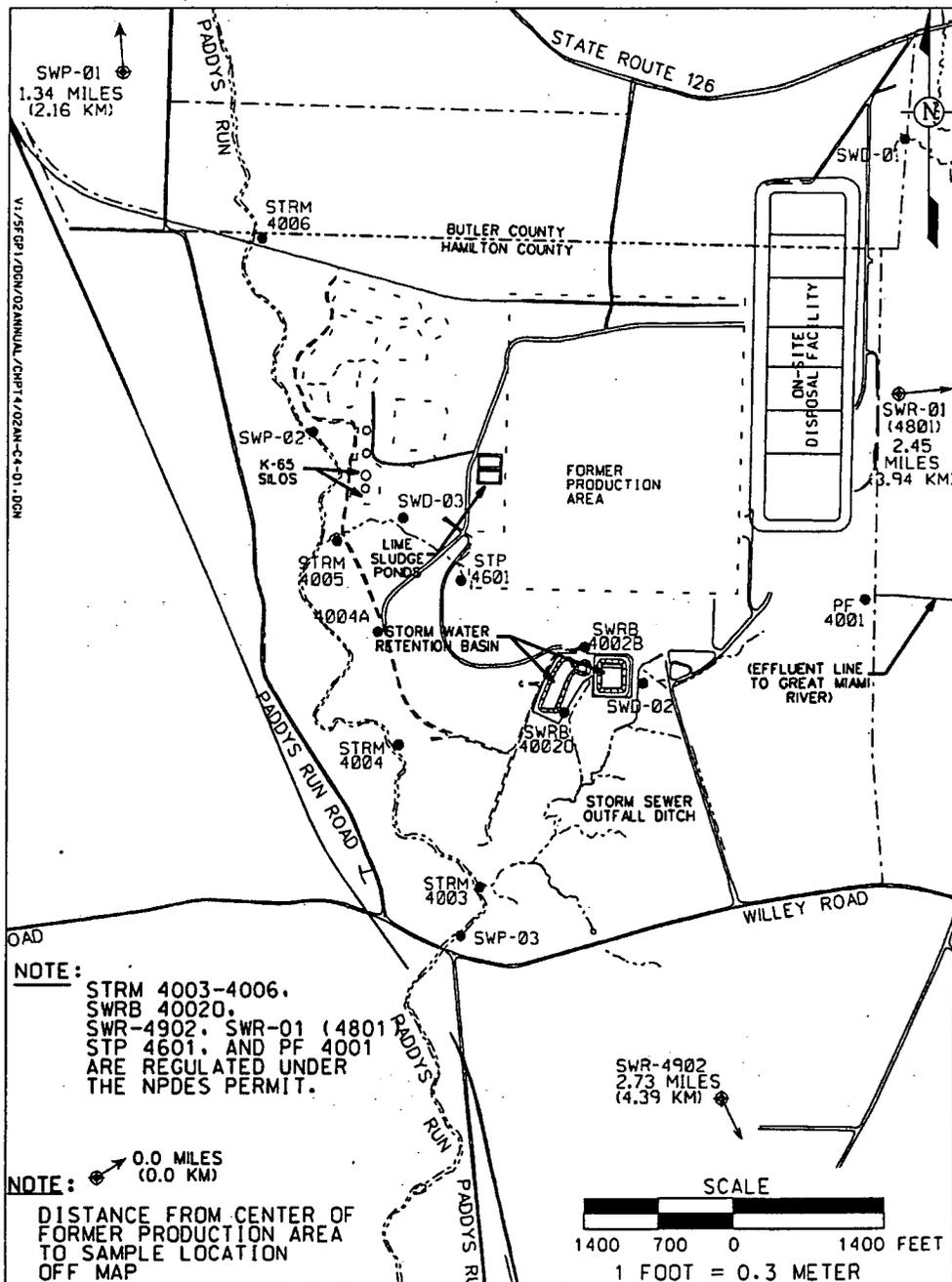
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REPORTING

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- **Semi-annual reports**
 - **Mid-year report in November**
 - **Available at PEIC**
 - ◆ **Site Environmental Report in June**
 - **Distributed to stakeholders**
 - **Available at PEIC**
 - **Available on Internet (www.fernald.gov under **Cleanup/Environmental Monitoring**)**

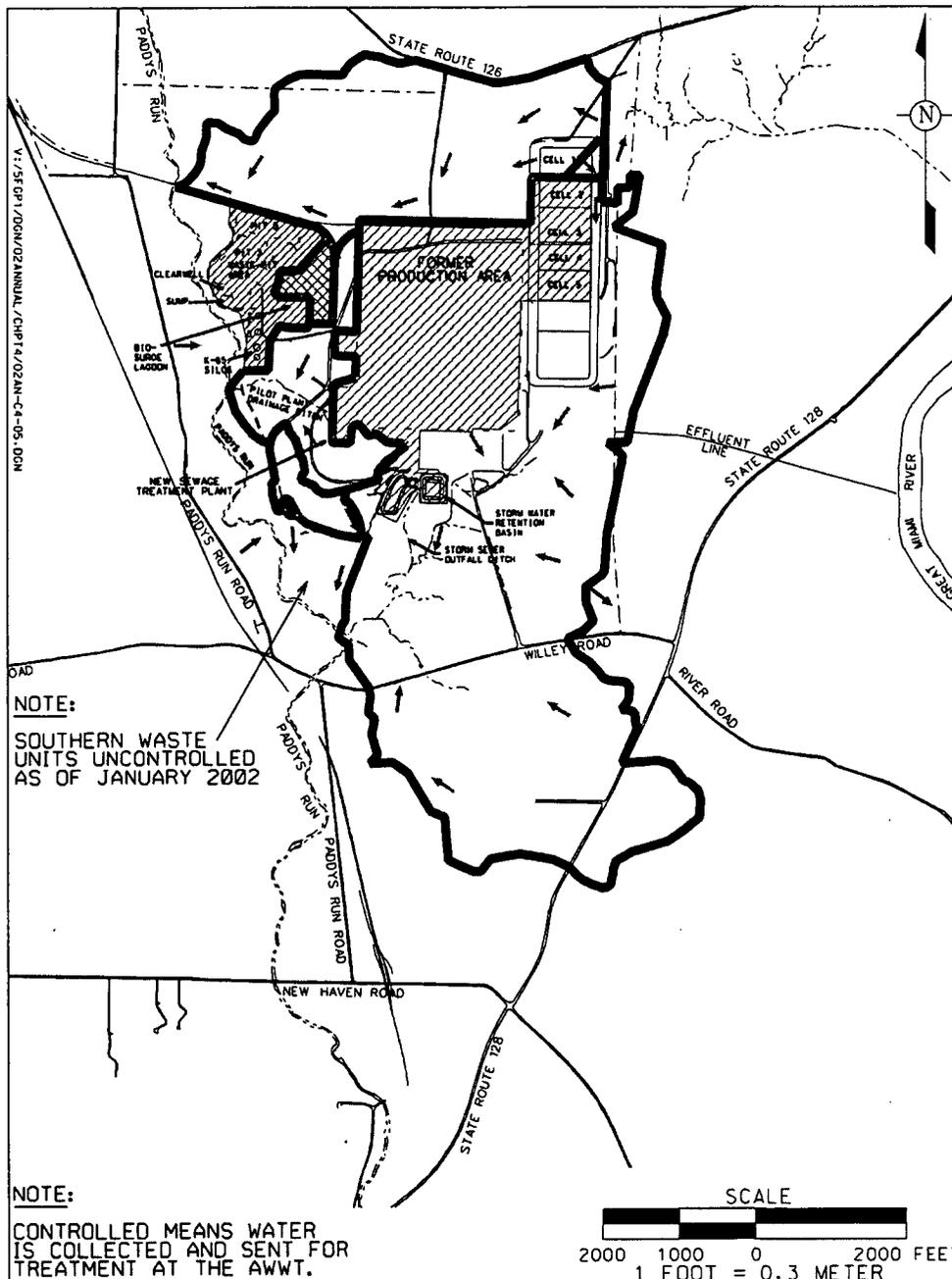
SURFACE WATER AND TREATED EFFLUENT SAMPLING LOCATIONS



LEGEND:

- FERNALD SITE BOUNDARY
- SAMPLE LOCATION

CONTROLLED SURFACE WATER AREAS AND UNCONTROLLED RUNOFF FLOW DIRECTION



LEGEND:

- FERNALD SITE BOUNDARY
- DRAINAGE BASIN BOUNDARY
- ↘ UNCONTROLLED RUNOFF FLOW DIRECTION

- CONTROLLED AREA
- WATER TREATED IF TOTAL URANIUM RESULT IS >30 µg/L

SURFACE WATER /TREATED EFFLUENT

Uranium Released

- **2000: 376 pounds**
 - ◆ **252 via treated effluent to Great Miami River (600 lb. annual limit)**
 - ◆ **116 via uncontrolled runoff to Paddys Run**
 - ◆ **8 via Storm Water Retention Basin overflow**

- **2001: 474 pounds**
 - ◆ **353 via treated effluent to Great Miami River (600 lb. annual limit)**
 - ◆ **121 via uncontrolled runoff to Paddys Run**

- **2002: 653 pounds**
 - ◆ **524 via treated effluent to Great Miami River (600 lb. annual limit)**
 - ◆ **127 via uncontrolled runoff to Paddys Run**
 - ◆ **2 via Storm Water Retention Basin overflow**

SURFACE WATER

Comparison of Current Conditions to Final Remediation Levels (FRL) and Benchmark Toxicity Values (BTV)

