

FERNALD CLEANUP PROGRESS BRIEFING

JULY 2000

ENVIRONMENTAL MONITORING 1999 PROGRAM SUMMARY

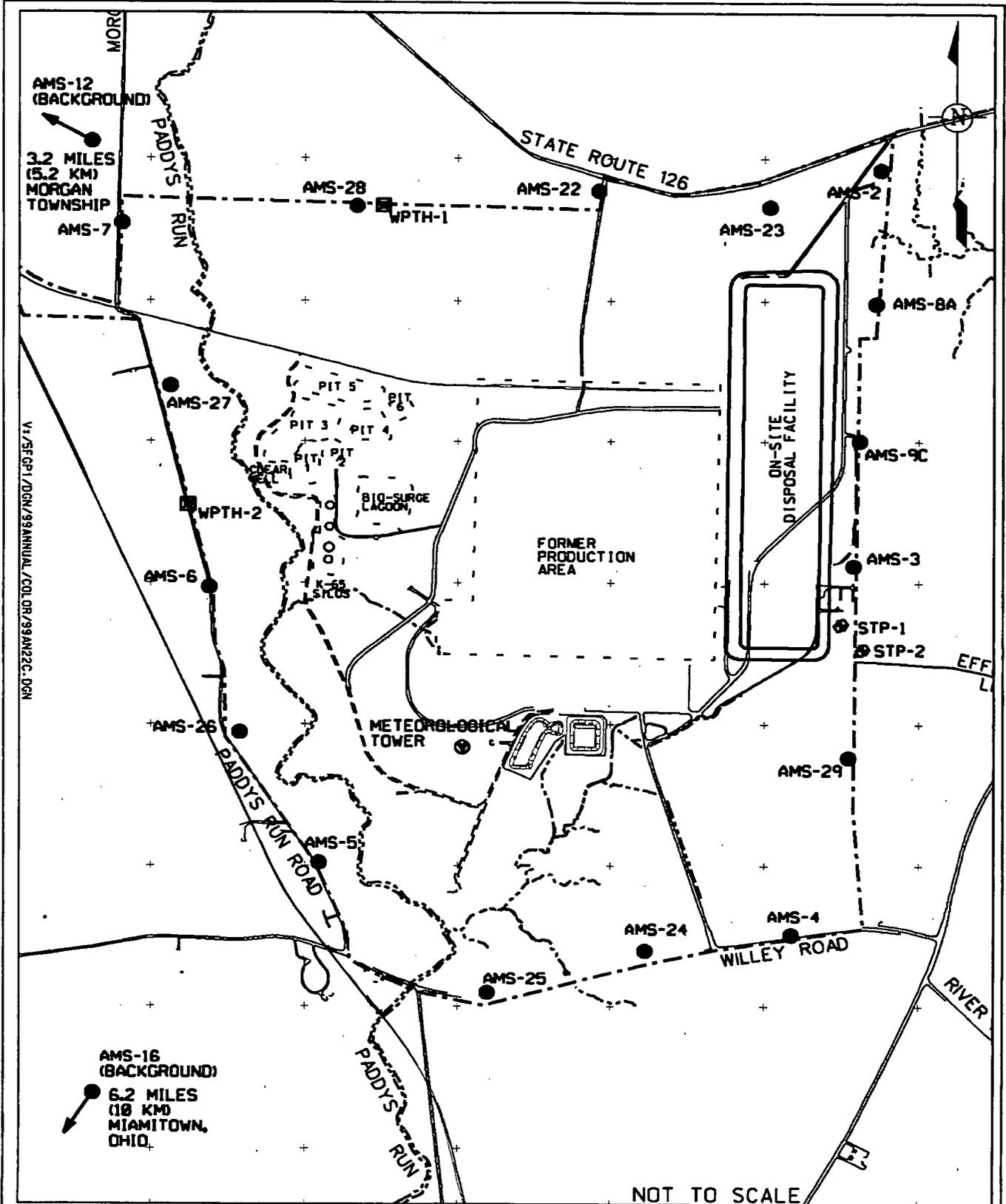
Opening Remarks	Kathi Nickel
Air Monitoring	John Byrne
Groundwater Monitoring	Bill Hertel
Surface Water Monitoring	Kathi Nickel
Natural Resources Monitoring	Kathi Nickel
Question and Answer Session	

AIR MONITORING PROGRAM

PARTICULATE MONITORING

- Dose from particulate emissions: 0.29 mrem
(0.26 mrem in 1998)
- Maximum dose at AMS-3 (East fenceline)
- 2.9% of the National Emission Standards for Hazardous Air Particulates (NESHAP) Limit
- Less than 1% of DOE Derived Concentration Guide Value

200000



LEGEND:

- FEMP BOUNDARY
- AMS LOCATION
- (with arrow) DISTANCE FROM CENTER OF FORMER PRODUCTION AREA TO AMS LOCATION OFF MAP
- ⊕ PROJECT-SPECIFIC LOCATION
- ⊞ THORIUM MONITOR LOCATION

NOT TO SCALE

AIR MONITORING PROGRAM

PARTICULATE MONITORING

- Fourth quarter increases in thorium-230 at WPTH-1 and WPTH-2
- Fourth quarter thorium-230 increases at 8 fence line monitors
- First quarter increase in thorium-230 at AMS-3
- AMS-3 concentrations if sustained for the year could result in a year 2000 fence line dose of 1.6 mrem or 16% of the NESHAP limit

000004

AIR MONITORING PROGRAM

PARTICULATE MONITORING

- Fenceline thorium results reported to WPRAP
- Material Handling Building is the largest contributor
- WPRAP will take measures to better seal building
- WPRAP will continually wet down materials

AIR MONITORING PROGRAM

AIR PARTICULATE RESEARCH

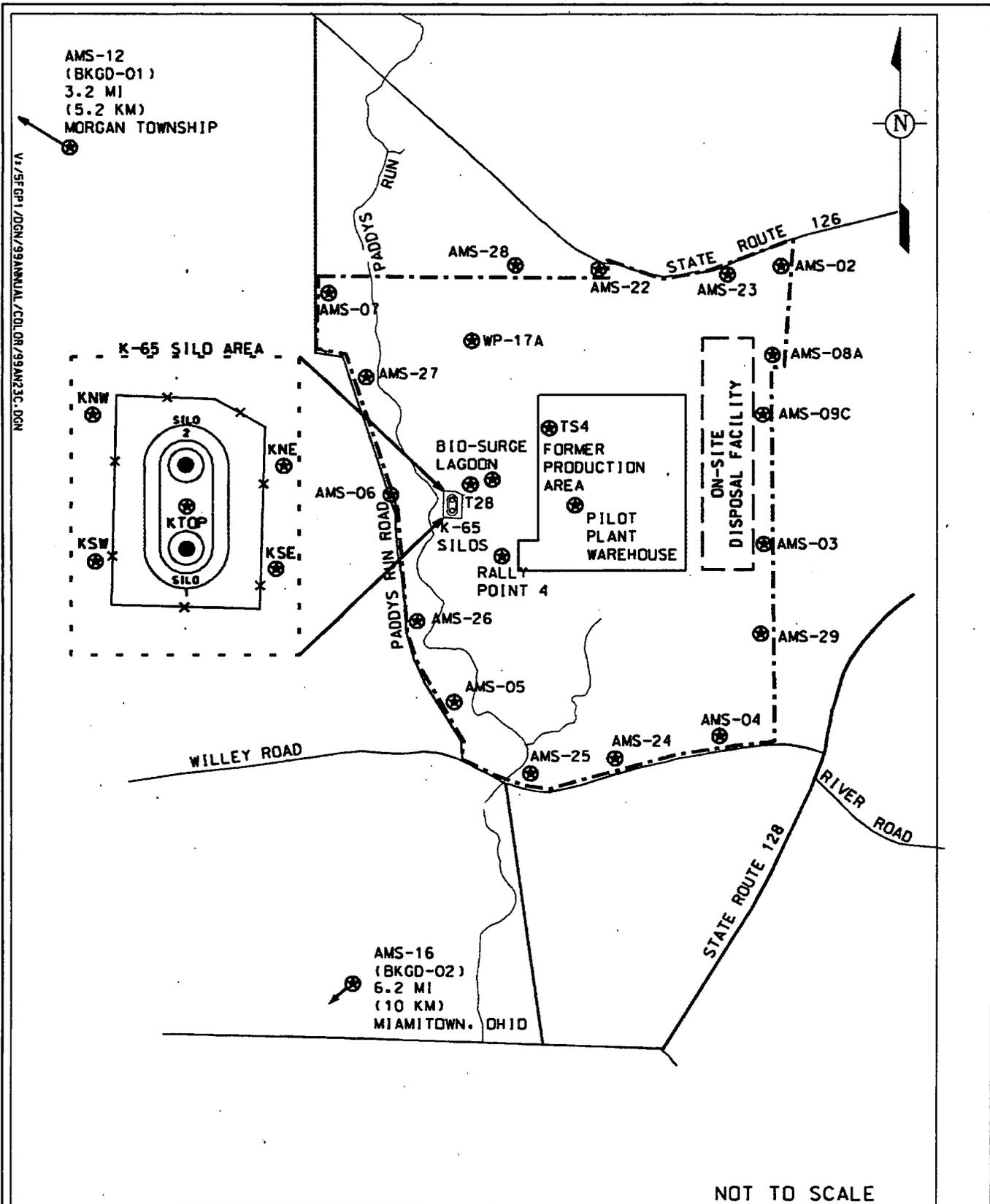
900000

- Size fractionation of particulate air emissions
- >70% particulates >15 microns in diameter
- Dose equations assume 1 micron diameter
- Dose contribution decreases with increase particle size
- May overestimate dose by factor of 7
- DOE considering thorium-230 focused study

