PACIFIC
ENVIRONMENTAL
GROUP, INC.

HAZMAT
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July 26, 1994
Project 330-006.3B

MEMORANDUM

To: Mr. Mike Whelan, ARCO Products Company

cc: Ms. Juliet Shin, Alameda County Health Care Services Agency
Mr. Kevin Graves, Regional Water Quality Control Board
Dr. Ravi Arulanantham, Regional Water Quality Control Board
Dr. Charles Lapin, ARCO Products Company

From: Ms. Debra Moser, Pacific Environmental Group, Inc.

Subject: Meeting Minutes, July 8, 1994
ARCO Service Station 0608
17601 Hesperian Boulevard
San Lorenzo, California

This memorandum summarizes the main topics of the meeting conducted between the Alameda County Health Care Services Agency (ACHCSA), San Francisco Bay Regional Water Quality Control Board (RWQCB), ARCO Products Company (ARCO), and Pacific Environmental Group, Inc. (PACIFIC) on July 8, 1994. The purpose of the meeting was to (1) provide a project update, and (2) seek agreement on the approach and contents of the upcoming remedial investigation/feasibility study (RI/FS) report, particularly the proposal to manage the off-site plume using institutional controls consisting of a groundwater management plan. Those present at the meeting included Ms. Juliet Shin of the ACHCSA, Mr. Mike Whelan and Dr. Charles Lapin of ARCO, Dr. Ravi Arulanantham and Mr. Kevin Graves of the RWQCB, and Mr. Keith Winemiller, Dr. Cleve Solomon, and Ms. Debra Moser of PACIFIC. The main topics discussed

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and subsequent action items (*in italics*) are summarized below. A copy of the meeting agenda is attached.

PROJECT UPDATE

Mr. Winemiller presented the current status of the investigation, including soils and groundwater data, a summary of the liaison with the local domestic irrigation well owners, discussion of the feasibility studies completed to date, and a summary of the risk assessment methodology and results. The existing remedial action (on-site groundwater extraction) was also described, and discussion of migration control followed.

Action Items:

- *The feasibility studies described in the RI/FS should include documentation of the feasibility of bioremediation of groundwater. This could include microbiological testing, or review of dissolved oxygen levels, eH, pH, or redox potential of the groundwater. Also, comparison of historic to present plume configuration could support progress of bioremediation.*
- *Send copies of Risk Assessment documents (Methodology, Results, Addendum) to Kevin Graves, Juliet Shin, and Ravi Arulanantham.*

MODELING RESULTS

Dr. Solomon described the groundwater modeling performed to date. The modeling was designed to examine groundwater flow, and fate and transport of benzene in groundwater, assuming a constant on-site source. The models used were MODFLOW and MT3D; hydrogeologic conditions input to the model were obtained from site investigation results; benzene concentrations from the March 1994 sampling event were used; and a biodegradation rate of 110 days, per published literature, was used. Four scenarios were modeled: (1) no on-site migration control and no off-site pumping, (2) on-site source control and no off-site pumping, (3) on-site source control and selected off-site wells pumping at maximum rates, and (4) on-site source control and all off-site wells pumping at maximum rates. The following conclusions were reached.

- Biodegradation effectively limits benzene plume size.
- Source control keeps the benzene plume at the site.

- Off-site Well 633H lies within the 1 part per billion benzene isoconcentration contour during Year 1 in all scenarios modeled.
- Other off-site wells show little to no benzene impact.

The input assumptions and results of the modeling are attached to these minutes.

Action Items:

- *Send references on biodegradation rates to Juliet Shin.*
- *Get reference on mass reduction in soils from Ravi Arulanantham (Julies, 1990).*
- *Perform sensitivity analysis with larger range of biodegradation rates. Rates between 6 to 250 days are acceptable.*
- *Recommend calibrating model by inputting historic plume configurations. This will increase credibility of modeling results.*
- *RI/FS should address decay of TPH-g, toluene, ethylbenzene, and xylene compounds as well as benzene. It is not necessary to model these compounds, but they should be addressed at least qualitatively.*

REMEDIAL INVESTIGATION/FEASIBILITY STUDY APPROACH

Mr. Winemiller presented a proposed RI/FS outline, to contain the following.

