



Progress Update SFPP Remediation Efforts

Norwalk Tank Farm Cleanup

Presented to the Norwalk RAB

January 23rd, 1997

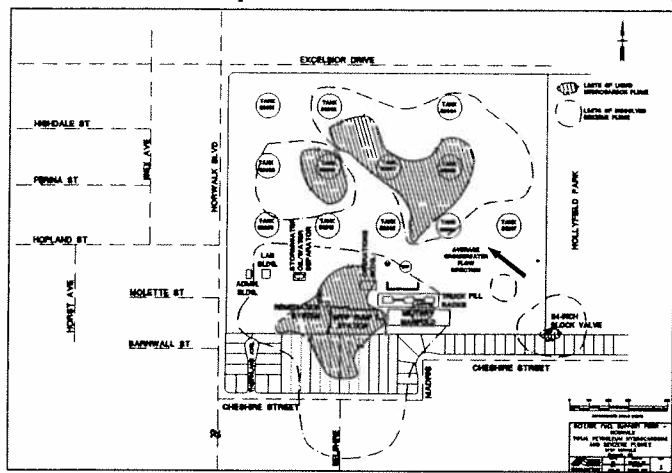


Topics to be Covered

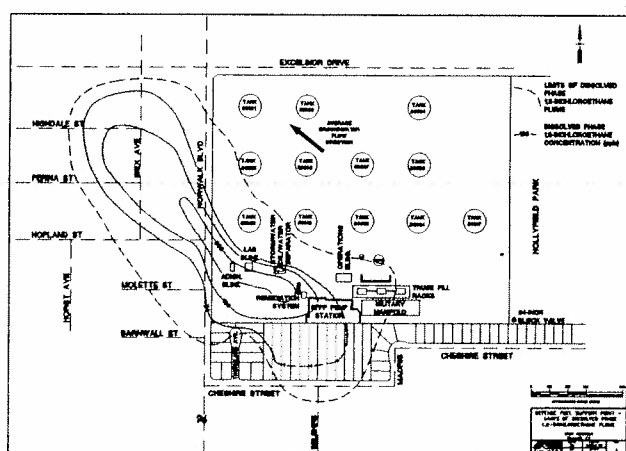
- ◆ *SC Plume contamination removal statistics*
- ◆ *WSB system initial operational data & interpretation of its effectiveness*
- ◆ *24" valve cleanup system progress*



Groundwater Plumes-Free Product /BTEX

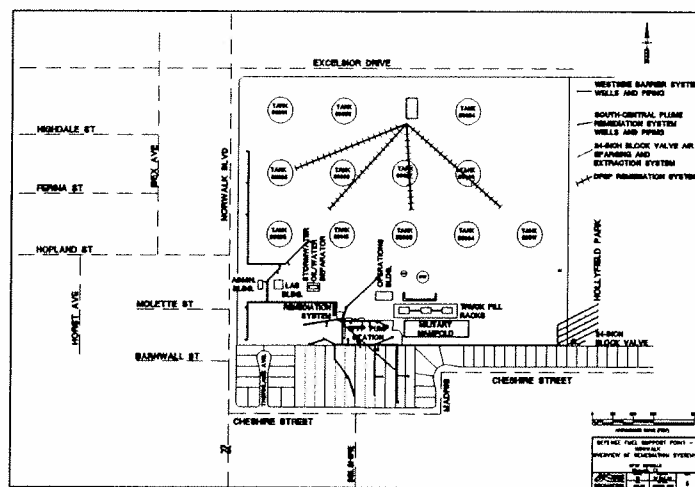


Groundwater Plume-1,2 DCA





Map of Current Remediation Systems



SUMMARY OF REMEDIATION PROGRESS

Soil Vapor Extraction System Operations Summary

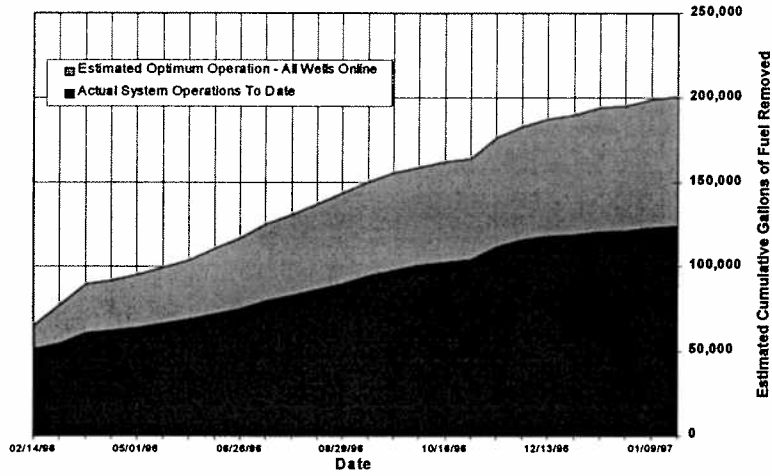
- ◆ 20 Vapor extraction wells online and in use
- ◆ Approximately 125,000 gallons of fuel removed from soil and destroyed
- ◆ Approximately 25,000 gallons of fuel removed since October RAB meeting

Product Recovery/West Side Barrier System Operations Summary

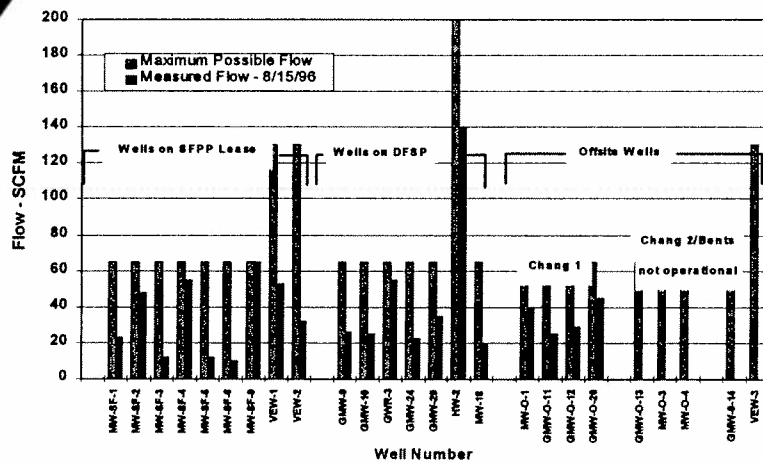
- ◆ 6 Product/groundwater extraction wells online in South/Central Plume area
- ◆ 9 West Side Barrier wells placed online in October
- ◆ Approximately 1.53 million gallons of water pumped and treated (740,000 gallons since October RAB meeting)
- ◆ Approximately 5,000 gallons of liquid fuel recovered
- ◆ Approximately 100 gallons of liquid fuel recovered since October RAB meeting