AIR MONITORING PROGRAM

RADON MONITORING

- Utilized continuous radon monitors
- Radon concentrations at Silos exhibited increasing trend in early 1999
- Radon levels decreased by approximately 70% after resealing of domes in June
- Radon levels inside Silos 1 & 2 continue to increase
- Property line results were well below the DOE standard (3 pCi/L as an annual average above background)
- Radon at property line ranged from 0.3 - 0.8 pCi/L



LEGEND:

----- FEMP BOUNDARY

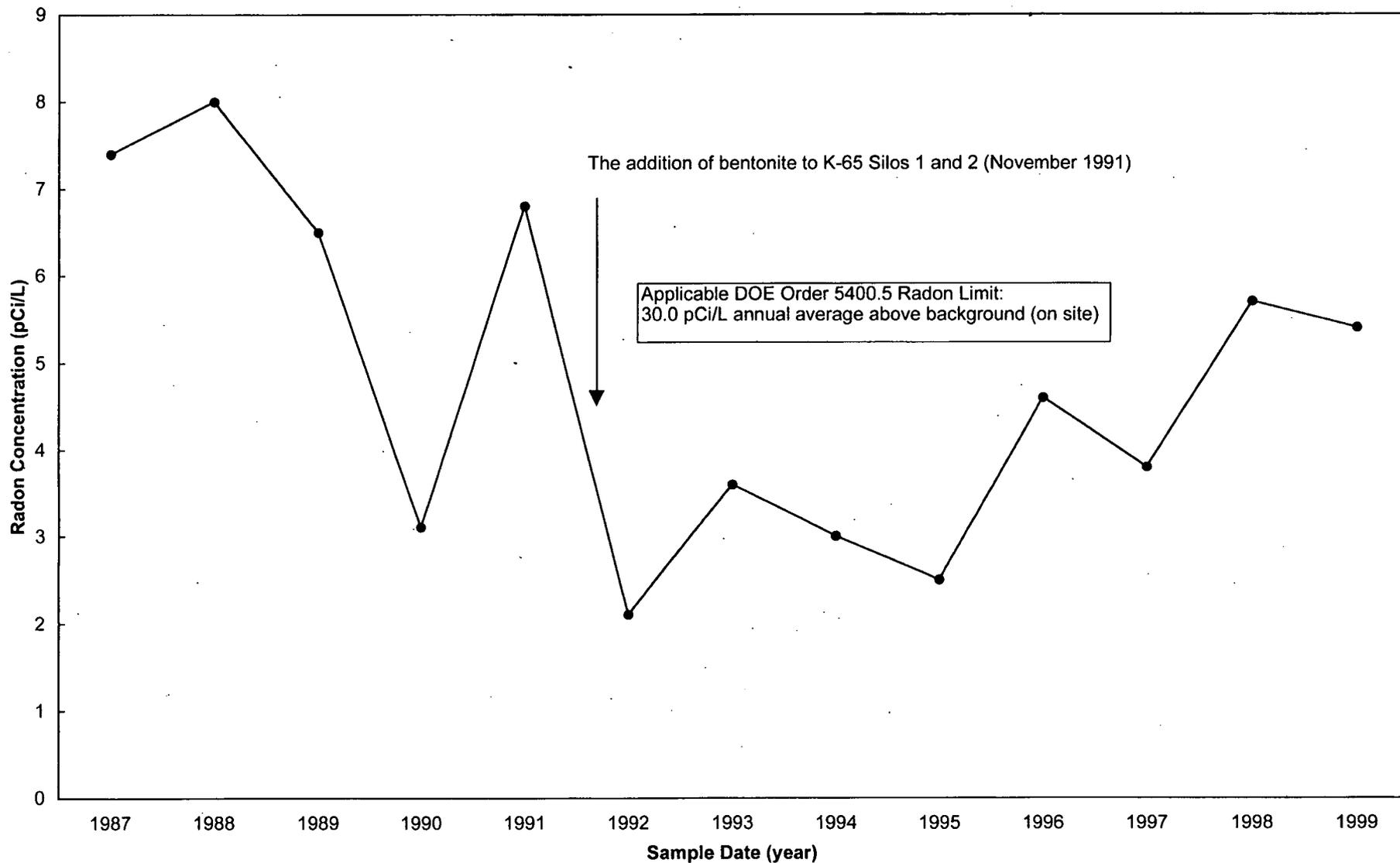
⊕ ENVIRONMENTAL RADON MONITORING - CONTINUOUS ALPHA SCINTILLATION LOCATION

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

● SILO HEAD SPACE RADON MONITORING - CONTINUOUS ALPHA SCINTILLATION LOCATION

NOT TO SCALE

V:\SFCR1\DCGN\99ANNUAL\CDL OR \99AN23C.DGN



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 1999 data are based on the average radon concentration from continuous radon monitors at the K-65 exclusion fence.

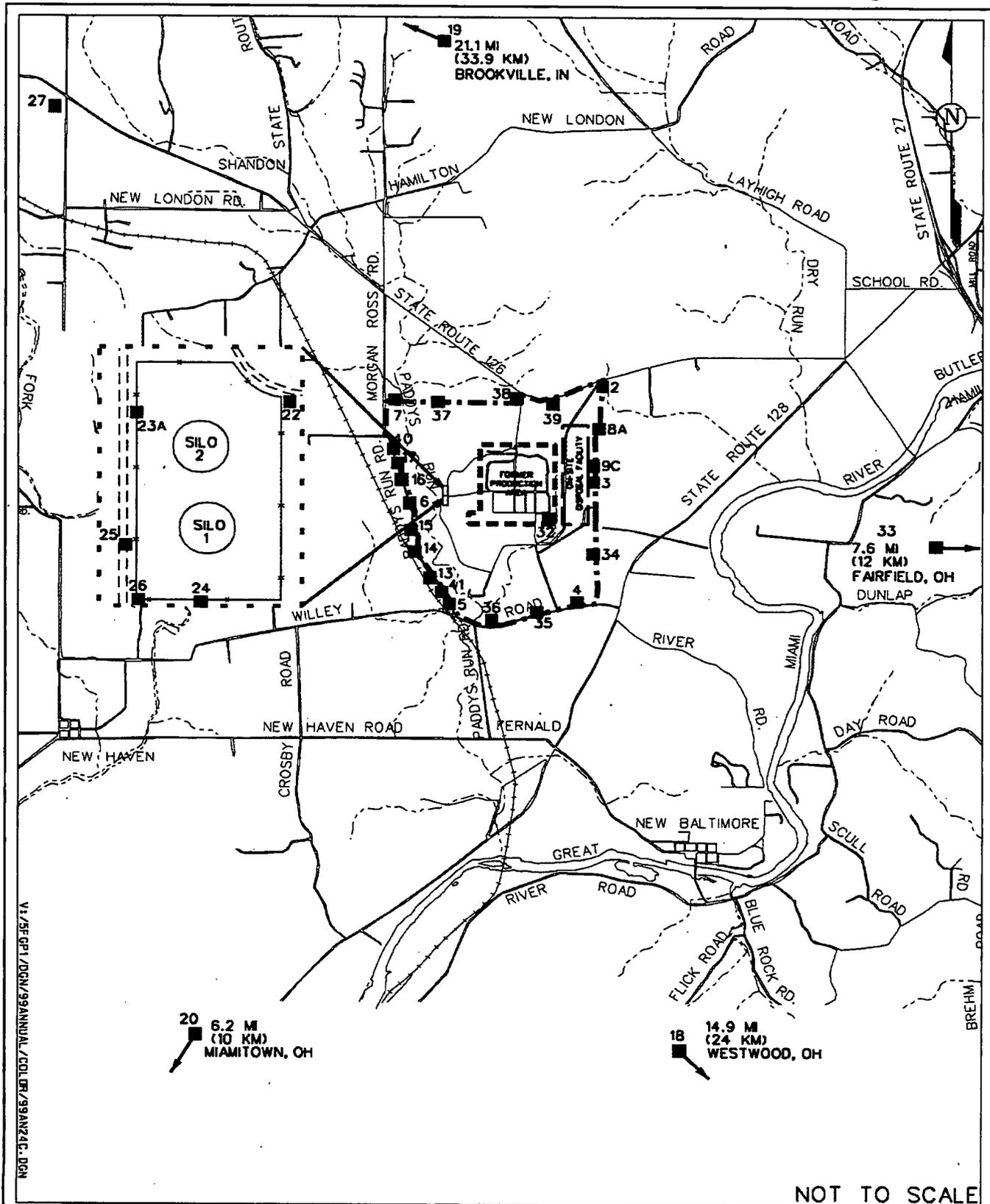
ANNUAL AVERAGE RADON CONCENTRATIONS AT K-65 SILOS EXCLUSION FENCE, 1987 - 1999

AIR MONITORING PROGRAM

DIRECT RADIATION MEASUREMENTS

010000

- Direct radiation within K-65 area continues to rise
- Still 61% lower than pre-bentonite cap
- Gradual increase at property line (AMS-6)
- Direct radiation is largest dose contributor to the maximally exposed individual