- History/Background. This section will not reproduce the existing *Remedial Investigation Report*; but will provide a chronological summary of all relevant data. Maps, tables, and a list of references will be used to present the data.
- Risk Assessment. The risk assessment will be revised/updated using site data collected since June 1993.
- Remedial Objectives. The main remedial objective is protection of human health and environment. For groundwater, maximum contaminant levels are proposed. For soils, the specific objectives are to be determined.
- Remedial Alternative Development and Evaluation. Four alternatives were proposed: (1) no action, (2) institutional controls off-site, groundwater extraction on-site, (3) institutional controls off-site, biosparging on-site, and (4) institutional controls off-site,

air sparging/venting/groundwater extraction on-site. No additional alternatives were requested by attendees.

- o Recommended Remedial Alternative. An on-site alternative will be recommended in the RI/FS. Institutional controls off-site are recommended. More discussion on this topic follows.
- o Implementation Schedule.

The definition of institutional controls was discussed, and consists of an overall groundwater management plan. The groundwater management plan should incorporate an appropriate monitoring network to include wells at the toe of the plume as well as hot spots. Also, the plan will include ongoing sampling of off-site wells and review of current well sampling frequency.

The RI/FS will be submitted on November 22, 1994.

Action Items:

- o *Ms. Moser will contact the well owner at 633 Hacienda to solicit permission to sample the well. Since this well owner has not responded to any letters, the face-to-face meeting will also identify any issues that this well owner has with the ongoing investigation. At ARCO's request, Ms. Shin could assist in contacting the well owner, possibly by writing a letter.*
- o *In justifying the institutional controls, include a discussion of TPH-g as well as benzene. Show that the plume is stable and shrinking. Address source reduction on-site, possibly by biodegradation.*

SUMMARY

The action items listed above were confirmed. Also, the agreement to consideration of passive remediation of the off-site plume was confirmed. Dr. Arulanantham noted that perceived risk on the part of the community may affect acceptance of the passive remedial approach off-site.

Enclosures

MEETING AGENDA
ARCO SERVICE STATION 0608
JULY 8, 1994

I. INTRODUCTION

II. PROJECT STATUS/UPDATE

III. MODELING RESULTS

IV. RI/FS APPROACH

V. SUMMARY DISCUSSION AND WRAP-UP

Table 1
Fate & Transport Model Parameters

Model Parameters
ARCO Service Station 608
17601 Hesperian Boulevard

Model Codes: Modflow combined with MT3D

Chemical Compound: Benzene

Biodegradation Rate: 110 day half life

Model Type: Numerical Finite Difference (see grid figure)

Boundary Conditions:

Constant Head at grid edges (based on field data)
Constant Concentration at former tank pit = 330 ppb
Pumping Rate (cubic feet per day) at wells:

