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REVISED PUMPING REGIME FOR THE SOUTH PLUME RECOVERY WELL FIELD (REMOVAL ACTION 3, PART 2) - JUNE 5, 1994

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LETTER

Department of Energy
Fernald Environmental Management Project
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DOE-2022-94

Mr. James A. Saric, Remedial Project Manager
U. S. Environmental Protection Agency
Region V - 5HRE-8J
77 W. Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, OH 45402-2911

Dear Mr. Saric and Mr. Schneider:

REVISED PUMPING REGIME FOR THE SOUTH PLUME RECOVERY WELL FIELD (REMOVAL ACTION 3, PART 2) -- JUNE 5, 1994

This letter serves to inform you that the Department of Energy (DOE) implemented a revised pumping regime for the South Plume Recovery Well Field (Removal Action 3, Part 2) on June 5, 1994. The revised pumping regime was implemented in order to optimize the recovery system operation. The revised pumping configuration was evaluated prior to implementation using SWIFT flow model simulations in conjunction with monitoring data collected as part of the Design, Monitoring, and Evaluation Program Plan (DMEPP).

Pumping operations were last modified in December of 1993 when the pumping rate of the five wells, which comprise the recovery system, was reduced from 2000 gpm (400 gpm/well) to 1500 gpm (300 gpm/well) in order to minimize the recovery systems effect on the migration of Paddys Run Road Site (PRRS) groundwater contaminants. Monitoring activities conducted under the DMEPP and SWIFT flow modeling simulations confirmed that the 1500 gpm pumping rate maintained complete capture of the 20 ppb uranium isopleth, and minimized the impact on PRRS contaminants.

Subsequent to the reduction in the extraction flow rate, information was obtained from the pump manufacturer which indicated that the 300 gpm/well pumping rate is below the recommended minimum pumping rate. It is believed that sustained pumping below 450 gpm is detrimental to the pump motors and can result in pump failure. As the site had already experienced a failure of the pump motor in Well No. 5 on January 23, 1993, it was felt that a modification to the wellfield operation needed to be implemented. Modifications available included either replacement of the pumps with smaller sized units or a change in the number of operating units to increase the flow in those remaining.

Accordingly, SWIFT flow model evaluations of the South Plume Recovery Well Field were conducted during early May 1994. An alternate pumping configuration was identified which addressed the below recommended pumping rates and at the same time optimized the recovery field operation.

However, on June 4, 1994, before the revised pumping configuration could be discussed with United States and Ohio Environmental Protection Agency (USEPA and OEPA) and implemented, Recovery Well #4 (3927) failed; assumably due to the low pumping rate described above. At that time it was determined to implement the revised pumping configuration which had been evaluated through model simulation.

In order to bring the well pumps into their recommended operating range and optimize the operation of the recovery system, the following pumping configuration was initiated on June 5, 1994:

- Pumps in recovery wells #2 and #4 (3925 and 3927) were shut down
- Pumping from Recovery Well #1 (Well #3924) was increased to 450 gpm
- Pumping from Recovery Well #3 (Well #3926) was increased to 550 gpm
- Pumping from Recovery Well #5 (Well #3928) was increased to 500 gpm
- The combined pumping of the recovery system is maintained at 1500 gpm.

On Monday, June 6, 1994, at approximately 3:45 p.m., a severe thunderstorm interrupted the power supply to all recovery wells. Recovery Wells 1, 3, and 5 were restarted after Cincinnati Gas and Electric (CG&E) restored power at approximately 8:45 p.m. Approximately one hour later at 9:50 p.m., the operator on duty noted that one of the recovery wells had apparently shutdown because of the reduced flow indicated at the Valve House. Upon investigation, RW-5 was found to be off and unable to be restarted. A more thorough inspection revealed extensive damage to the Motor Starter panel, apparently caused by a large electrical surge from CG&E or lightening. On Tuesday, June 7, 1994, Maintenance and CRU5 Engineering evaluated the damage and determined that the most expeditious repair for RW-5 would be to remove the damaged Motor Starter panel and replace it with the undamaged panel from RW-4, which was not in use because of a damaged pump motor. These repairs required coordination with CG&E in order to effectively isolate the electrical power supply and were completed on Monday and Tuesday June 13 and 14, 1994. Recovery Wells 1, 3, and 5 were returned to service at approximately 1:30 p.m., Tuesday June 14, 1994.

The results of the modeling evaluation for the revised pumping configuration showed that an effective hydraulic barrier will be maintained with only minimal impact to the migration of contaminants associated with PRRS. Thus, the prime objectives of Removal Action 3, Part 2 continue to be met. In addition, increased system flexibility is realized by maintaining Recovery Well Pumps #2 and #4 as spares which can be brought on-line in the event of a future pump failure at wells #1, #3, or #5.

Presented as an enclosure are the modeling outputs showing comparisons between the base pumping case (5 wells pumping at 300 gpm/well) and the revised pumping configuration (3 wells pumping at 450 gpm, 550 gpm and 500 gpm) along with a brief description of results.

If you require additional information on this subject please contact Kathi Nickel at (513) 648-3166 or Pete Yerace at (513) 648-3161.

Sincerely,

Johnny Reising

for Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Nickel

Enclosure: As Stated

cc w/enc:

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M. Proffitt, OEPA-Dayton
R. Owen, ODOH
J. Michaels, PRC
L. August, GeoTrans
F. Bell, ATSDR
AR Coordinator, FERMCO