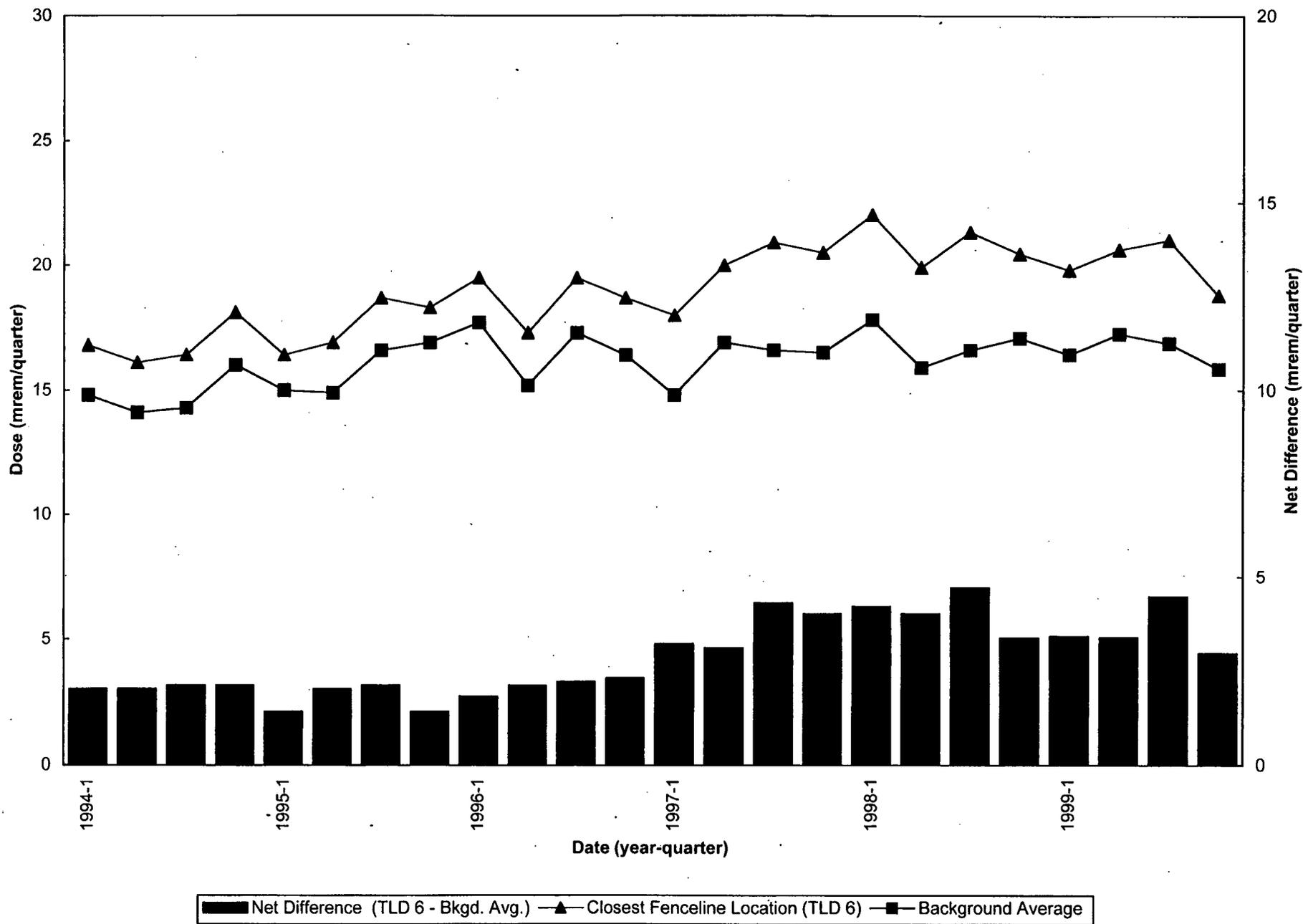
NOT TO SCALE

LEGEND:

----- FEMP BOUNDARY

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

■ DIRECT RADIATION (TLD) MONITORING LOCATION



DIRECT RADIATION (TLD) MEASUREMENTS, 1994 - 1999
(LOCATION 6 VERSUS BACKGROUND AVERAGE)

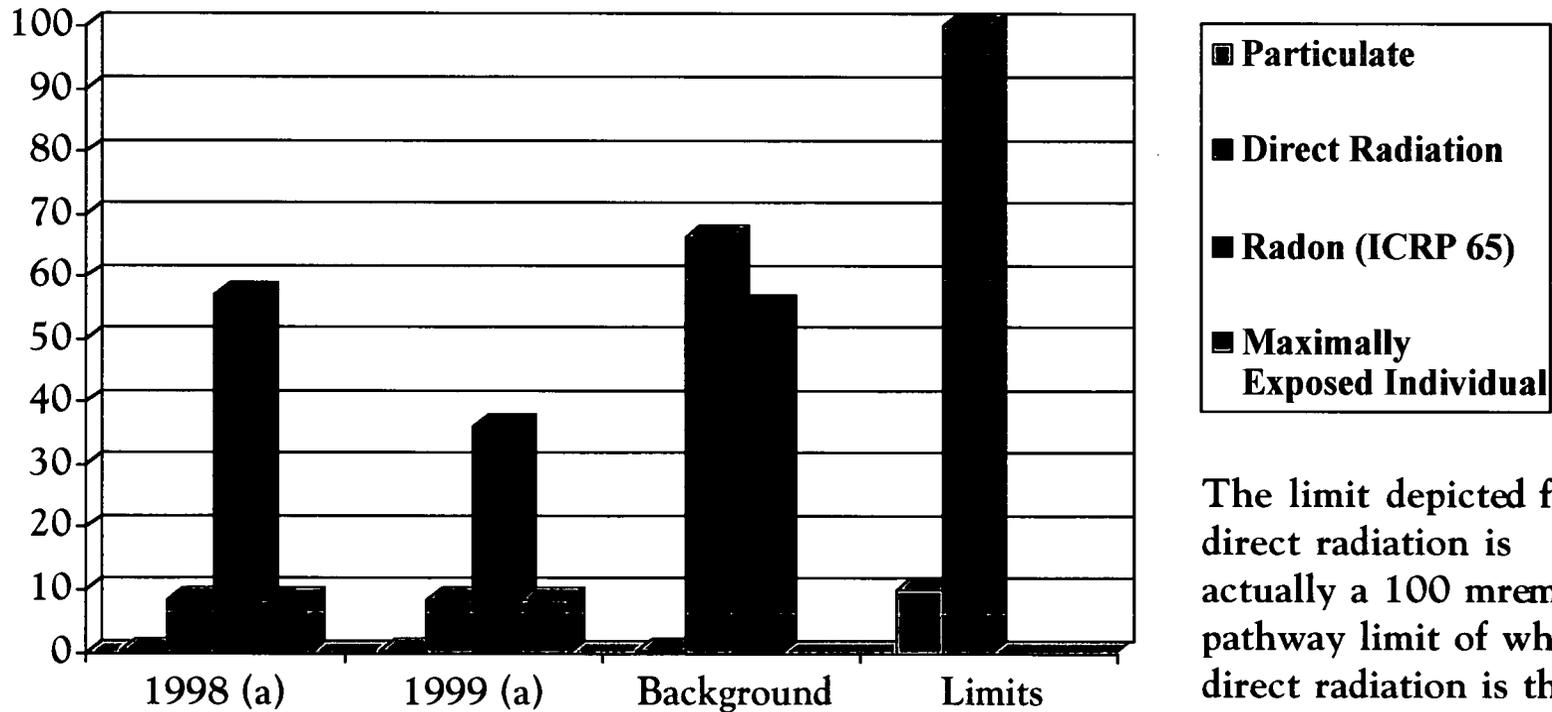
AIR MONITORING SUMMARY

DOSE COMPARISON (mrem)

	<u>1998 RESULT</u> (Net above background)	<u>1999 RESULT</u> (Net above background)	<u>BACKGROUND</u>
Particulate	0.26	0.29	0.24
Direct Radiation	8.16	8.3	66.3
Maximally Exposed Individual	8.2	8.4	NA
Radon (ICRP METHOD)	57.0	36.0	55.0

AIR MONITORING SUMMARY

DOSE COMPARISON



(a) net above background

The limit depicted for direct radiation is actually a 100 mrem all pathway limit of which direct radiation is the primary contributor