	<u>2000</u>	<u>2001</u>	<u>2002</u>
Surface water FRL exceedances for all constituents	9	7	8
Surface water BTV exceedances for all constituents	1	4	1
Surface water exceedances of groundwater total uranium FRL	15	17	9

SURFACE WATER / TREATED EFFLUENT

National Pollutant Discharge Elimination System (NPDES) Compliance Rates

- **2000 compliance rate: >99 percent**
- **2001 compliance rate: >99 percent**
 - ◆ **12 at location 4001 (Parshall Flume)**
 - ◆ **7 at location 4601 (Sewage Treatment Plant effluent)**
- **2002 compliance rate: >99 percent**
 - ◆ **2 at location 4001 (Parshall Flume)**
 - ◆ **1 at Storm Water Retention Basin overflow**

SURFACE WATER MONITORING

Changes for 2003 and 2004

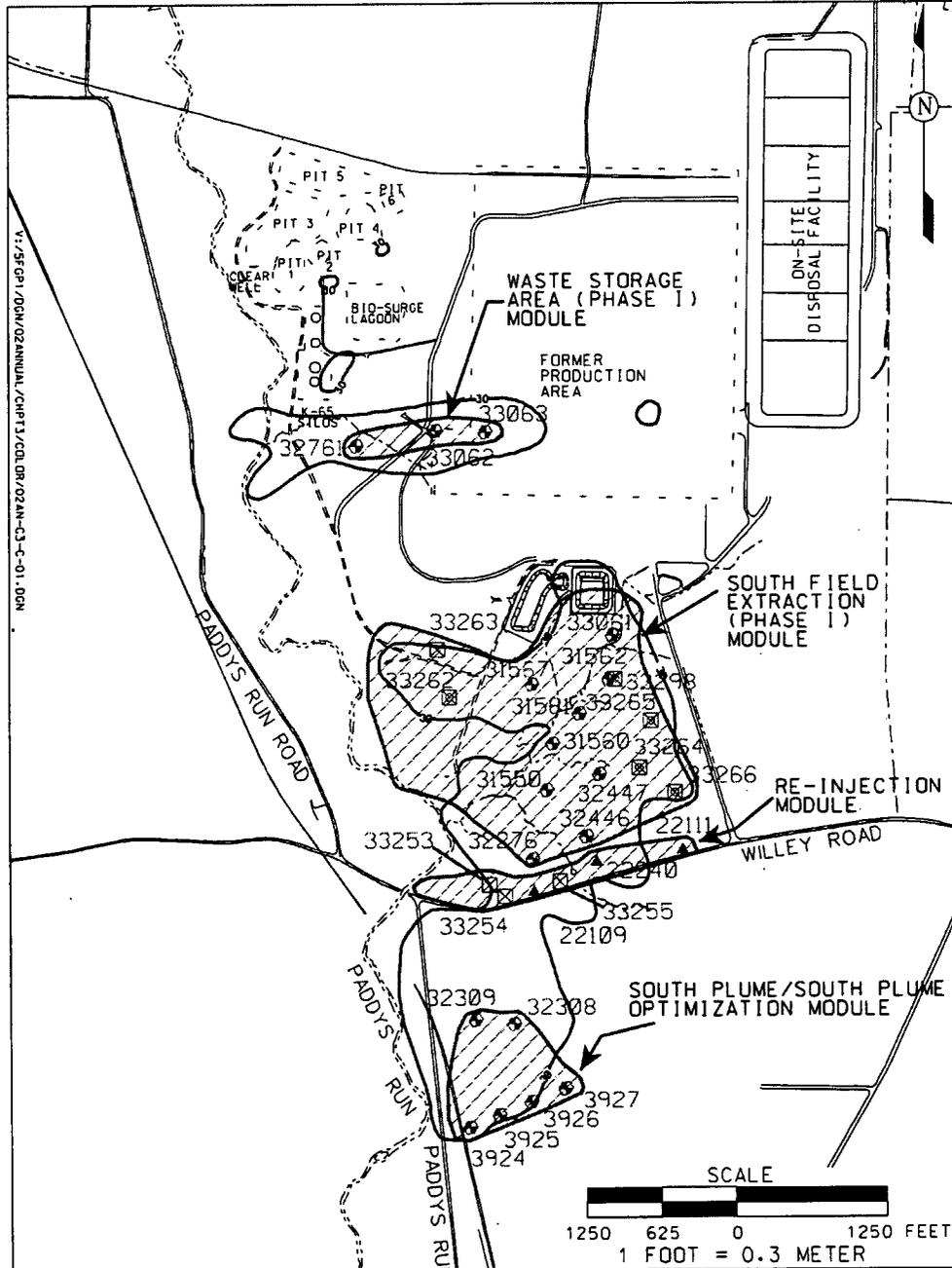
- **Received the renewed NPDES permit, effective July 1, 2003**
- **Monitoring changes documented through IEMP process**

GROUNDWATER MONITORING

2002 Program Changes

- **Integrated Environmental Monitoring Plan (IEMP) program changes**
 - ◆ **Sampling frequency changed from quarterly to semi-annual in July 2002**

CURRENT EXTRACTION AND RE-INJECTION WELLS FOR ENHANCED GROUNDWATER REMEDY



- LEGEND:**
- FERNALD SITE BOUNDARY
 - ⊕ EXTRACTION WELL
 - ▲ RE-INJECTION WELL
 - ⊞ EXTRACTION WELL (PUMPING TO BEGIN IN 2003)
 - ⊠ RE-INJECTION WELL (INJECTION TO BEGIN IN 2003)
 - ▨ CURRENT ACTIVE MODULE
 - 30 μg/L TOTAL URANIUM PLUME FROM SECOND HALF 2002

GROUNDWATER MONITORING

2002 Program Changes

- **Waste Storage Module**
 - ◆ **Began active restoration on May 8**
 - ◆ **Began operating 3 new extraction wells, 16 months ahead of the OU5 Remedial Action Work Plan scheduled start date**
 - ◆ **Finished installing 9 new monitoring wells to help track remediation progress around new extraction wells**

GROUNDWATER MONITORING

2002 Program Changes

- **South Field (SF) Module**
 - ◆ **May: Began operating new Extraction Well 33061 and issued design for Phase II of the SF Module**
 - ◆ **Installed new components of SF Phase II Design: 4 extraction wells, 1 injection well, an injection pond and 30 additional monitoring wells**
 - ◆ **Shut down Extraction Well 31563 in the upgradient portion of the plume where uranium concentrations are now less than the final remediation level. Converting this well to a re-injection well as part of the SF Phase II Design.**

GROUNDWATER MONITORING

2002 Program Changes

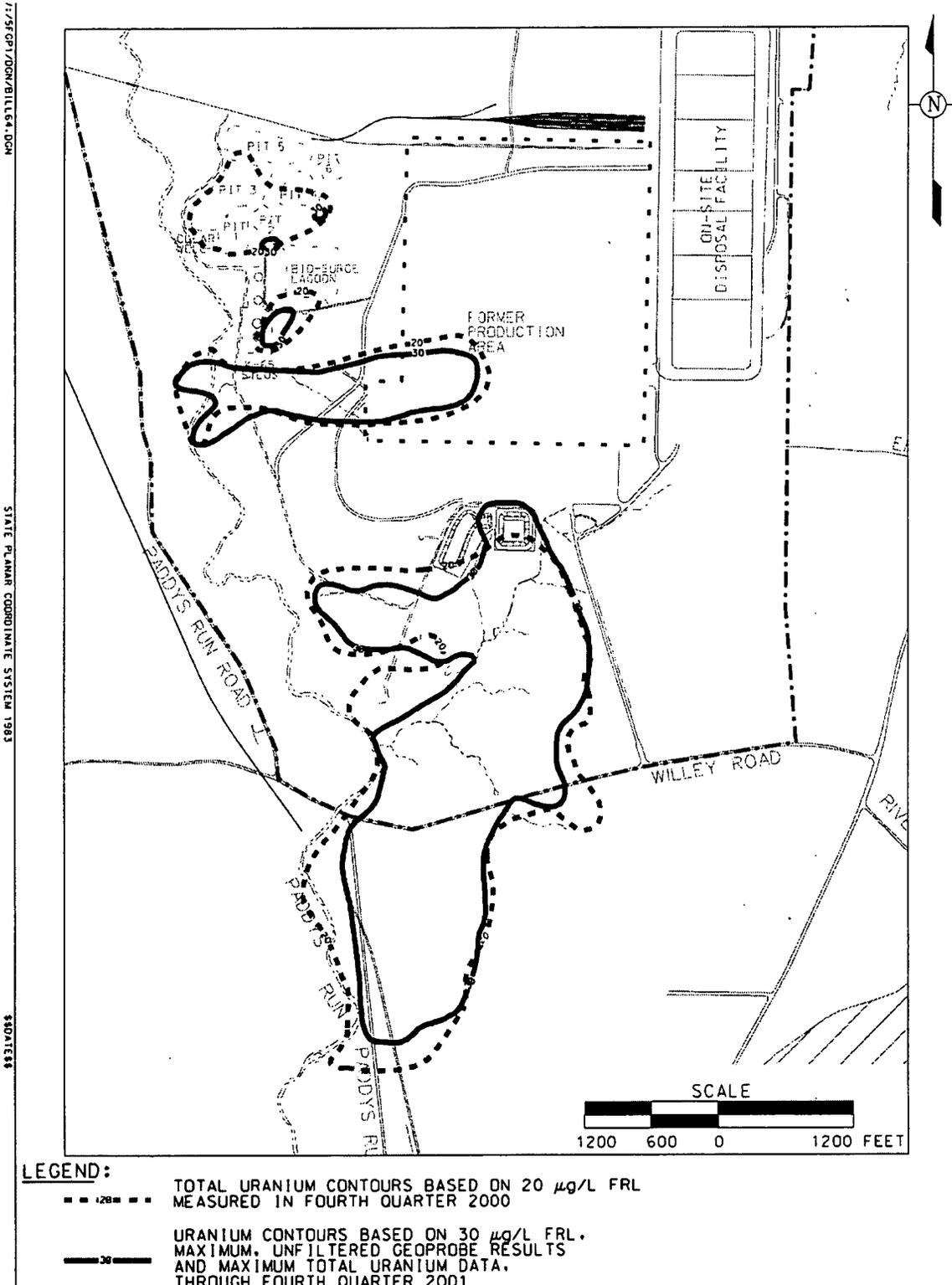
- **Groundwater Re-injection Module**
 - ◆ **November: Began operating 2 new replacement wells, 33253 and 33254. Replacements needed to address recurrent plugging.**
 - ◆ **Installed a sixth well, 33255, between 22109 and 22240. This new well began operating in 2003.**

