# Southeast New Mexico Case Study for Shallow Eumont Gas Well Bore Clean Outs

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## ABSTRACT

This paper presents a case study in developing a method for cleaning out wellbores of shallow, low pressure, low rate Southeast New Mexico Eumont gas wells. These wells have inherent problems that were addressed utilizing different approaches with some interesting results. The methodology is discussed along with the successes and failures.

## INTRODUCTION

BP Permian operates approximately 150 wells in the Eumont Gas Field located in the area between Hobbs and Jal, New Mexico. These wells average about 100 MCFPD and 2 BWPD from about 3400' with about a 25 psi producing bottomhole pressure. The wells typically have 5.5" casing and 2 3/8" tubing, and are produced using natural flow, plunger lift, and/or rod pumps. The field presents several inherent problems such as low bottom hole pressures, high solids, and $H_2S$ that not only creates problems producing the wells, but also in cleaning them out. This paper briefly reviews the methodology used to reduce failures, improve clean outs, and discusses a few case studies.

## REVIEW OF PAST PRODUCTION METHODS

Most of the wells were initially cleaned out and stimulated with a $CO_2$ induced fracture program beginning in 1993 and completed in 1997. There was not a formal follow-up program to evaluate nor clean up wells that experienced production problems such as stuck pumps, high failure rates, or rapidly declining production rates. Beginning in 1998, a program was initiated for near well bore cleanups.

The well bore cleanup program was started using 500 gallons of 7.5% - 15% HCL NEFE acid that was placed on the formation and allowed to set for about one hour. The well was then swabbed back in an attempt to remove any solids, but due to the low bottomhole pressures very little fluid was recovered. This method was somewhat successful, but the well problems would return after a very short period. Therefore, it was decided to get more aggressive by addressing the cleanup procedures along with production methods.

Initially, condensate was used to enhance reducing any hydrocarbon deposition, and acid volumes began to be increased in increments of 500 gallons of 15% HCL NEFE. Foam air units were used to help aid in the removal of the solids, but the unit inherently required more water and the low reservoir pressures prevented the recovery of most of the treatment fluids. Thus, the well was taking anywhere from days to months after the well was put back on production, to return to optimum rates. Another method that was attempted and evaluated was the use of MAG M jobs.

Mag M was attractive in that very low fluid volumes could be used, and the treatment did not require the well to be pulled. It was decided that some wells were to be treated with only a third of a cylinder, while others would be treated with a half of cylinder. The results were mixed in that a couple of wells experienced a little production increase while the rest showed no increase, and in one case production actually declined. However, the well's failure rate in attachment #1 was greatly decreased due to reduced iron sulfide and in effect, improved production. It was decided that this type of treatment could be effective in reducing iron sulfide and resultant downhole failures, but it would not be used as a primary clean up method.

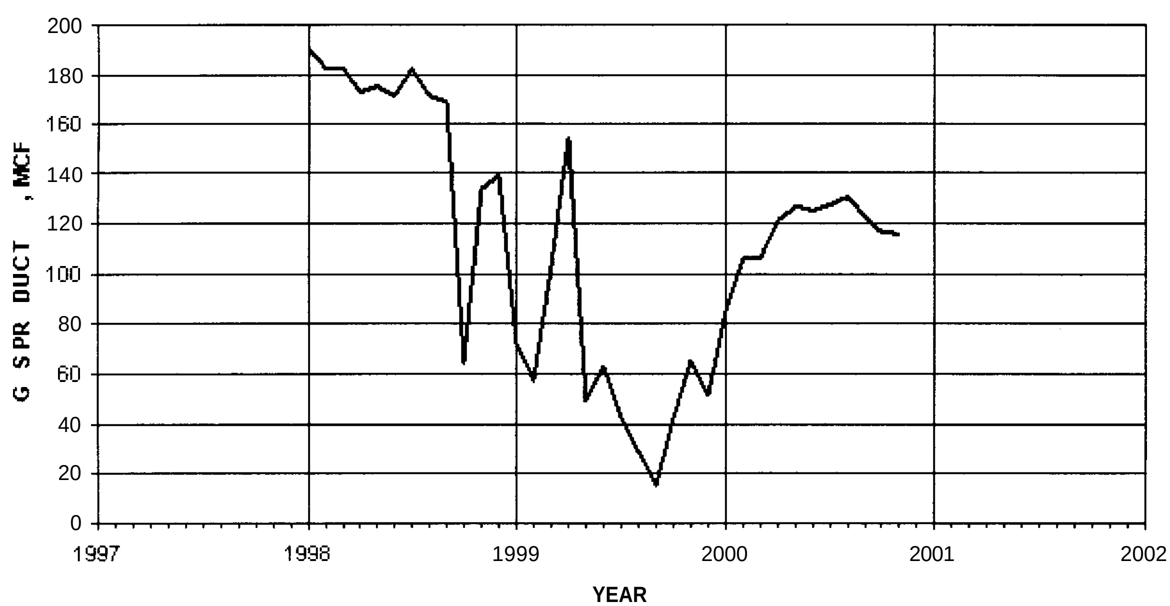
During this time, production methods were also changed to keep the well producing with minimum downtime to enhance production clean ups. Some rod pump wells were converted from gas engines to electric motors, timers were replaced with clocks, and/or pump-off controllers were installed to reduce over pumping. Additionally, the clearance on the downhole pumps was increased to a minimum of a –7 overall to help prevent sticking problems. Plunger lifts were installed on a couple of rod pump wells that were experiencing high downhole failure rates and others to eliminate swabbing. All have been helpful in reducing downtime and operating costs, but these changes still needed help with better clean up methods.