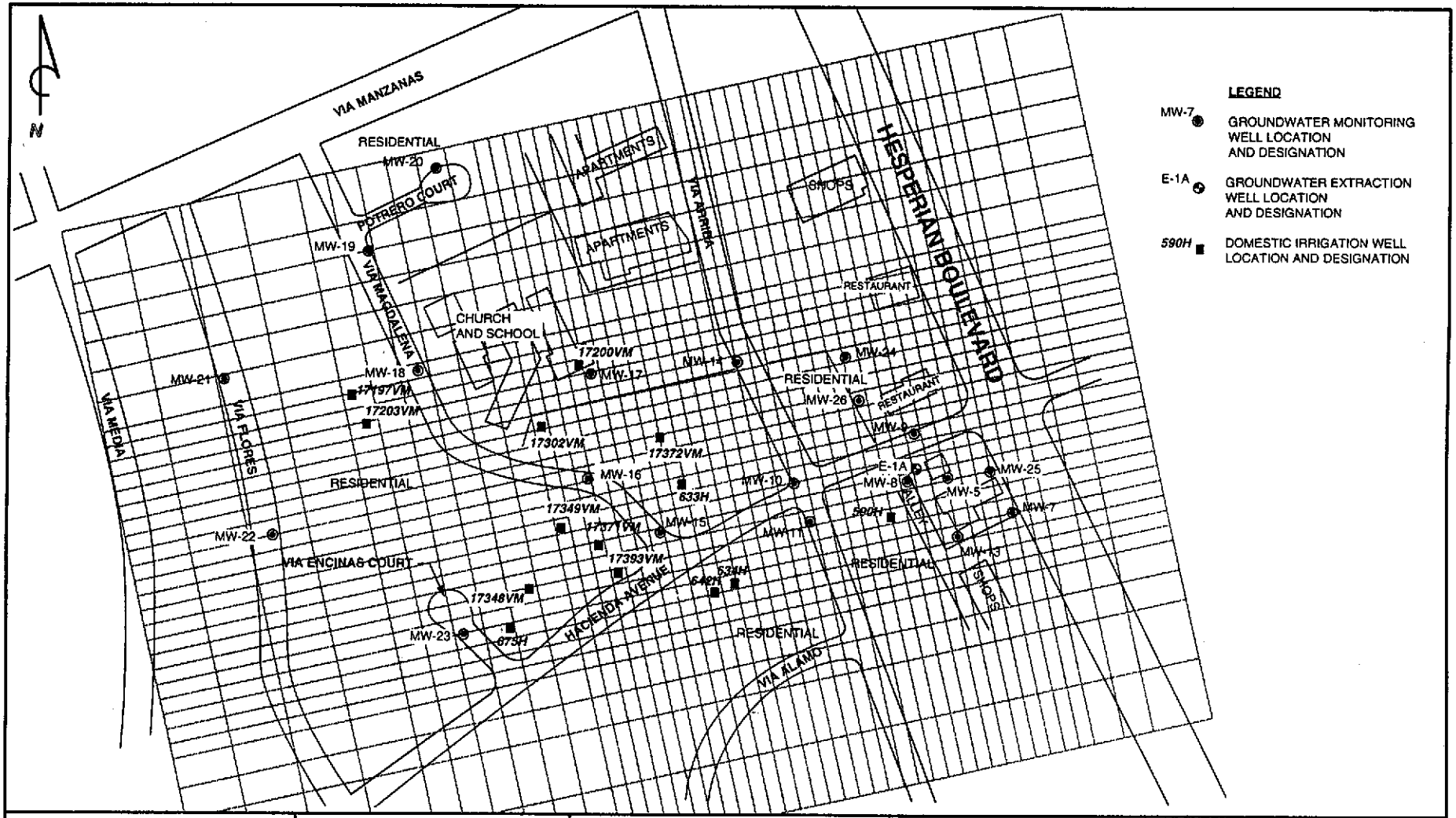
Well No.	Rate
17197	72
17203	7.2
17302	103
17349	51.3
17371	9.6
17372	103
633	153
642	77
590	72
E-1A	577.5

Initial Conditions:

Plume Concentrations: 3/94 Monitoring Data (see map)

Properties:

Permeability (feet per day): 6.5 to 40
Storativity: 0.1
Porosity: 0.25
Saturated Thickness (feet): 14
Dispersivity alpha longitudinal (feet): 10
Dispersivity alpha transverse (feet): 1