AIR MONITORING CHANGES FOR 2001 AND 2002

- 5 additional radon monitors in K-65 area in support of AWR Project
- Potential modifications to fenceline air sampling and analysis for additional thorium-230 monitoring

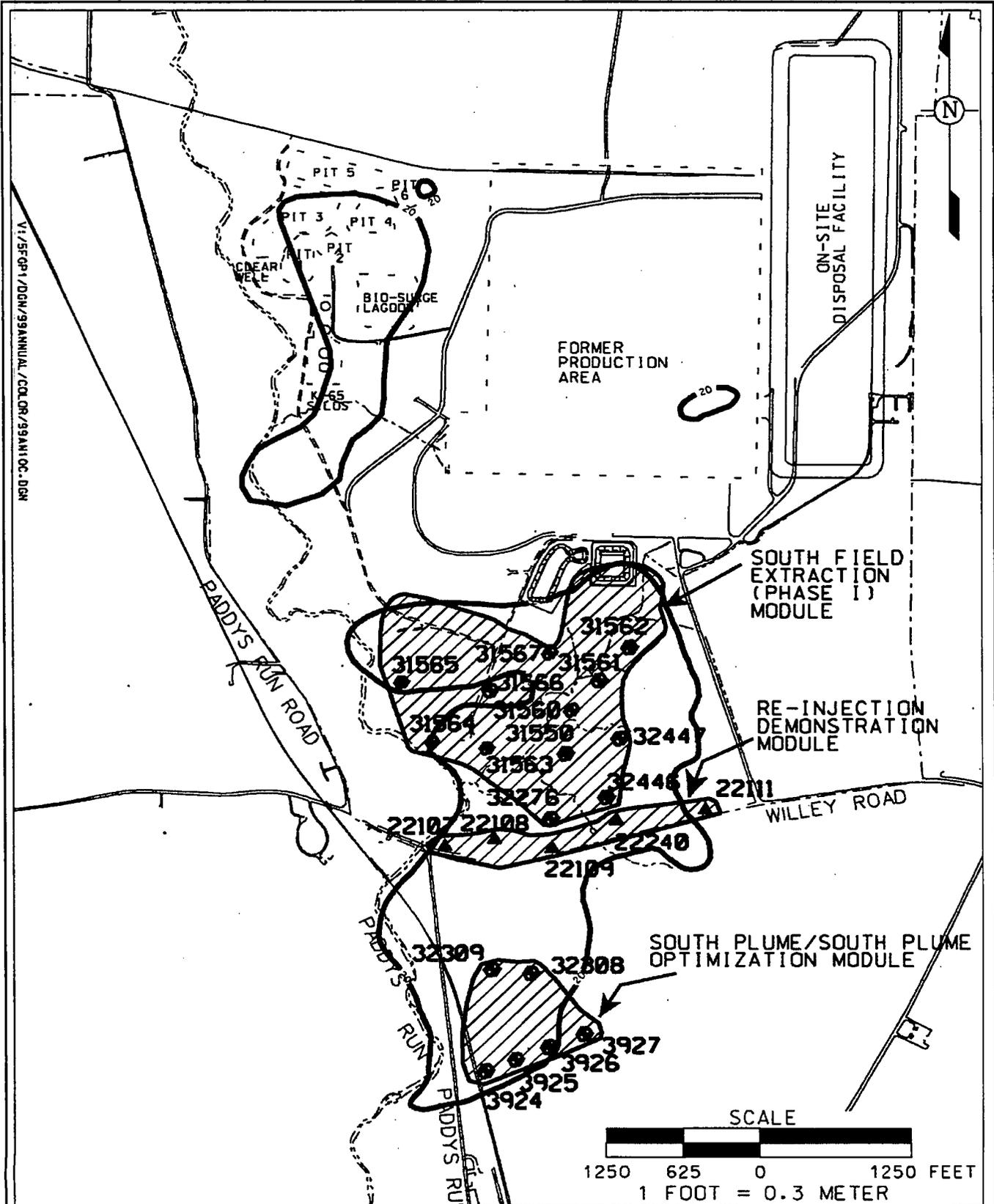
GROUNDWATER MONITORING PROGRAM CHANGES

- Added 2 new extraction wells in South Field
(11 total)
- Added 4 new monitoring wells
- Completed re-injection demonstration

GROUNDWATER MONITORING OPERATIONAL SUMMARY

000017

	<u>1998</u>	<u>1999</u>
Gallons Pumped from Great Miami Aquifer	974M	1,700M
Gallons Re-injected	151M	433M
Uranium Removed from Great Miami Aquifer	425lbs	698lbs



LEGEND:

- FEMP BOUNDARY
- EXTRACTION WELL
- ▲ RE-INJECTION WELL
- ▨ CURRENT MODULE AREA
- 20 µg/L TOTAL URANIUM PLUME

GROUNDWATER MONITORING CHANGES TO PLUME INTERPRETATION

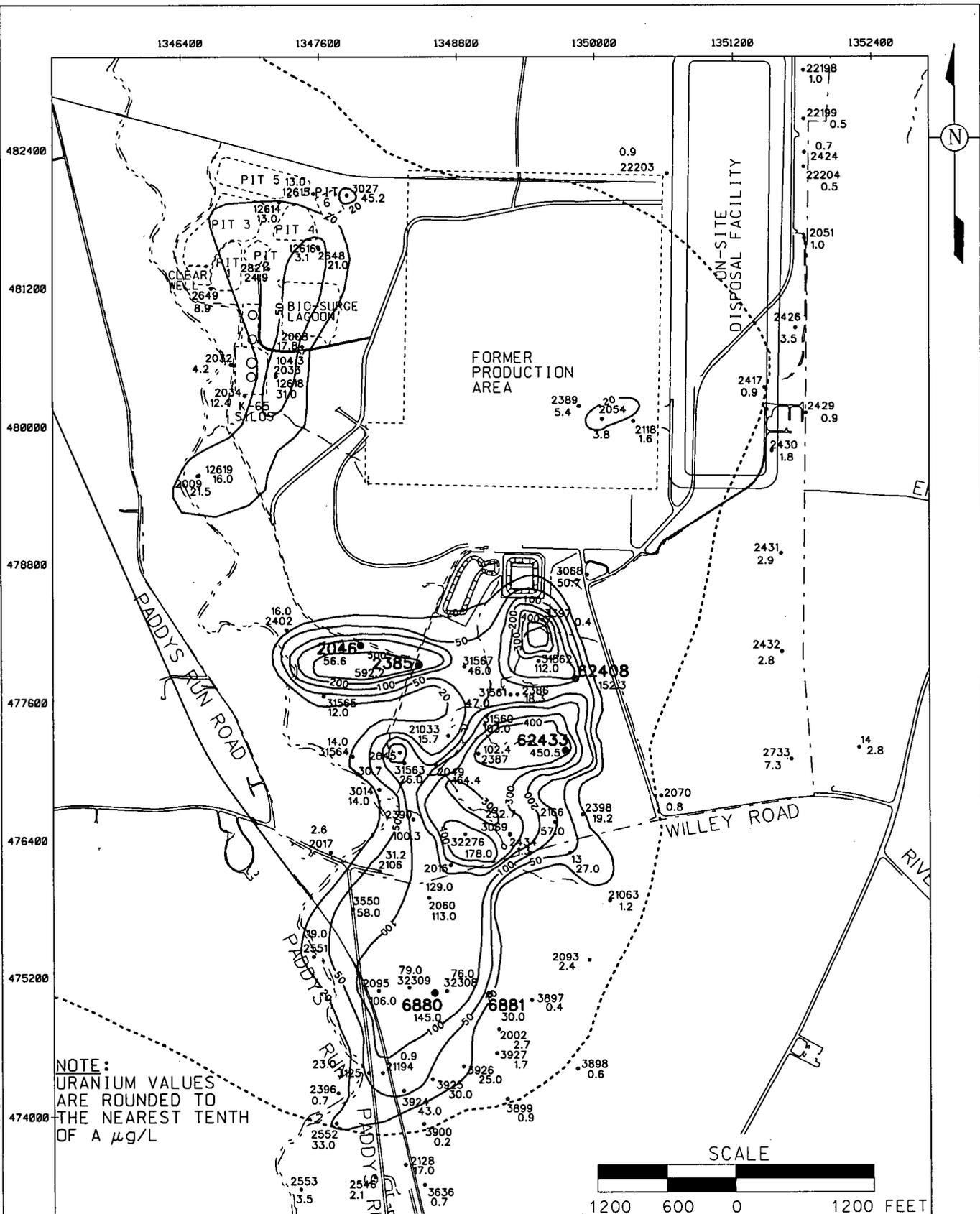
610000

- Decrease in uranium North of IAFP (2046) from 165 ppb to 57 ppb
- Increase in uranium East of the IAFP (2385) from 242 ppb to 600 ppb
- Changes suggest extraction wells are accelerating plume movement toward wells, as designed
- Plume boundary extends further east of the SWU than previously identified

V:\SF\GP1\OGN\99ANNUAL\CINDY01.DGN

STATE PLANAR COORDINATE SYSTEM 1983

11-23-99



NOTE:
URANIUM VALUES
ARE ROUNDED TO
THE NEAREST TENTH
OF A $\mu\text{g/L}$

LEGEND:

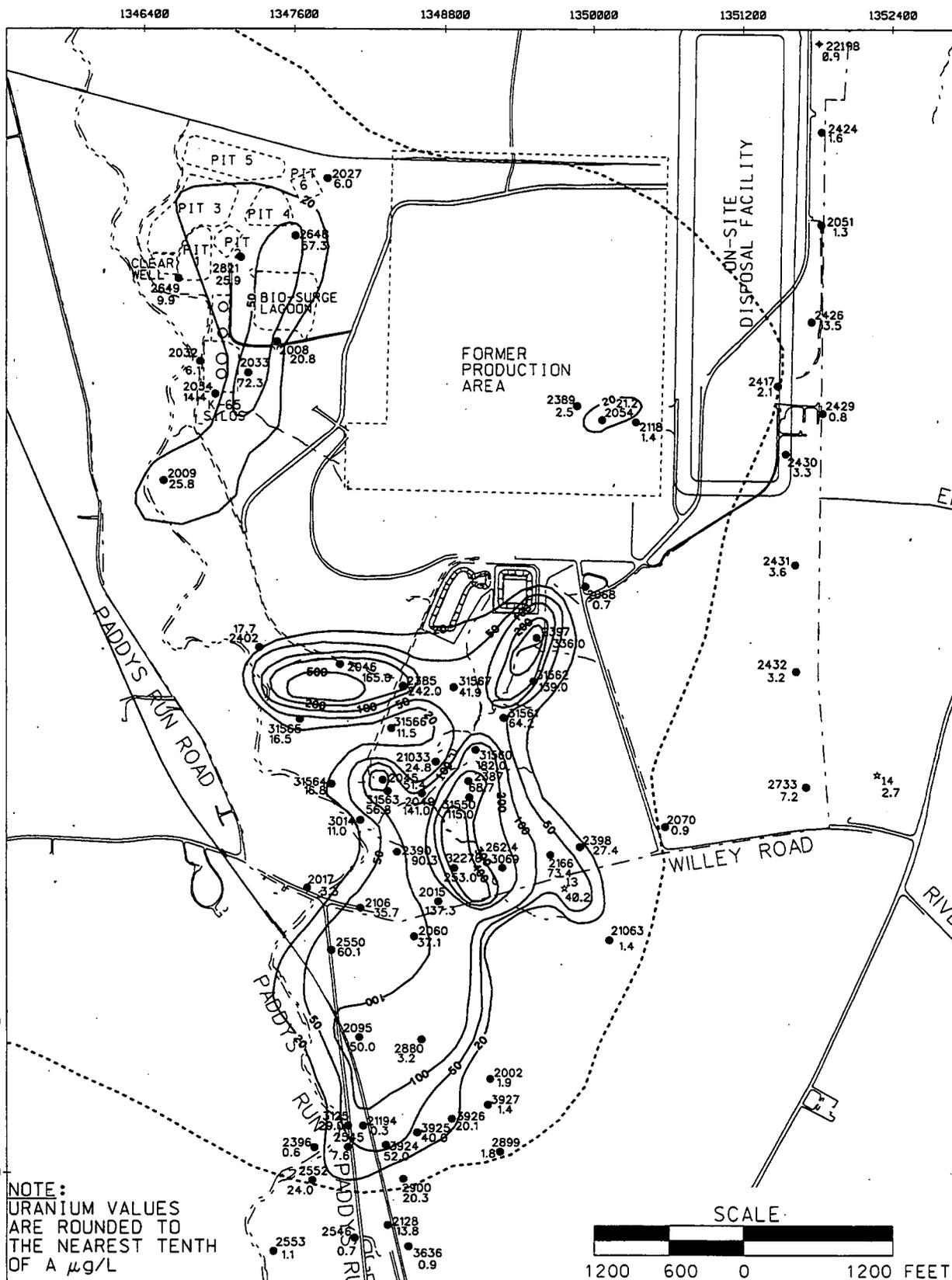
- 2553 ● MONITORING WELL OR GEOPROBE LOCATION
- 5.1 TOTAL URANIUM CONCENTRATION MEASURED IN FOURTH QUARTER 1999
- FEMP BOUNDARY
- MAX TOTAL URANIUM CONTOUR IN $\mu\text{g/L}$ FROM BASELINE MODIFIED QUARTERLY
- 10-YEAR, URANIUM-BASED RESTORATION FOOTPRINT

TOTAL URANIUM PLUME MAP, FOURTH QUARTER 1999

v:\5\fgp1\wqgm\88\annual\88ramp\um.dgn

STATE PLANNED COORDINATE SYSTEM 1983

29-JUN-2000



NOTE:
 URANIUM VALUES
 ARE ROUNDED TO
 THE NEAREST TENTH
 OF A $\mu\text{g/L}$

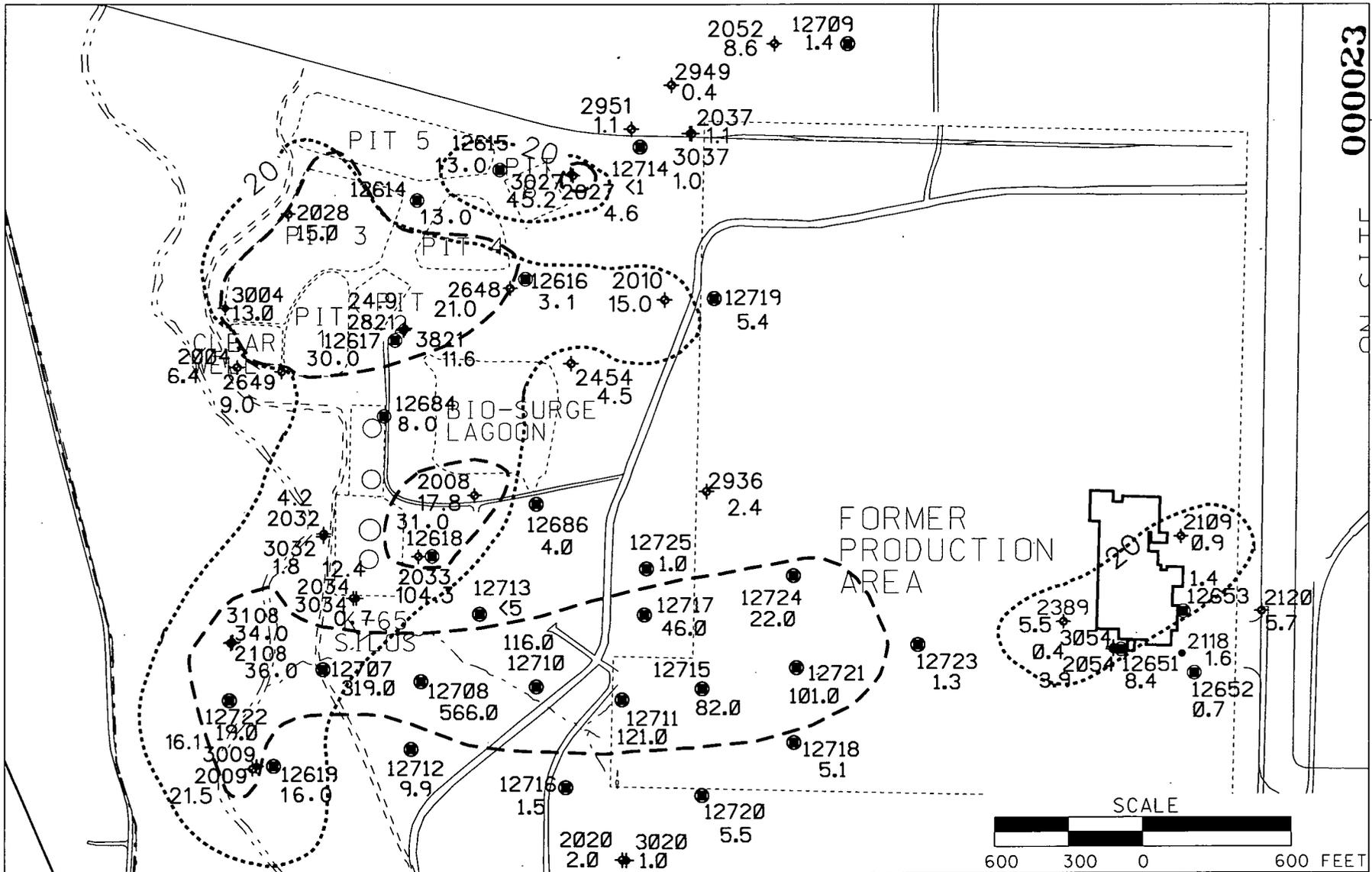
- LEGEND:**
- 2553 ● MONITORING WELL LOCATION
 - 5.1 MAXIMUM TOTAL URANIUM CONCENTRATION UPDATED THROUGH FOURTH QUARTER 1998
 - FEMP BOUNDARY
 - TOTAL URANIUM CONTOUR IN $\mu\text{g/L}$
 - - - - 10-YEAR, URANIUM-BASED RESTORATION FOOTPRINT