## PRESENT METHODS

A few modifications were made to improve the clean out methods that included using a mechanical bailer (sand hog or S&P), rather than the foam air unit to reduce treatment fluid volumes. In addition, using samples from rods and tubing plus solids recovered during initial clean out with the bailer are inspected for hydrocarbons, scale, iron sulfide, and/or sand to help optimize the job. Solids found coated with a hydrocarbon film result in the first step being that the tubing is run to the bottom of the perfs where condensate and a paraffin dispersant is pumped down the tubing-casing annulus. This mixture is allowed to set on the formation for 24 hours, then 1000 gallons of 15% HCL NEFE acid and miscellar solvent is pumped down the tubing-casing annulus. **A** like volume is pumped down the tubing and flushed with 12 barrels of 2% KCL water. The acid is allowed to set on the formation for a minimum of 24 to 48 hours. Then the bailer assembly is run as close to bottom as possible. **As** bailing operations continue, the well is cleaned up. Utilizing a stripper head above the blow out preventor enables the well to be produced and the gas flow rates monitored during bailing operations. This along with additional samples is used to determine the jobs effectiveness and in some cases may determine that more acid is needed. The attached well plots show a few examples of the procedures success. (See Attachments).

## SUMMARY AND CONCLUSIONS

An aggressive clean out program and changes in production methods of Eumont gas wells in Southeast New Mexico has resulted in several benefits. (1) The payout for this procedure is about 60 days at today's prices and an average cost of $30,000 per well. (2) The wells can now be produced as they are worked on to enhance clean out and minimize downtime. (3) Reduced volumes of fluids placed on the formation to enhance a faster recovery of production. (4) Extended the job life and resultant problems. *(5)* Reduced the possibility of injecting large amounts of oxygen and solids into the formation that may have been contributing to problems, and (6) reduced downhole failures and operating costs from reduced sticking pumps.

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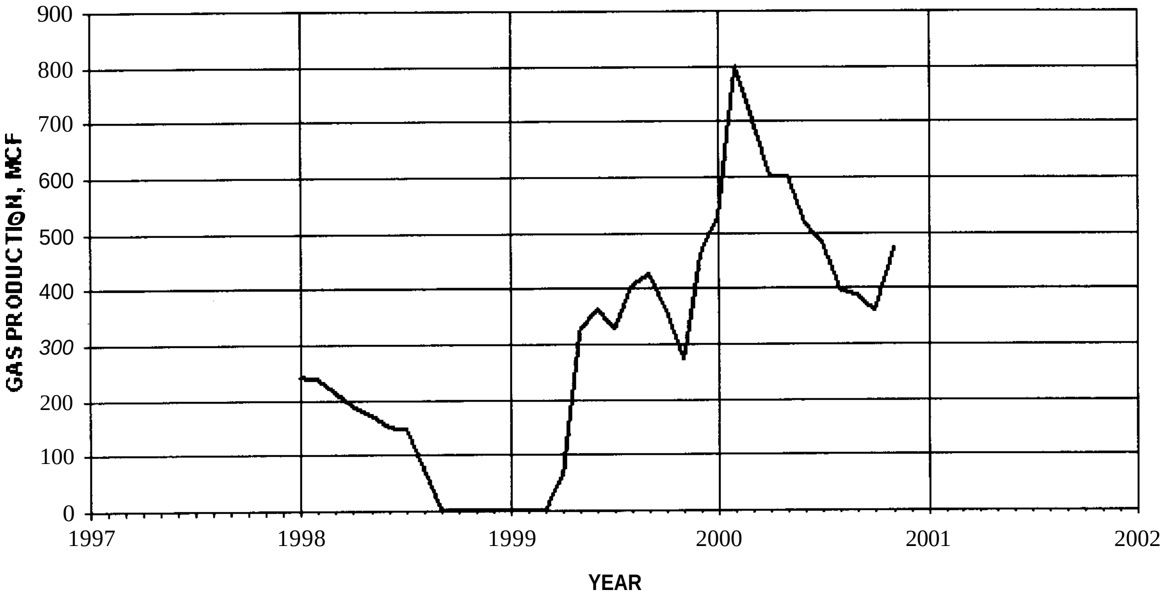