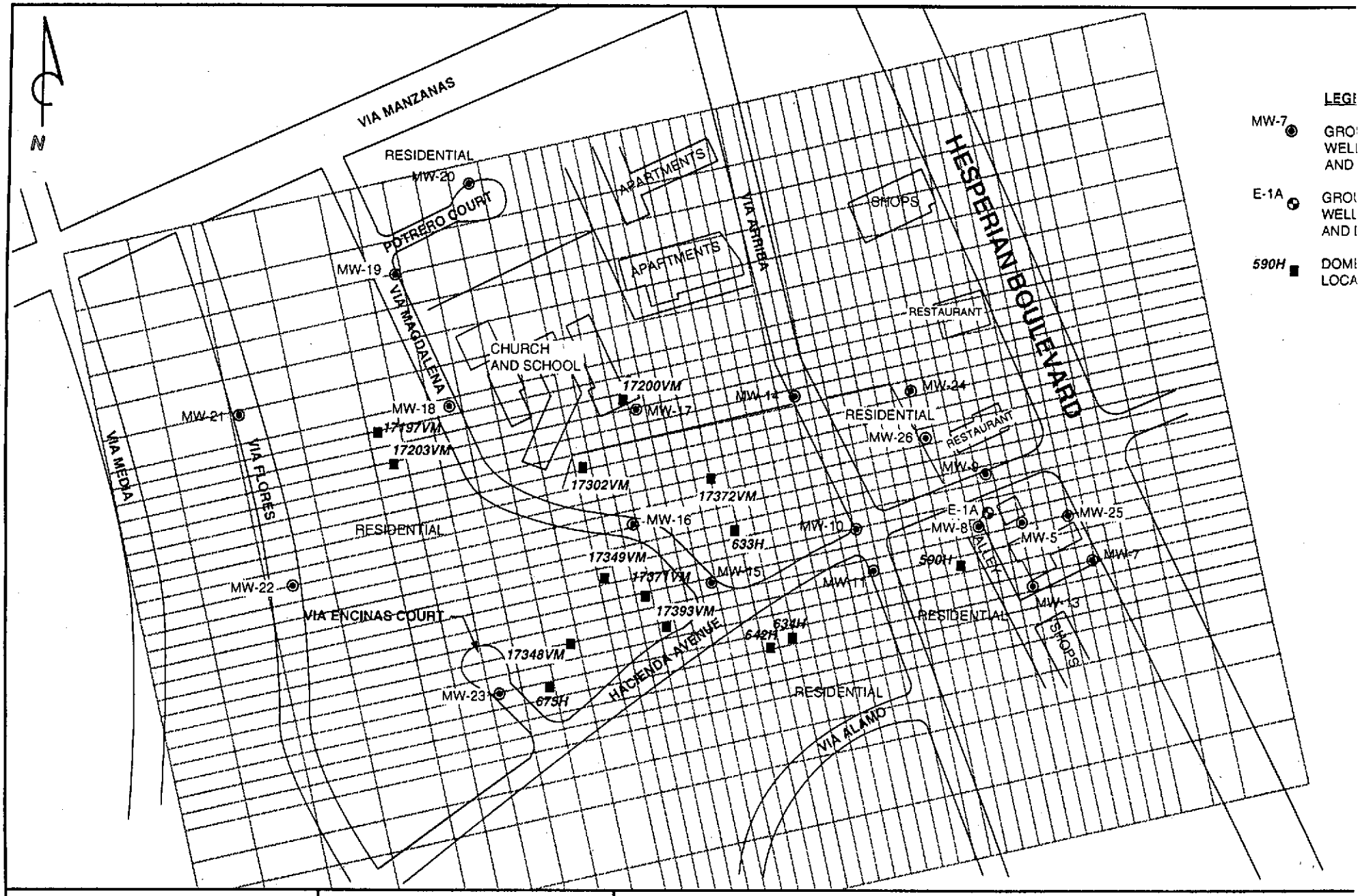
PACIFIC ENVIRONMENTAL GROUP, INC.

