



**US Army Corps
of Engineers**

St. Louis District

Leaders in Customer Care

AFTER ACTION REPORT DROUGHT OF 1988

OCTOBER 1988

26 October 1988

AFTER ACTION REPORT FOR
DROUGHT OF 1988
ST. LOUIS DISTRICT

1. **EVENT:** During late June, weather in the midwest was dry and hot, with temperatures in the high 90's, and higher temperatures forecasted. First of 58 SITREPS was initiated on June 20, 1988 and a water control drought committee was formed within the St. Louis District. Reduced channel widths and depth hampered the towing industry and in some cases barges were loaded to less than full capacity. Other pertinent data was reported daily to the Emergency Management Branch for consolidation into SITREPS.
2. **TYPE AND ASSISTANCE REQUIRED:** Interagency coordination was established between Federal Agencies, FEMA Region V and Region VII, US Coast Guard MSO, St. Louis, MO. and Paduach, KY. State Emergency Management organizations in Missouri and in Illinois were also contacted. Public Affairs office provided support handling 20-50 telephone inquires daily and on weekends. Also news releases, photo and video highlites were furnished to the media after coordination with district elements. Other significant media contacts were made and supported queries from Congressman Buechner's office, US Department of Agriculture, National Steel, Prudential-Bache (commodities), Kansas City Stock Exchange, Defense Mapping Agency, Memphis Historical Society, Coastal Marine and many barge interests. (See Data cost sheet Encl no. 1)
3. **DROUGHT ACTIVITIES:**
 - (1) 20 June 1988 - Contract Dredge America dredging lower approach to L&D 26. Dredge Potter Mobilization initiated today Proable Date of Completion (PDOC) expected by 23 July 1988.
 - (2) 23 June 1988 - Dredge Potter mobilized, under way down stream to site no. 1. Dredge America continues dredging. M/V Pathfinder under way to mark best water course. U.S. Coast Guard set advisory for RM 126.
 - (3) 24 June 1988 - Public Affairs Office (PAO) providing CELMVD and HQ^SUACE with news clippings, video tapes and photos shipped via Express Mail. Dredge America continues dredging at new site RM 126, PDOC estimated at four days. M/V Pathfinder enroute to monitor tow passages. Grounded 20 barge tow RM 126. Reduced channel width continues.
 - (4) 27 June 1988 - Liaison meeting, with U.S. Coast Guard, Industry and Corps of Enginners at Cario, Illinois.
 - (5) 28 June 1988 - 1,420 acres of hay offered for sale. Bid opening schedule is for 11 July 1988. Location, Mark Twain Lake Project, Ralls and Monroe Co., Missouri. Total Marinas in CELMS Lake Projects is 20, Total Slips is over 2,436. Coast Guard MSO, Paduach to estimate tow movement at RM 42.2 UMR. Average percent of flow at St. Louis for this month is 23.9 Per-cent.
 - (6) 30 June 1988 - CELMS, is restricting no. of lockages during the 4th of July weekend at Kaskaskia, Lock.

(7) 16 thru 28 June 1988 - PAO telephonic quires have been averaging 20 to 50 per day, Monday thru Friday and 3 to 5 call per day over the weekend at PAO residence. Specific activities during this period are as follows:

- a. Handled 200-250 telephonic queries, ranging from one to twenty minutes each.
- b. Escorted TV crew on a river cruise; two TV interviews; twelve-fifteen taped radio interviews; one fifteen minute live radio interview.
- c. Flew two video/slide photo surveys of the Mississippi; St. Louis to Cario, Illinois.
- d. Made two printed releases and fifteen telephonic releases and to media who had specifically requested contingency notifications.
- e. Scanned and clipped more than 300 newspapers.
- f. Arranged for video taping of relevant TV news coverage.

(8) 5 July 1988 - Dredging continues. Retired channel patrol operator supplementing channel patrol capability using M/V Blankenship.

(9) 6 July 1988 - Pool 26 below limit, reduced channel width continues. Damaged roller gate No. 18 at L&D 26 was passing excessive flow. It was assumed that the lower portion of the (apron) had collapsed. Roller gate No. 17 had a similar problem. If inflows decreased to the point at which inflows were less than the uncontrolled outflow, full pool (and navigation depths) would have been jeopardized. A plan to prevent loss of pool was implemented and consisted of the following steps:

- a. Repair roller gate No. 17 and place back into service.
- b. Remove bulkheads from gate bay No. 17 to gate bay No. 18.
- c. Inspect gate No. 18 and repair if necessary.