Figure 1. BASE CASE: LAYER 1 HEADS: File: ALTBASE1.CMD

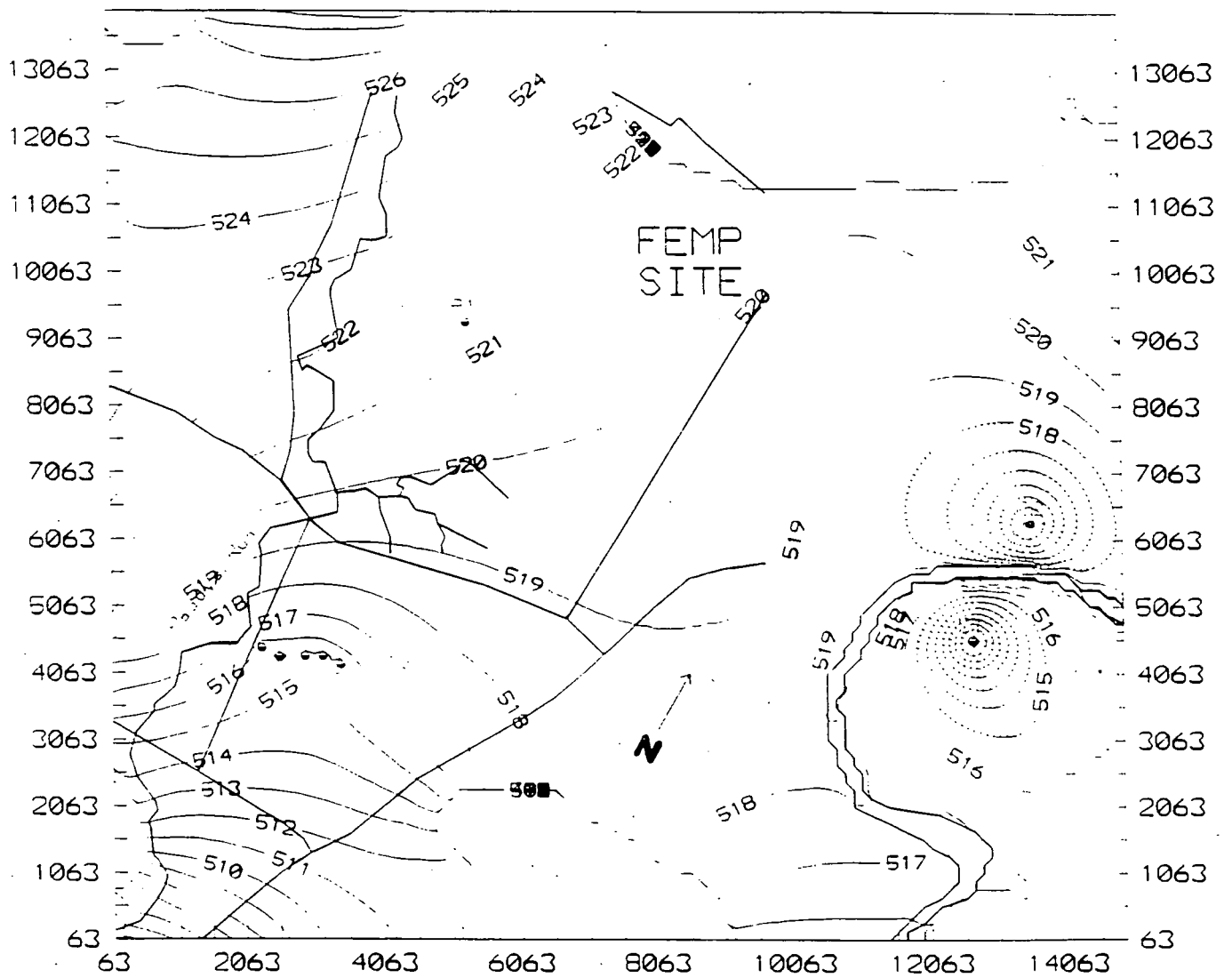


Figure 2. BASE CASE: LAYER 5 