GROUNDWATER MONITORING

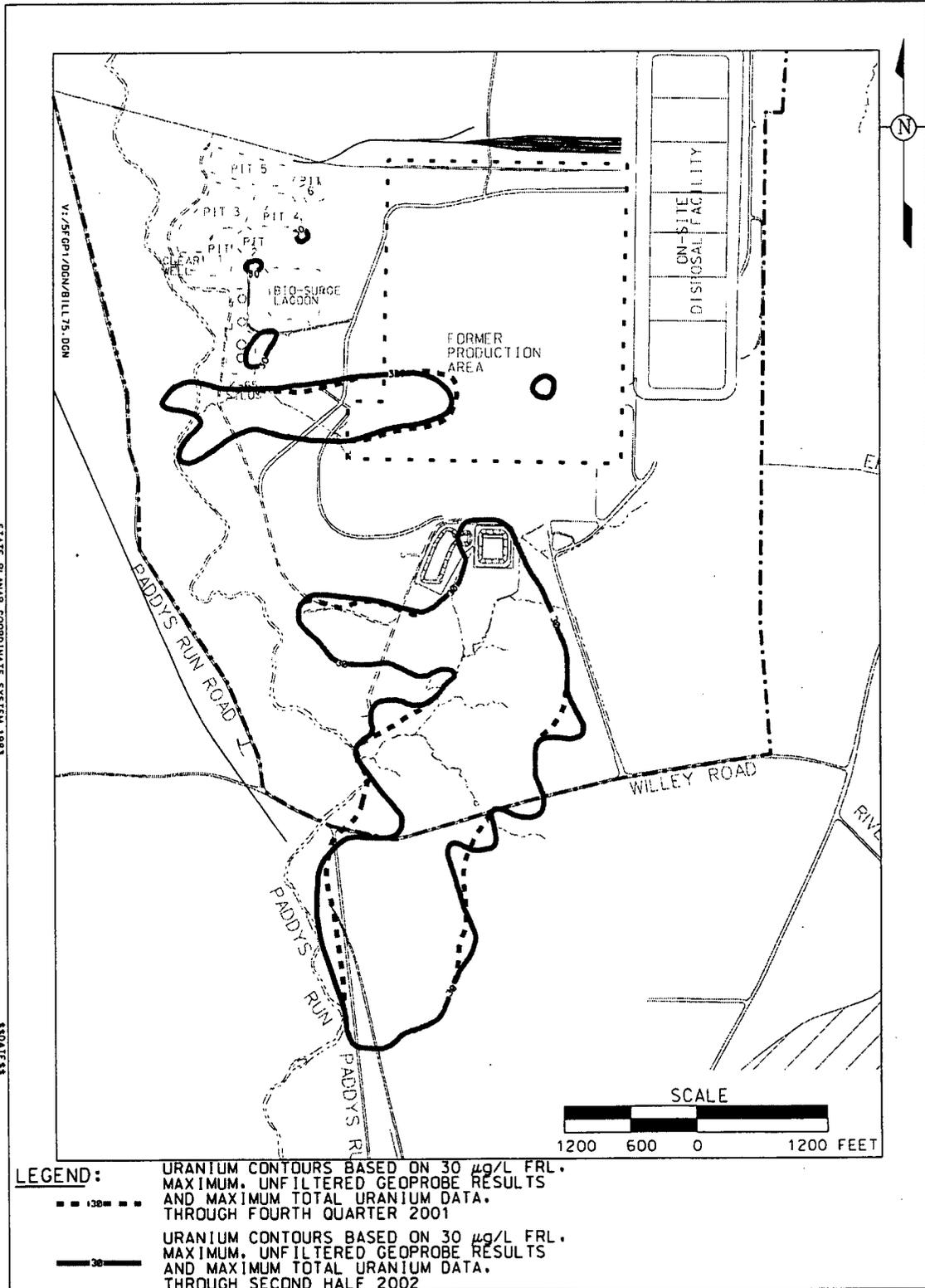
Operational Summary

	2001		2002	
	<u>Planned</u>	<u>Actual</u>	<u>Planned</u>	<u>Actual</u>
<i>Gallons pumped from Great Miami Aquifer</i>	1,787M	1,861M	1,787M	2,287M
<i>Gallons Re-injected</i>	526M	147M	526M	241M
<i>Uranium removed from Great Miami Aquifer</i>	857 lbs.	867 lbs.	900 lbs.	1,225 lbs.

TOTAL URANIUM PLUME COMPARISON OF FOURTH QUARTER 2000 TO FOURTH QUARTER 2001



TOTAL URANIUM PLUME COMPARISON OF FOURTH QUARTER 2001 TO SECOND HALF OF 2002



GROUNDWATER MONITORING

Changes for 2003/2004

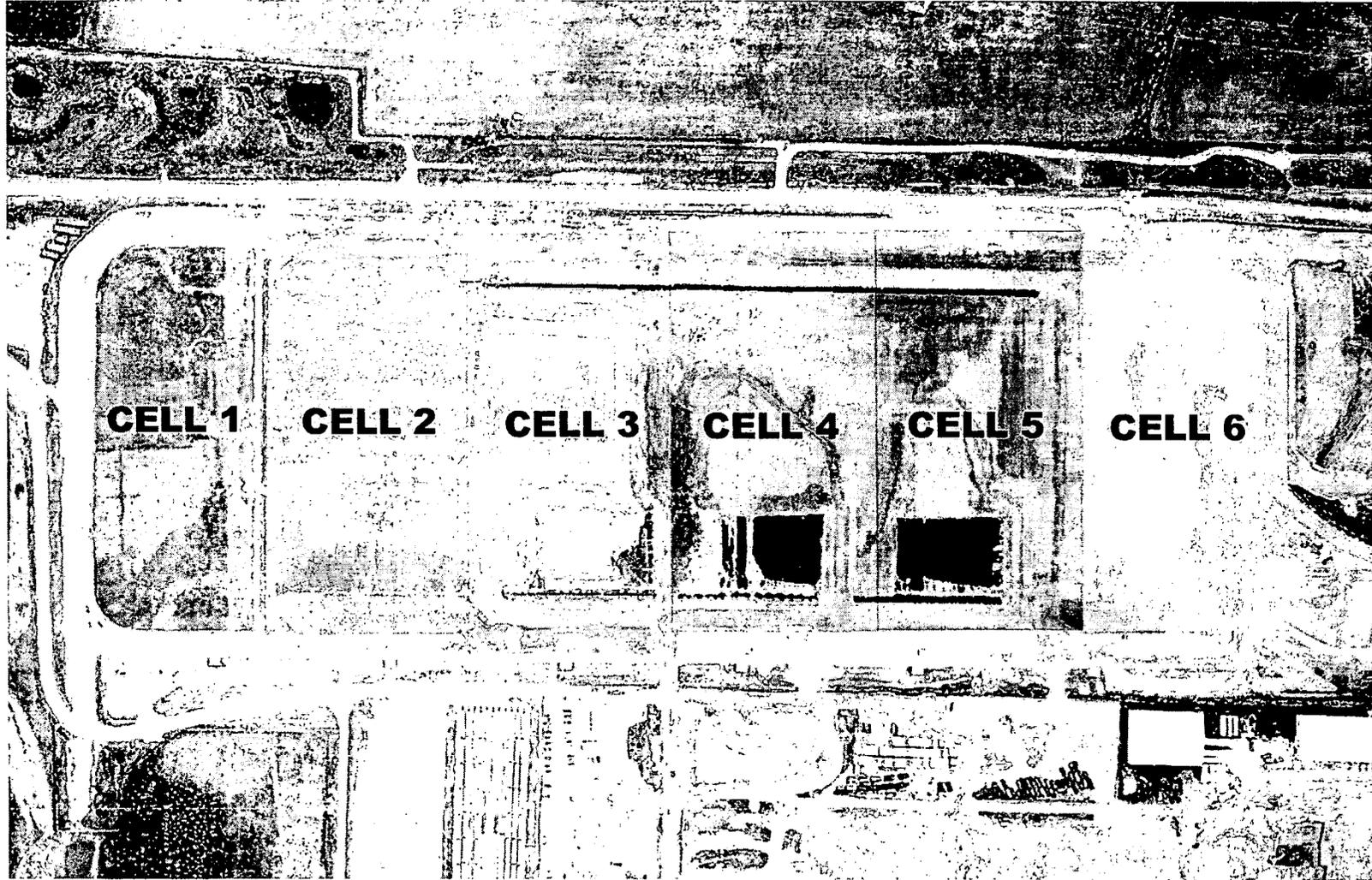
- **Initiated IEMP program changes January 2003**
 - ◆ **Monitor semi-annually for constituents with FRL exceedances since inception of IEMP**
 - ◆ **Monitor once every five years for constituents without FRL exceedances**

