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THE MEMPHIS DEPOT
TENNESSEE

ADMINISTRATIVE RECORD
COVER SHEET

AR File Number 614

ANNUAL OPERATION AND MAINTENANCE SUMMARY REPORT FOR YEAR 2000 GROUNDWATER INTERIM REMEDIAL ACTION

DUNN FIELD

MEMPHIS DEFENSE DEPOT, TENNESSEE

PREPARED FOR

MOBILE DISTRICT COE

CONTRACT NO. DACA01-99-D-0040

BY

JACOBS ENGINEERING GROUP

MARYLAND HEIGHTS, MISSOURI

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1.0 INTRODUCTION

This report summarizes the information contained in the monthly operation and maintenance reports, which are generated and submitted to the Memphis Depot and the regulating government agencies.

1.1 Site Description and Background

DDMT covers 642 acres in Shelby County, Tennessee. The facility is approximately four miles southeast of the central business district and one mile northwest of Memphis International Airport. Operations began in 1942 with the mission to inventory and supply materials for the United States Army. In 1964, its mission was expanded to serve as one of the principal distribution centers for a complete range of military commodities. Past activities at DDMT included a wide range of storage, distribution, and maintenance practices. DDMT has been closed since 1997 and is maintained by the Memphis Depot Caretaker Division, under the control of the Defense Depot, Susquehanna, Pennsylvania/Defense Logistics Agency (DLA). DDMT is currently undergoing Base Realignment and Closure (BRAC) activities.

Dunn Field, also called OU-1, consists of 68 acres of land located north of the main installation. The northwestern quadrant of Dunn Field was used as a landfill area. The southwestern and southeastern quadrants were used as a storage area for mineral stockpiles. The northeastern portion was used as a pistol range and later as a pesticide storage area. Until 1970, Army supplies, including hazardous and non-hazardous materials were burned or buried primarily in the northwest portion of Dunn Field. These materials potentially included oil and grease, paint, paint thinner, methyl bromide, pesticides, herbicides, and food supplies. Disposal operations at Dunn Field have created a plume of contaminated groundwater, in the shallow fluvial aquifer, along the western and northern portion of Dunn Field. Groundwater monitoring performed during the 1989 and 1990 remedial investigation/feasibility study (RI/FS) identified concentrations of dissolved volatile organic compounds (VOCs) and heavy metals above regulatory limits. Identified VOCs included, but were not limited to tetrachloroethene, trichloroethene, dichloroethene, carbon tetrachloride, chloroform and 1,1,2,2 – trichloroethane. The DDMT facility is classified as a Superfund Site under the Comprehensive Environmental Response, Compensation, and Liability Act of 1990 (CERCLA) Section 120 (Federal Facilities).

1.2 Groundwater Recovery System Description

As part of the Record of Decision (ROD) for interim remedial action at Dunn Field, seven groundwater extraction wells, one pre-cast concrete building, an underground conveyance system, a flow measurement and control system, and associated components were installed in 1997. Equipment, process controls, operational requirements, recovery well sizes and depths, pumping rates, and construction drawings are defined in the Technical Specifications prepared by CH2M-Hill.

2.0 OPERATION AND MAINTENANCE SUMMARY

2.1 Recovery Wells

Downtime and maintenance operations for individual recovery wells are discussed below:

RW-03:

January - RW-03 was non-operational in January. The pump was oversized and the well had been cycling. Pump was scheduled to be replaced in the first quarter of 2000.

February – RW-03 was back up and operating, but was still cycling and had reduced discharge. RW-03 was 60% operation in February.

March – RW-03 pump was replaced with a lower horsepower pump. This was intended to prevent cycling on/off of the pump and to provide a more consistent flow and operation. RW0-03 was 85% operational in March.

April – Flow meter at RW-03 was not accurately measuring discharge due to a damaged flow meter cable wire. New cable wire was installed. RW-03 was 62% operational.

May – RW-03 control valve malfunctioned and was non-operational.

June – Repairs were made and flow meter was recalibrated. Well was back on line by 19th of the month. RW-03 was 38% operational.

July – September – RW-03 operating normally. Operational 90-100%.

October – RW-03 began shutting down due to tripping of the low level alarm. This required changing of the set point for pump shut-off. System was shut down on October 31 for the installation of pumps and controllers in four new wells. RW-03 was 58% operational in October.

November – Well was down until November 16, when seven existing wells were restarted. Actuator malfunction caused some down-time the last two weeks of November, but was corrected. RW-03 was 23% operational.

December – RW-03 was operated until the 13th, at which time below-freezing temperatures caused intermittent shutdowns through the end of the month. The air-release valve was damaged during the freeze and was replaced. Heated enclosures for surface piping were installed last week of the month. RW-03 was 24% operational.

RW-04

January – March – Normal operation. Well was 90-100% operational.

April through June – Well began cycling on/off due to low water level conditions. Pump is oversized and is scheduled to be replaced. Well was an average of 50% operational.

July – Control valve began malfunctioning and caused high pressure in lines. Well was shut down on July 3rd pending diagnosis of malfunction. Well was 3% operational.

August – Well was diagnosed as having a controller malfunction during semi-annual instrumentation and calibration inspection. Malfunction was corrected and well was restarted August 1st. There was some cycling due to low water level conditinos, however, the well was 72% operational.

September – October – Well is cycling on/off occasionally, apparently due to a worn control valve. This is scheduled to be replaced during the recovery well upgrade in the final quarter of 2000. System is shut down October 31 to begin upgrade operations. Well was average of 88% operational during this period.

November – Well is down until 16th of the month, then is restarted following installation of new pump. Controller malfunctioned, causing some cycling, but this problem was corrected. Well was 14% operational.