HEADS; File: ALTBASE5.CMD

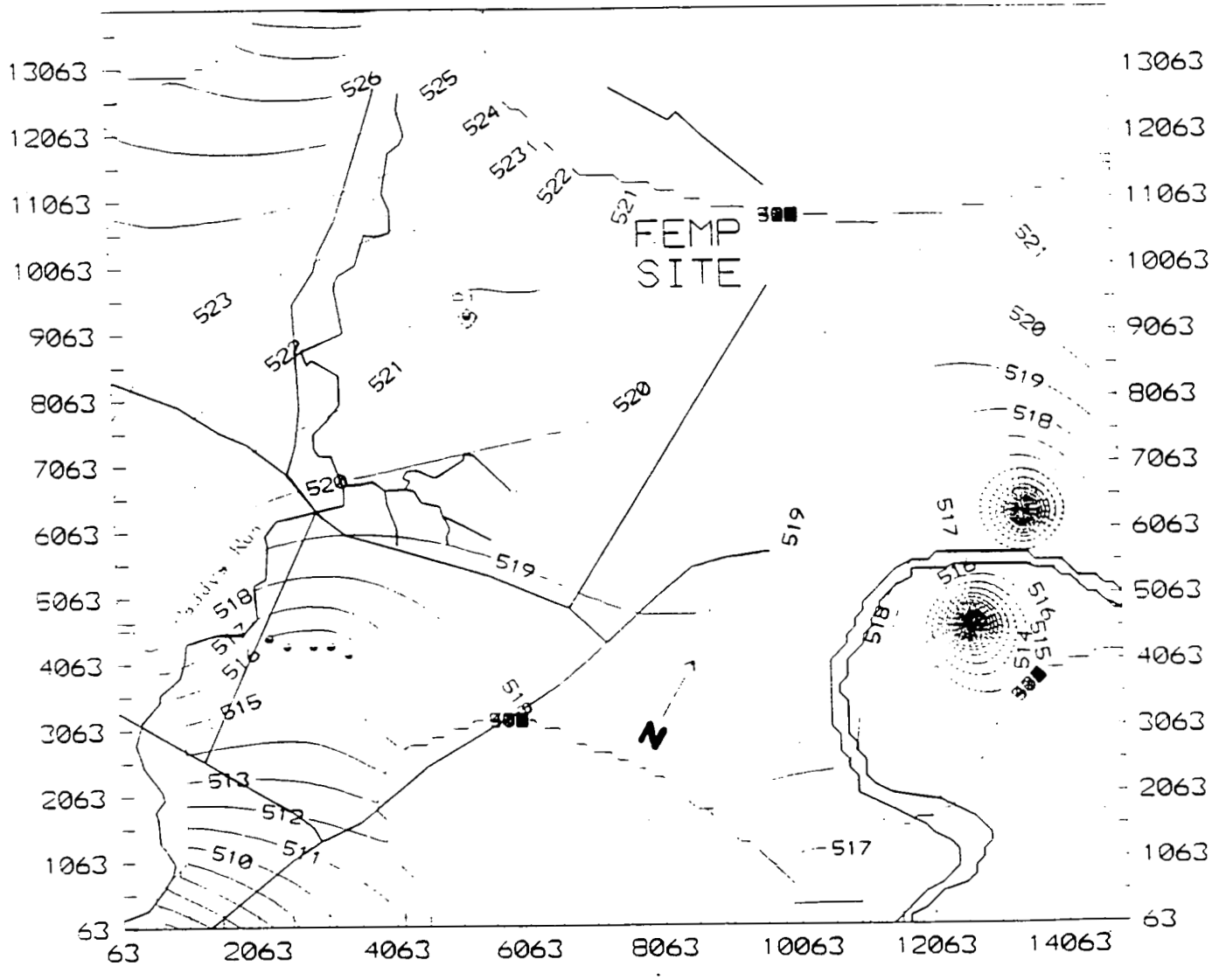


Figure 3. ALTERNATE CASE: LAYER 1 HEADS: File: ALTPUM11.CMD