- **Operations**
 - ◆ **Began operating new components of the South Field Phase II Module Design**
 - ◆ **Began operating new re-injection well along Willey Rd.**

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ON-SITE DISPOSAL FACILITY (OSDF)

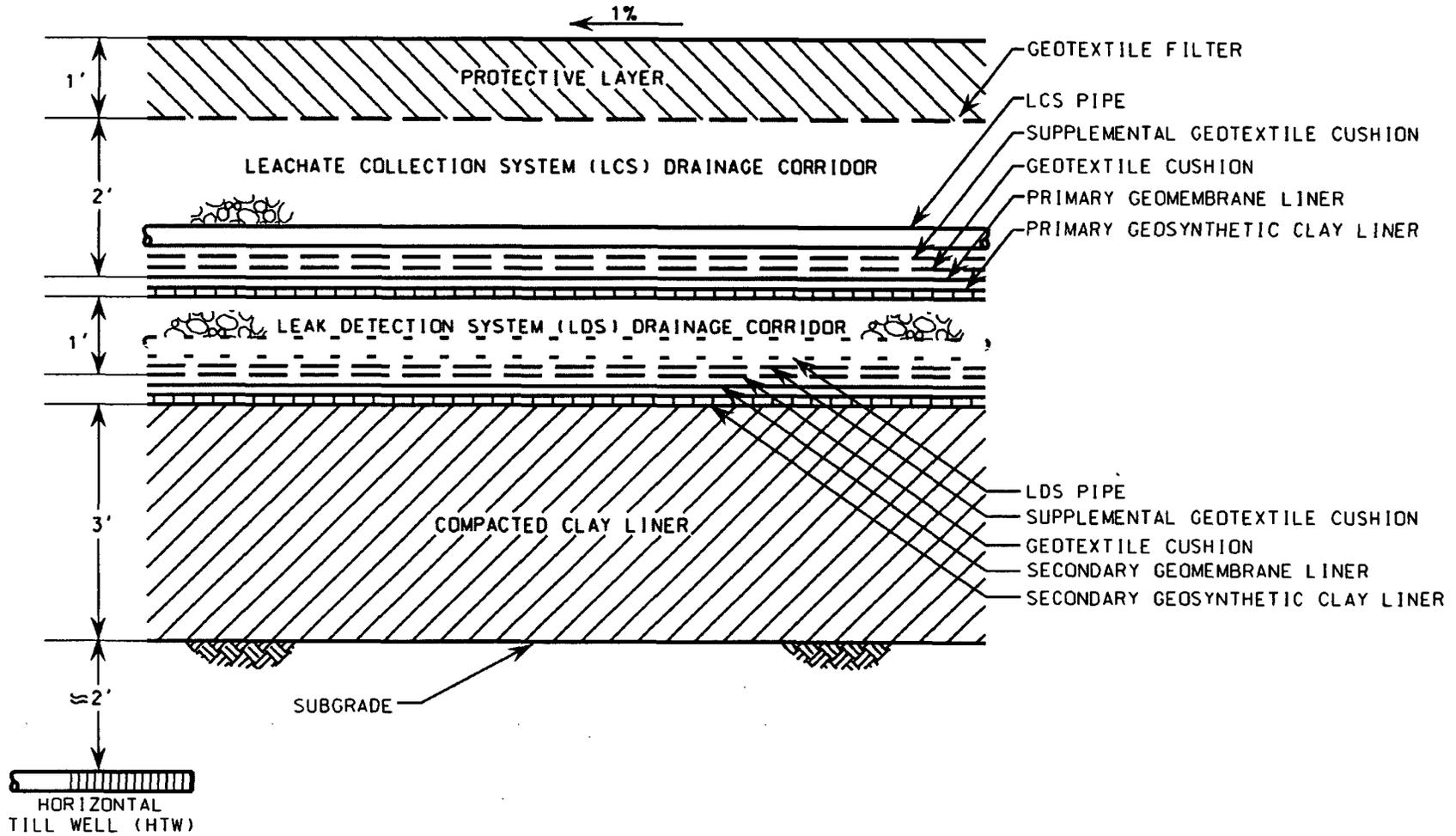
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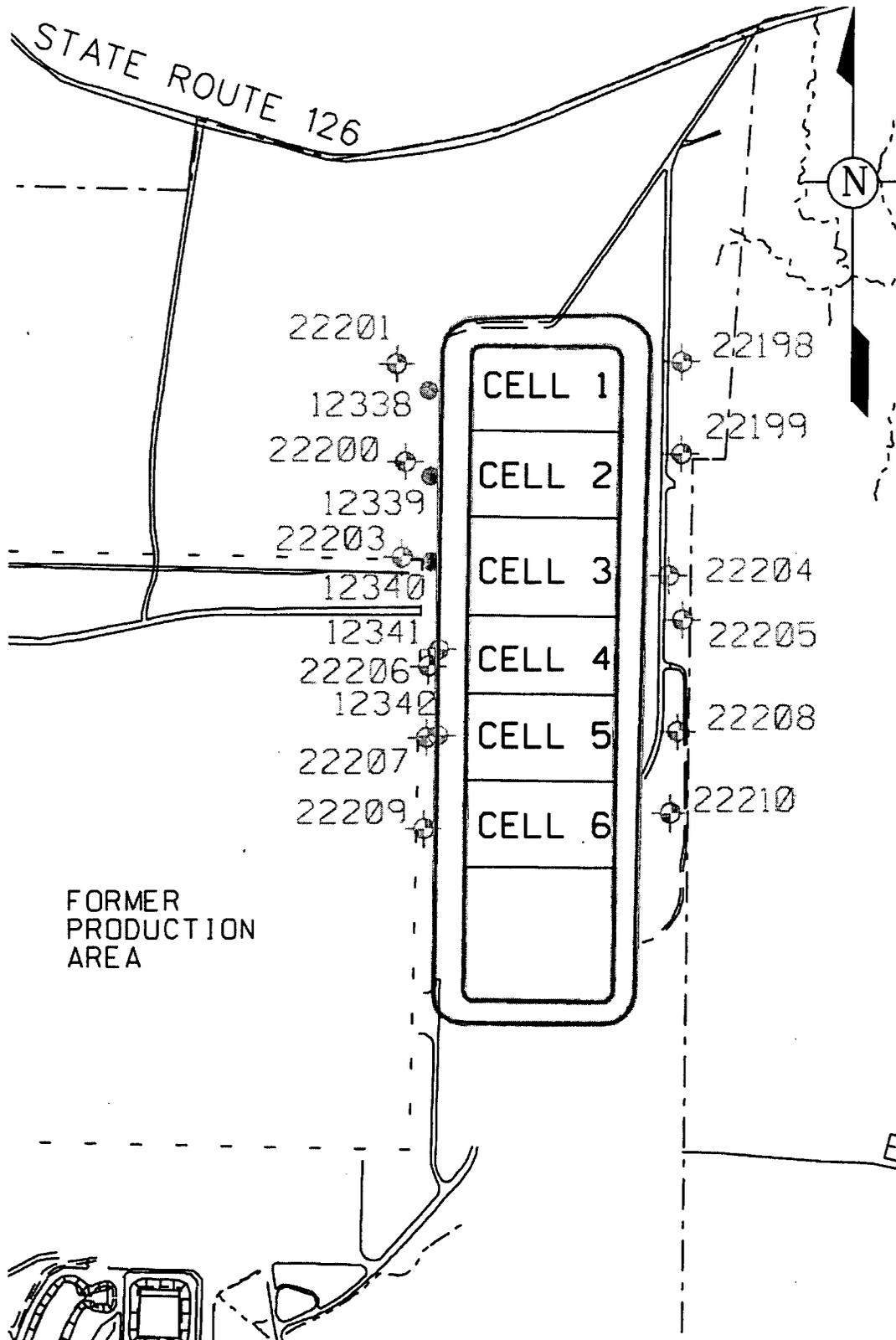
MAY 2003

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OSDF LINER SYSTEM AT THE DRAINAGE CORRIDOR



OSDF FOOTPRINT AND MONITORING WELL LOCATIONS



OSDF MONITORING

Cell 1

- 100 percent filled
- Cap completed November 2001
- Leachate collection system total uranium concentrations
 - ◆ 2000: 50 to 106 parts per billion (ppb)
 - ◆ 2001: 60 to 142 ppb
 - ◆ 2002: 23 to 66 ppb
- Leak detection system total uranium concentrations
 - ◆ 2000: 6 to 15 ppb
 - ◆ 2001: 9 to 11 ppb
 - ◆ 2002: 10 to 23 pbb
- Leak detection system accumulation rate, gallons per acre per day (gpad)
 - ◆ Maximum = 1.12
 - ◆ Minimum = 0.00
 - ◆ Average = 0.61
- Initial response leakage rate: 20 gpad