As a contingency plan a set of (seven) 80 foot bulkheads from L&D 24 was brought to L&D 26. Although not a perfect fit, if necessary these bulkheads could have been modified and installed in gate bay No. 18 to prevent loss of pool if repair of gate No. 17 was not accomplished in time.

(10) 11 July 1988 - After bid openings this date they~~e~~ were 4 buyers on 8 items totaling 443 acres of hay for the sum \$ 140.00.

(11) 15 July 1988 - Dredge Thompson (St. Paul District) underway scheduled to arrive St. Louis by 24 July 1988.

(12) 19 July, 1988 - The St. Louis District Engineer hosted a briefing for approximately 30 members of the interagency drought fact-finding team of the Interagency Drought Policy Committee appointed by President Reagan.

Missouris' Congressman Emerson and Governor Ashcroft met with the Secretary of Agriculture and the team at Cape Girardeau, Mo. airport. The team, Congressman Emerson and Governor Ashcroft were transported by bus from the Cape Girardeau, Mo. airport to the downtown riverfront. They boarded a covered barge, provided by the Corps of Engineers, and were briefed on the river conditions by Mr. Jim Tuttle, Chief, Water Control Branch, CELMVD and Mr. Larry Rabalis, Chief, Operations Branch, CELMVD.

After a question and answer session and statements by Governor Ashcroft, Congressman Emerson and Secretary of Agriculture Lyng, the team visited a local farm near Jackson, Mo.

(13) 25 July 1988 - Dredge Thompson dredging PDOC, RM 202.8 UMR, and is expected to begin dredging on Missouri River on 26 July 1988.

(14) 29 July 1988 - Local interests request water from Lake Shelbyville, for livestock. Local livestock farmers will be permitted to draw water from Lake Shelbyville beginning 1 August 1988. Illinois Department of Commerce will provide pumps and manpower on Mondays, Wednesdays and Fridays from 0830 to 1030 hours.

(15) 1 August 1988 - Mark Twain Lake reports crappie fish kill. The impact of this fish kill will be a reduced crappie spawn over the next two seasons.

(16) 6 September 1988 - L&D 26, installation of the fabricated sections began today. Repairs to gate No. 17 were completed on 10 September 1988 and then the bulkheads were moved from gate bay No. 17 to No. 18 on 11 September 1988. Full pool was maintained through the repair process. Repairs are underway for gate bay No. 18 according to the schedule and the fabrication process is expected to be completed by the second week in December.

CLIMATOLOGICAL WEATHER SUMMARY SPRING AND SUMMER 1988:

<u>Temperature:</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	* <u>Aug</u>	<u>Sep</u>
Avg High	69.2	80.7	89.1	91.3	92.4	83.3
Avg Low	45.0	57.2	66.2	71.8	72.9	61.7
Monthly high temp	91.0	92.0	102.0	103.0	103.0	94.0
Days above 90	1	3	16	20	21	4
Record high temp	91/5th	98/1953	102/24th	115/1954	110/1934	104/1984
Monthly precip	1.15	1.44	1.97	3.02	2.31	1.99
Departure from normal	-2.40	-2.10	-1.76	-0.61	-0.24	-0.71

* Temperatures this August placed it as the 9th hottest August since records began in 1870.

This past April 1988 has been the 4th driest period since records began in 1870.

<u>Year</u>	<u>Amount</u>
1895	0.46 in/precip
1871	0.49 in/precip
1977	0.99 in/precip
1988	1.15 in/precip

This past May 1988 has been the 9th driest since 1934 with 0.54 inches of precipitation. May and April total rainfall was 2.59 inches and was the driest May and April periods since records began in 1870.

Rain provided only a brief respite to the moderate to severe drought conditions in most of the northern half of Missouri. This area has received less than 50 percent of their normal rainfall since April 1st and need 10 to 15 inches of additional rain in most areas to reach normal for the year.