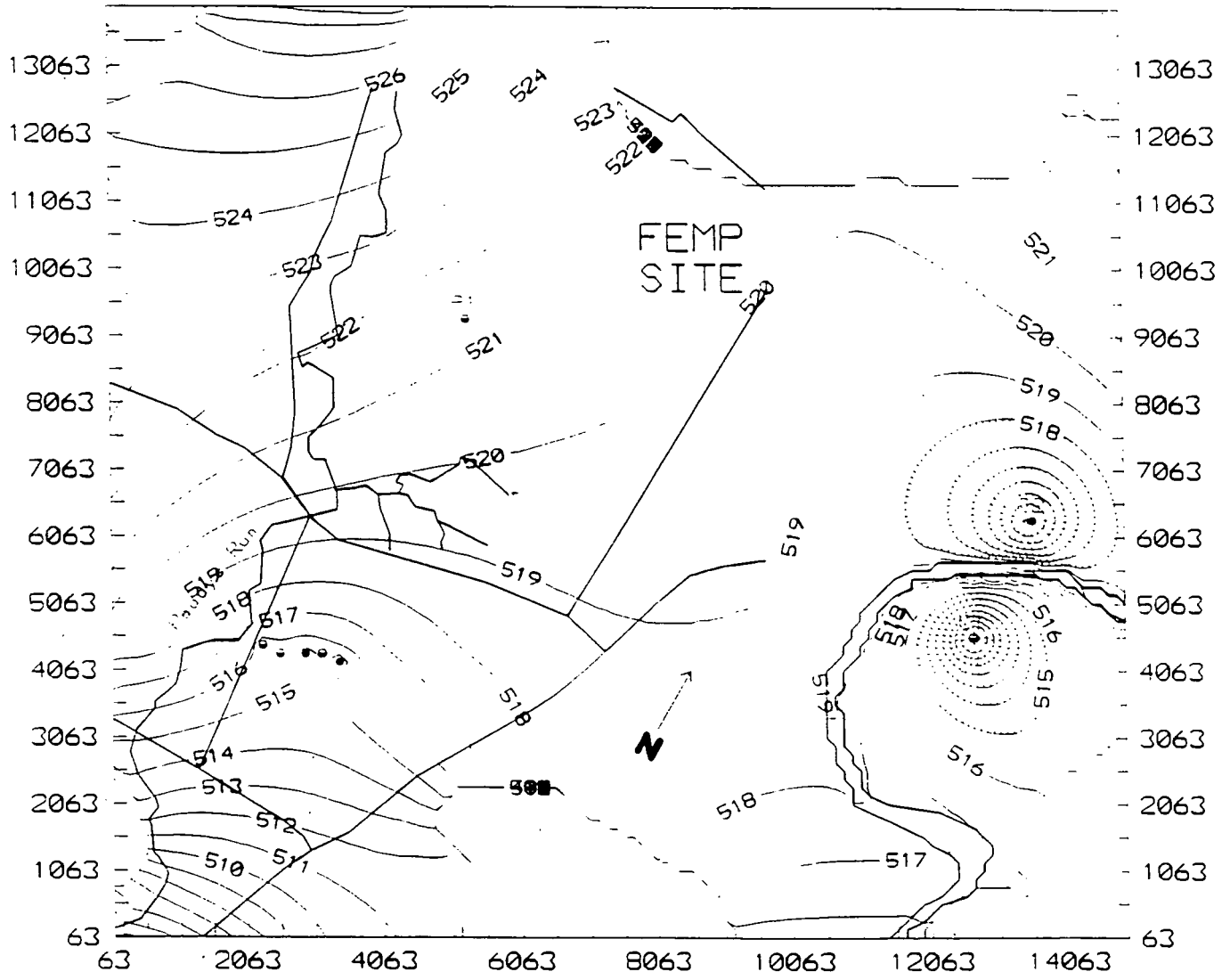
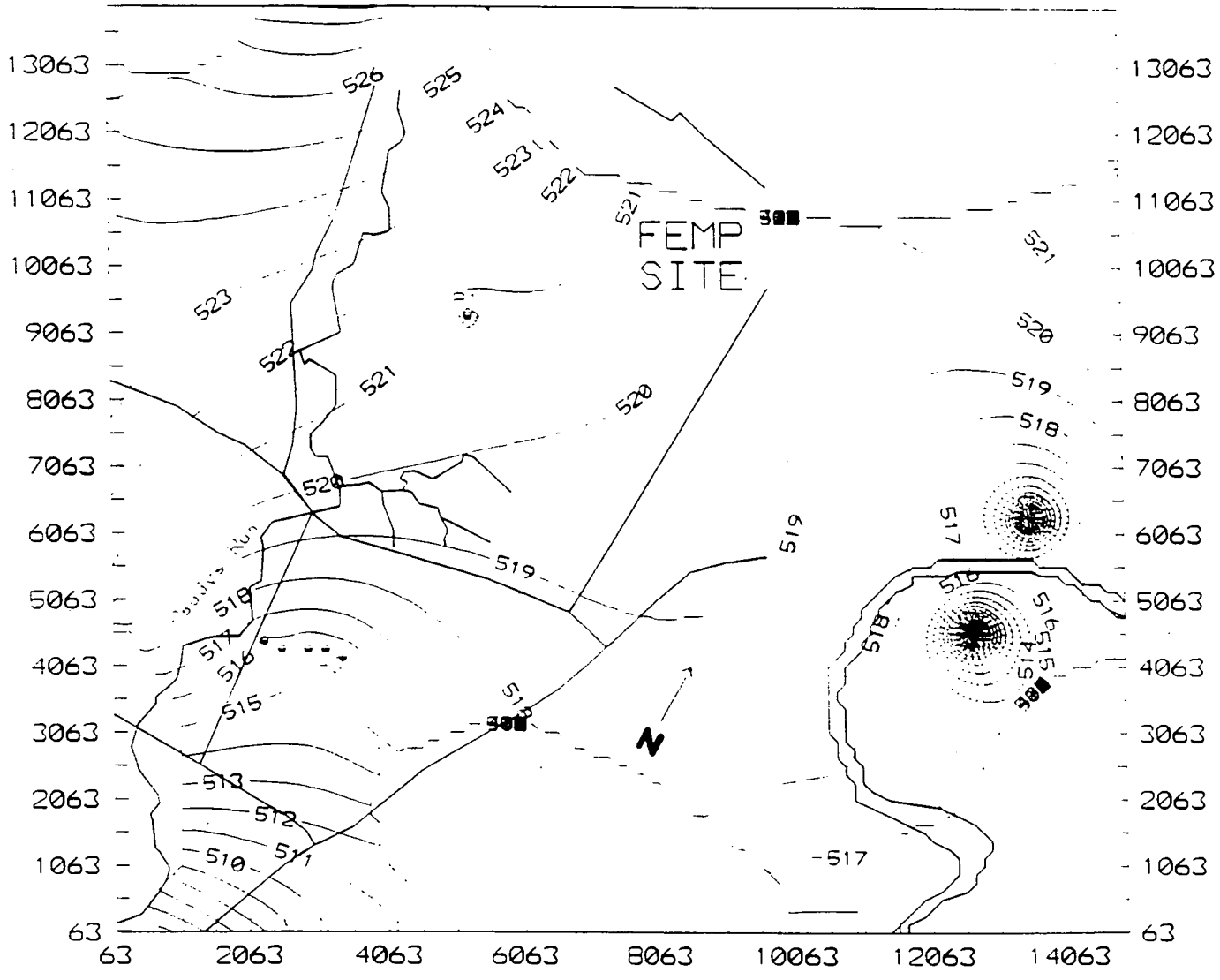
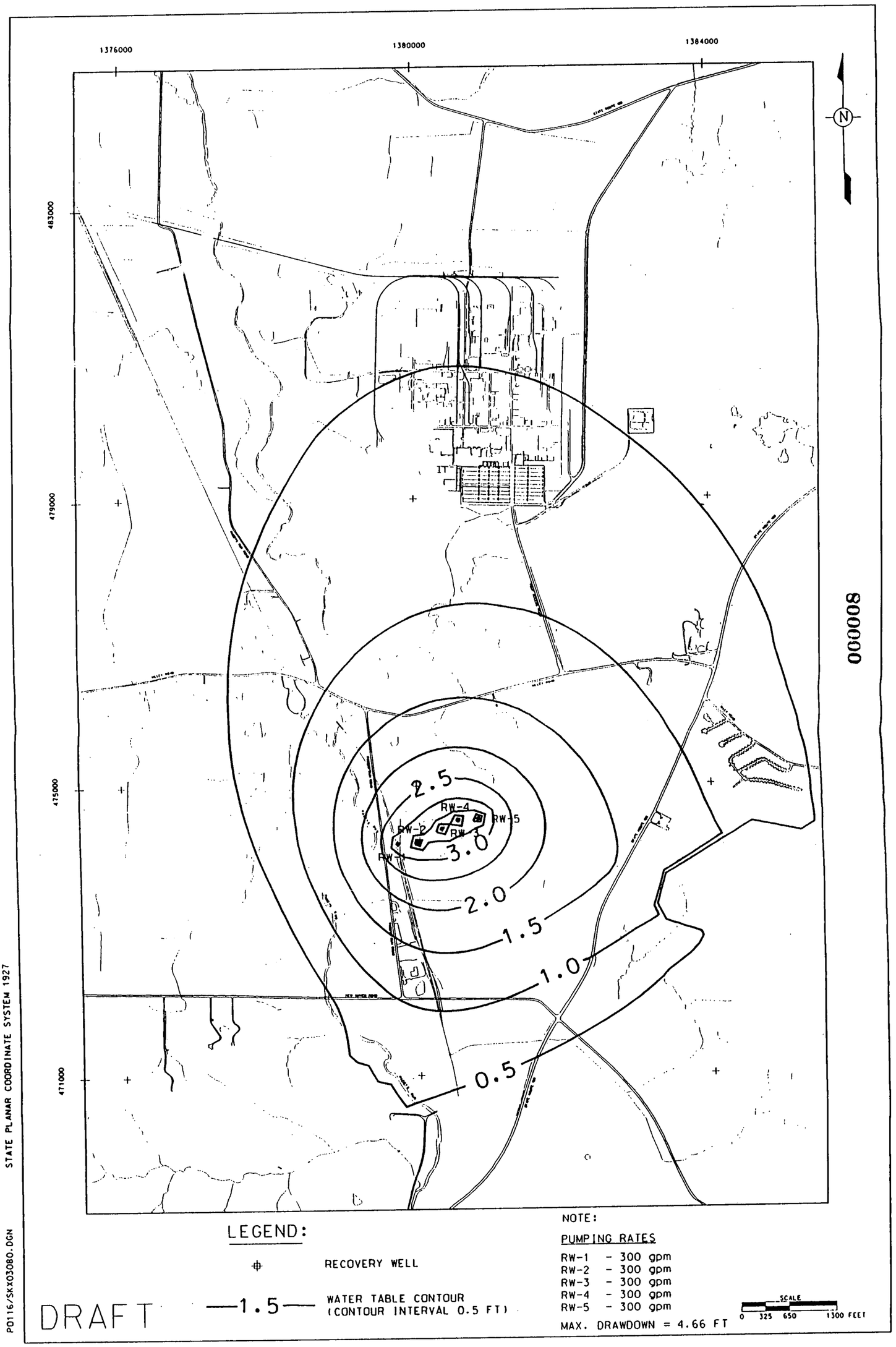