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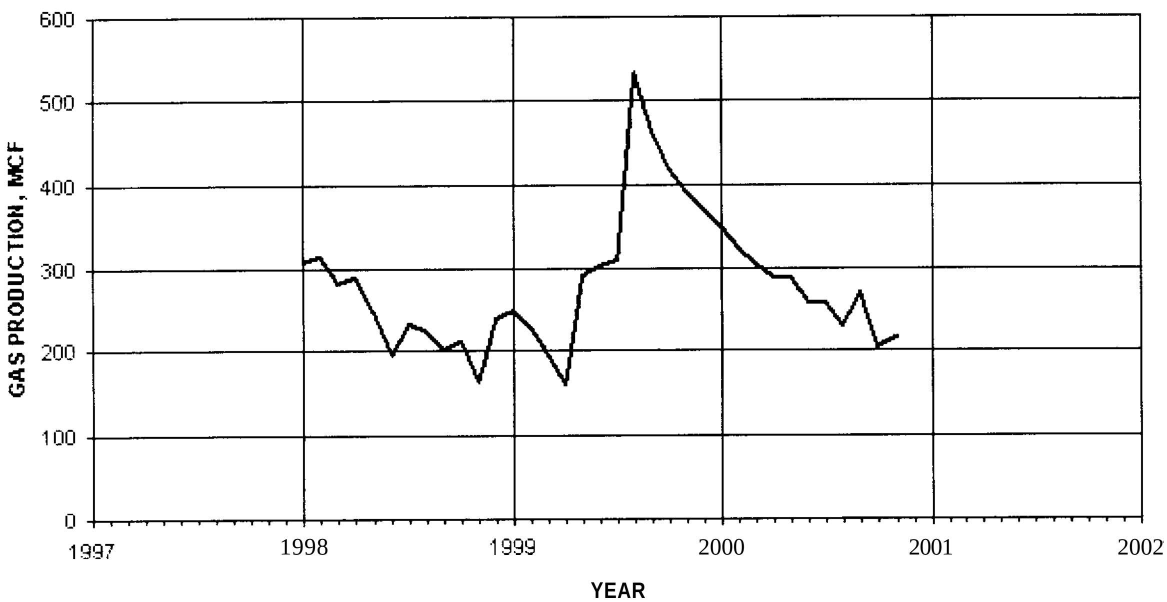