APPROXIMATE SCALE
0 150 300 FEET

ARCO SERVICE STATION 0608
17601 Hesperian Boulevard at Hacienda Avenue
San Lorenzo, California

EXTENDED SITE MAP WITH MODEL GRID

FIGURE: 1
PROJECT: 730-001.01



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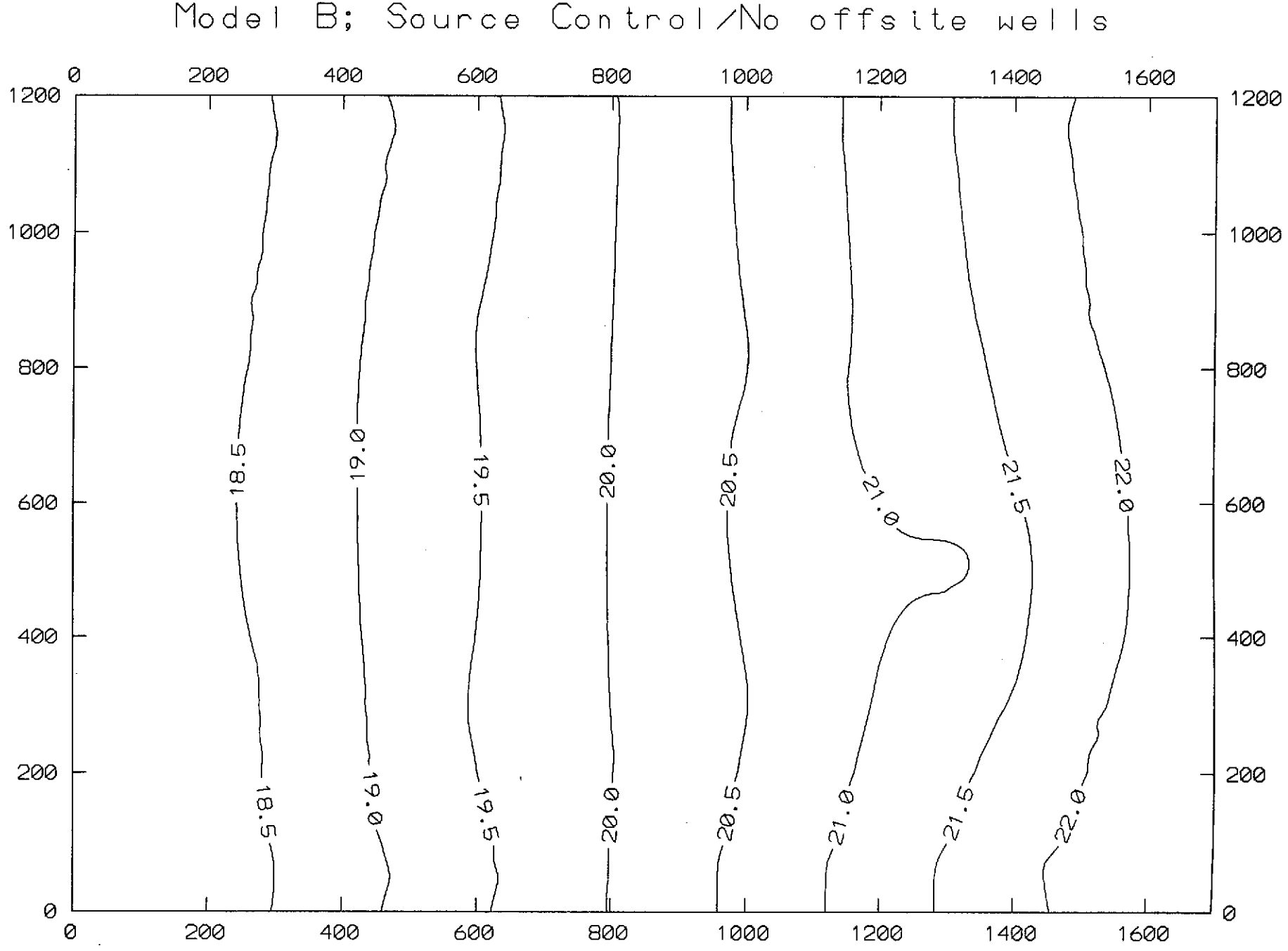
Model B; Source Control/No offsite wells
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200
400
600
800