Crop losses: Agricultural crop losses were staggering with corn, soybeans and wheat down production approximately 37 percent, 27 percent and 15 percent respectively

Lake Projects: SAMPLE OF STATISTICAL DATA SUBMITTED
26 June 1988
ACRES-FT STORAGE-LAKE PROJECTS

<u>PROJECT</u>	<u>RULE CURVE</u> <u>EL.</u>	<u>POOL</u> <u>EL.</u>	<u>NORMAL POOL</u> <u>SUMMER POOL</u> <u>AC-FT</u>	<u>EXISTING</u> <u>STORAGE</u>	<u>EXIST POOL OVER</u> <u>----- %</u> <u>NORMAL POOL</u>
CARLYLE	445.0	443.68	233,000	202,450	87 %
REND	405.0	405.88	185,000	200,900	109 %
SHELBYVILLE	599.7	597.14	210,000	180,000	86 %
MARK TWAIN	606.0	600.71	544,000	451,072	83 %
WAPPAPELLO	359.74	359.80	62,660	63,440	101 %

Rock removal:

As of 22 September 1988, drought expenditure for rock removal was \$ 100,000. The amount of funds authorized for rock removal, Regulating Works Project Mississippi River, was \$ 18,500,000.

On 18 October 1988, Luhr Bros Construction Company was the low bidder for the rock removal contract at \$ 12,787,730. Number of contract days is 420 to complete rock removal between approximate miles 82.0 to 37.0, Upper Mississippi River.

The proposed worksites are described in more detail as follows:

a. Wittenberg - Grand Tower, Mississippi River Mile (MRM) 82 to 79. Some pinnacle rock is located on the left bank of the navigation channel at mile 81.2 (Wittenberg). Ledge rock is located across the entire navigation channel at Grand Tower, MRM 79 to 80. Rock within the channel will be removed to elevation 314. Approximately 24,100 cubic yards of material will be removed.

b. Grays Point, MRM 46 to 45. Ledge rock is located on the left bank of the navigation channel. This stretch of river is an area where numerous barge groundings have occurred. The Coast Guard did an accident survey study in 1983 and indicated that between 1979 and 1983, 11 barge groundings occurred, all due to the barges flanking or steering too close to the outside of the solid rock ledge in the bend. Rock within the channel will be removed to elevation 294. Approximately 66,400 cubic yards of material will be removed.

c. Thebes bridge area, MRM 44.5 to 43.7. Pinnacle rock is near the right bank of the natural channel. Ledge rock is located on the left bank. Rock within the channel will be removed to elevation 291. Approximately 33,200 cubic yards of material will be removed.

d. Counterfeit Rock, MRM 43.7-40. Ledge rock is located on the left bank of the natural channel. Some pinnacle rock also lies within the natural channel. Rock within the channel will be removed to elevation 290. Approximately 14,200 cubic yards of material will be removed.

e. Commerce, MRM 39.7-37.7. Pinnacle rock is located throughout the natural river channel. Rock within the channel will be removed to elevation 288. Approximately 24,800 cubic yards of material will be removed.

Loosened rock will be piled into reefs outside the channel to mitigate for the loss of habitat in the channel where possible.

The emergency nature of the work is based on the fact that if current drought conditions persist, the main channel depth could be reduced seven to eight feet by late fall. The Missouri Department of Conservation conferred with the U.S. Fish and Wildlife Service and the Illinois Department of Conservation regarding the proposed work of the Corps of Engineers. In letter dated 19 August, 1988, the Missouri Department of Conservation stated the agencies approved the removal plan. In addition, the Corps of Engineers will continue to work with these agencies on modifications that may further reclaim fish and wildlife resource values while maintaining the mandated navigation channel.

Dredging Costs:

Total additional dredging cost by Dredge AMERICA was \$ 700,000.

Flow:

Average normal flow at St. Louis from 20 June 1988 to present was 31.0 %.

SITREP: CELMS Final Drought SITREP report was 22 September 1988.

Commander's Assessment.

The 1988 Drought event was a unique experience with in the St. Louis District. Drought activities were primarily related to the record settings low water conditions on the Mississippi River. These conditions prompted the previously described emergency Rock Removal and emergency repair of gate no. 17 at L&D 26. In addition there was only one permit issued for withdrawal of up to 50 acre feet of water from Lake Shelbyville, Illinois. This permit expired on 31 December 1988. Positive actions displayed by other Divisions and Districts to accomplish the mission of meeting daily dredging requirements for St. Louis, Kansas City, Memphis and Louisville were impeccable.