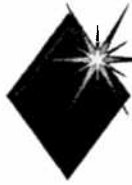


SOUTH CENTRAL PLUME SUMMARY OF VAPOR PHASE EXTRACTION OPERATIONS

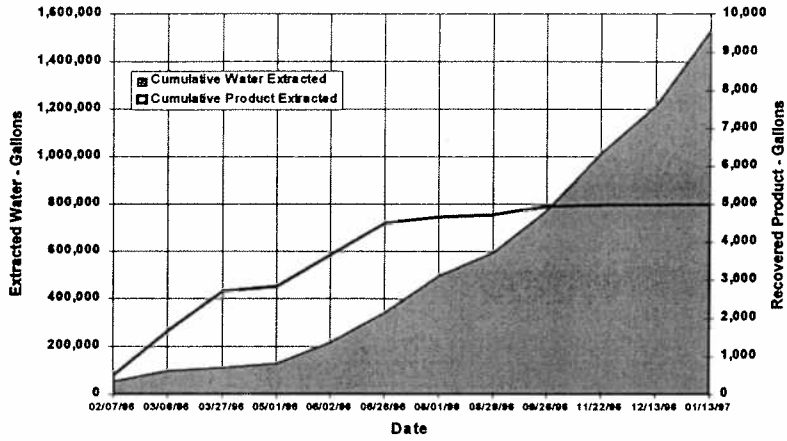


SOUTH CENTRAL PLUME SUMMARY OF VAPOR WELL FLOW

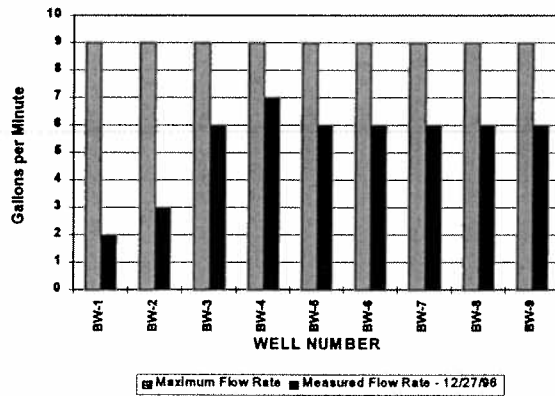




SUMMARY OF LIQUID PHASE PRODUCT RECOVERY SYSTEM OPERATIONS

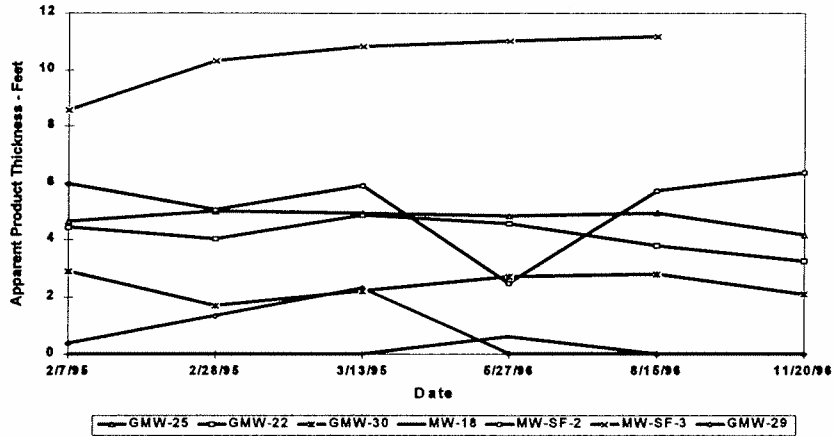


SUMMARY OF PRODUCT PUMP FLOW RATES



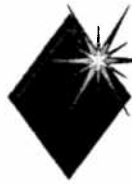


SUMMARY OF PRODUCT THICKNESS CHANGES OVER TIME-SC PLUME WELLS

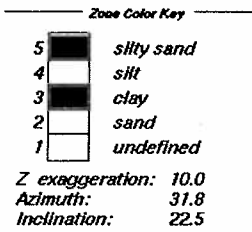
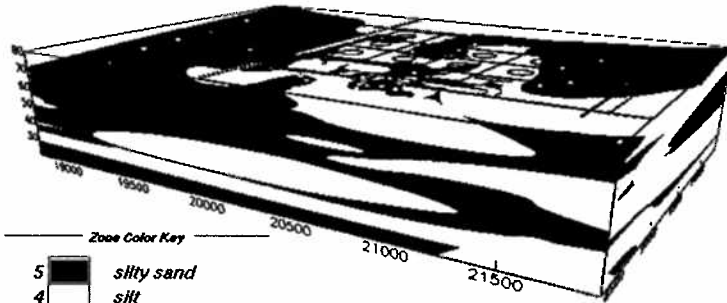


What do these trends tell us ?

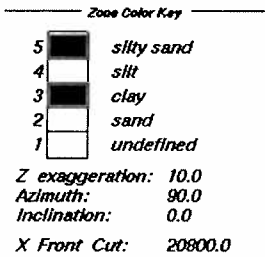
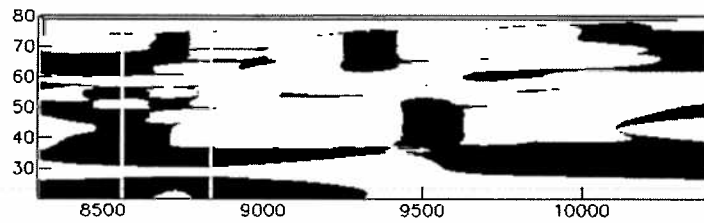
- ◆ Vapor extraction continues to be an effective cleanup tool for soil & free product
- ◆ Recovery of free-product by pumping below normal rates for the site
- ◆ SFPP is looking at re-developing the 6 liquids pumping wells to speed up cleanup
- ◆ If unsuccessful, will drill new extraction wells
- ◆ This information is looked at and acted upon.