December – RW-04 was operated until the 13th, at which time below-freezing temperatures caused intermittent shutdowns through the end of the month. Heated enclosures for surface piping were installed last week of the month. Well was 35% operational.

RW-05

January – March – RW-05 was cycling on/off due to low water levels and an oversized pump and was approximately 50% operational

April – July - RW-05 was shut down on 13 March due to a malfunctioning control valve and actuator. The well was non-operational while a new actuator and control valve were procured.

August – Control valve and actuator were replaced and well was brought back on-line on August 8th RW-05 was then 75% operational for the month.

September – October – Well operating nominally. Shut down on October 31 to begin well upgrade and new well pump installation. RW-05 is scheduled to receive a new smaller pump. RW-05 was 95-100% operational during this time.

November – System is down until the 16th of the month and is then restarted. RW-05 received a new pump and was restarted. Well was 23% operational.

December - December – RW-05 was operated until the 13th, at which time below-freezing temperatures caused intermittent shutdowns through the end of the month. Heated enclosures for surface piping were installed last week of the month. Well was 15% operational.

RW-06

January through August – RW-06 operated normally (at or near 100% operatinal).

September – Began to shut down due to tripping of the low level alarm. Pump is oversized and is scheduled to be replaced with smaller unit. Set point was lowered to allow well to run. Well was 89% operational.

October – Well operated normally until system shutdown on the 31st for the new well pump installation. Well was 95% operational.

November – New pump is installed. Well was run briefly until actuator malfunctioned. The actuator is scheduled to be replaced. Well was only 1% operational.

December – Malfunctioning actuator has resulted in complete shut-down of the well. It was run manually for a brief period to obtain a sample for the quarterly sampling event. Heated enclosure for the piping was delivered the last week in December.

RW-07

January – June – RW-07 operated normally (at or near 100%).

July – RW-07 began cycling on/off due to tripping of the low flow alarm Pump is oversized and is scheduled to be replaced. Well was 84% operational.

August – October – Well operates at approximately 75% due to cycling and low flow conditions. System is shut down on October 31 for new well installation.

November – Pump is replaced with smaller unit and is restarted on the 16th. Well was then 23% operational.

December– RW-07 was operated until the 13th, at which time below-freezing temperatures damage to the unit. Freeze damage occurred to the air release valve and the ball check valve. Procurement activities for replacement parts were begun, and the repairs were to be made at the earliest possible time. Heated enclosures for surface piping were installed last week of the month. Well was 34% operational.

RW-08

January – March – RW-08 operated normally at or near 100%.

April – Low level conditions caused well to cycle. The set point was readjusted and the well restarted. Well was 95% operational.

May – Well was cycling due to low level conditions. Pump is oversized and is scheduled to be replaced. Well was 53% operational. Set point was adjusted to reduce flow.

June – October – Well operating normally at or near 100%. System is shut down on October 31 to begin installation of four new well pumps and replacement of existing pumps.

November – Pump is replaced. Unit is restarted on 16th of the month. Unit is 24% operational.

December - RW-08 was operated until the 13th, at which time below-freezing temperatures caused intermittent shutdowns through the end of the month. Heated enclosures for surface piping were installed last week of the month. Well is 35% operational.

RW-09

January – October – RW-09 operated normally at near 100%. System was shut down on October 31st to begin installation of pumps in four new wells and replacement of pumps in 6 existing wells.

November – RW-09 pump is replaced by smaller unit. Unit is restarted on the 16th. Well is 24% operational.

December - RW-09 was operated until the 13th, at which time below-freezing temperatures caused intermittent shutdowns through the end of the month. Heated enclosures for surface piping were installed last week of the month. Well was 35% operational for the month.

2.2 Telemetry System

Data from each of the recovery well is collected in a central processor in the pump control building and is accessible via a remote modem connection. The system was in-use and operating throughout the year with the following exceptions:

March – An apparent electrical surge caused the modem to be damaged. The modem was replaced and was back in operation by April. The processor stored the gathered data and there was no loss of information.

June – Incorrect flow readings were being received from well RW-03. This was a programming problem due to setup of the well controller , which was corrected.

November – December – The existing phone line to the modem was terminated by the previous maintenance contractor, IT Corp. A new line and phone number were arranged by Jacobs Engineering Group. The telemetry system is operational, but needs to be recalibrated for the new pumps, which were installed. This will be accomplished during the start-up of the four new pumps and controllers scheduled for the first quarter 2001.

3.0 SYSTEM PERFORMANCE

Monthly and cumulative extraction volumes for each well have been tabulated and are presented in Table 1. Graphical depictions of the recovery volumes have also been prepared and are presented as Figures 1 through 7.

Overall, the system performed to expectations with only a few exceptions. Significant down-time was experienced for wells RW-03 and RW-05, while diagnosis of problems and procurement of replacement parts were occurring. The over-sizing of the existing pumps caused intermittent cycling and low-flow or low-level conditions in many of the wells over the course of the year. Installation of smaller pumps in the seven existing wells and the installation of four new wells and pumps should result in overall improvement of system performance in 2001.

Approximately 24.7 million gallons of water were removed from the ground in the calendar year 2000, resulting in removal of approximately 28.8 pounds of TCE and 67.9 pounds of total volatile organic compounds.

Groundwater quality, as indicated by Total VOC and TCE concentrations in effluent (Figure 8), did not show significant change over the course of the year. Total effluent concentrations showed a decrease of approximately 40% from February to March, but remained fairly constant until December, when the lowest concentration of the year was detected. The low concentration in December is not indicative of the system as a whole, since shut-down of the recovery wells was under way to install new pumps and components.