TOTAL URANIUM PLUME MAP, FOURTH QUARTER 1998

GROUNDWATER MONITORING CHANGES TO URANIUM PLUME INTERPRETATION

000022

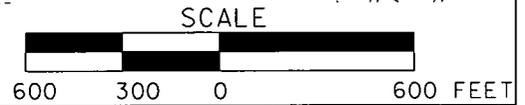
- 30 additional direct push locations in waste storage area and Plant 6 area
- Beneath Plant 6 total uranium concentrations below 20 ppb
- Three individual plumes distinguished
 - E-W Plume paralleling Pilot Plant Drainage Ditch (556 ppb)
 - Beneath Bio-surge Lagoon and Silos (31 ppb)
 - East of Pit 3 and Clearwell (30 ppb)



LEGEND:

- FEMP BOUNDARY
- 20 µg/L TOTAL URANIUM CONTOUR
OU5 RI PLATE E-81
- - - - - CURRENT 20 µg/L TOTAL URANIUM CONTOUR
- PLANT 6 OUTLINE

- ◆◆ MONITORING WELL RESULTS (DECEMBER 1999, JANUARY AND FEBRUARY 2000, AND PRIOR TO PLUGGING AND ABANDONMENT)
- GEOPROBE LOCATION RESULTS



GROUNDWATER MONITORING RE-INJECTION DEMONSTRATION

- Demonstration was successful
 - Reliable source of injection water can be maintained
 - Acceptable injection rate can be sustained
 - No negative impacts on aquifer or plume

GROUNDWATER MONITORING CHANGES FOR 2001 AND 2002

- Update monitoring to reflect any new FRL exceedances
- Remove wells that have been plugged and abandoned from monitoring list

000025

OSDF MONITORING

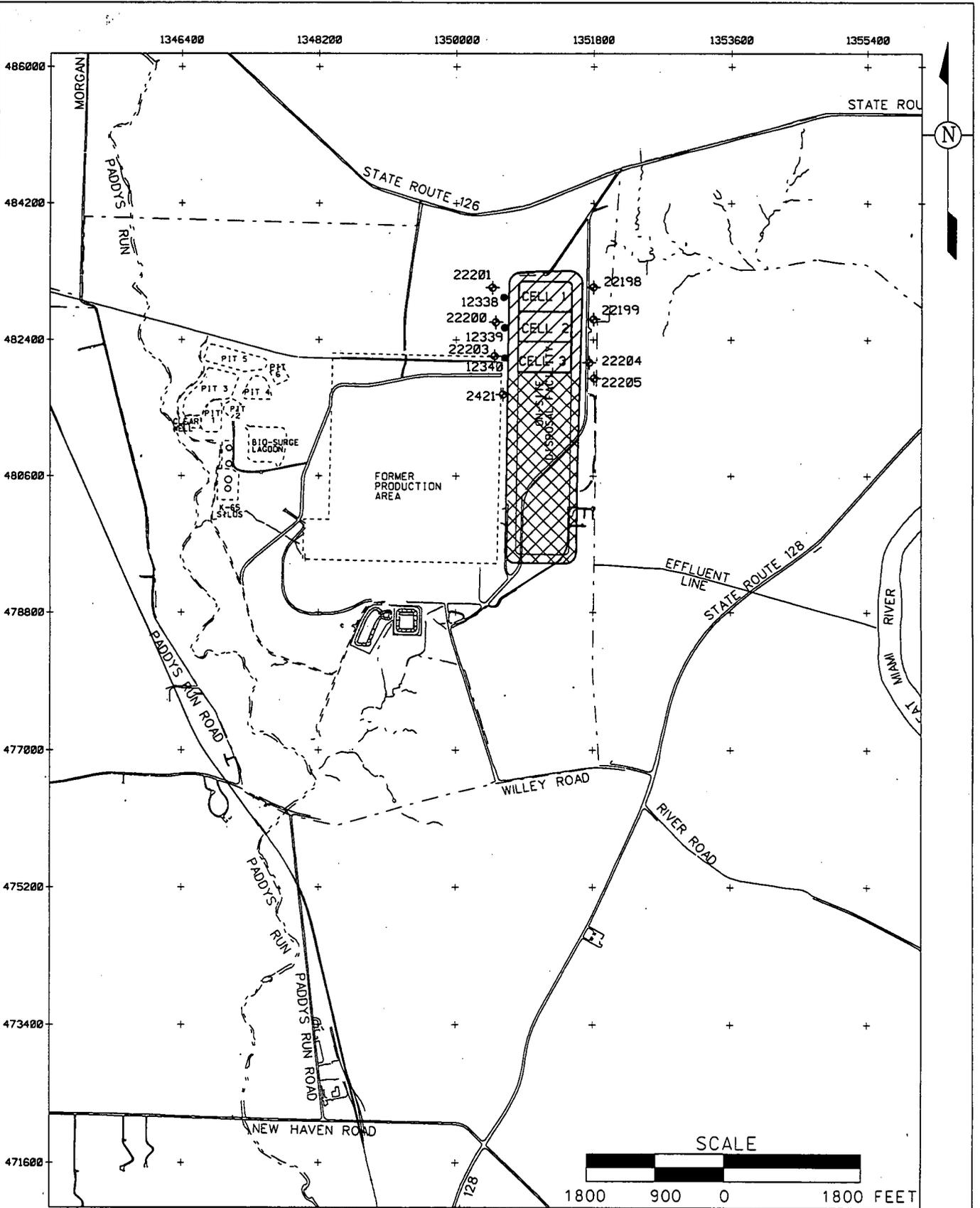
CELL 1

- 80% full of soil and debris
- Leachate Collection System
 - 1998: 47 ppb to 119 ppb total uranium
 - 1999: ND to 102 ppb total uranium
- Leak Detection System
 - 1998: 1.5 ppb to 13.7 ppb total uranium
 - 1999: 11.4 ppb to 20.7 ppb total uranium
- Leak Detection System accumulation rate: max 0.87 gpad declined to 0.26 gpad by end of 1999
- Initial response leakage rate: 20 gpad

v:\\$fcp1\ndgn\#1133.dgn

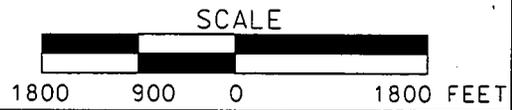
STATE PLANNED COORDINATE SYSTEM 1983

29-JUN-2000



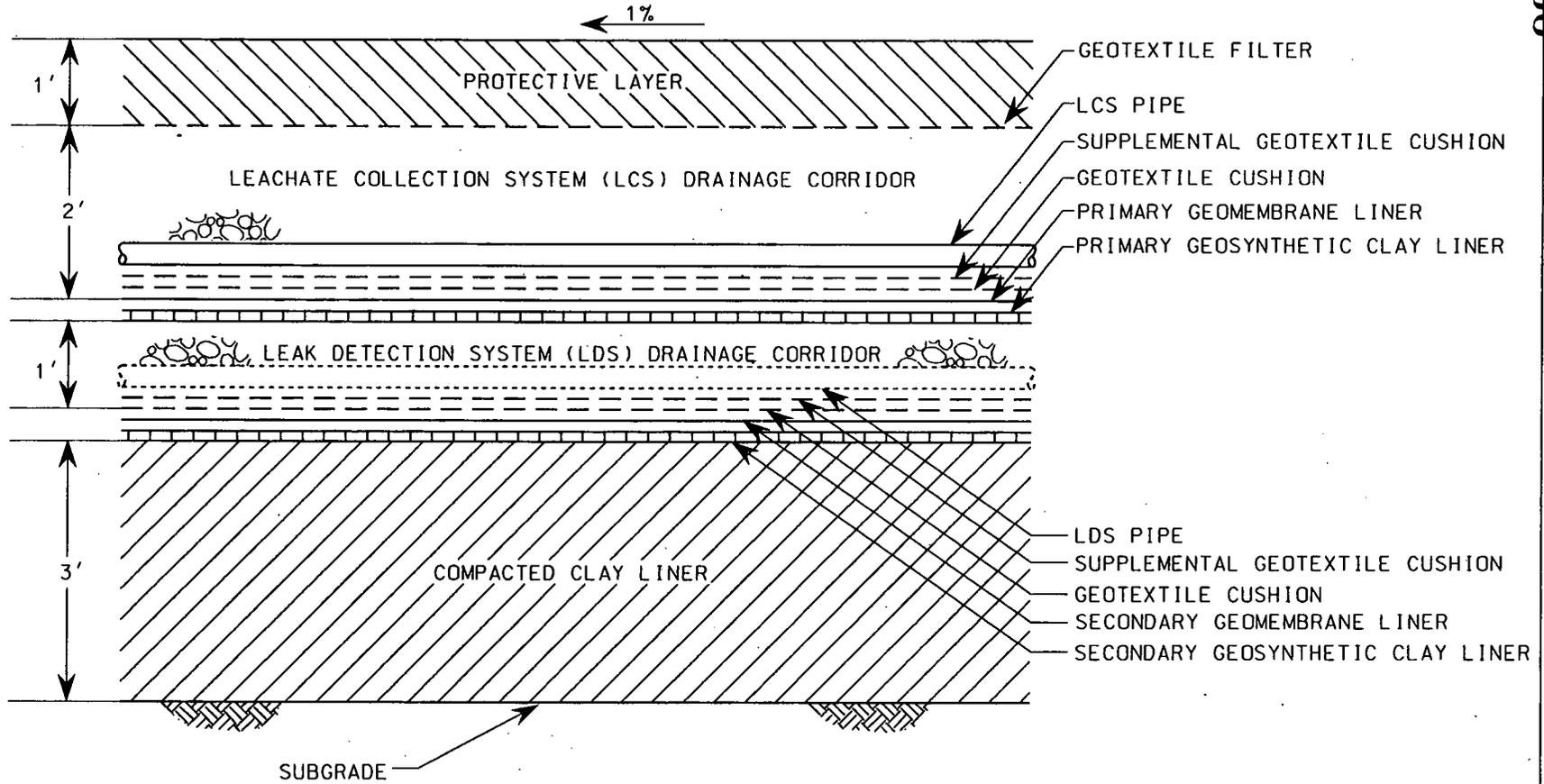
- LEGEND:
- - - - FEMP BOUNDARY
 - ◆ OSDF MONITORING WELL IN GREAT MIAMI AQUIFER
 - HORIZONTAL TILL WELL