3-Dimensional Presentation of Site Geology



Transverse Geological Cross-Section - A





West Side Barrier System Update

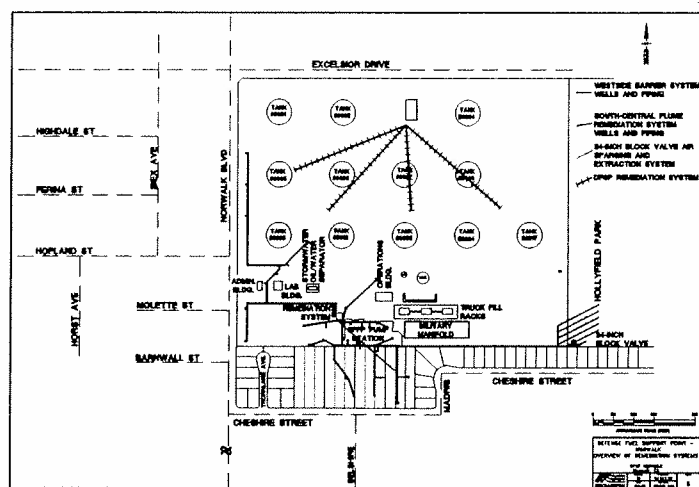
- ◆ *WSB operational in October, 1996*
- ◆ *System designed to halt further offsite migration of MTBE/DCA west of NW boulevard*
- ◆ *9 SFPP groundwater extraction wells along western tankfarm area*
- ◆ *Pump groundwater at 40-50gpm*
- ◆ *Water piped back to treatment system*



West Side Barrier System Update-Cont'd

- ◆ *How do we measure its effectiveness ?*
- ◆ *Groundwater level change measurements*
 - ◆ *Drop in water table indicates "hydraulic control"*
- ◆ *Monitor changes in chemical concentrations in groundwater*
 - ◆ *Over time DCA/MTBE concentrations should decrease in "zone of influence"*

Map of West Side Barrier Map

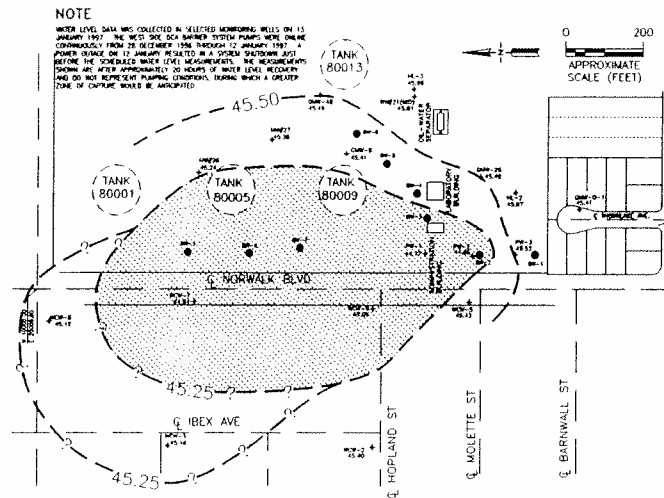


West Side Barrier System Update-Cont'd

- ◆ Preliminary results to date:
- ◆ Groundwater level change measurements
 - ◆ Significant drop in groundwater levels in area of WSB
 - ◆ Zone of influence larger than expected-good news for cleanup
 - ◆ 800' x 500' "capture zone"
 - ◆ Extends 200' west of Norwalk Boulevard



DFSP NORWALK - WEST SIDE BARRIER SYSTEM PRELIMINARY WATER LEVEL DATA IN OPERATION

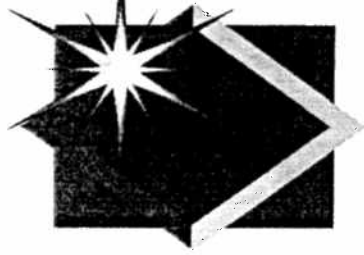


West Side Barrier System Update-Cont'd

- ◆ Preliminary results to date:
- ◆ Chemical concentration changes
 - ◆ Plan to conduct more frequent sampling in between semi annual monitoring events
 - ◆ Will gauge & sample wells in western portion of site
 - ◆ First event scheduled for mid-February
 - ◆ Get results to RAB in March
 - ◆ 2-3 more events planned for 1997