Lesson Learned. There is only one issue to be discussed. Corrective action will be taken by the district. Recommendation for this issue is forwarded to CELMV-CO-E and HQUSACE for consideration.

- (1) **Issue** - Reporting to too many stove pipes.
- (2) **Discussion** - During the Drought of 1988 we were constantly requested to provide pertinent information to higher authority. CELMS-OD-R provided data to Emergency Management channels, Operation channels, Natural Resource channels, and Hydropower channels. CELMS-OD-R received calls from HQUSACE as well as the Division office.
- (3) **Recommendation** - Keep all information requests and reports in one channel, perferably the emergency management channel, because this channel is the most flexiable.
- (4) **Office** - CELMS-OD-R.

FOR THE COMMANDER:

/s/ JAMES A. PETERSEN
Chief, Operations Division

Enclosures:

- Encl 1, Documentation of Drought Activities
- Encl 2, Personnel Engaged in Drought Activities
- Encl 3, River Stage Hydograph

CELMS-OD-E

28 September 1988

MEMORANDUM FOR: Commander, Lower Mississippi Valley Division
ATTN: CELMV-CO-E

SUBJECT: Documentation of Drought Activities and Funding for Drought Emergency Operations

1. Reference is made to CECW-OD-E memorandum dated 17 September 1988, SAB.
2. This letter rescinds letter dated 22 September 1988, SAB.
3. IAW, paragraph 4 of referenced memorandum the following Drought Cost Data is as follows:

Division: CELMV-CO-E / District: CELMS-OD-E

a. <u>Personnel Services:</u>	<u>Hours</u>	<u>Costs</u>
Direct Labor:		
Regular Hours	388	\$ 61,000
District Overhead (26.18 %)	388	16,000
Overtime Hours	-0-	-0-
Compensatory Hours	-0-	-0-
Technical Indirect Costs		32,400
Overhead Costs (26.18 %) Less Direct Labor Costs on Overhead Elements Shown Below		100
<u>Subtotal</u>	<u>388</u>	<u>\$ 109,400</u>

Lock and Dam No. 26 Roller gate repairs.

b. Personnel Services:

Service Base Direct Labor:

Regular Hours	2002	37,800
Overtime Hours	984	19,000
SB Shop Overhead	-0-	62,400
District Overhead	-0-	13,500
<u>Subtotal</u>	<u>2986</u>	<u>\$ 132,700</u>

SUBJECT: Documentation of Drought Activities and Funding for Drought Emergency Operations

b. Personnel Services: (cont'd)

Service Base - Other

Plant Rental	-0-	26,800
Travel and Per-Diem	-0-	2,900
Materials and Supplies	-0-	20,600
<u>Subtotal</u>	<u>-0-</u>	<u>\$ 50,300</u>
<u>Towboat Services (Commerical)</u>	<u>-0-</u>	<u>14,300</u>
<u>Total</u>	<u>2986</u>	<u>\$ 197,300</u>

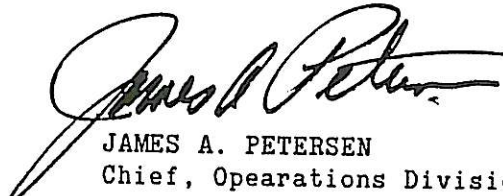
Direct Labor on Overhead Elements (OC, SO, PA, RM etc...)

Regular Hours (PA)	12	400
Overtime Hours	-0-	-0-
Compensatory Hours	-0-	-0-
<u>Subtotal</u>	<u>12</u>	<u>400</u>

a. <u>Contract Payments (List by Contract)</u>	<u>700,000</u>
Additional Dredging due to Drought Conditions	
b. <u>Miscellaneous (Specify)</u>	<u>100,000</u>
Additional Drought Expenditures Rock-Removal	
<u>TOTAL</u>	<u>\$ 1,107,000</u>

4. Additional funding was not required in FY 88, all amounts were covered with current year funds (Except 100,000 for Rock Removal). However, the Drought Conditions experienced in FY 88 may continue on and increase dredging requirements in FY 89.