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1200
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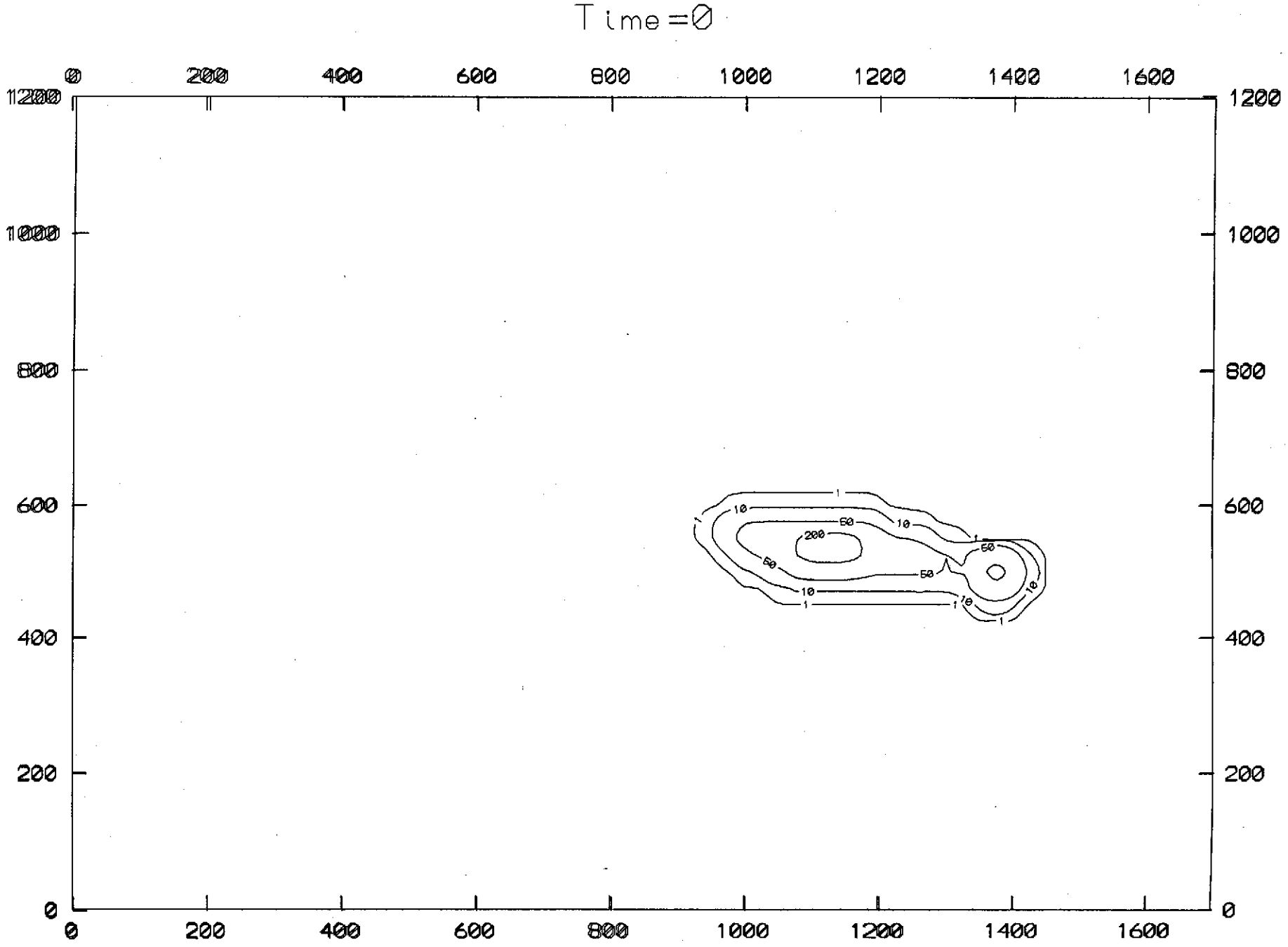
19.0
19.5
20.0
20.5
21.0
21.5
22.0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