TCE concentrations generally varied from 100 – 200 ug/L, with the lowest concentration occurring in December. As discussed above, this is most likely not truly indicative of the system water quality.

TABLES

TABLE 1

YEAR 2000
SUMMARY OF GROUNDWATER EXTRACTION VOLUMES

	RW-3 Extraction Volume (Gal)	RW-4 Extraction Volume (Gal)	RW-5 Extraction Volume (Gal)	RW-6 Extraction Volume (Gal)	RW-7 Extraction Volume (Gal)	RW-8 Extraction Volume (Gal)	RW-9 Extraction Volume (Gal)	Monthly Totals
JAN	0	200,477	178,978	253,872	172,051	940,579	869,688	2,615,645
FEB	97,243	140,501	158,774	266,674	148,795	863,165	739,958	2,415,110
MAR	158,501	160,416	60,394	294,653	152,021	844,531	816,883	2,487,398
APR	130,896	105,379	0	308,909	147,427	791,021	811,080	2,294,712
MAY	0	66,007	0	365,947	178,934	469,051	919,210	1,999,149
JUN	66,011	56,049	0	365,493	147,266	875,348	869,749	2,379,915
JUL	171,095	4,169	0	355,304	100,731	858,332	862,467	2,352,097
AUG	199,941	225,761	84,174	341,257	117,915	727,373	853,061	2,549,481
SEP	148,764	266,682	388,800	289,518	104,376	403,272	815,460	2,416,872
OCT	63,702	259,569	380,160	320,434	17,210	356,209	617,663	2,014,947
NOV	28,230	45,216	40,866	5,580	72,690	153,210	149,970	495,762
DEC	28,400	126,240	26,784	0	93,744	228,810	222,498	726,476
Totals	1,092,783	1,656,465	1,318,930	3,167,640	1,453,161	7,510,900	8,547,686	24,747,565

FIGURES

Figure 1
Year 2000 Monthly and Cumulative Groundwater Extraction Volume for Recovery Well RW-3 in Gallons

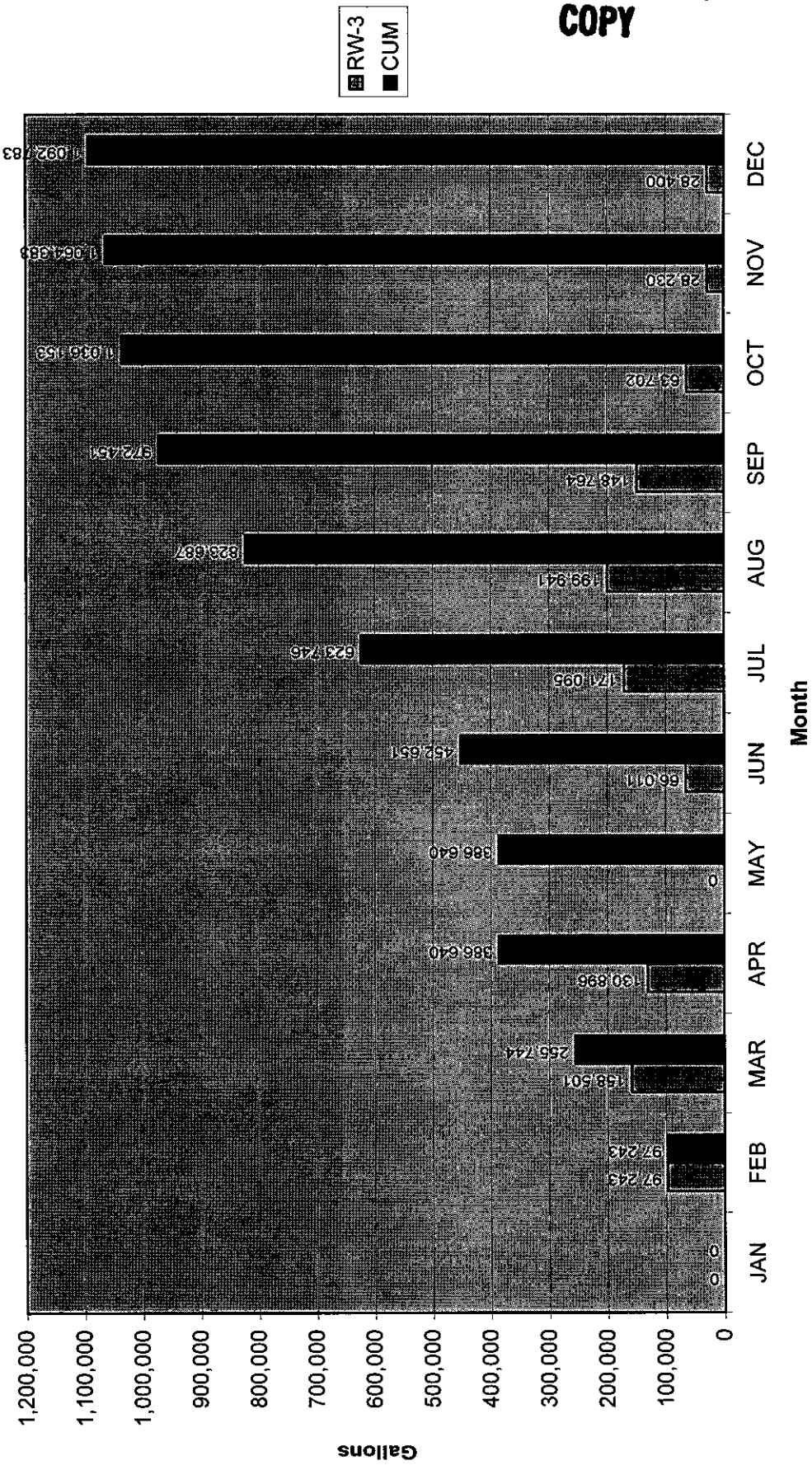

Figure 2
Year 2000 Monthly and Cumulative Groundwater Extraction Volume for Recovery Well RW-4 in Gallons