Figure 4. ALTERNATE CASE: LAYER 5 HEADS; File: ALTPUM15.CMD





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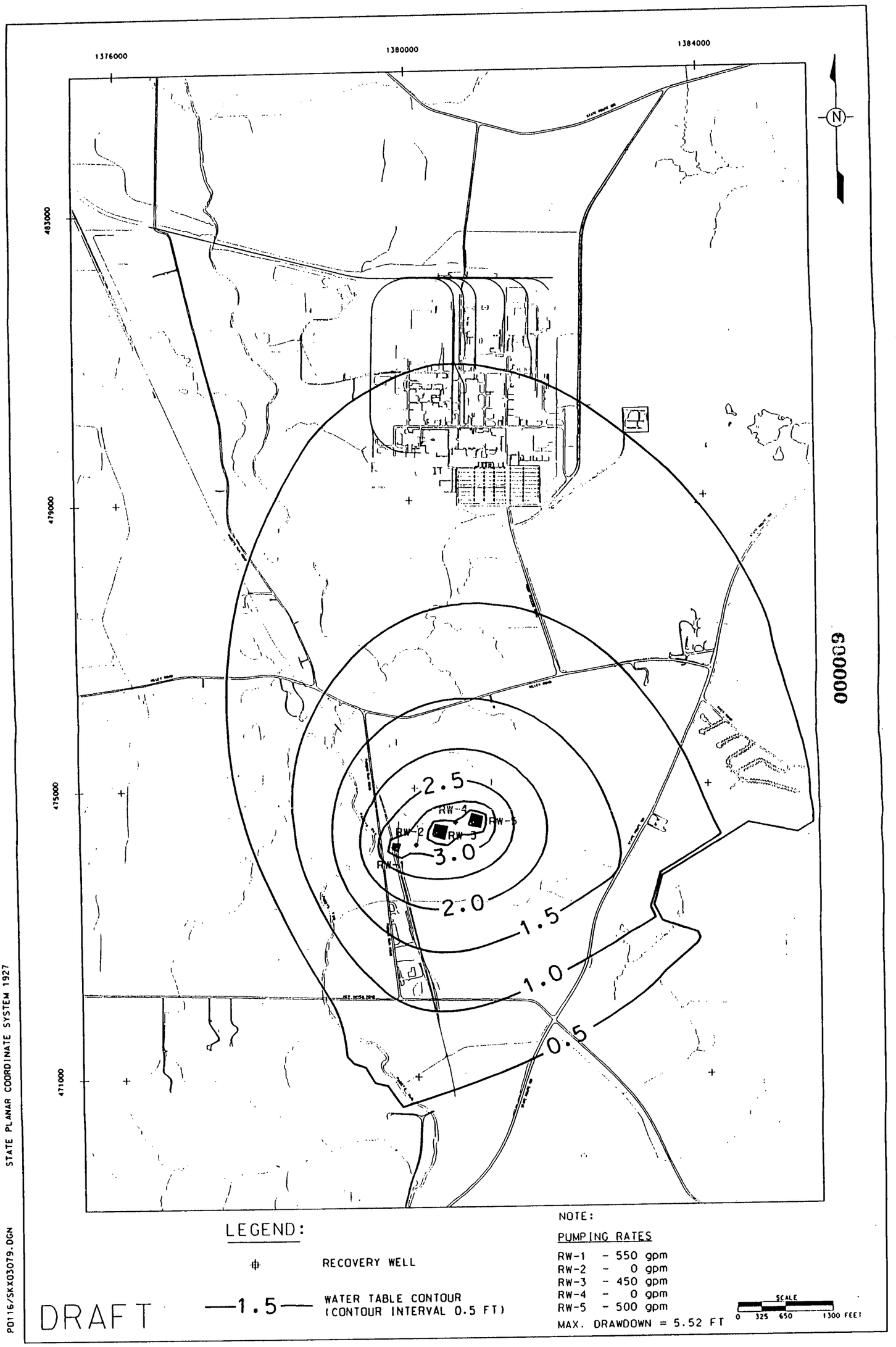
BASE CASE PUMPING OF SOUTH PLUME RECOVERY WELLS



ALTERNATE PUMPING OF SOUTH PLUME RECOVERY WELLS

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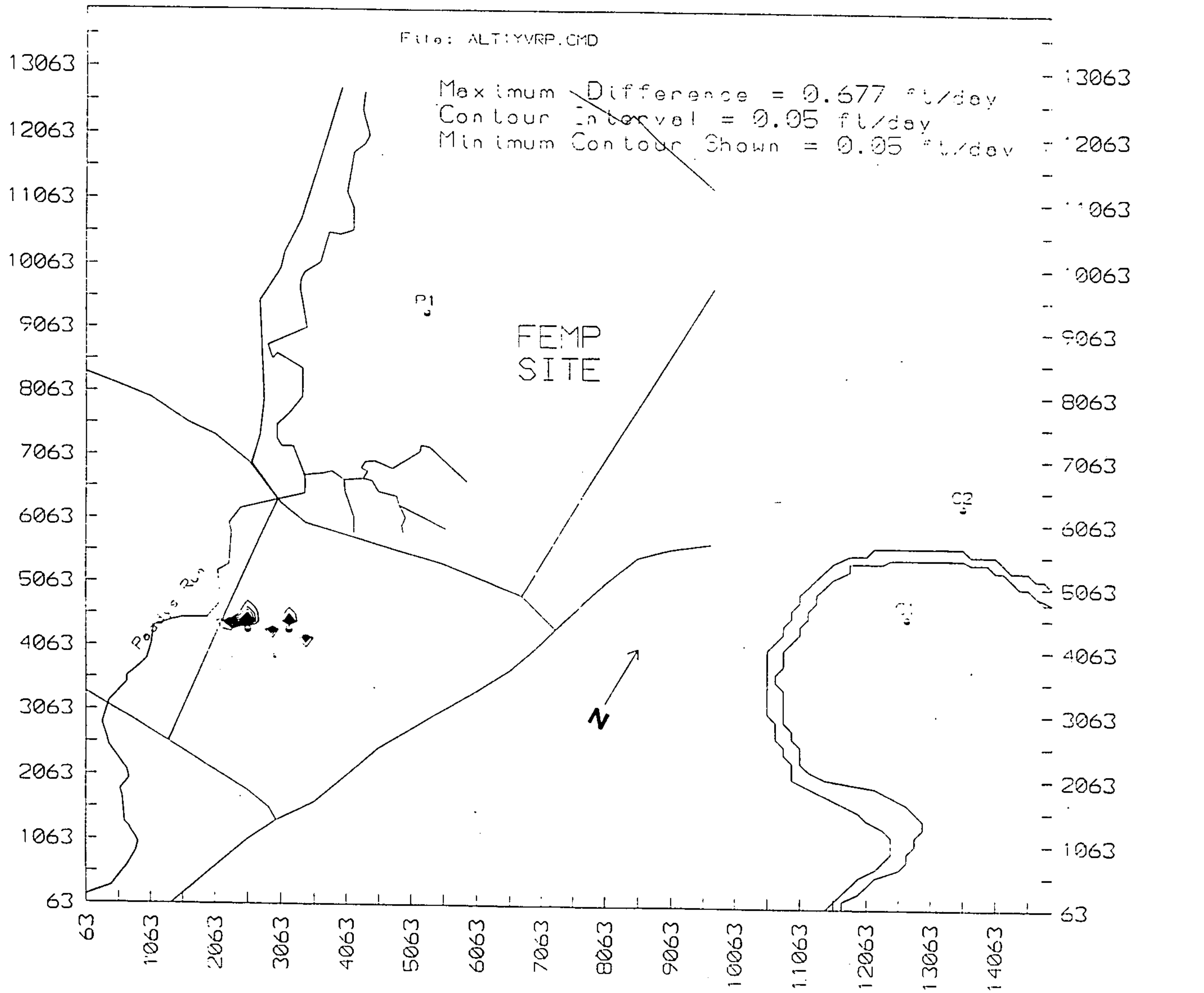
Figure 11. POSITIVE DIFFERENCES IN Y VELOCITY: SCENARIO ' - BASE CASE, ft/day



ure 10. FORWARD TRACKING CAPTURE: BASE CASE PUMPING SCENARIO
SPILLME WELLS 1,2,3,4, & 5 AT 300 gpm EACH
File: ALTBASE.CMD