◆ *Questions ??*



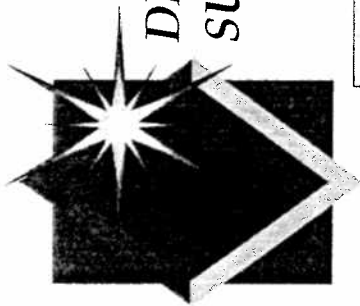
DFSP NORWALK

**SOUTH CENTRAL PLUME AND WEST SIDE BARRIER SYSTEM
SUMMARY OF REMEDIATION PROGRESS**

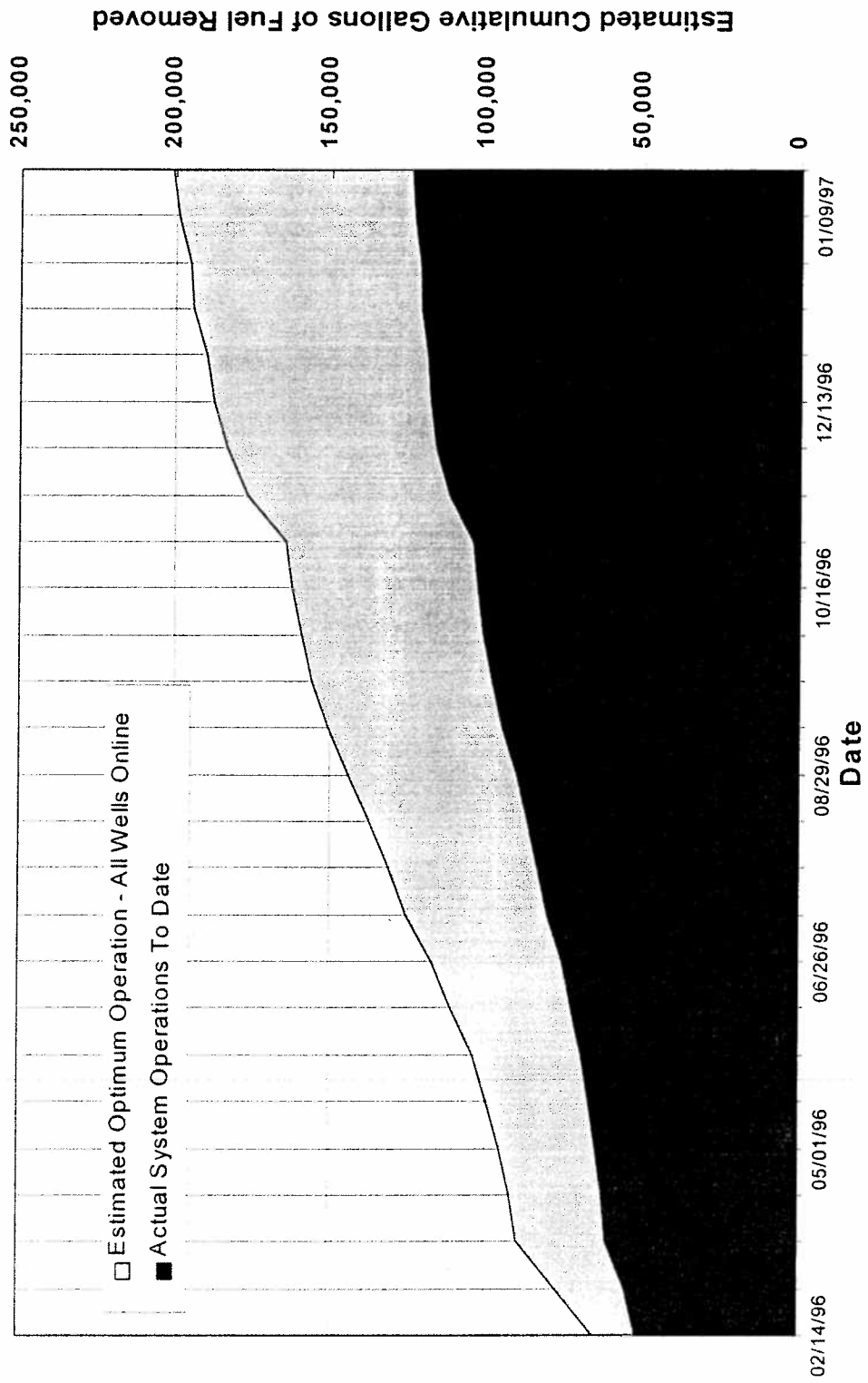
- ◆ System placed in operation September 15, 1995
- ◆ System has operated 7500 hours since startup
- ◆ **Soil Vapor Extraction System Operations Summary**
- ◆ 20 Vapor extraction wells online and in use
- ◆ 5 Offsite vapor extraction wells not yet online
- ◆ Approximately 125,000 gallons of fuel removed from soil and destroyed
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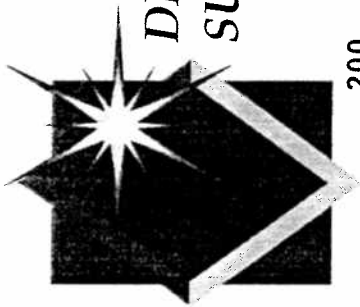
Product Recovery/West Side Barrier System Operations Summary

- ◆ 6 Product/groundwater extraction wells online in South/Central Plume area
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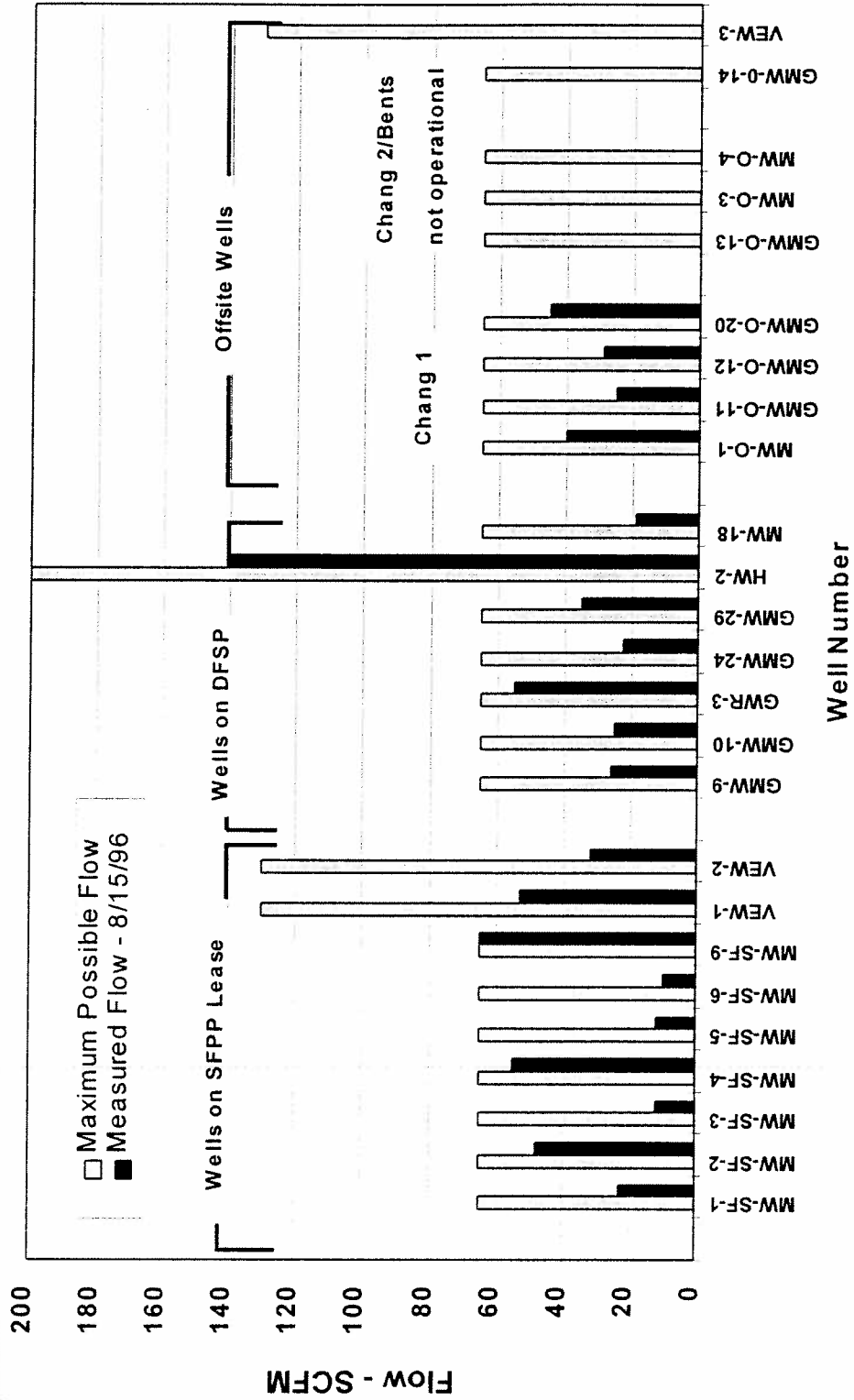