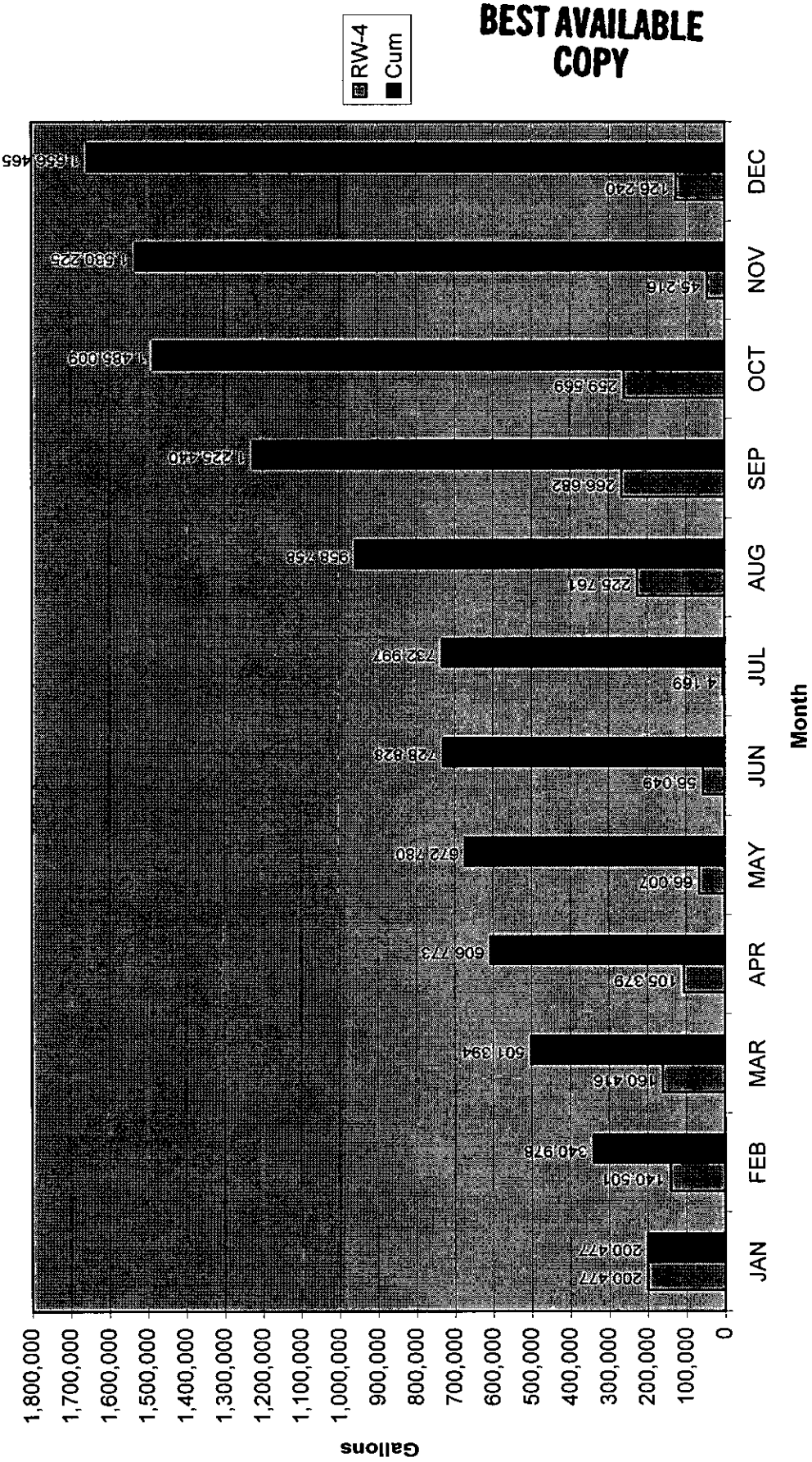

Figure 3
Year 2000 Monthly and Cumulative Groundwater Extraction Volume for Recovery well RW-5 in Gallons