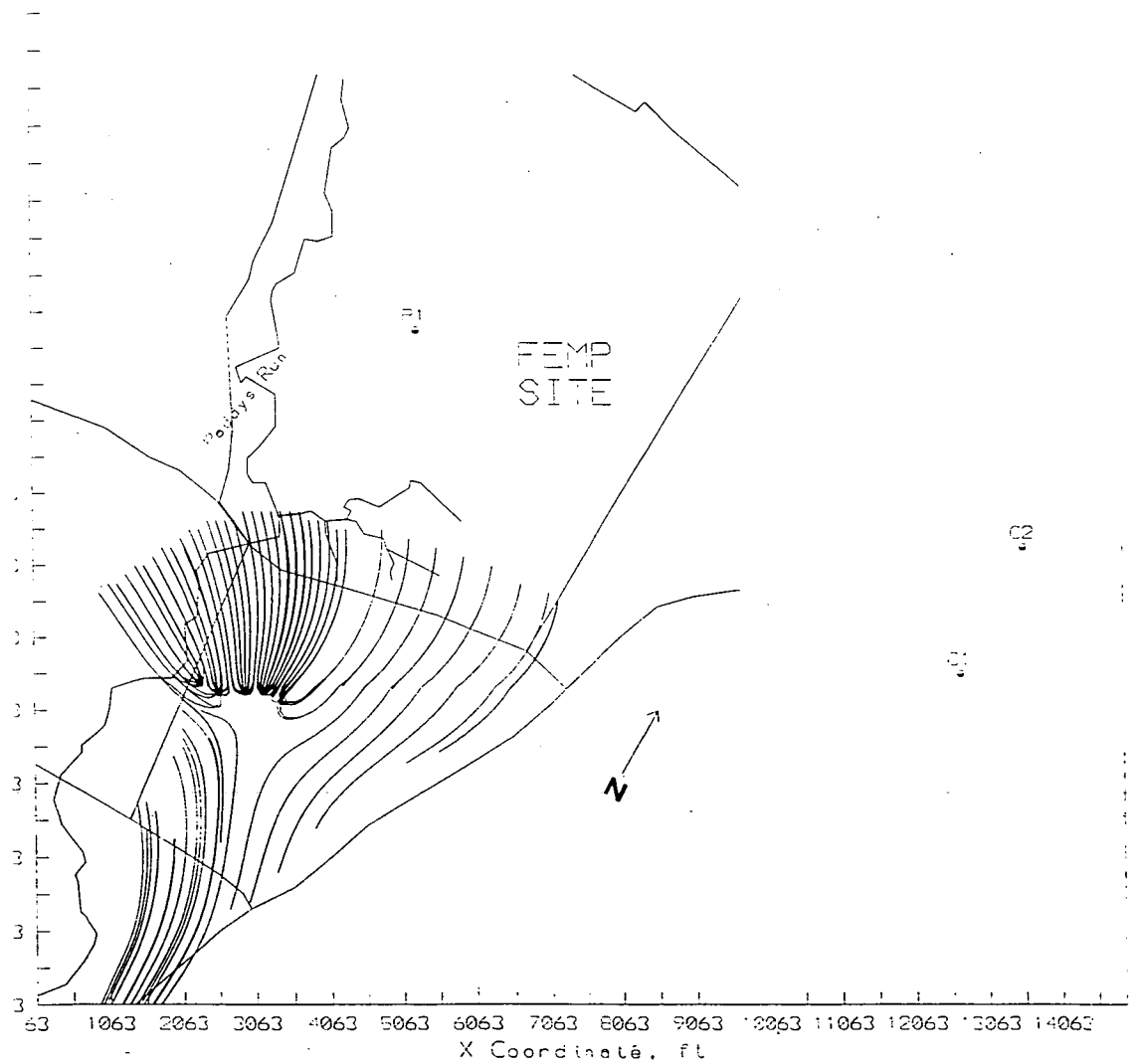


Figure 9. FORWARD TRACKING CAPTURE: ALTERNATE PUMPING SCENARIO
SPLUME WELLS 1,3,5 AT SPECIFIED RATES GIVEN BELOW
File: ALTPUMP1.CMD