DFSP NORWALK - SOUTH CENTRAL PLUME SUMMARY OF VAPOR PHASE EXTRACTION OPERATIONS



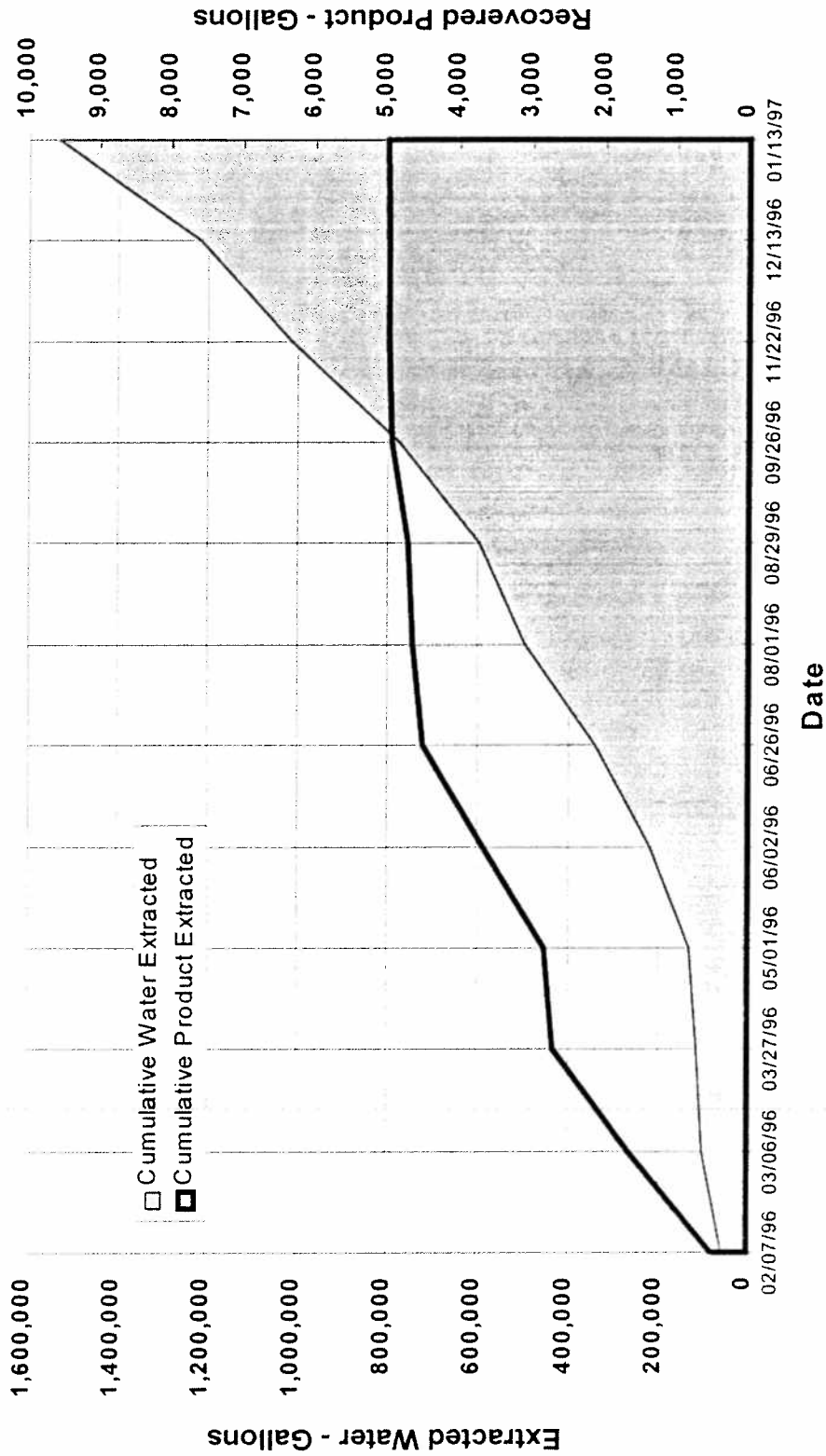


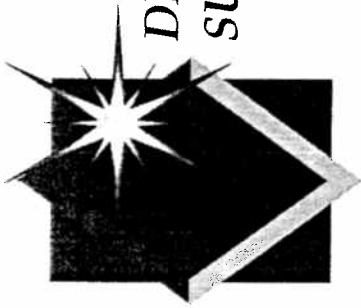
DFSP NORWALK - SOUTH CENTRAL PLUME SUMMARY OF VAPOR WELL FLOW



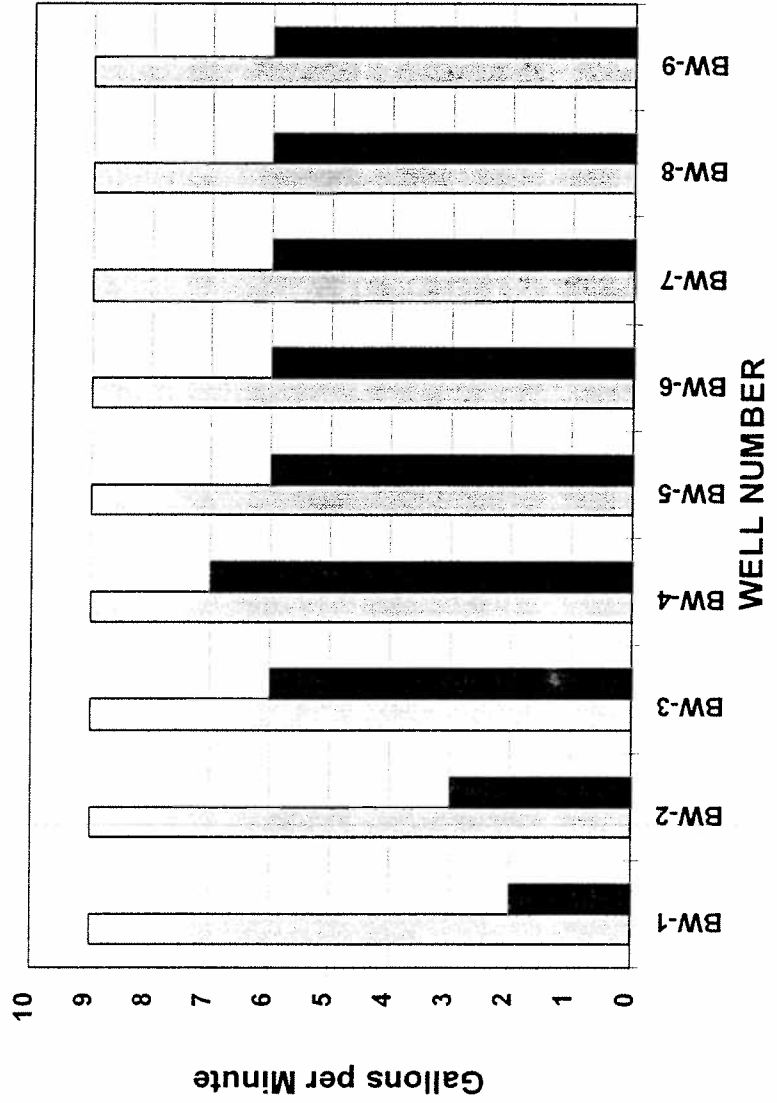


**DFSP NORWALK
SOUTH CENTRAL PLUME AND WEST SIDE BARRIER SYSTEM
SUMMARY OF GROUNDWATER AND
PRODUCT RECOVERY SYSTEM OPERATIONS**