OSDF MONITORING

Cell 2

- 100 percent filled October 2002
- Leachate collection system total uranium concentrations
 - ◆ 2000: 24 to 39 ppb
 - ◆ 2001: 28 to 69 ppb
 - ◆ 2002: 34 to 54 ppb
- Leak detection system total uranium concentrations
 - ◆ 2000: 9 to 25 ppb
 - ◆ 2001: 9 to 14 ppb
 - ◆ 2002: 13 to 20 ppb
- Leak detection system accumulation rate, gallons per acre per day (gpad)
 - ◆ Maximum = 0.30
 - ◆ Minimum = 0.00
 - ◆ Average = 0.10
- Initial response leakage rate: 20 gpad

OSDF MONITORING

Cell 3

- **51 percent filled**
- **Leachate collection system total uranium concentrations**
 - ◆ **2000: 9 to 38 ppb**
 - ◆ **2001: 28 to 59 ppb**
 - ◆ **2002: 30 to 84 ppb**
- **Leak detection system total uranium concentrations**
 - ◆ **2000: dry**
 - ◆ **2001: dry**
 - ◆ **2002: 15 to 27 ppb**
- **Leak detection system accumulation rate, gallons per acre per day (gpad)**
 - ◆ **Maximum = 0.25**
 - ◆ **Minimum = 0.00**
 - ◆ **Average = 0.06**
- **Initial response leakage rate: 20 gpad**

OSDF MONITORING

Cells 4, 5, and 6

- **Cells 4 and 5 waste placement initiated November 2002**
 - ◆ **Cell 4: 9 percent filled**
 - ◆ **Cell 5: 3 percent filled**
- **Leachate collection system total uranium concentrations**
 - ◆ **Cell 4: 4 ppb**
 - ◆ **Cell 5: 3 ppb**
- **Leak detection system total uranium concentrations**
 - ◆ **Cell 4: 6 ppb**
 - ◆ **Cell 5: 3 ppb**
- **Cell 6: Initiated monitoring of Great Miami Aquifer
December 2002**

OSDF MONITORING

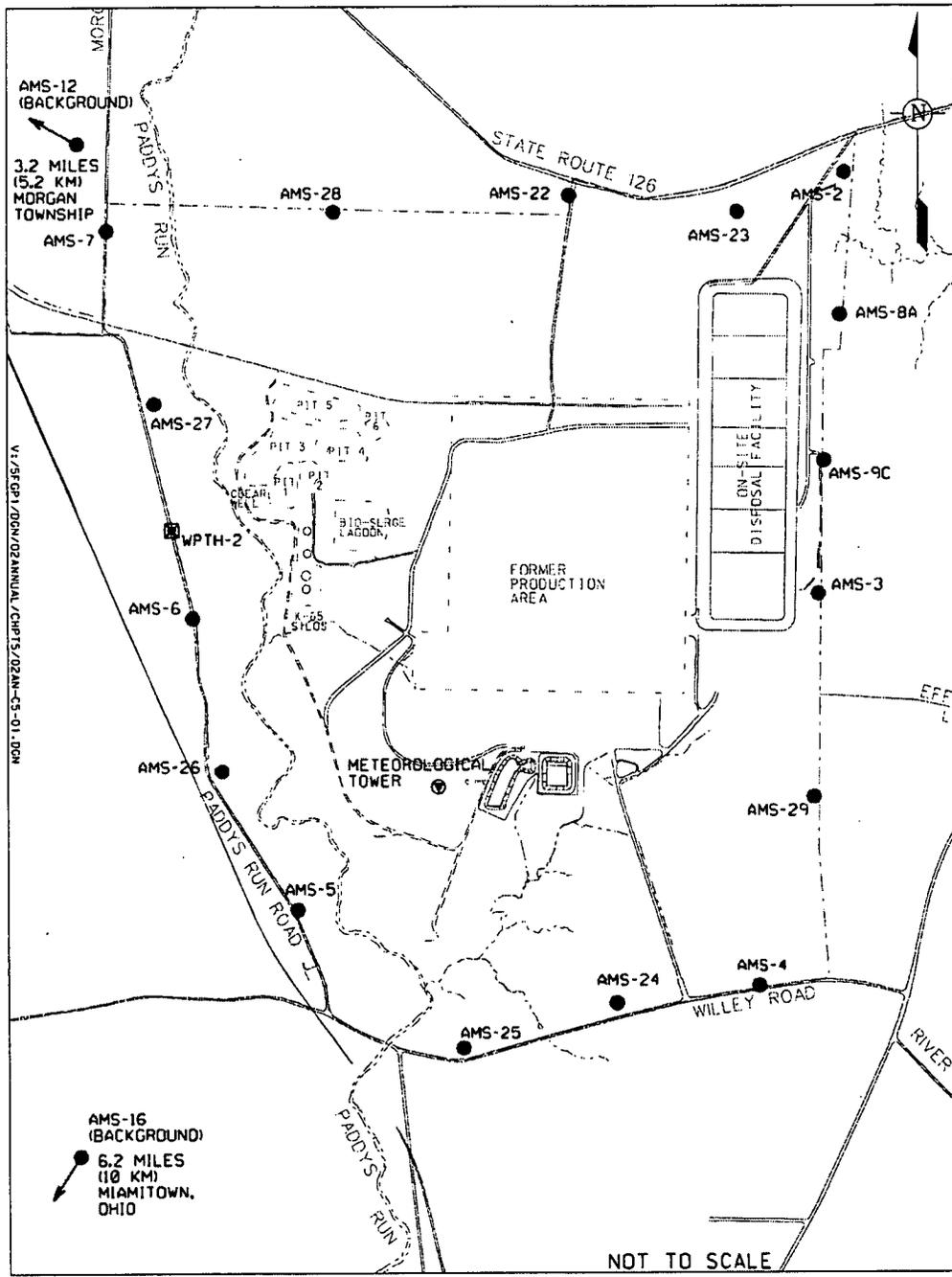
Changes for 2003/2004

- **Issued Technical Memorandum for Cells 1, 2, and 3 baseline conditions**
- **Modified sampling protocols for Cells 1, 2, and 3**
- **Continued baseline sampling in Cells 4 and 5**
- **Initiated baseline sampling in Cell 6**

AIR MONITORING PROGRAM

- **Particulate**
- **Radon**
- **Direct radiation**

PARTICULATE AIR MONITORING LOCATIONS



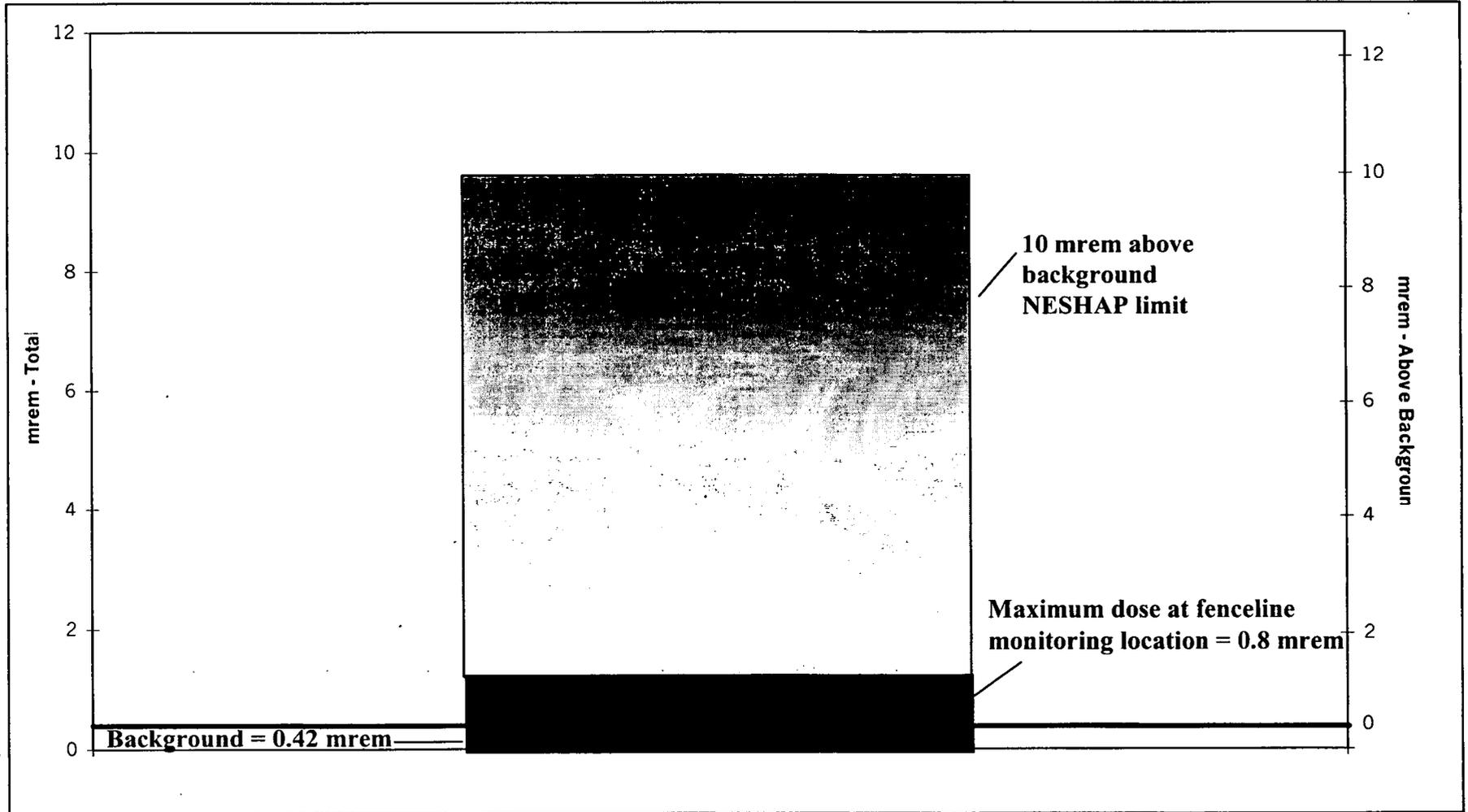
- LEGEND:**
- FERNALD SITE BOUNDARY
 - AMS LOCATION
 - ☒ THORIUM MONITOR LOCATION
 - ↖ DISTANCE FROM CENTER OF FORMER PRODUCTION AREA TO AMS LOCATION OFF MAP