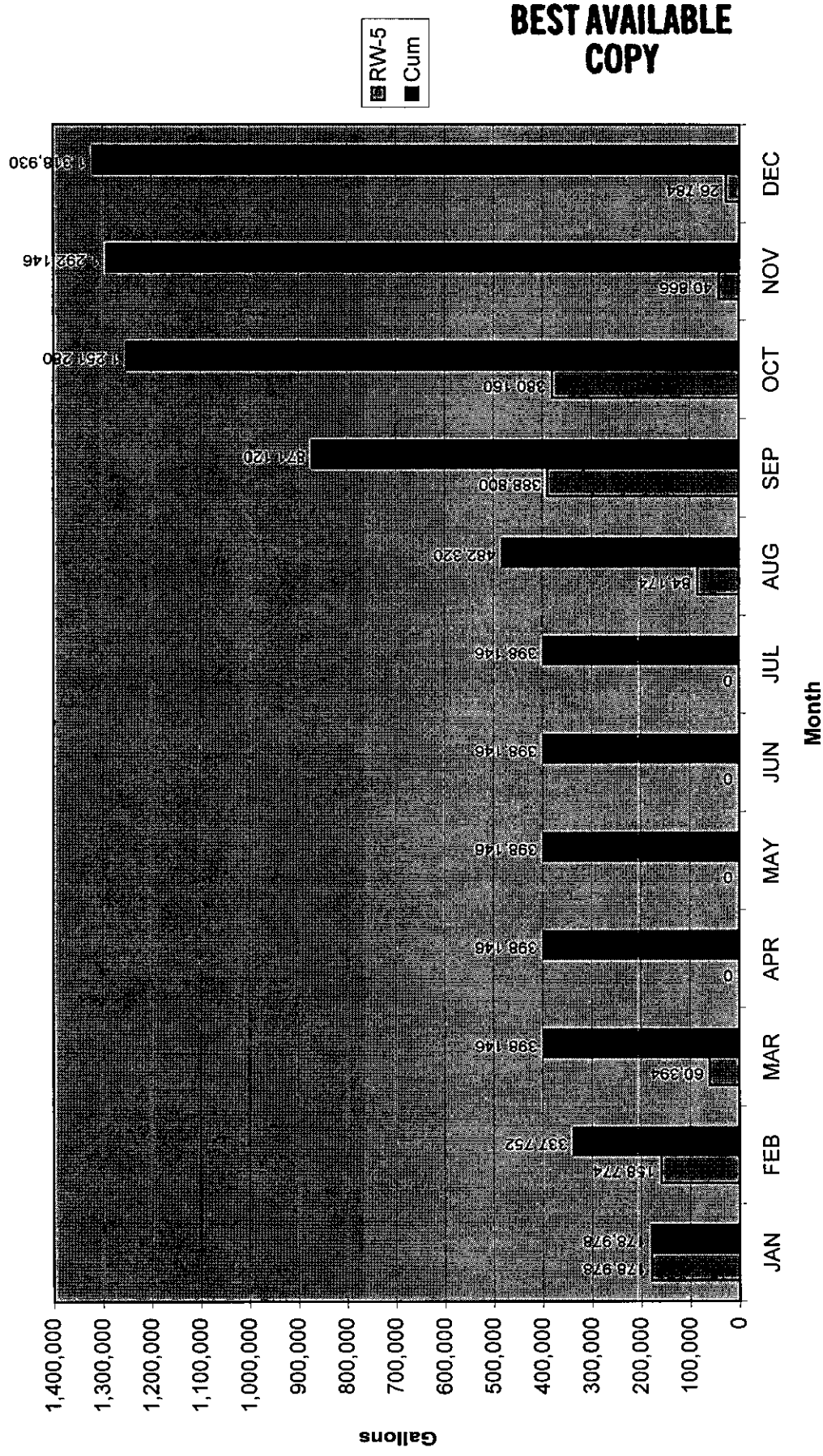

Figure 4
Year 2000 Monthly and Cumulative Groundwater Extraction Volume for Recovery Well RW-6 in Gallons