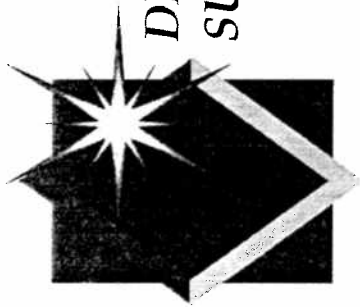




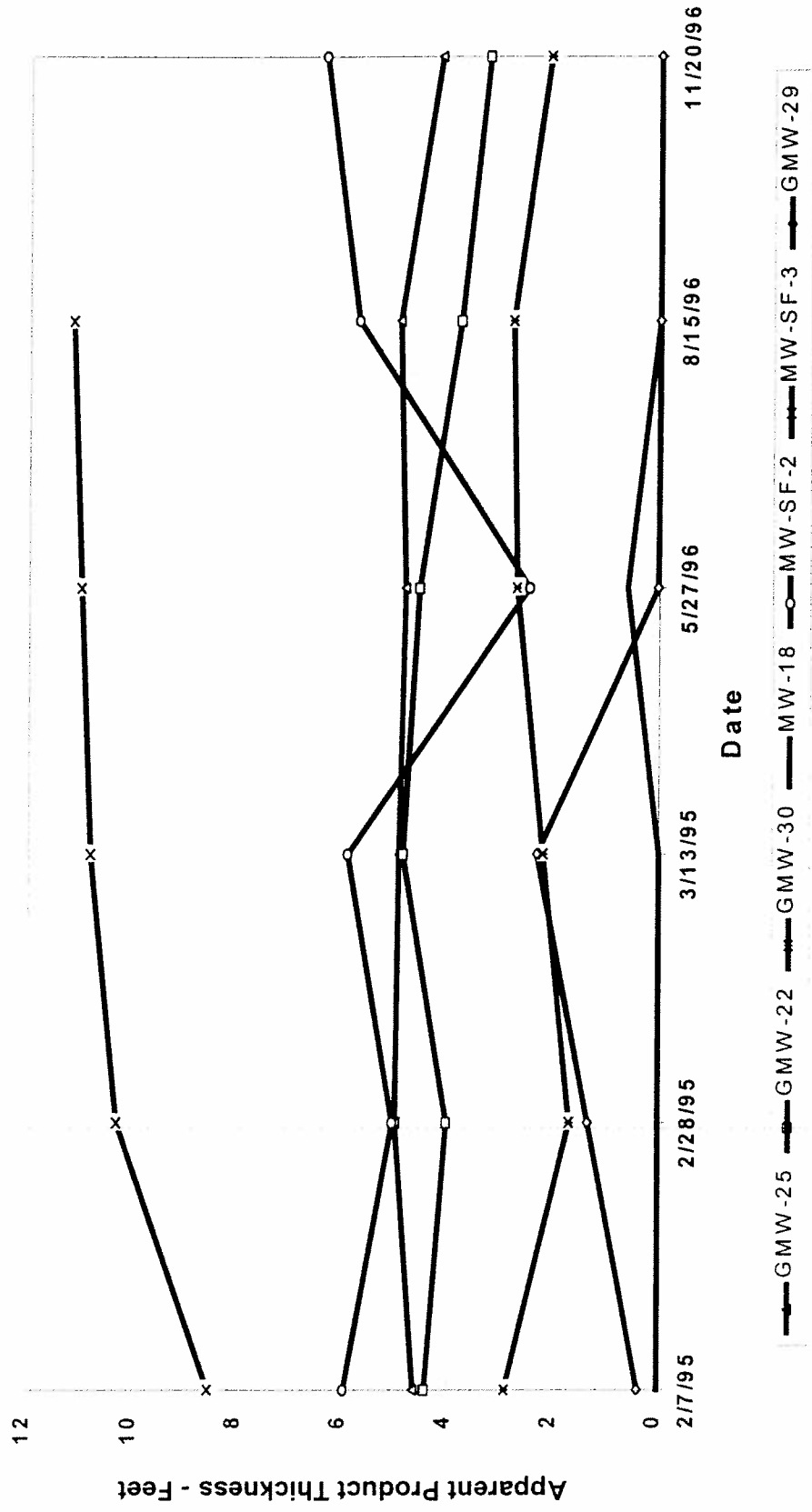
**DFSP NORWALK - SOUTH CENTRAL PLUME
SUMMARY OF PRODUCT PUMP FLOW RATES**

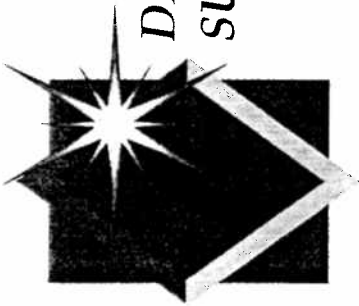


□ Maximum Flow Rate ■ Measured Flow Rate - 12/27/96

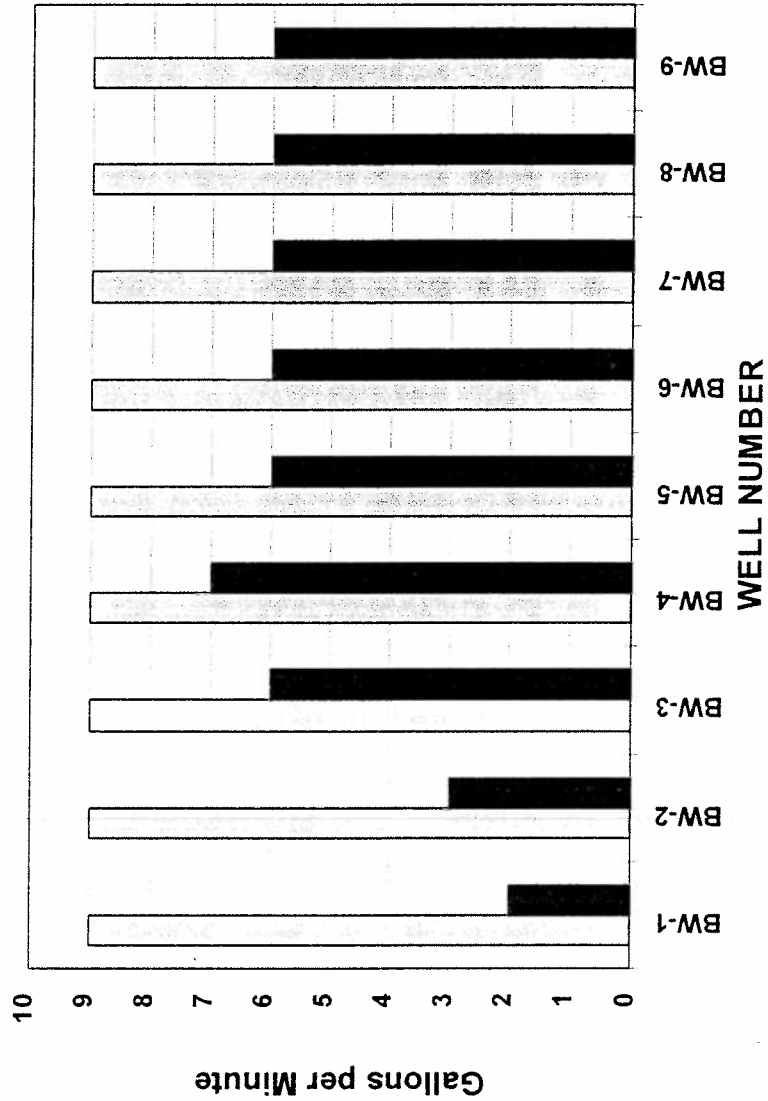


DFSP NORWALK - SOUTH CENTRAL PLUME SUMMARY OF FREE PRODUCT THICKNESS MEASUREMENTS

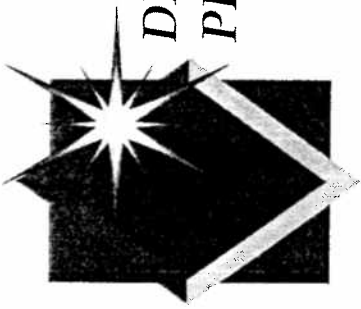




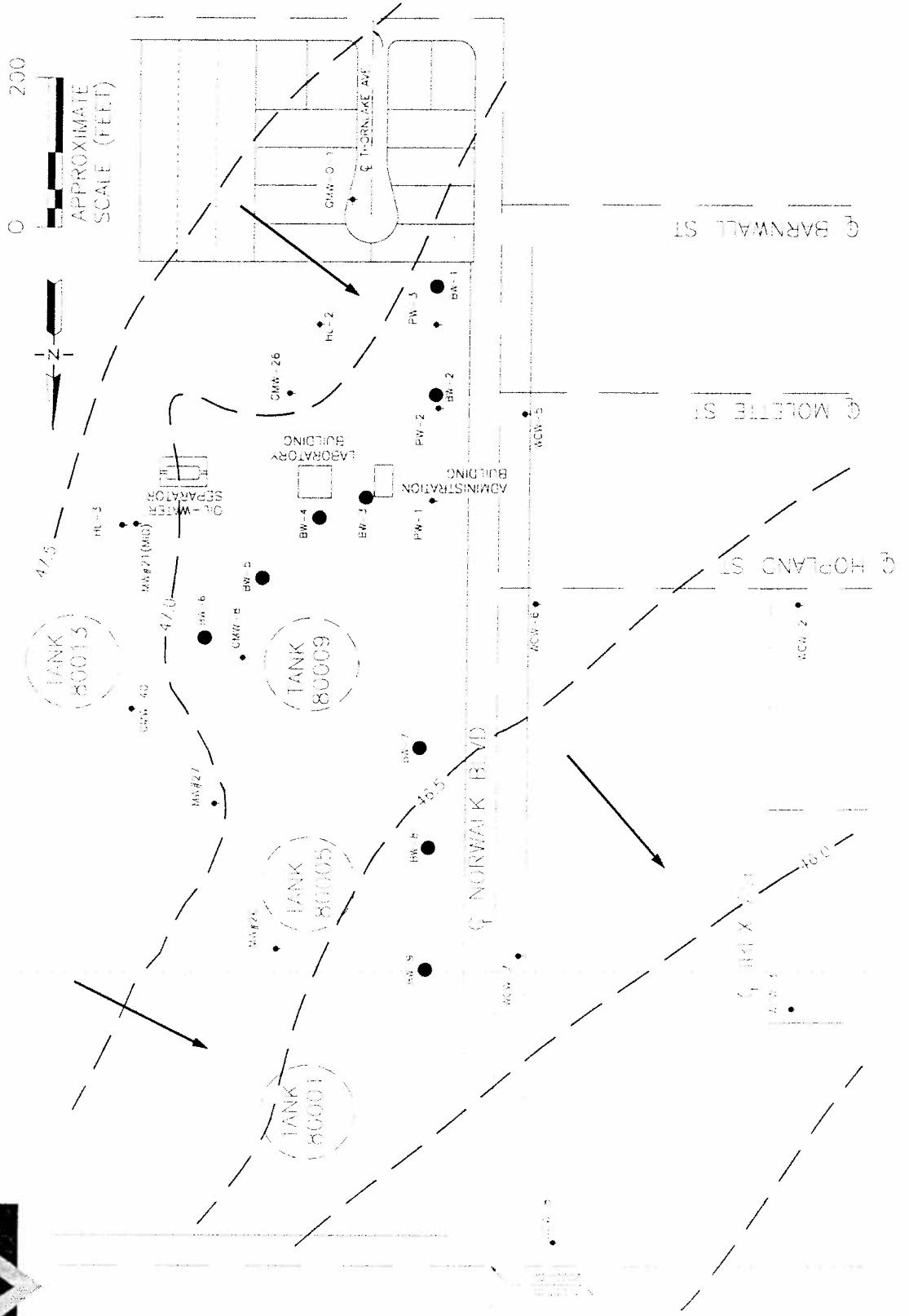
**DFSP NORWALK - WEST SIDE BARRIER SYSTEM
SUMMARY OF PRODUCT PUMP FLOW RATES**

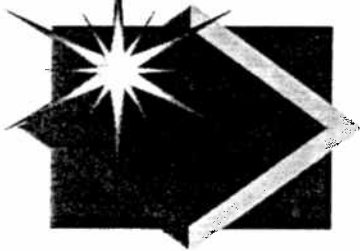


□ Maximum Flow Rate ■ Measured Flow Rate - 12/27/96



DFSP NORWALK - WEST SIDE BARRIER SYSTEM PRE-OPERATION GROUNDWATER FLOW CONDITIONS

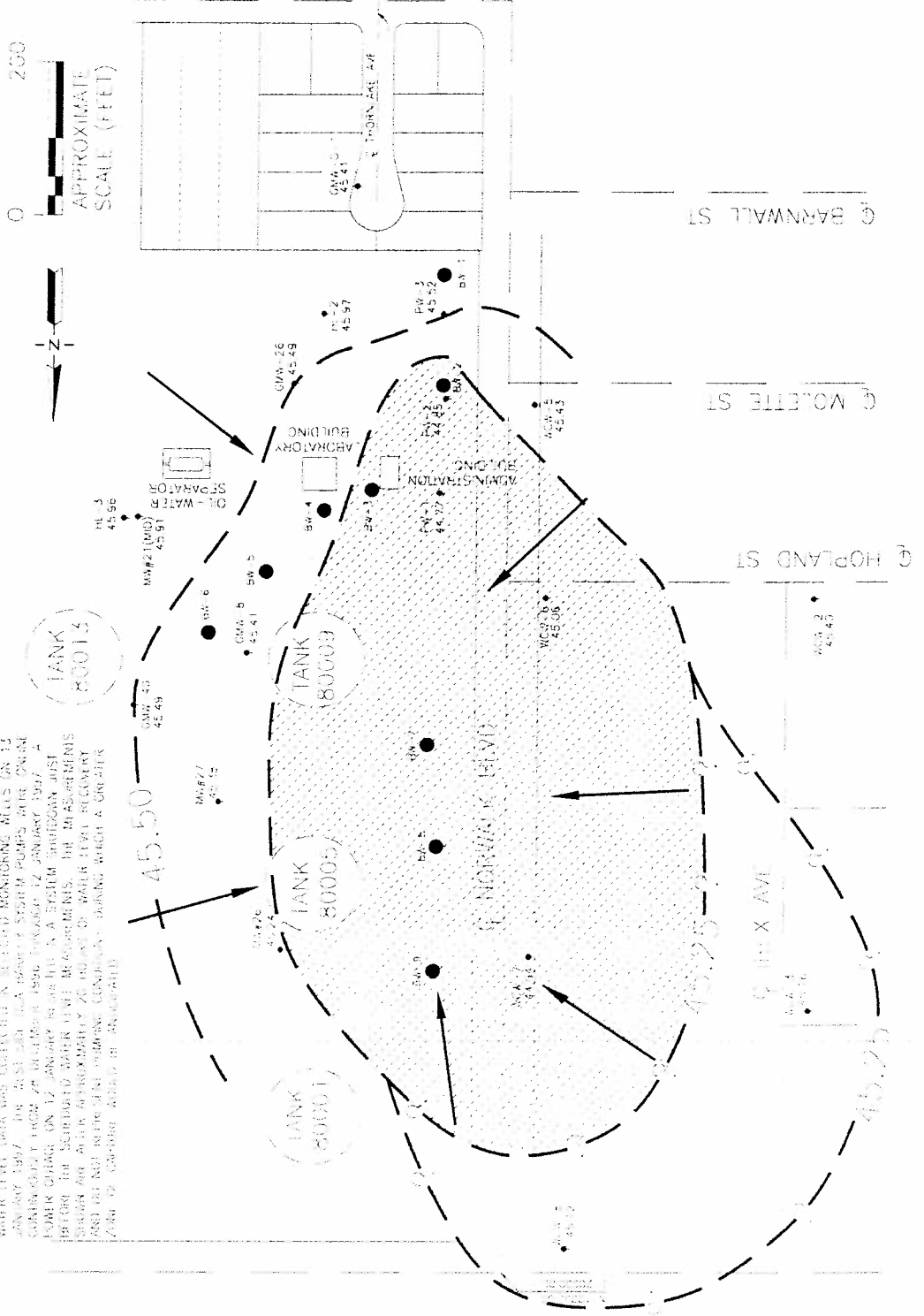