AIR MONITORING PROGRAM

Particulate Monitoring

- **Dose from air particulate emissions: 0.8 mrem, same as 2001**
- **Maximum dose at AMS-3, east fenceline**
- **8 percent of National Emissions Standards for Hazardous Air Pollutants (NESHAP) limit**

AIR INHALATION DOSE COMPARISON TO LIMIT AND BACKGROUND



AIR MONITORING PROGRAM

Particulate Monitoring

- **Material processing at the Waste Pits Remedial Action Project (WPRAP) is likely the largest contributor to airborne emissions**

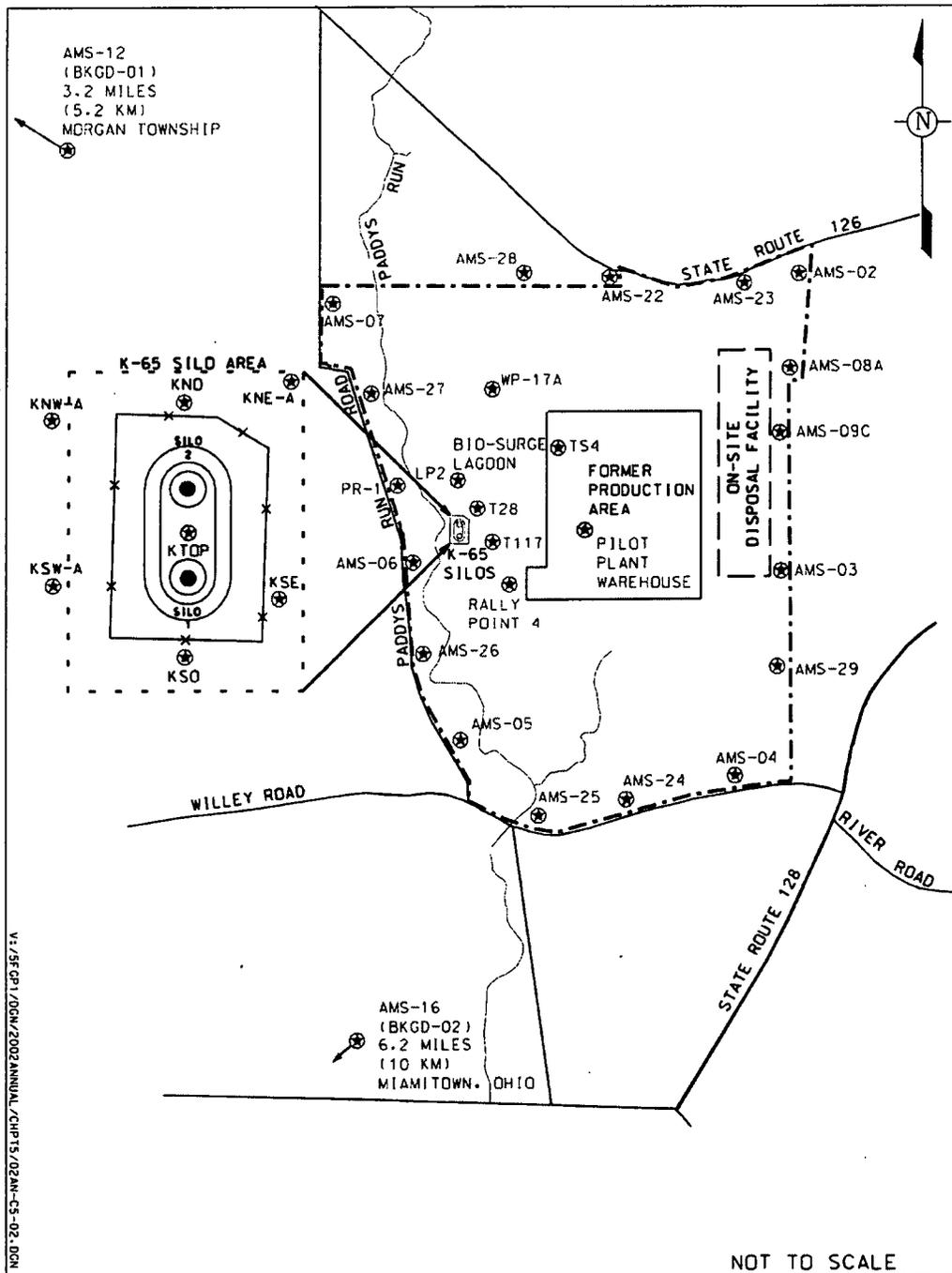
- **WPRAP has implemented further operational controls to limit emissions and decrease project impacts at the fenceline**
 - ◆ **Pugmill ventilation system, operating since April 2002**

AIR MONITORING PROGRAM

Radon Monitoring

- **Radon concentrations at Silos Project area during 2002 were comparable to concentrations in 2001**
- **Radon levels inside Silos 1 and 2 stabilized**
- **Radon at property line ranged from 0.2 - 0.5 picocuries per liter (pCi/L)**
- **Property line results were well below the DOE standard, which is 3 pCi/L annual average above background**

RADON MONITORING LOCATIONS



LEGEND:

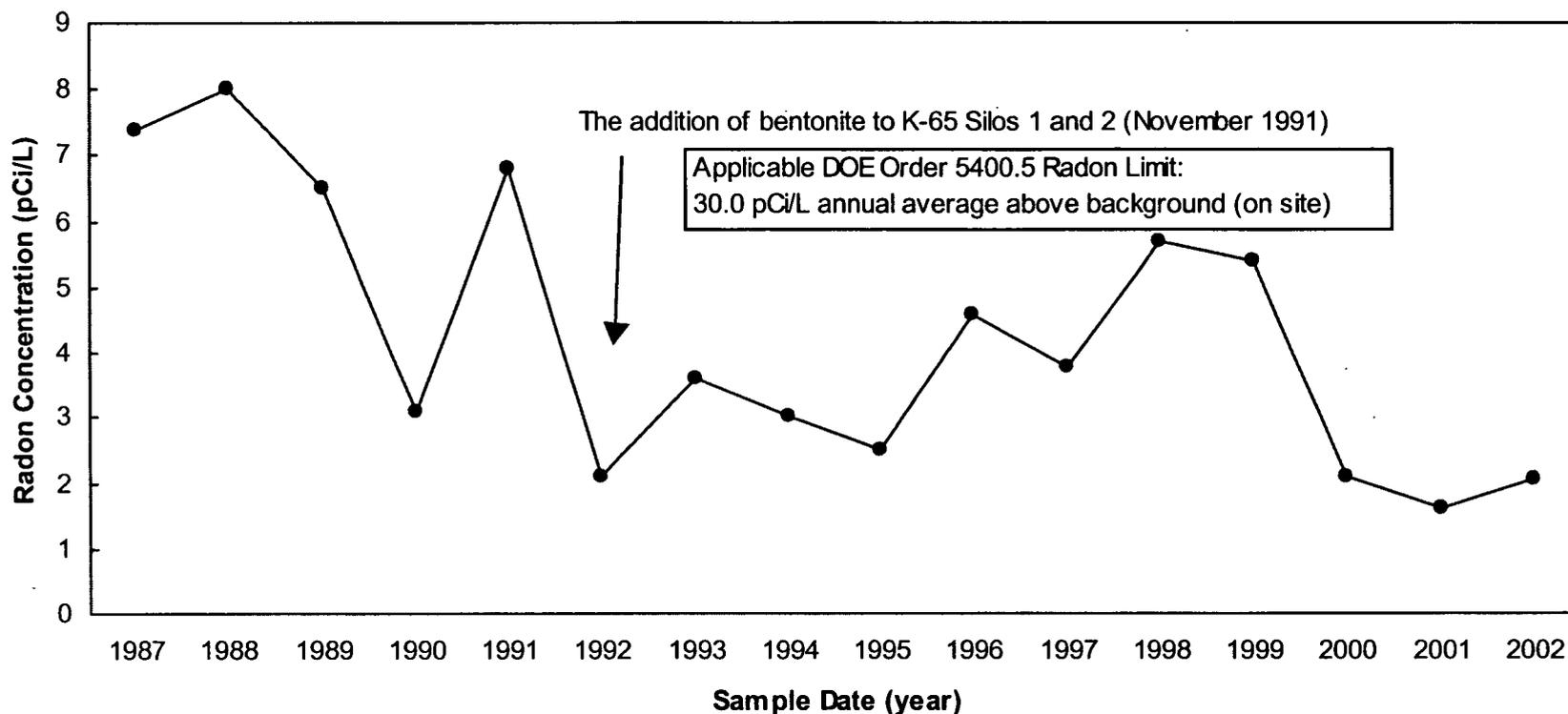
----- FERNALD SITE BOUNDARY

⊗ ENVIRONMENTAL RADON MONITORING - CONTINUOUS ALPHA SCINTILLATION LOCATION

⊗ DISTANCE FROM CENTER OF FORMER PRODUCTION AREA TO LOCATION OFF MAP

● SILO HEAD SPACE RADON MONITORING - CONTINUOUS ALPHA SCINTILLATION LOCATION

ANNUAL AVERAGE RADON CONCENTRATIONS AT K-65 SILOS EXCLUSION FENCE, 1987-2002



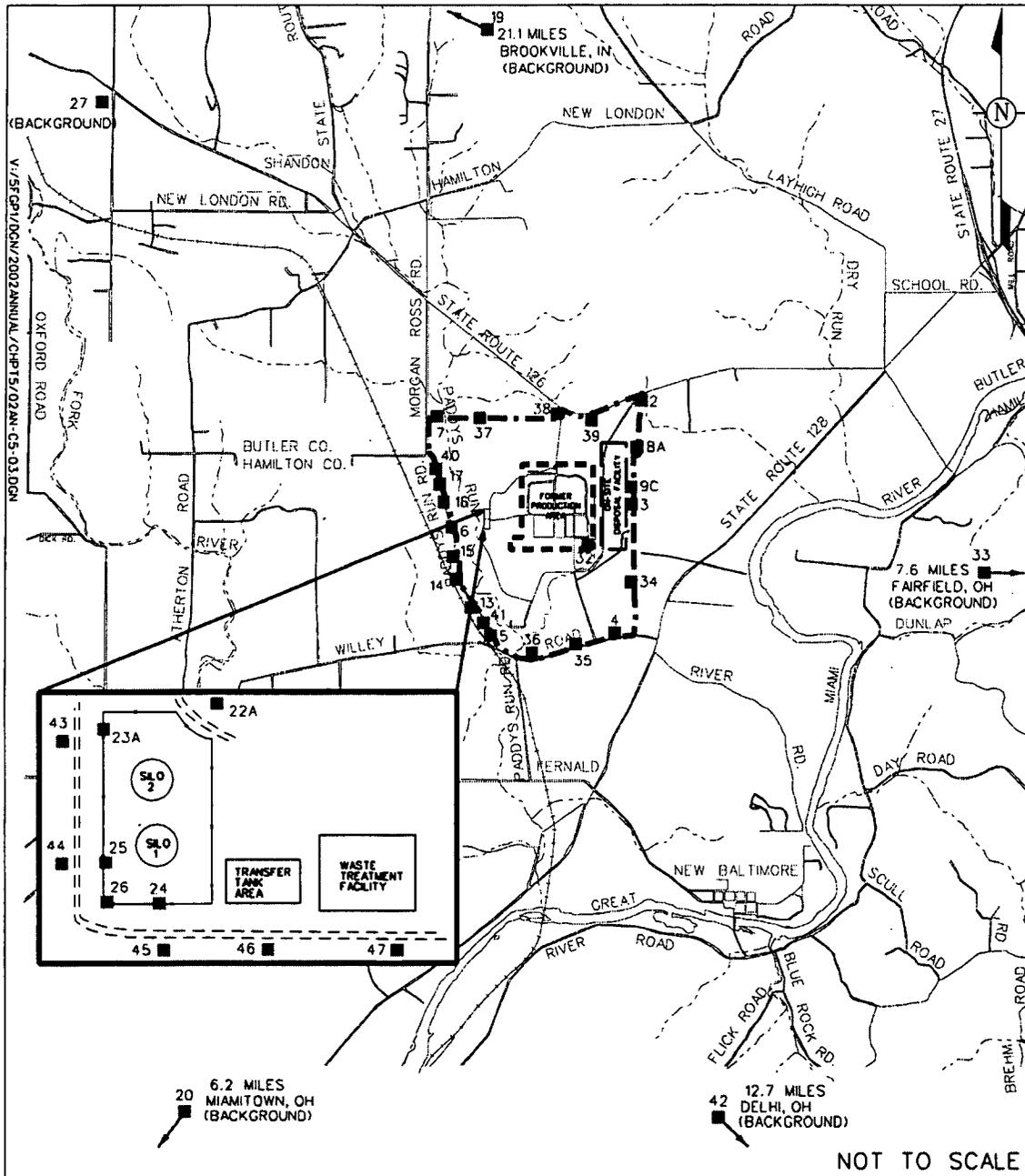
Note: The 1987 through 1996 data are based on the alpha track-etch detectors and averaging locations corresponding to continuous radon monitors. The 1997 through 2001 data are based on the average radon concentration from continuous radon monitors at the K-65 exclusion fence.

AIR MONITORING PROGRAM

Direct Radiation Monitoring

- **Direct radiation within Silos 1 & 2 Project area stabilized in 2002**
- **Direct radiation is largest dose contributor to the maximally exposed individual member of the public**
- **Operation of Radon Control System expected to lower direct radiation levels**

DIRECT RADIATION (TLD) MONITORING LOCATIONS



LEGEND:

 DISTANCE FROM CENTER OF FORMER PRODUCTION AREA TO SAMPLE LOCATIONS OFF MAP

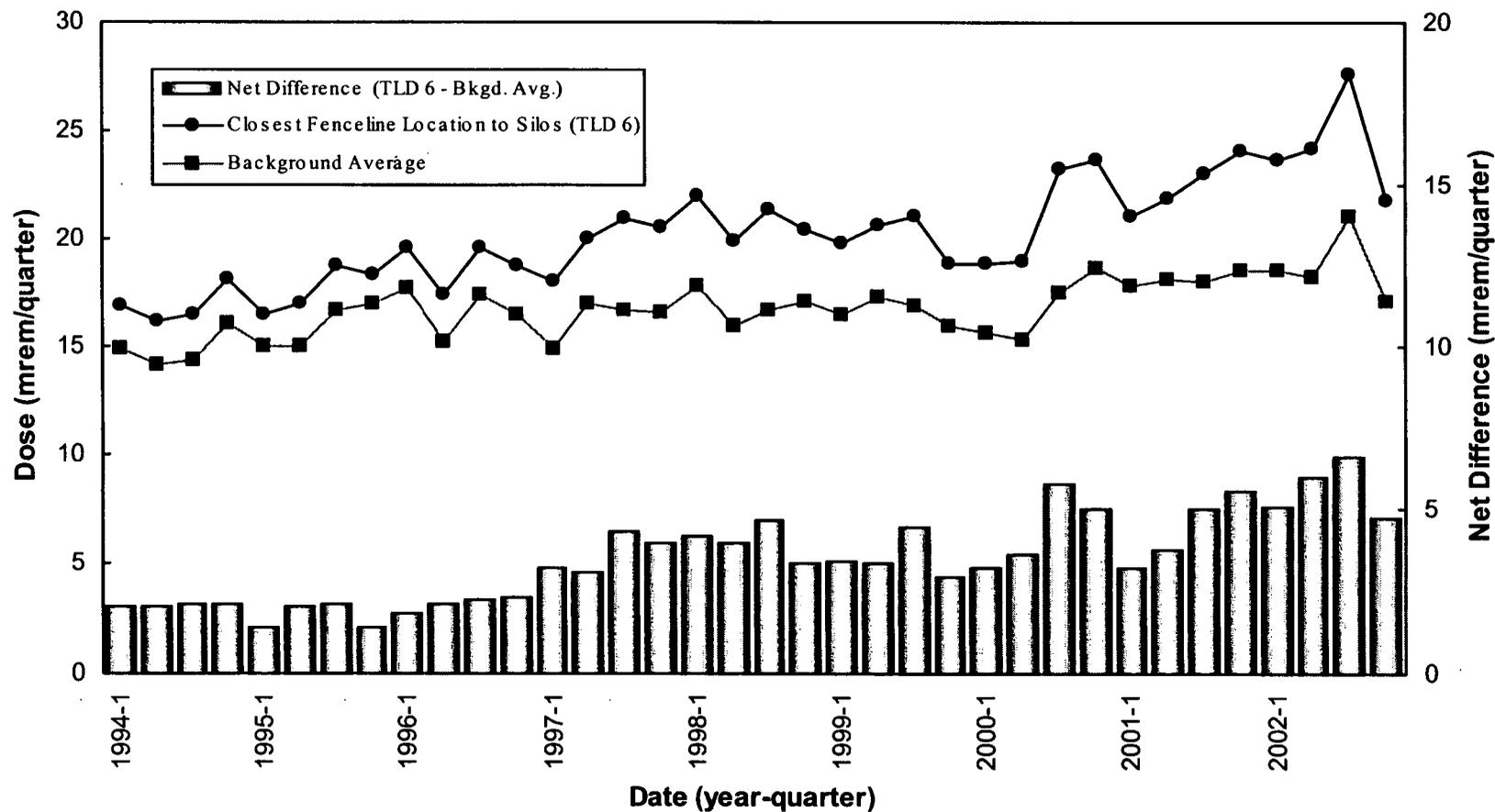
 FERNALD SITE BOUNDARY
 DIRECT RADIATION (TLD) MONITORING LOCATION

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DIRECT RADIATION (TLD) MEASUREMENTS 1994-2002

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Location 6 Versus Background Average