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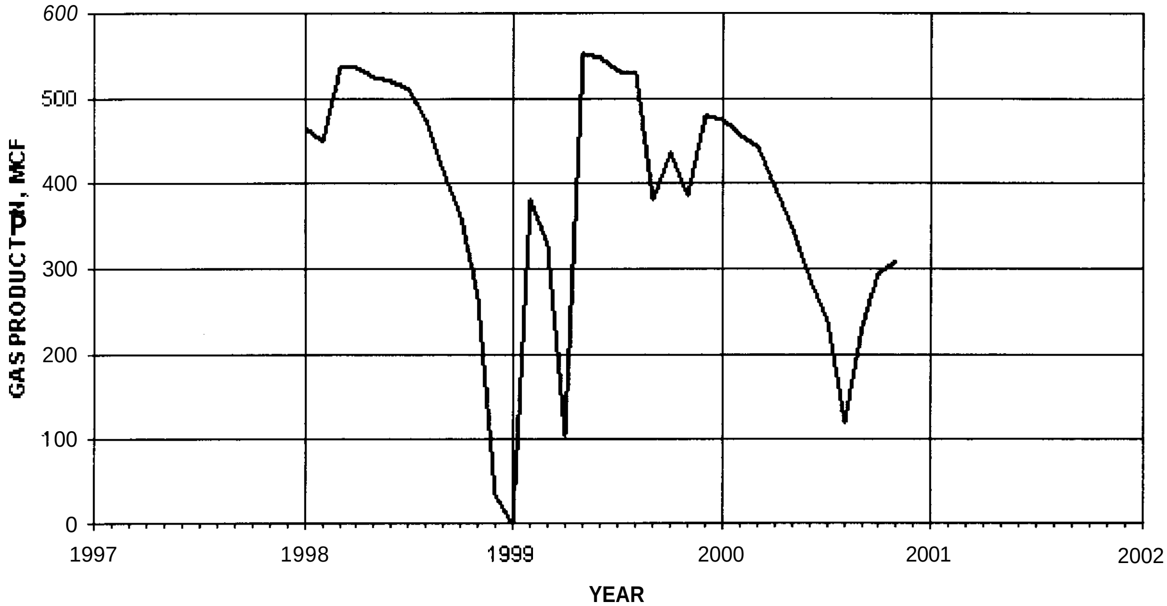


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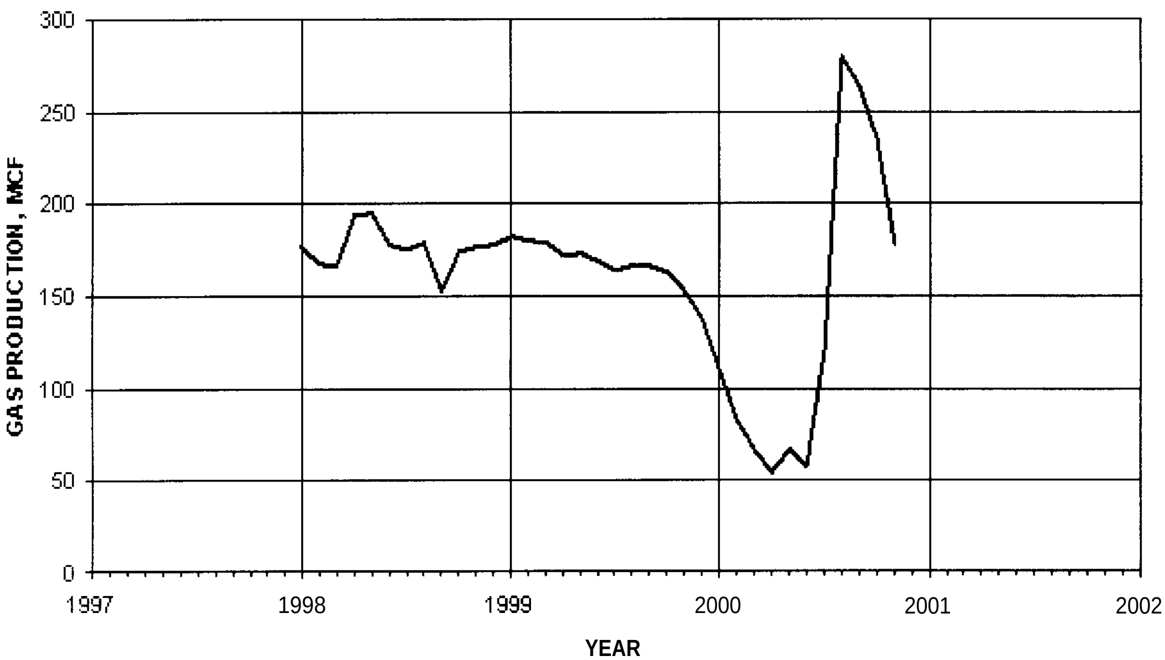