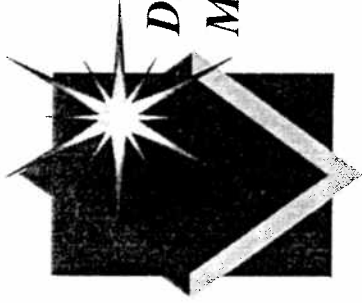


DFSP NORWALK - WEST SIDE BARRIER SYSTEM PRELIMINARY WATER LEVEL DATA BARRIER SYSTEM IN OPERATION

NOTE

WATER LEVEL DATA WAS OBSERVED IN SELECTED MONITORING PUNTS ON 13 JANUARY 1997. THE DATA WAS OBTAINED FROM SEVEN PUMPS ON THE WEST SIDE BARRIER SYSTEM FROM 27 BARNWALL ST. TO 27 JANUARY ST. IN THE AREA OF THE FORMER GARAGE ON 12 JANUARY ST. AND THE AREA OF THE BARRIERS JUST BEFORE THE SUBURBAN WATER USE FACILITIES. THE DATA POINTS WERE OBTAINED FROM A PROGRAMMED 72 HOUR CYCLE OF WATER LEVEL RECORDING AND NOTED IN THE DATA MONITORING LOGS. DRAWING WORTH & COMPANY, 12 JANUARY ST. NORWALK, CONNECTICUT 06858.





DFSP NORWALK WEST SIDE BARRIER SYSTEM MONITORING PLAN AND SCHEDULE

- ◆ Perform groundwater level measurements and groundwater sample chemical analyses on a regular basis in the vicinity of the West Side Barrier System
- ◆ Collect groundwater samples and measure water levels on or about February 18
- ◆ Water levels measured in 20 to 30 wells on and off site to provide data on groundwater flow in the vicinity of the barrier wells
- ◆ Collect groundwater samples from offsite wells that appear to be influenced by system. Tentatively to include WCW-5, WCW-6, WCW-7, and WCW-8
- ◆ Analyze samples for 1,2-DCA, MTBE, and BTEX
- ◆ Prepare a brief summary of analytical and groundwater level data for distribution to RAB by March 10
- ◆ Repeat this process about April 1 and September 1 to provide data at points in between the semi-annual sampling events scheduled for May/June and November/December