- EXISTING CELLS
- ANTICIPATED FUTURE CELLS



ON-SITE DISPOSAL FACILITY FOOTPRINT AND MONITORING WELL LOCATIONS

000027



OSDF MONITORING

CELL 2

- 40% full of soil and debris
- Leachate Collection System
 - 1998: 17 ppb total uranium
 - 1999: 4.5 to 22.7 ppb total uranium
- Leak Detection System
 - 1998: 71 ppb total uranium
 - 1999: 12 ppb to 50 ppb total uranium
- Leak Detection System accumulation rate: max 6.8 gpad declined to less than 1 gpad by September and remained below 1 gpad for the remainder of the year
- Initial response leakage rate: 20 gpad

000029

OSDF MONITORING

CELL 3

- 10% full of soil and debris
- Leachate Collection System
1999: 9.3 ppb to 11.5 ppb total Uranium
- Leak Detection System
1999: Dry
- Initial response leakage rate: 20 gpad

SURFACE WATER/TREATED EFFLUENT URANIUM RELEASED

1998 Data

- 521 Pounds

1999 Data

- 419 Pounds
 - Change in loading term
 - Decreased rainfall
 - Increase volume of extracted groundwater

SURFACE WATER/TREATED EFFLUENT FRL EXCEEDANCES

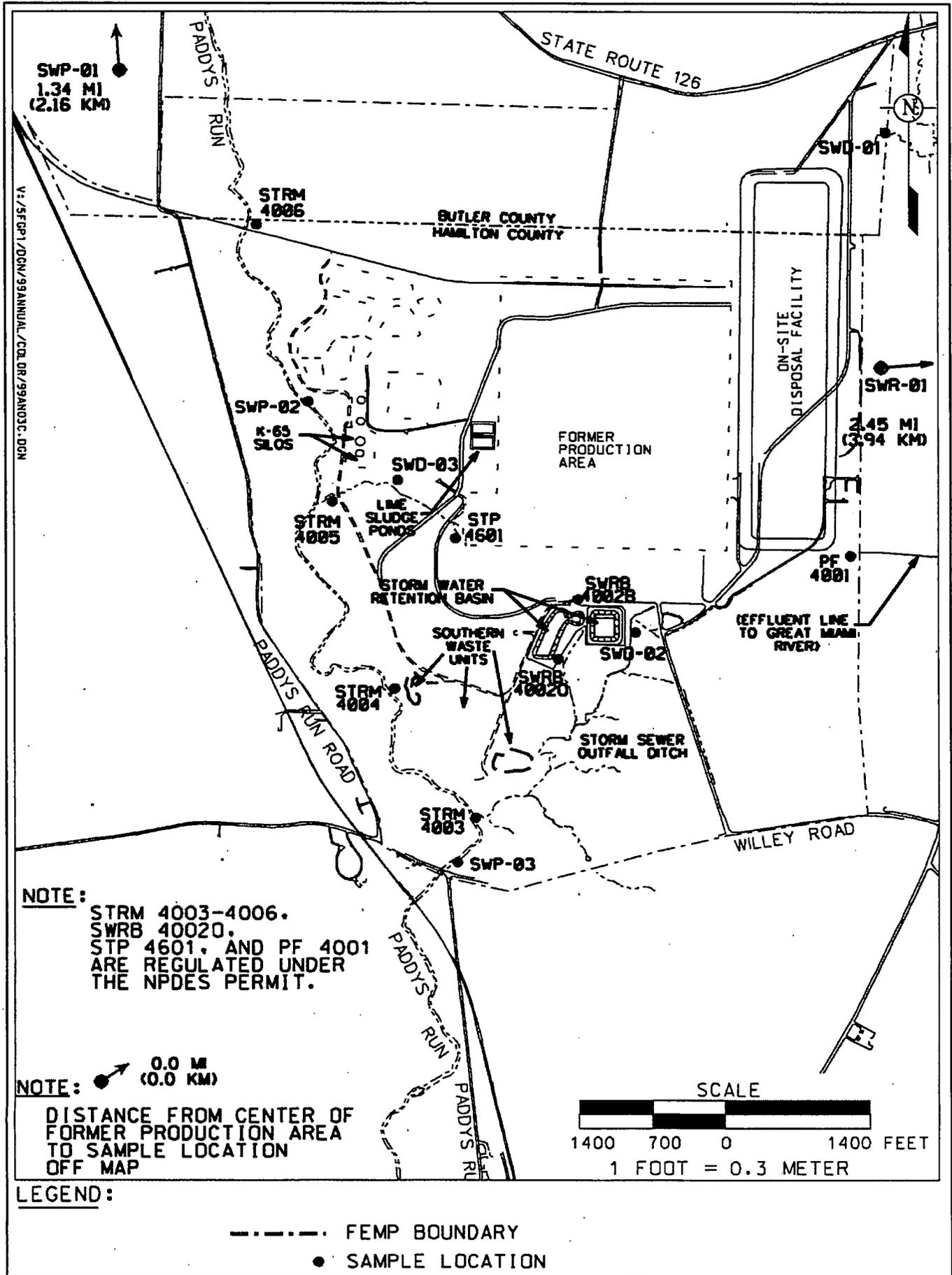
000032

1998 Results

- 12 surface water FRL exceedances
- 3 BTV exceedances
- 7 exceedances of the groundwater FRL for total uranium

1999 Results

- 2 surface water FRL exceedances
- No BTV exceedances
- 2 exceedances of groundwater FRL for total uranium



V:\SFGP1\DCM\99ANNUAL\CDL DR\99AND03.CGM

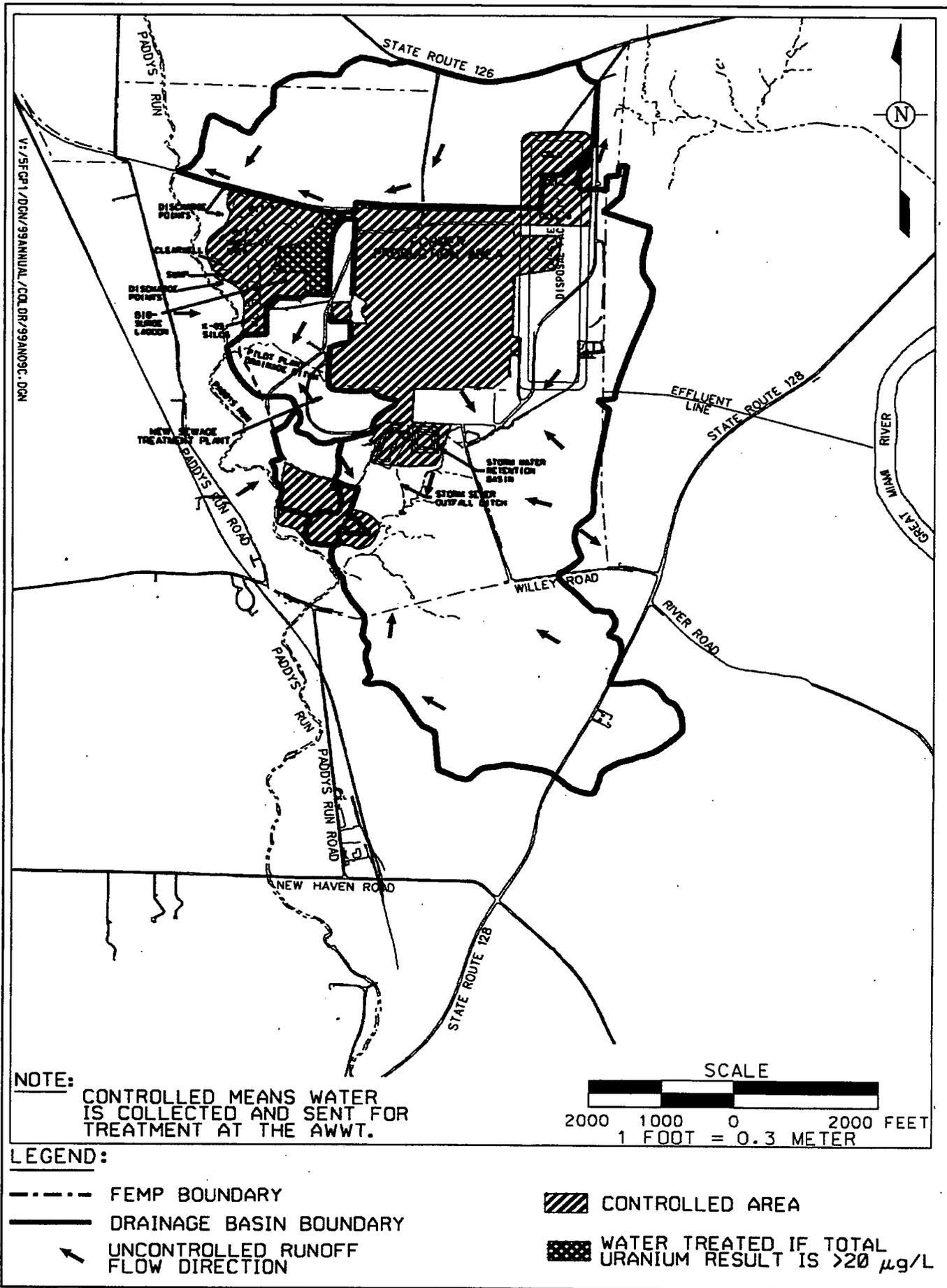
NOTE:
 STRM 4003-4006,
 SWRB 40020,
 STP 4601, AND PF 4001
 ARE REGULATED UNDER
 THE NPDES PERMIT.