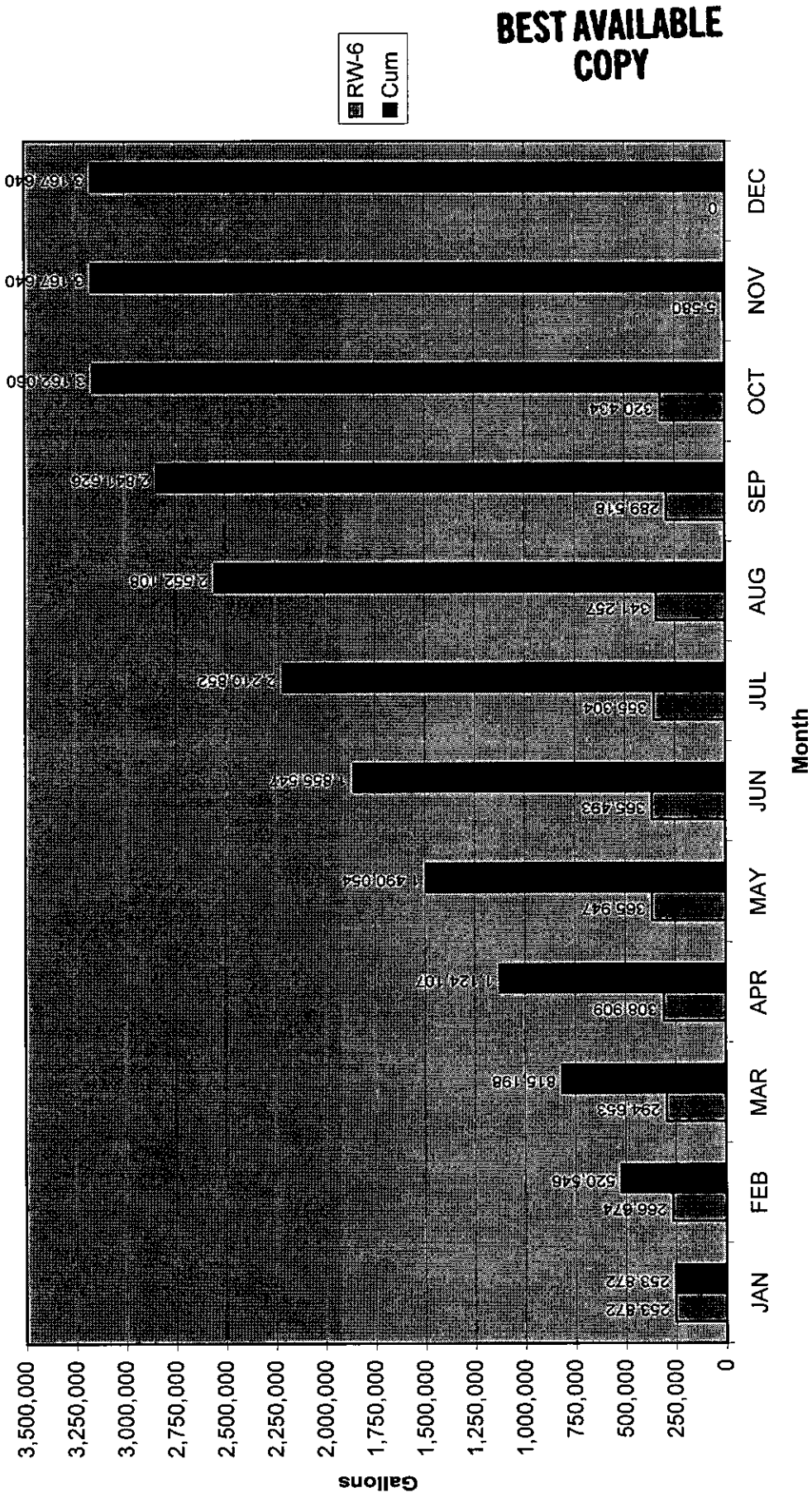

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Figure 5
Year 2000 Monthly and Cumulative Groundwater Extraction Volume for Recovery Well RW-7 in Gallons

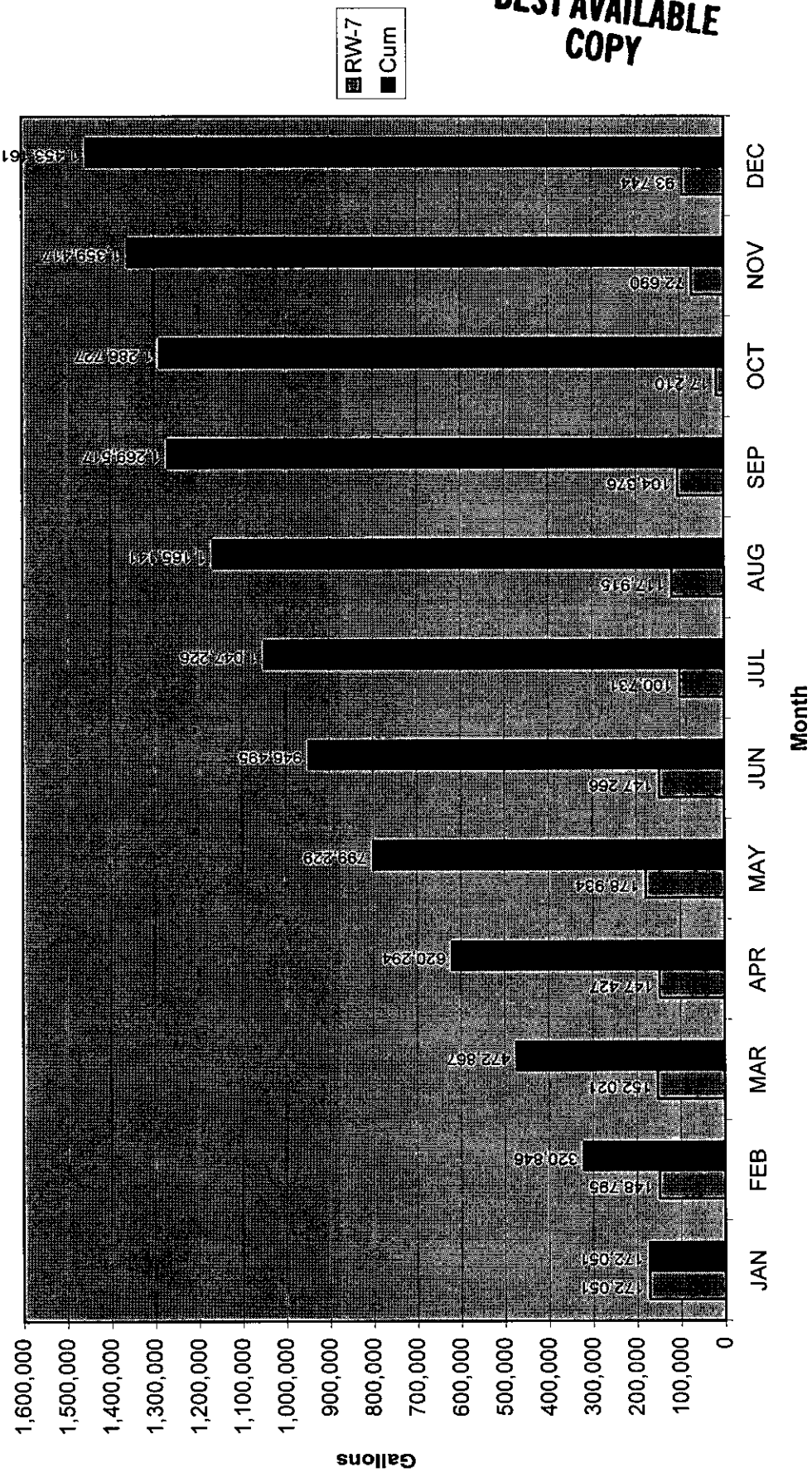

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Figure 6
Year 2000 Monthly and Cumulative Groundwater Extraction Volume for Recovery Well RW-8 in Gallons