FOR THE COMMANDER:


JAMES A. PETERSEN
Chief, Operations Division

ST. LOUIS DISTRICT
PERSONNEL ENGAGED IN DROUGHT ACTIVITIES
DROUGHT OF 1988

1. Contracting Division: CELMS-CT-P

- a. Joan C. Brickey, Purchasing Agent. - For timely acquisition of subsistence and related items for mobilization of the Dredge Potter.
- b. Laurence L. Kennedy, Purchasing Agent. - Same as above.
- c. Barbara J. Jarman, Purchasing Agent. - For acquisition of marine telephone and services and urgently needed towboats.
- d. Kathleen M. Sounders, Purchasing Agent. - For acquisition of urgently needed towboats.
- e. Joy S. Bode, Supvy Procurement Analys. - For coordination and planning in obtaining drought related supplies and materials and services. Acted as Contracting Officer for orders issued.

2. Engineering Division: CELMS-ED-H

- a. James T. Lovelace, Supvy Hydraulic Engr. - Chief Hydraulics Branch, Oversaw all hydraulic input concerning the drought on rivers, Lock and Dams and Reservoirs.
- b. Claude N. Strausser, Supvy Hydraulic Engr. - Water Control Mgmt. Coordinator.
- c. Henry T. Martin, Hydraulic Engr. - POC, chaired and coordinated drought meetings held weekly.
- d. Richard D. Mills, Hydraulic Engr. - POC, for SITREP data from Engineering Division.
- e. David R. Busse, Hydraulic Engr. - Water control regulator for Lock and Dams and Reservoirs. Maintained minimum water releases on lake projects, and Lock & Dam pools.
- f. Raymond J. Kopsky, Jr., Hydraulic Engr. - Same as above.
- g. Willie J. Stroud, Hydraulic Tech. - Same as above.
- h. Robert D. Davinroy, Hydraulic Engr. - River Engineer, rock removal coordinator.
- i. David C. L. O'Connel, Survey Boat Operator M/V Blankenship.
- j. Carl J. Okenfuss, Survey Boat Operator M/V Blankenship.
- k. Fred H. McLard, Hydraulic Tech. - Water data mgmt., (M/V Blankenship was also utilized for assisting tows thru Lock and Dam 26.)
- l. Kenneth B. Anderson, Surveying Tech. - M/V Blankenship.
- m. Edward L. Pelc, Hydraulic Tech. - Gaging station maintenance.

3. Operations Division: CELMS-OD-E, CELMS-OD-N and CELMS-OD-R.

- a. Louis J. Chiodini, Jr., Supvy Civil Engr. (CELMS-DX) - Assisted in establishing comuterized reporting format on Q&A.
- b. Richard J. Buncie, Civil Engr. (Deceased) CELMS-OD-E, POC for Emergency Management Branch, SITREPS, assisted in establishing reporting format.
- c. Benedict F. Venturella, Jr., Natural Disaster Mgr., - Acting Chief, Emergency Management Branch, coordinated drought activities and POC for funding inquires.

ST. LOUIS DISTRICT
PERSONNEL ENGAGED IN DROUGHT ACTIVITIES
DROUGHT OF 1988

d. Philip J. Hasser, Emerg Opns Plan Spec., CELMS-OD-E - Assisted in coordination of SITREPS to CELMV-CO-E.

e. Mary Ann Dostal, Clerk Typist, CELMS-OD-E - Coordinated data input into Final SITREPS and telecopy to CELMV-CO-E.

CELMS-OD-N:

a. Walter C. Feld, Supvy Civil Engr., Chief, Navagation Branch - Coordinated scheduling of Government and Contract Dredges for SLD an other Corps Districts.

b. Carol E. Sherrill, Civil Engr Tech., CELMS-OD-N - Activities to mobilize and staff dredges, daily contact with dredge inspectors and providing information to the USCG, and CELMVD.

c. Margaret A. Robbins, Civil Engr Tech., CELMS-OD-NC - Coordinated fund transfers for dredging activities between districts. Daily conformation update on dredging activities and channel conditions.

d. Paul Kornberger, Supvy Civil Engr., Chief Lock & Dam Section - Coordinated low water related actions to reduce leakage and monitored repairs to assure pool levels.

e. Donald D. Houston, Supvy Civil Engr Tech., Chief Channel Maintenance Section - Detailed channel observation to provide best channel conditions and assignment of dredges to most critical areas.