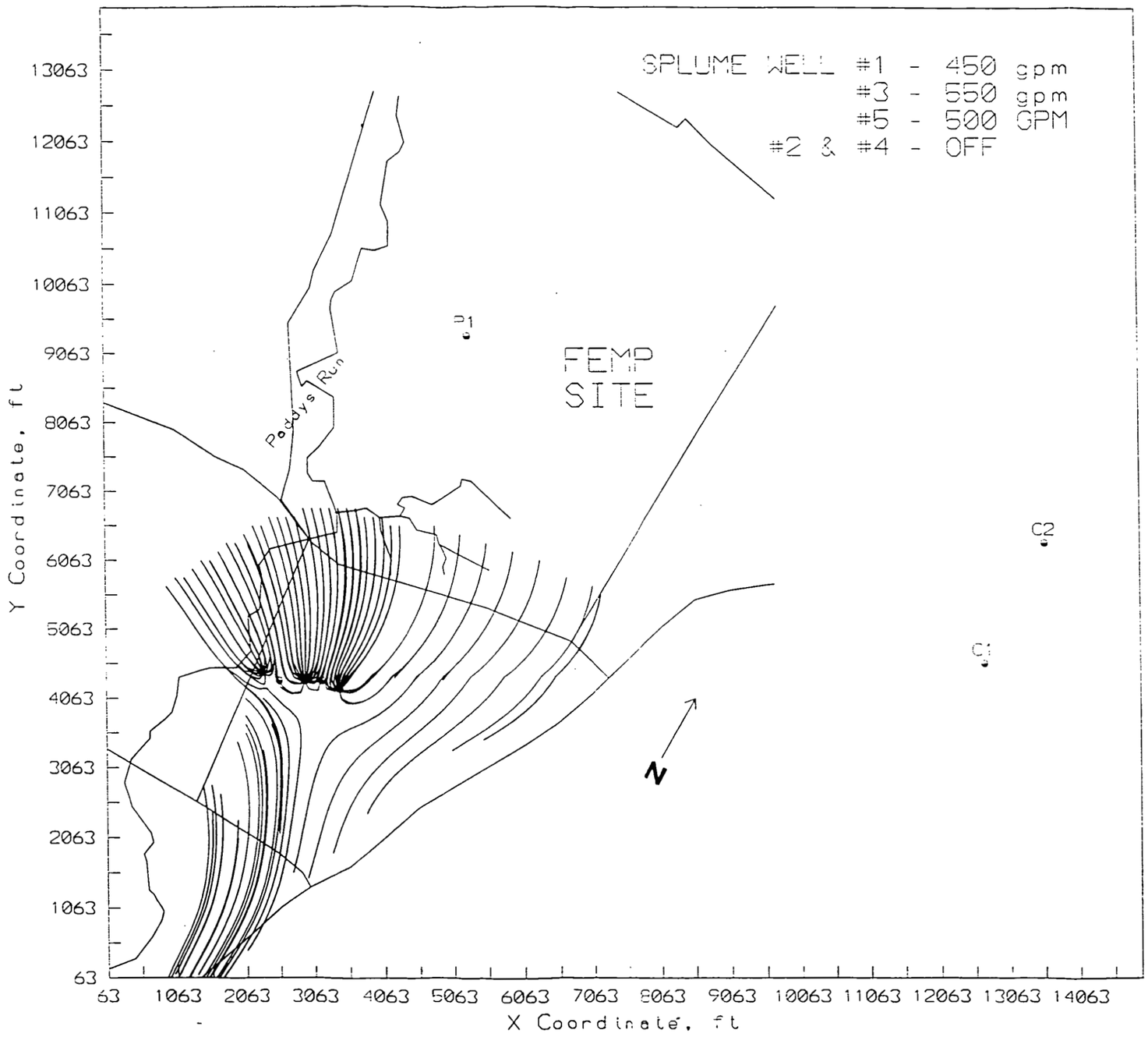


Figure 8. DIFFERENCE IN HEAD, FT (Layer 5); File: ALT1NEG5.CMD

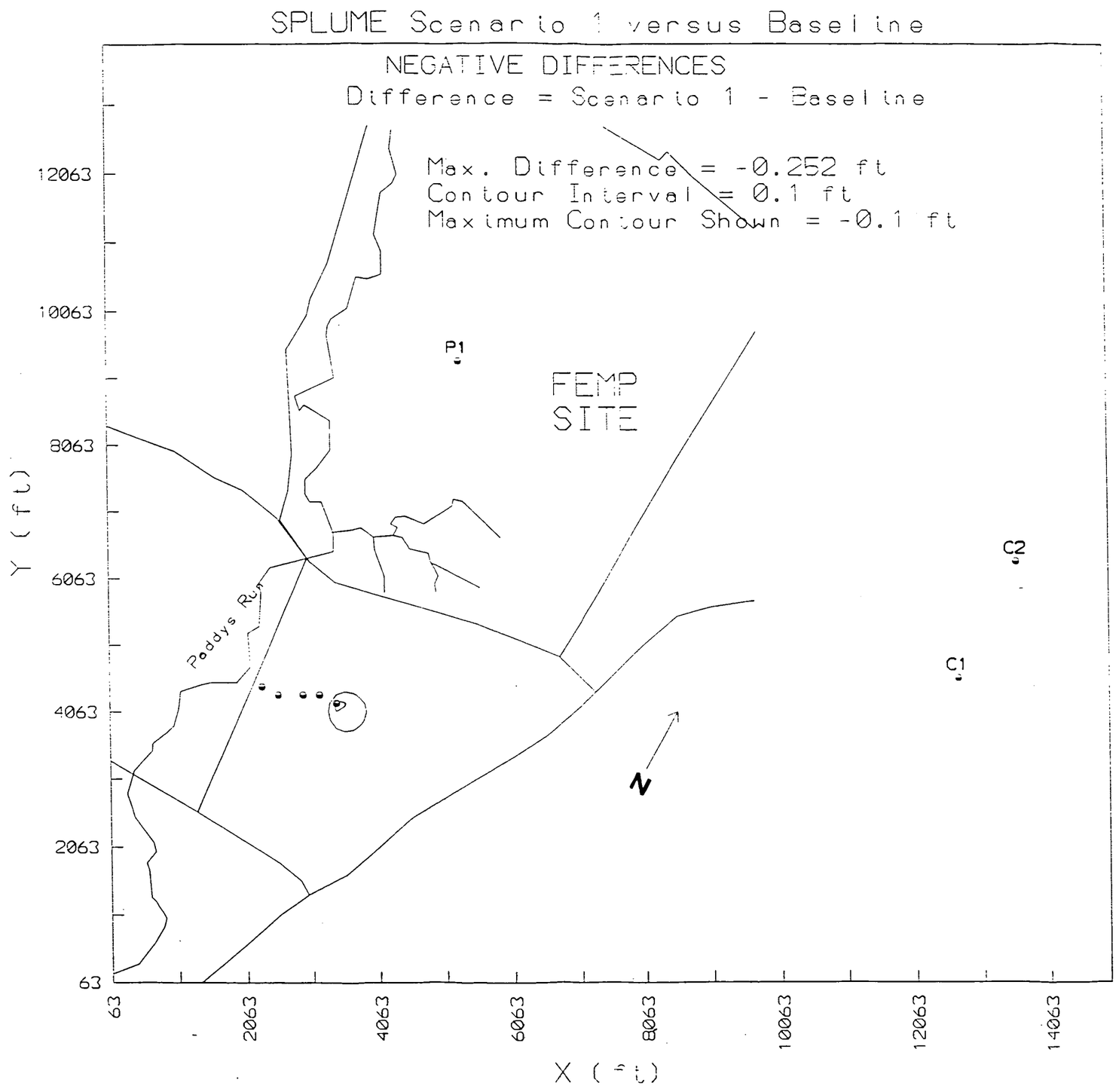


Figure 7. DIFFERENCE IN HEAD, FT (Layer 5); File ALT1POS5.CMD