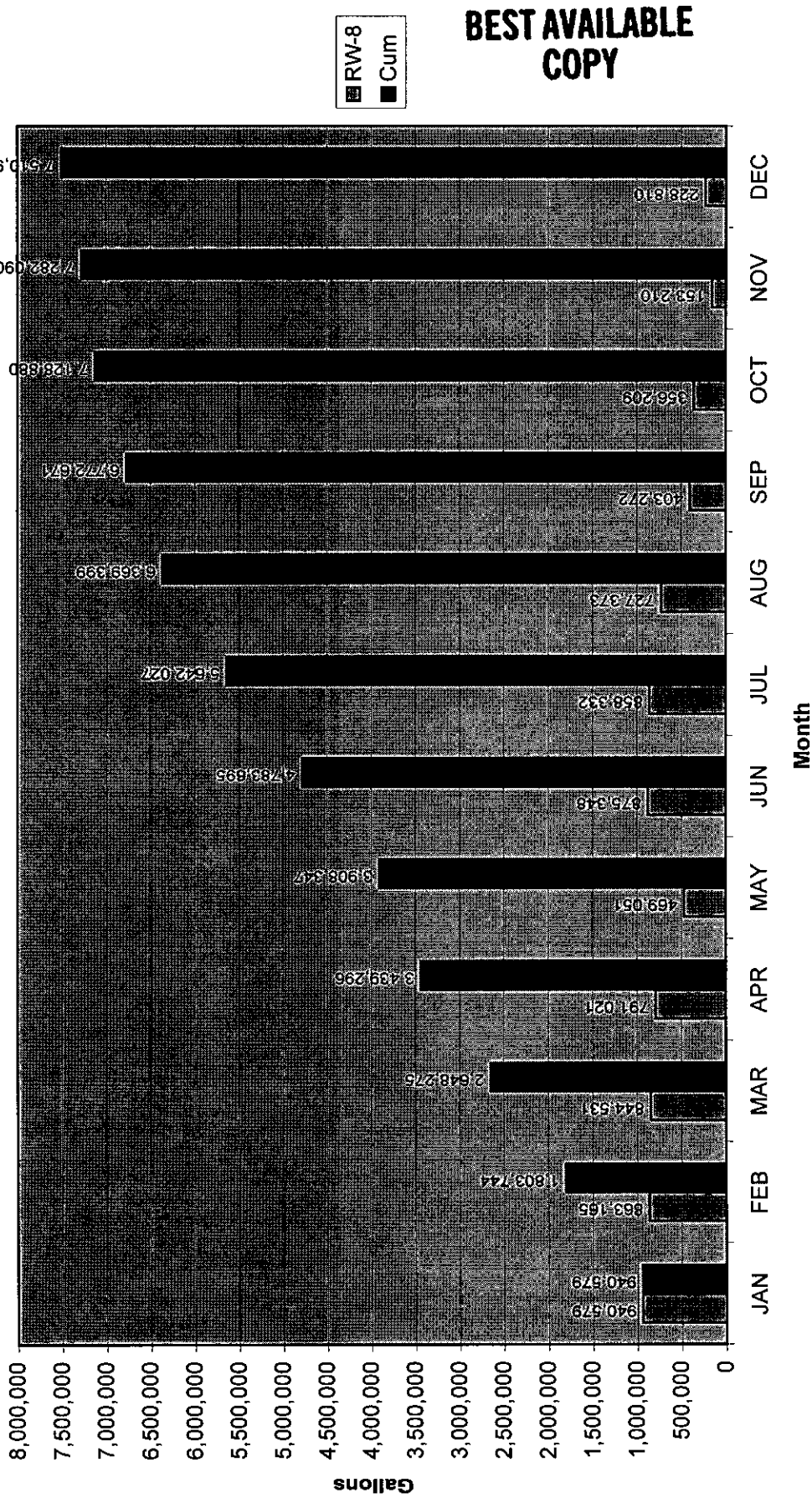
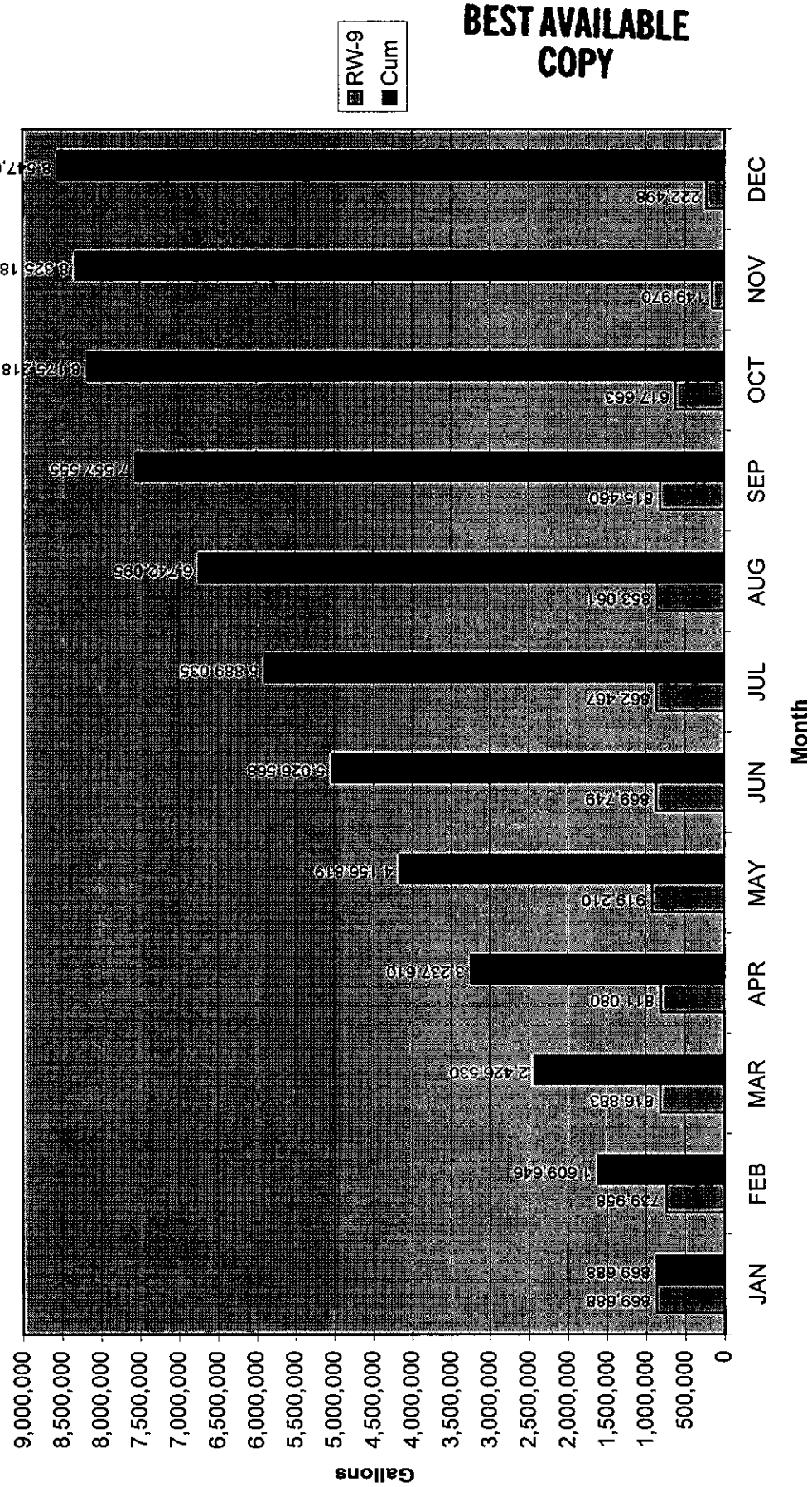