M/V PATHFINDER:

- a. Steven L. Jones, Master Towboat
- b. Howard L. Fields, Deckhand Towboat
- c. Terry L. Helming, Deckhand Towboat
- d. Jerry J. Schaperclaus, Chief Engineer Towboat
- e. Melvin J. Zerwig, Deckhand Towboat

Detailed channel observations marking the channel to keep navigation moving.

CELMS-PA:

Clyde A. Wilkes, Public Information Officer., - Provided video-taped reports, news clippings, and video tapes of televieion news coverage to CELMVD and HQUSACE.

ST. LOUIS DISTRICT
PERSONNEL ENGAGED IN DROUGHT ACTIVITIES
DROUGHT OF 1988

CELMS-OD-R

Stanley F. Ebershol, Civil Engr., Water Permits Coordinator
Gary J. Lee, Civil Engr., Coordinator SITREPS.

CELMS-OD-RP CANNON POWER

Walter D. Dale Russel, Pwr Plant Supt.
Informed news media on drought situation and provided SITREP data.

CELMS-OD-RC CARLYLE

Karl J. Tilkens, Assist. Park Mgr. - Same as above.

CELMS-OD-RS SHELBYVILLE

Winston B. Campell, Park Mgr., - Issued Permits and provided SITREP data.

CELMS-OD-RJ MARK TWAIN

Dennis D. Foss, Park Mgr., Hay Sale Coordinator

CELMS-OD-RR REND

Lowell F. Summers, Park Ranger. - Informed news media on drought situation
Phillip K. Jenkins, Park Mgr. - Provided SITREP data.

CELMS-OD-RW WAPPAPELO

Gary G. Stilts, Park Mgr. - Same as above.

ST. LOUIS DISTRICT
PERSONNEL ENGAGED IN GATE REPAIR
DROUGHT OF 1988

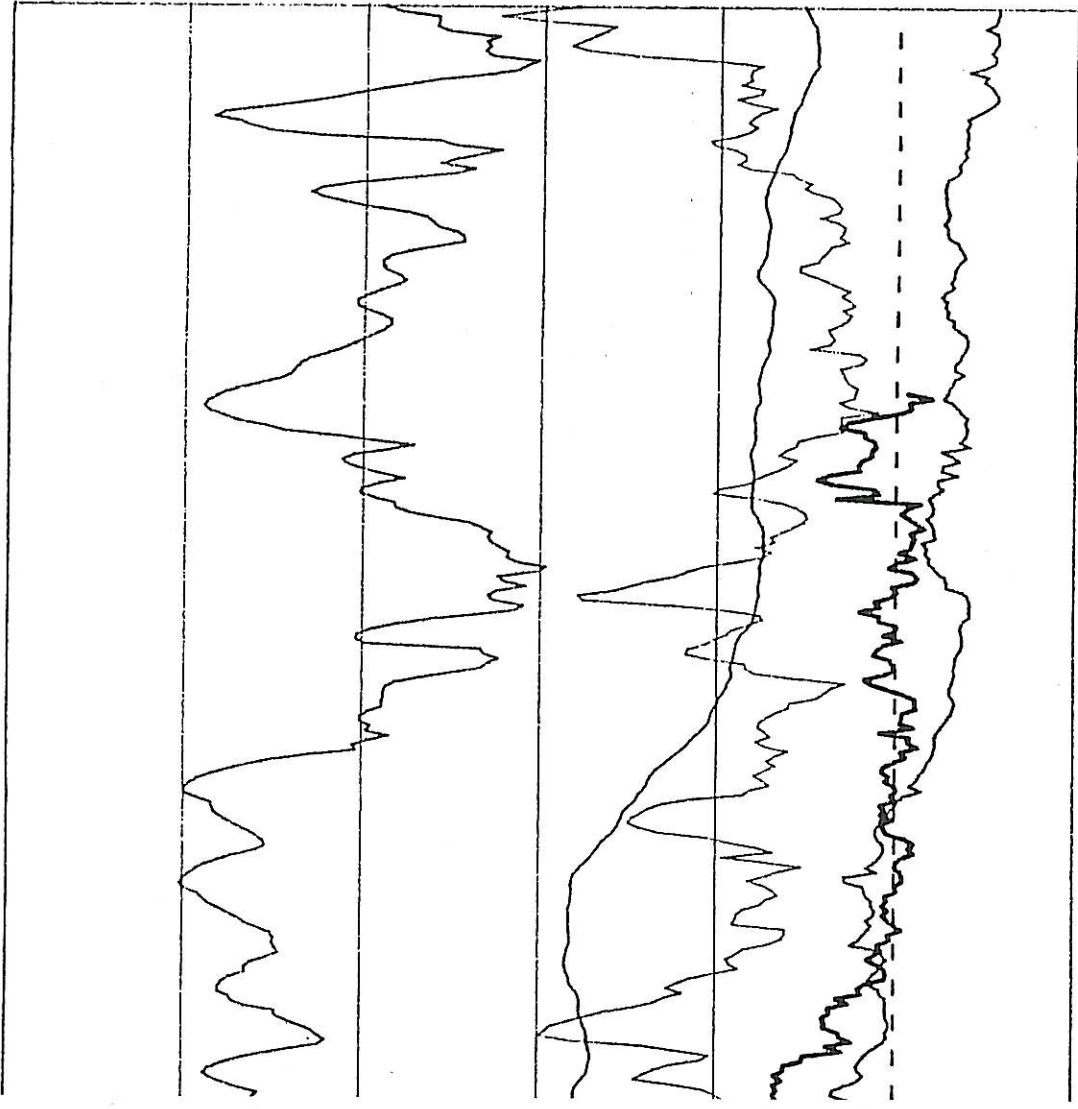
THE NAMED INDIVIDUALS WERE A PARTICIPANT IN AN EXTREMELY CRITICAL EMERGENCY REPAIR AND BULKHEADING OPERATION WHICH BECAME NECESSARY TO AVOID LOSS OF POOL 26, AND POSSIBLE CESSATION OF NAVIGATION.