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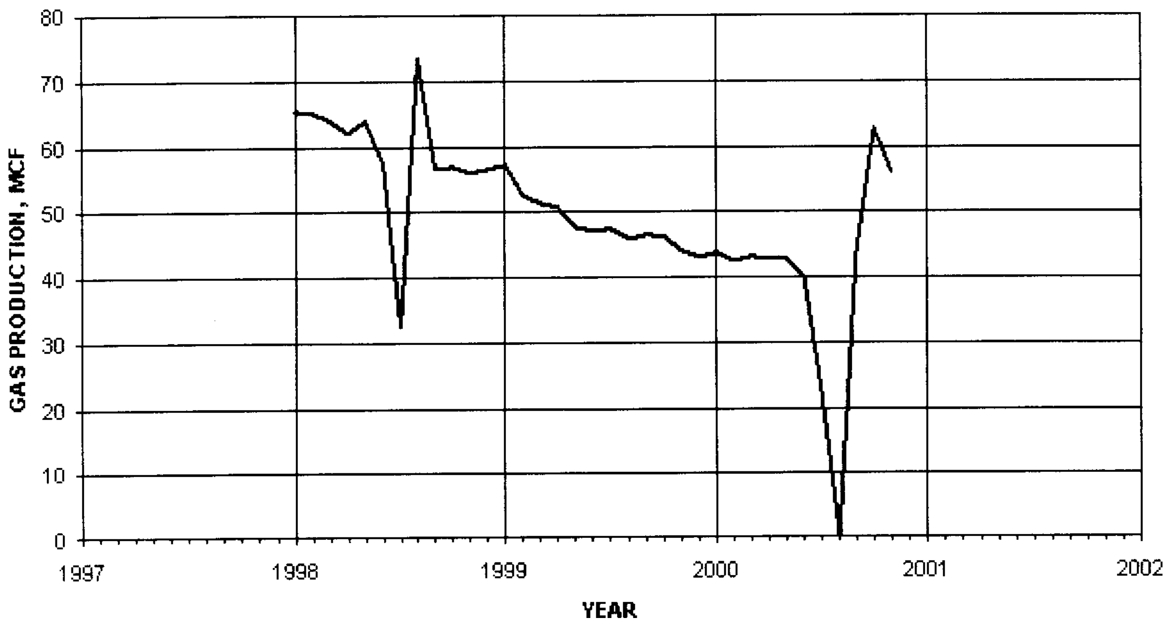


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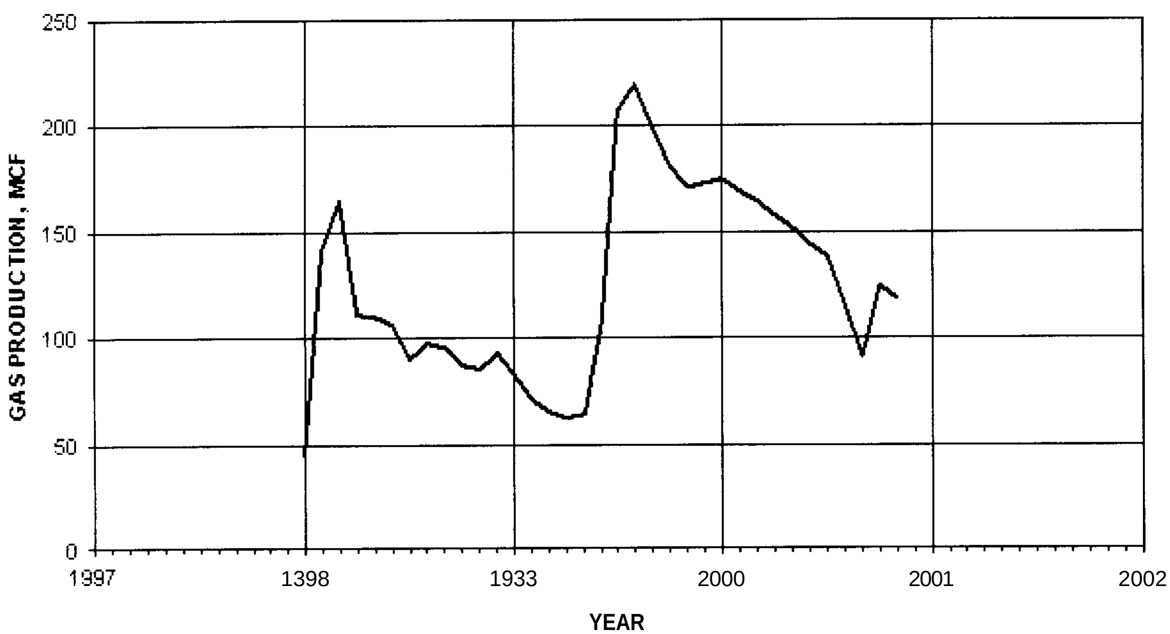