Figure 7
Year 2000 Monthly and Cumulative Groundwater Extraction Volume for Recovery Well RW-9 in Gallons



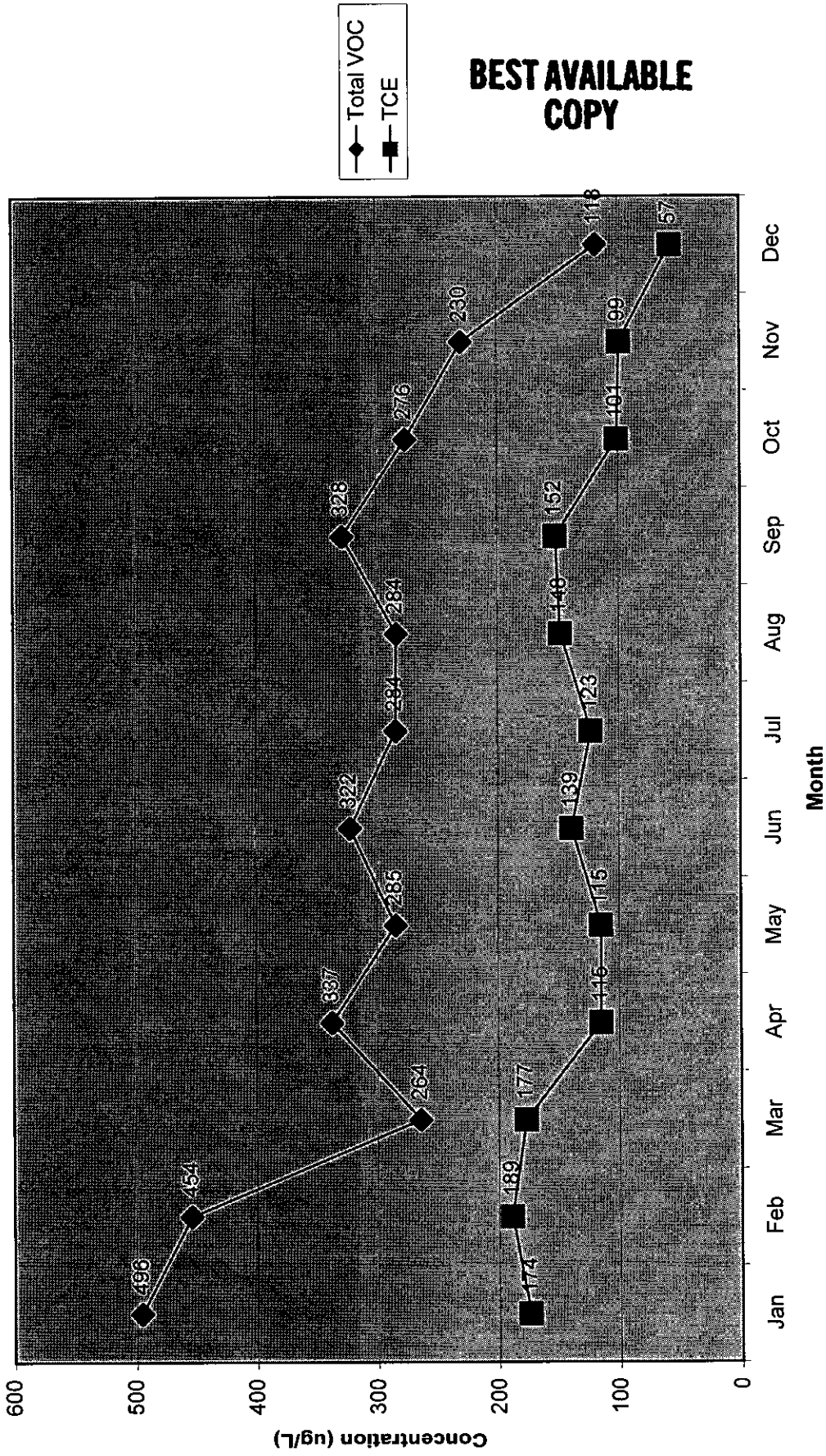


Figure 8
Year 2000 TCE and Total VOC Concentrations in Effluent

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