PAUL KORNBERGER	OD-NL
WELTON J. JOGGERST	OD-N
TERRY B. MEYERS	OD-NL L&D 24
EDMOND D. ROGERS	OD-NL LOCKS 27
KENNETH W. STRONG	OD-NL LOCKS 27
LAWRENCE P. STAHLSCHMIDT	OD-NL L&D 26
CYRUS N. KRIGBAUM JR.	OD-NL L&D 26
DONALD H. SCHRADER	OD-NL L&D 26
RANDY E. JONES	OD-NL L&D 26
JOHN C. BRANSON	OD-NL LOCKS 27
WILLIAM A. JONES	OD-NL L&D 26
TERRY D. WHITMER	OD-RW WAPPAPELO LAKE
DARRELL E. LAPLANTE	OD-PB SERVICE BASE
JOSEPH A. McELLIGOTT	OD-PB SERVICE BASE
PAUL A. NOTTMEIER	OD-PB SERVICE BASE
DAVID RUCK	OD-PB SERVICE BASE
LARRY L. SHAFER	OD-PB SERVICE BASE
JAMES R. STEELE	OD-PB SERVICE BASE
RICHARD P. STUBITS	OD-PB SERVICE BASE
RALPH J. THOMPSON	OD-PB SERVICE BASE
RICHARD K. ULLMAN	OD-PB SERVICE BASE
TED V. HAYN	OD-PB SERVICE BASE
NICHOLAS F. MILLER	OD-PB SERVICE BASE
EVELYN C. ROLAND	OD-PB SERVICE BASE
THOMAS C. JOHNSON	OD-PB SERVICE BASE
CHARLES R. JOHNSON	OD-PB SERVICE BASE
JOHN E. HEITZMANN	OD-PB SERVICE BASE
JOHN E. HILL	OD-PB SERVICE BASE
BRUCE GRAU	OD-PB SERVICE BASE
ROBERT E. EIFERT	OD-PB SERVICE BASE
JOSEPH CARACCI	OD-PB SERVICE BASE
MICHAEL S. BARFIELD	OD-PB SERVICE BASE
JUDGE T. HILL	OD-PB SERVICE BASE
LOUIS C. HURD	OD-PB SERVICE BASE

ST. LOUIS GAGE 1861-1988

10/14/88

— HIGH
— MEAN
— LOW
— 1988
— 1987



JUN
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