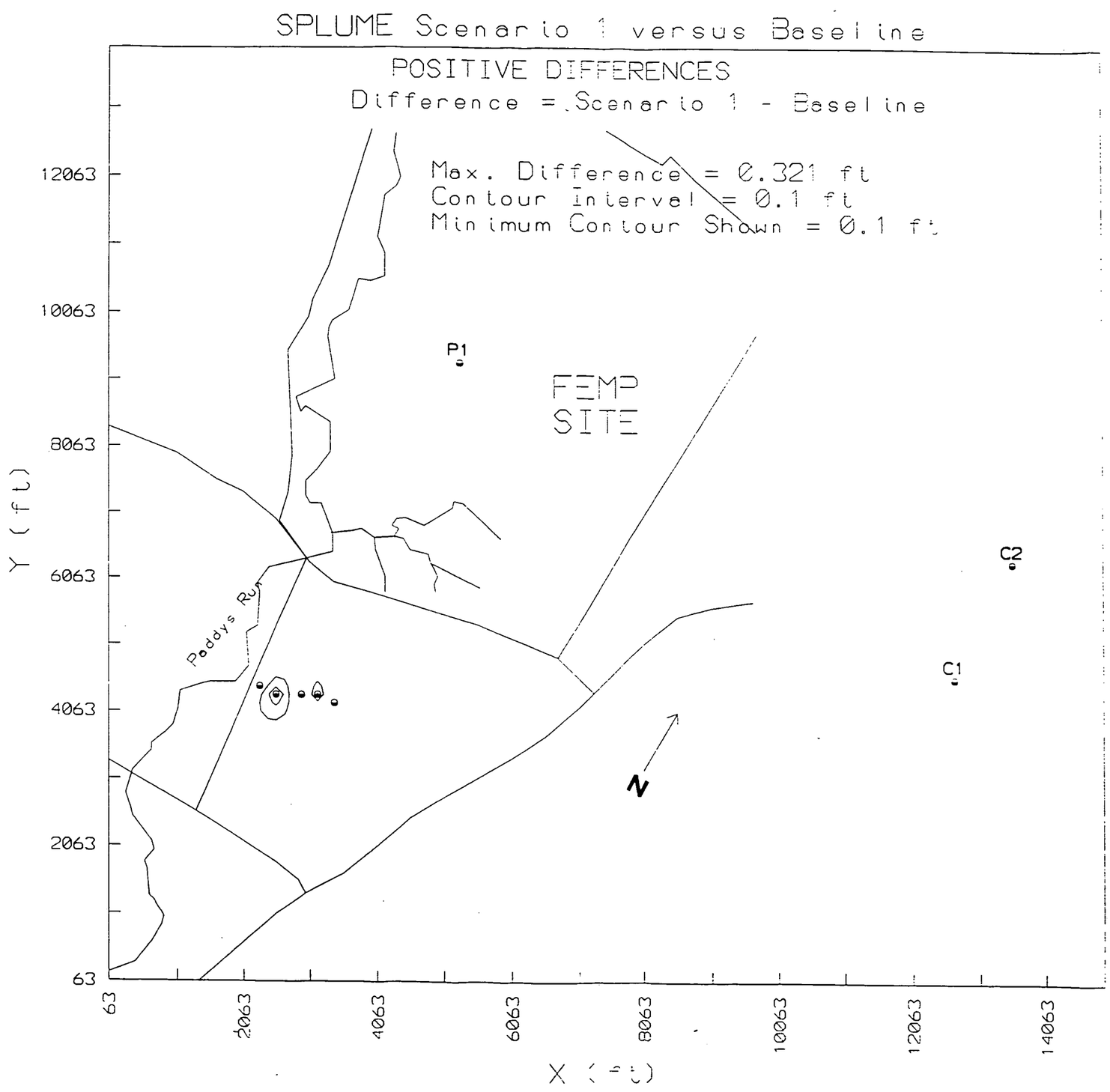


Figure 6. DIFFERENCE IN HEAD, FT (Layer 1); File: ALT1NEG1.CMD

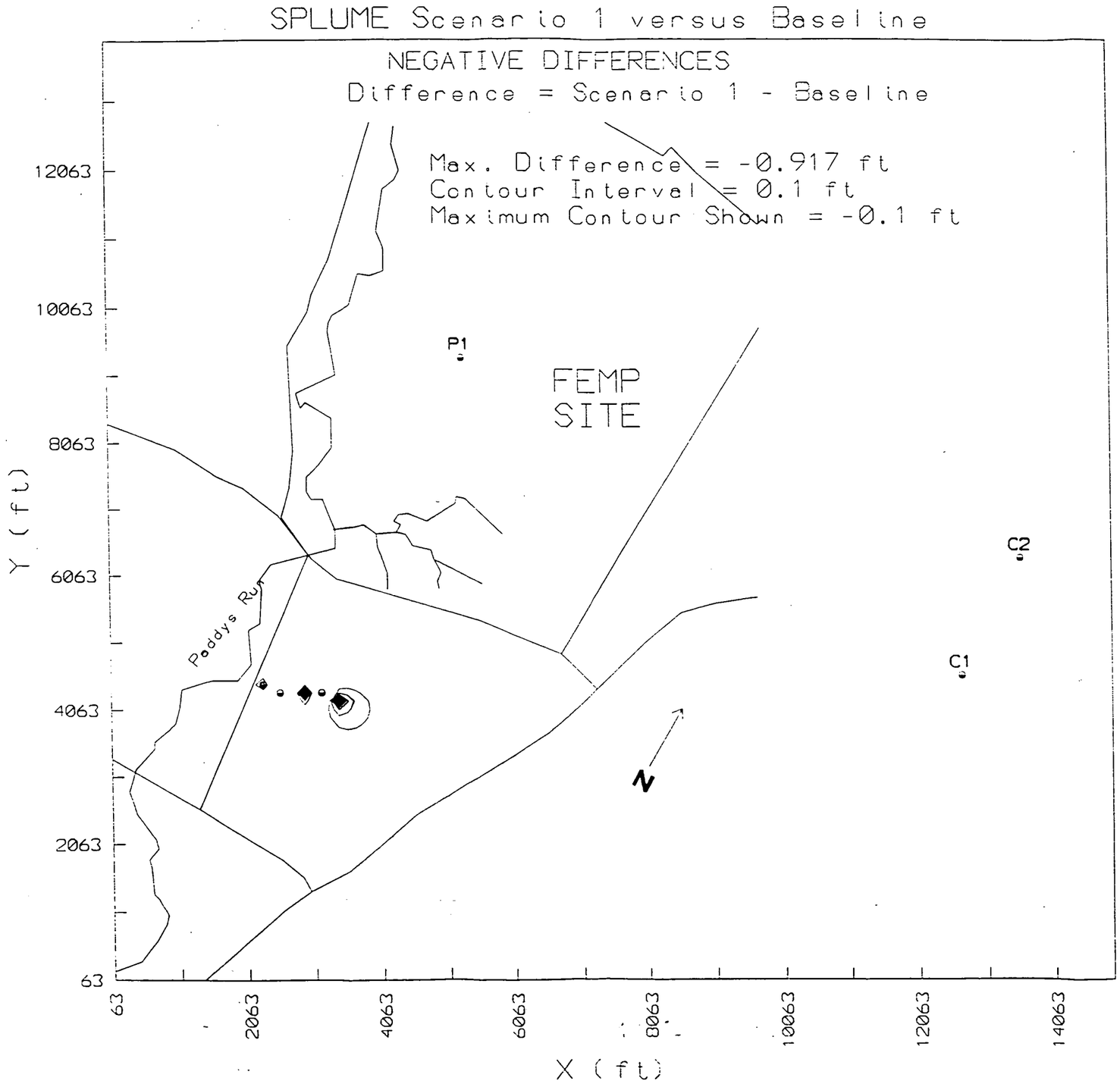


Figure 5. DIFFERENCE IN HEAD, FT (Layer 1). File: ALT1POS1.CMD