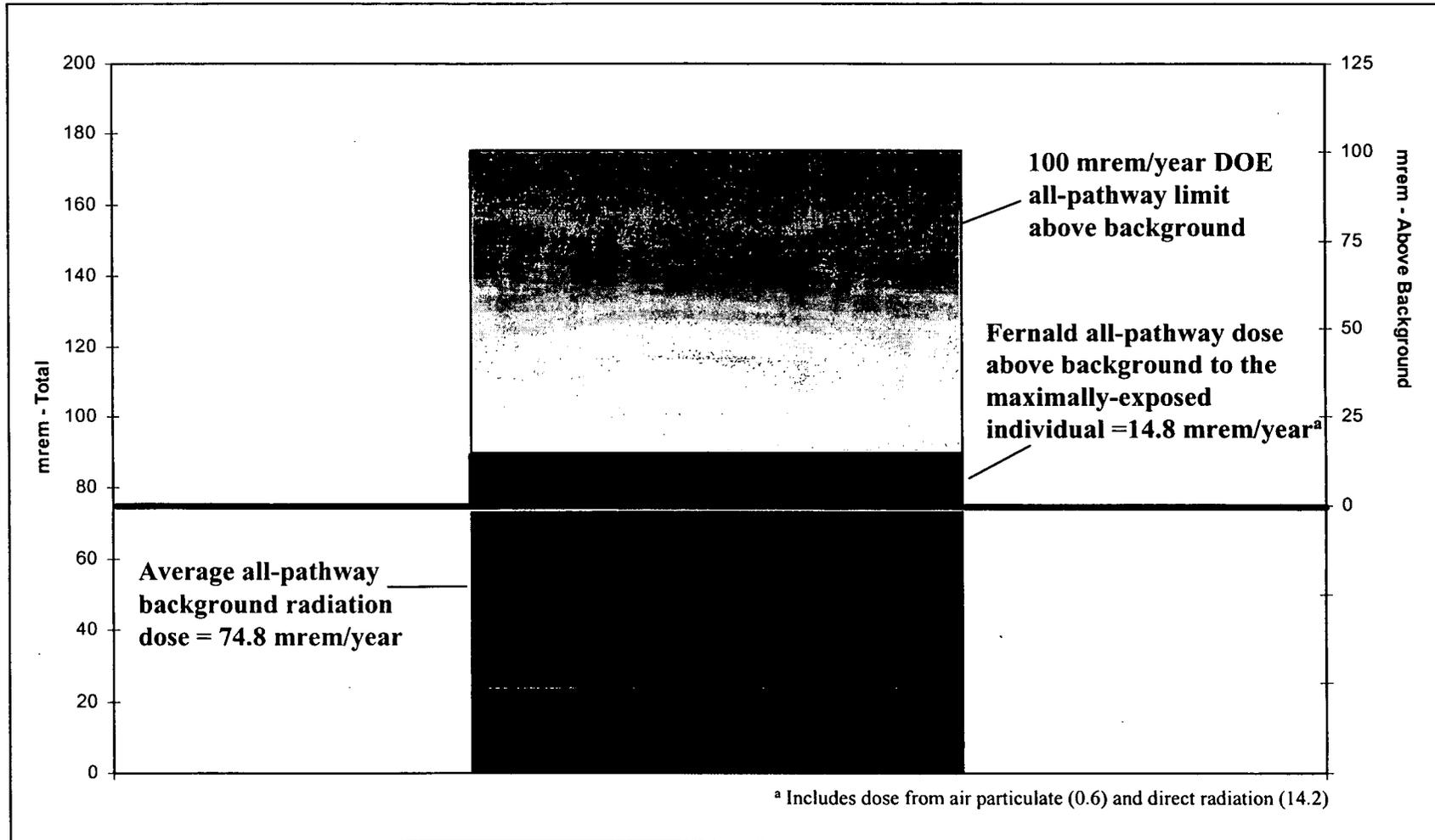


AIR MONITORING SUMMARY

Dose Comparison (mrem)

	<u>2001 RESULT</u> (Net above bkg.)	<u>2002 RESULT</u> (Net above bkg.)	<u>BACKGROUND</u> (per Fernald program)
<i>Particulate</i>	0.8	0.8	0.4
<i>Direct radiation</i>	11.5	14.2	74.4
<i>Produce</i>	Sampled every 3 years		
<i>Maximally exposed individual</i>	11.7	14.8	74.8
<i>Radon</i> (ICRP Method 65)	18	18	36

ALL-PATHWAY RADIATION DOSE COMPARISON TO LIMIT AND BACKGROUND

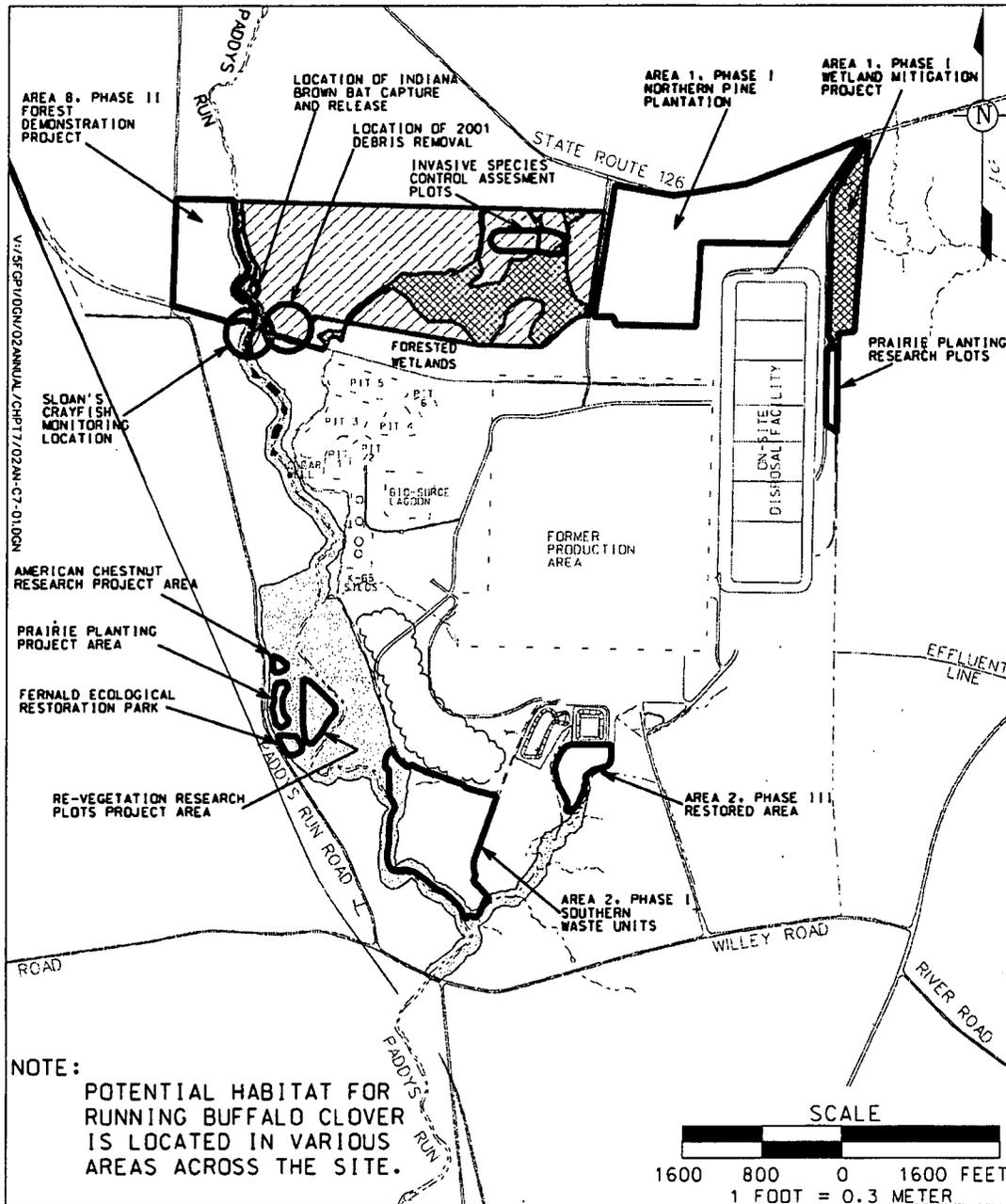


AIR MONITORING

Changes for 2003 and 2004

- **Operation of Radon Control System has lowered radon concentration in Silos Project area and direct radiation levels at site fenceline**
- **WPRAP scheduled for completion in 2004**

PRIORITY NATURAL RESOURCES AREAS



LEGEND:

- | | | | |
|---------------|---|------------------------|--|
| ----- | FERNALD SITE BOUNDARY | [Cross-hatched box] | WETLANDS |
| [Hatched box] | PADDY'S RUN AND TRIBUTARIES RIPARIAN CORRIDOR | [Diagonal hatched box] | NORTHERN WOODLOT AREA AND POTENTIAL AREA FOR SPRING CORAL ROOT |
| [Dotted box] | SLOAN'S CRAYFISH AREA | | |
| [Solid box] | POTENTIAL INDIANA BROWN BAT HABITAT | | |

NATURAL RESOURCES

Threatened and Endangered Species

- **Federally endangered Indiana brown bat present in northern portion of Paddys Run**
 - ◆ **Conducted Indiana brown bat survey in 2002**
- **State-threatened Sloan's crayfish also present in northern Paddys Run**

NATURAL RESOURCES

Turbidity Monitoring in Paddys Run

- **Monitoring drainage channel north of railroad track after rain events**
- **2002 results similar to previous years**
- **No impact on Sloan's crayfish**
- **Discontinued monitoring in May 2002**

NATURAL RESOURCES

- **Impacted habitat areas**
 - ◆ **Cleared two acres of woods and pine plantation for remedial activities**

- **Ecological restoration activities**
 - ◆ **Initiated the Area 2, Phase I Southern Waste Units and Area 1, Phase I Northern Pine Plantation Restoration Project**
 - **Continued wetland mitigation and Area 8, Phase II Forest Demonstration Projects implementation phase monitoring**
 - ◆ **Completed functional phase baseline and reference site characterization**
 - ◆ **Conducted maintenance/management activities in restored areas**