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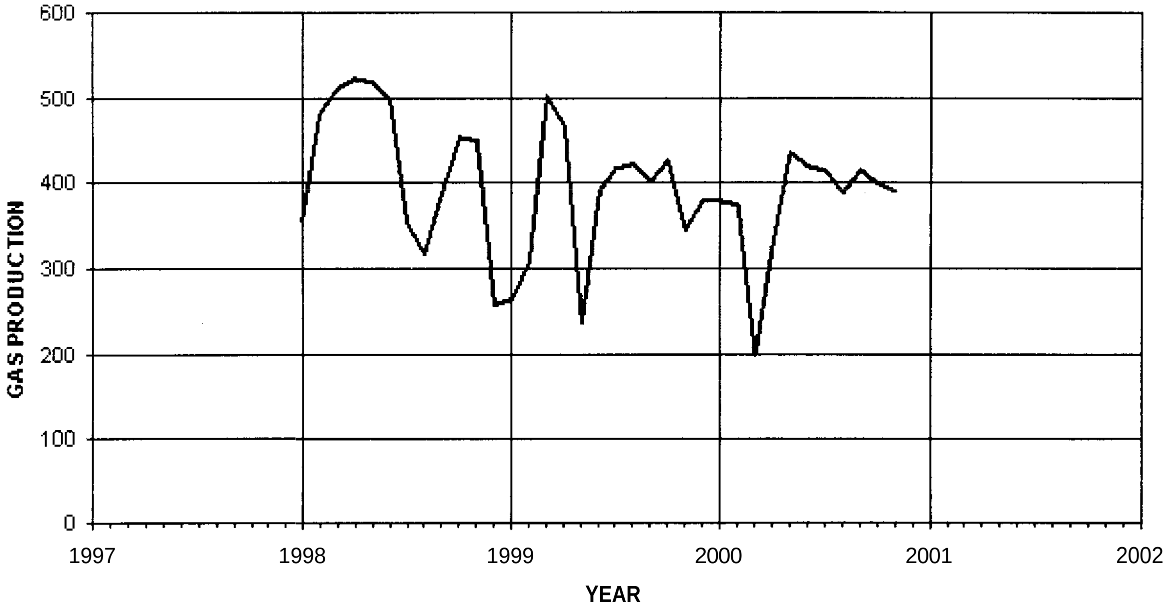


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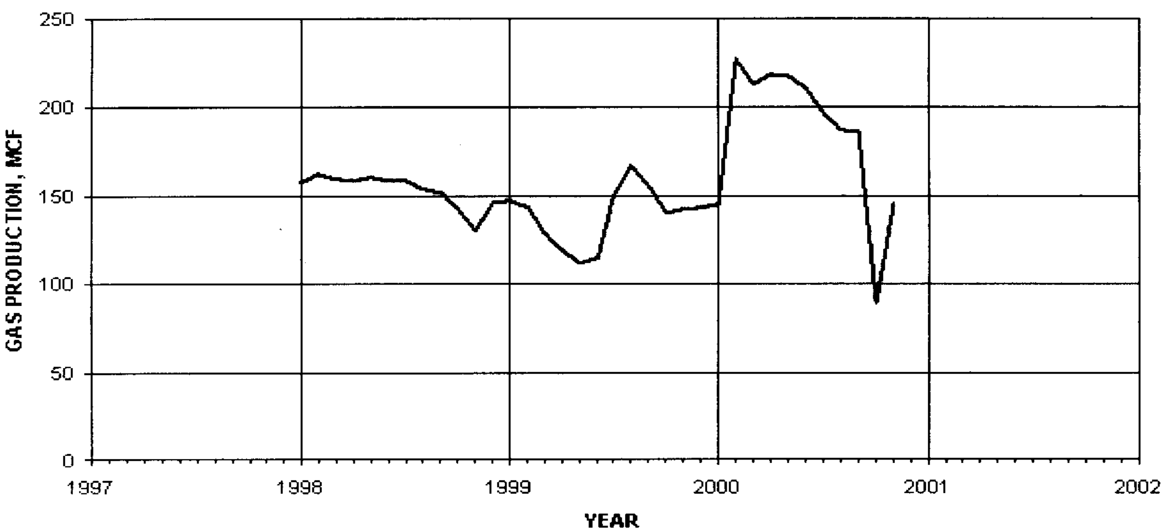


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