NOTE: 0.0 MI
 (0.0 KM)
 DISTANCE FROM CENTER OF
 FORMER PRODUCTION AREA
 TO SAMPLE LOCATION
 OFF MAP

LEGEND:
 - - - - - FEMP BOUNDARY
 ● SAMPLE LOCATION

SCALE

 1400 700 0 1400 FEET
 1 FOOT = 0.3 METER



Controlled Surface Water Areas and Uncontrolled Runoff Flow Directions

SURFACE WATER MONITORING FRL EVALUATIONS

- Locations STRM 4005 and SWD-03 will be evaluated based on groundwater FRL in the future
- Based on Geoprobe evaluation of Pilot Plant Drainage Ditch

SURFACE WATER/TREATED EFFLUENT NPDES COMPLIANCE

000036

1998 Results

- In compliance 98.5%

1999 Results

- In compliance 99.5%

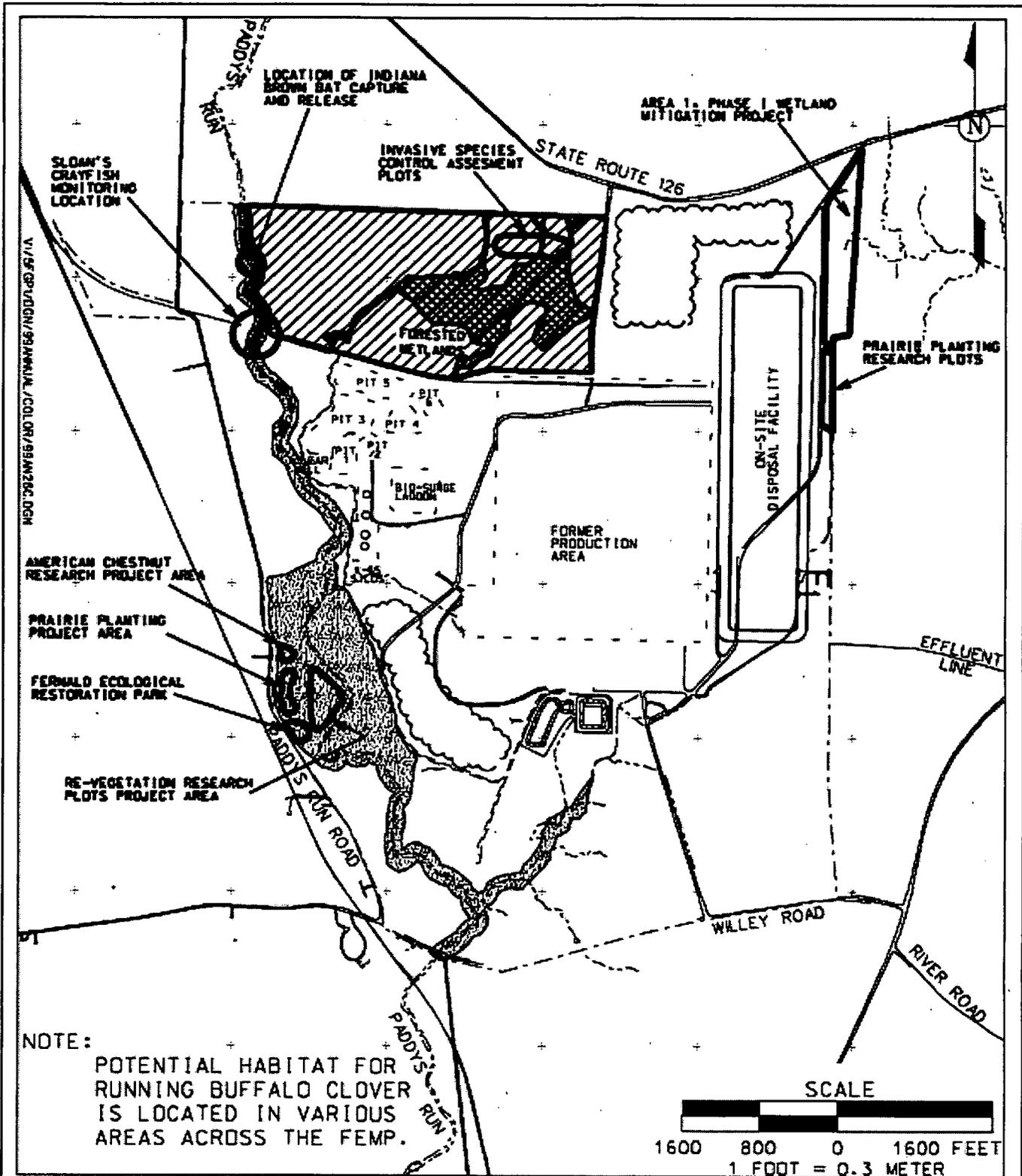
SURFACE WATER MONITORING CHANGES FOR 2001 AND 2002

- Incorporate revised NPDES Permit requirements
 - Add 4902 - Downstream of Fernald Site effluent line
 - Add new constituents and change frequencies at several locations
- Review planned remediation activities to determine if sampling frequencies should be modified

NATURAL RESOURCE MONITORING

SEDIMENT LOADING IN PADDYS RUN

- Increased sediment load from northern drainage ditch
- Source appears to be railyard sediment basin
- Turbidity of short duration
- Investigation continues



LEGEND:

- FEMP BOUNDARY
-  PADDY'S RUN AND TRIBUTARIES RIPARIAN CORRIDOR
-  SLOAN'S CRAYFISH AREA
-  POTENTIAL INDIANA BROWN BAT HABITAT

-  WETLANDS
-  NORTHERN WOODLOT AREA AND POTENTIAL AREA FOR SPRING CORAL ROOT
-  PINES

NATURAL RESOURCE MONITORING THREATENED AND ENDANGERED SPECIES

- Large healthy population of Sloan's crayfish
- Indiana brown bat captured during survey
- Favorable habitat for running buffalo clover
- Favorable habitat for spring coral root

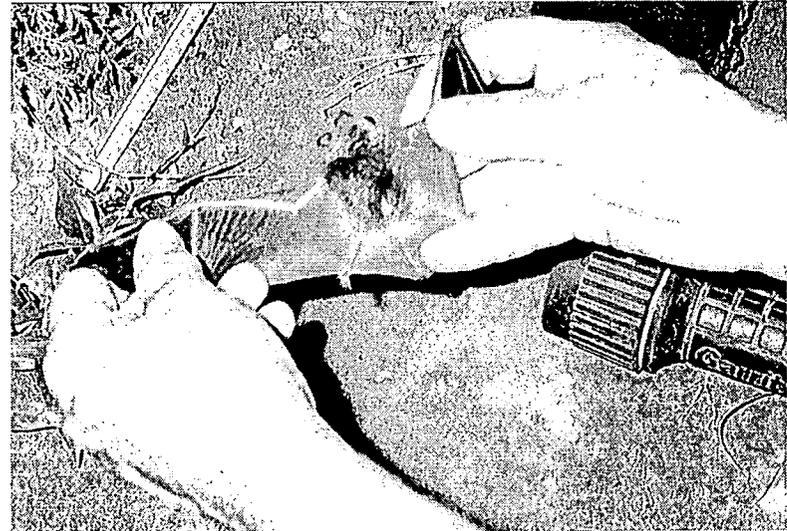


Photo # 7215-1