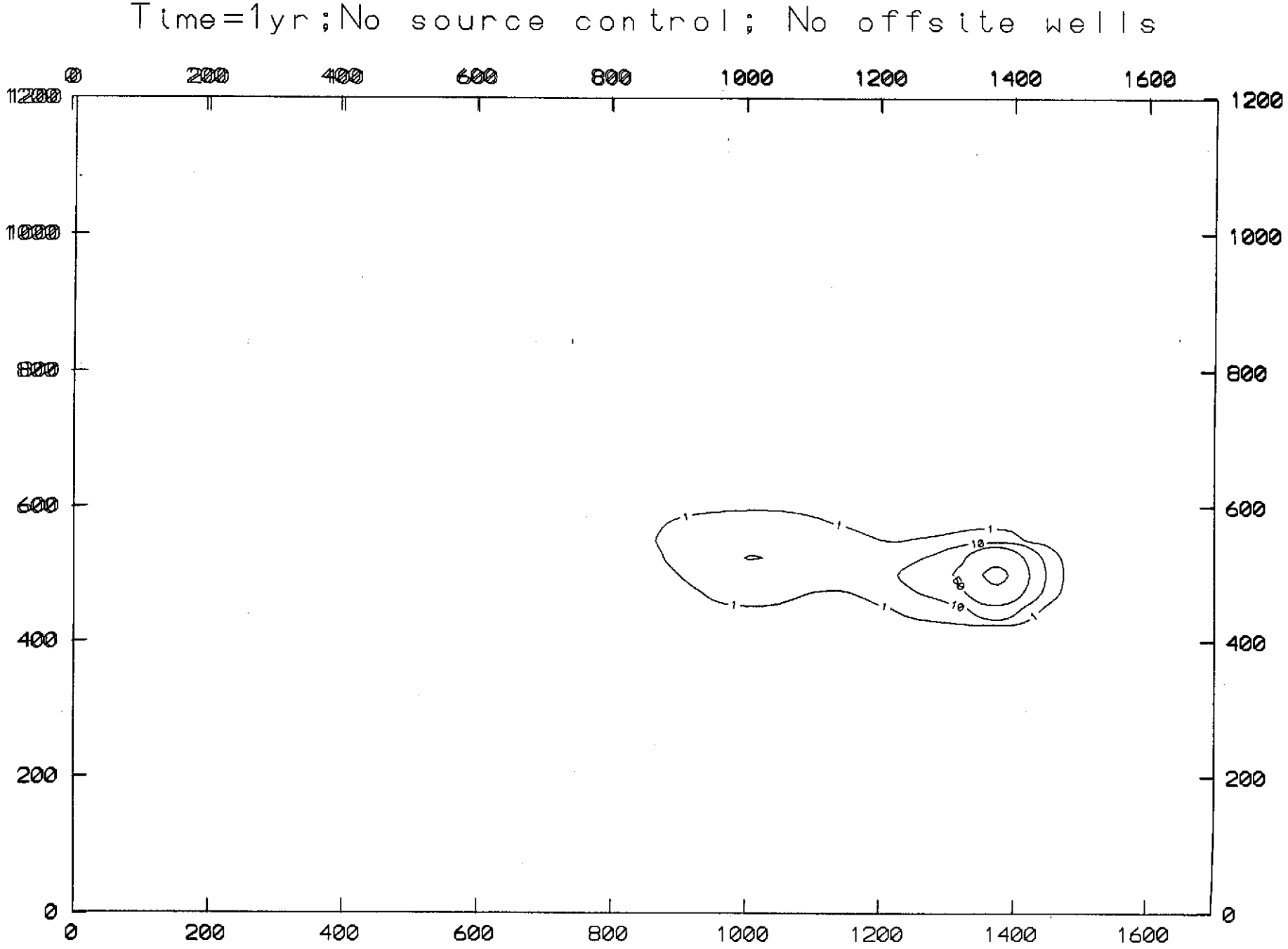
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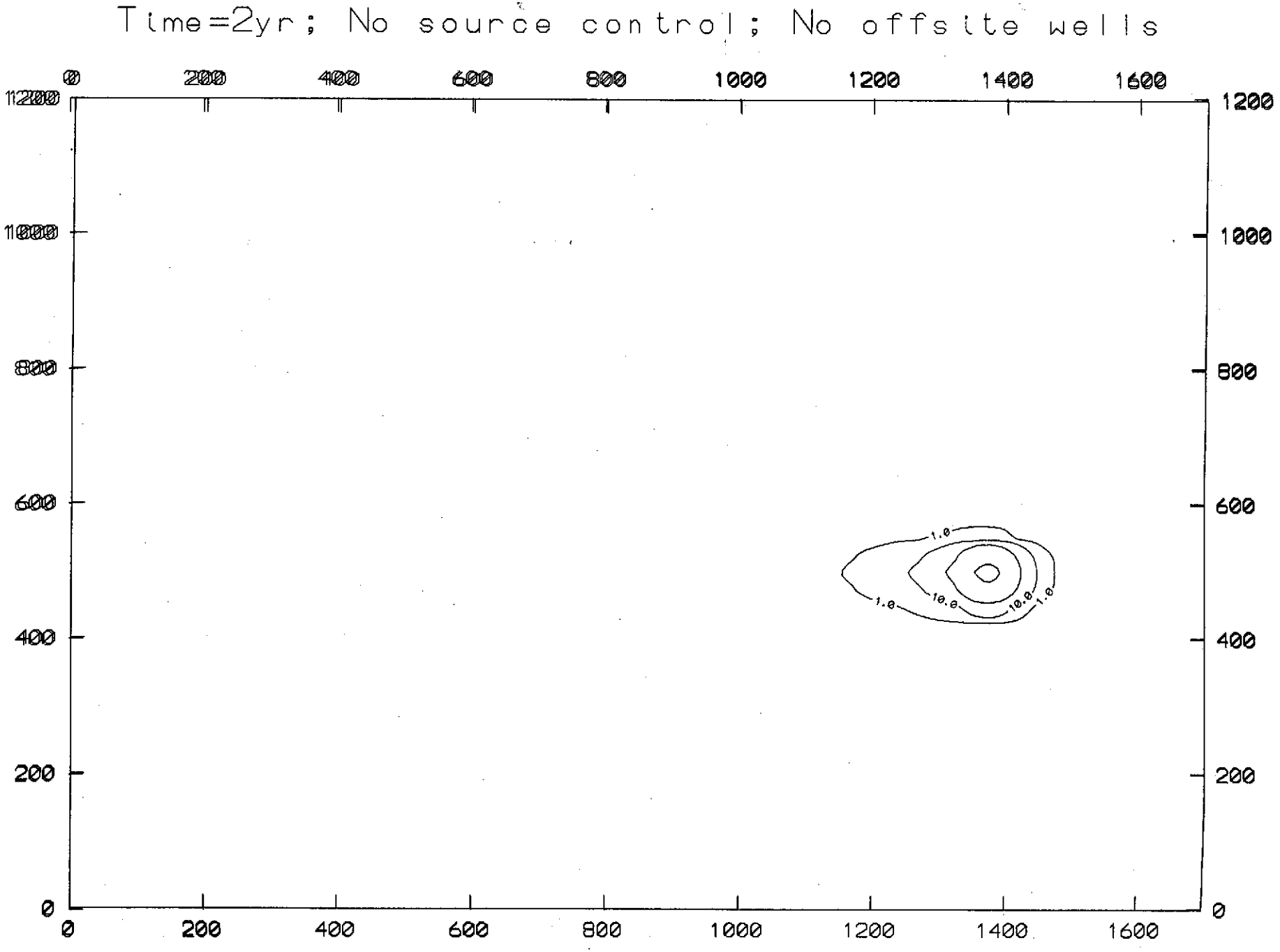
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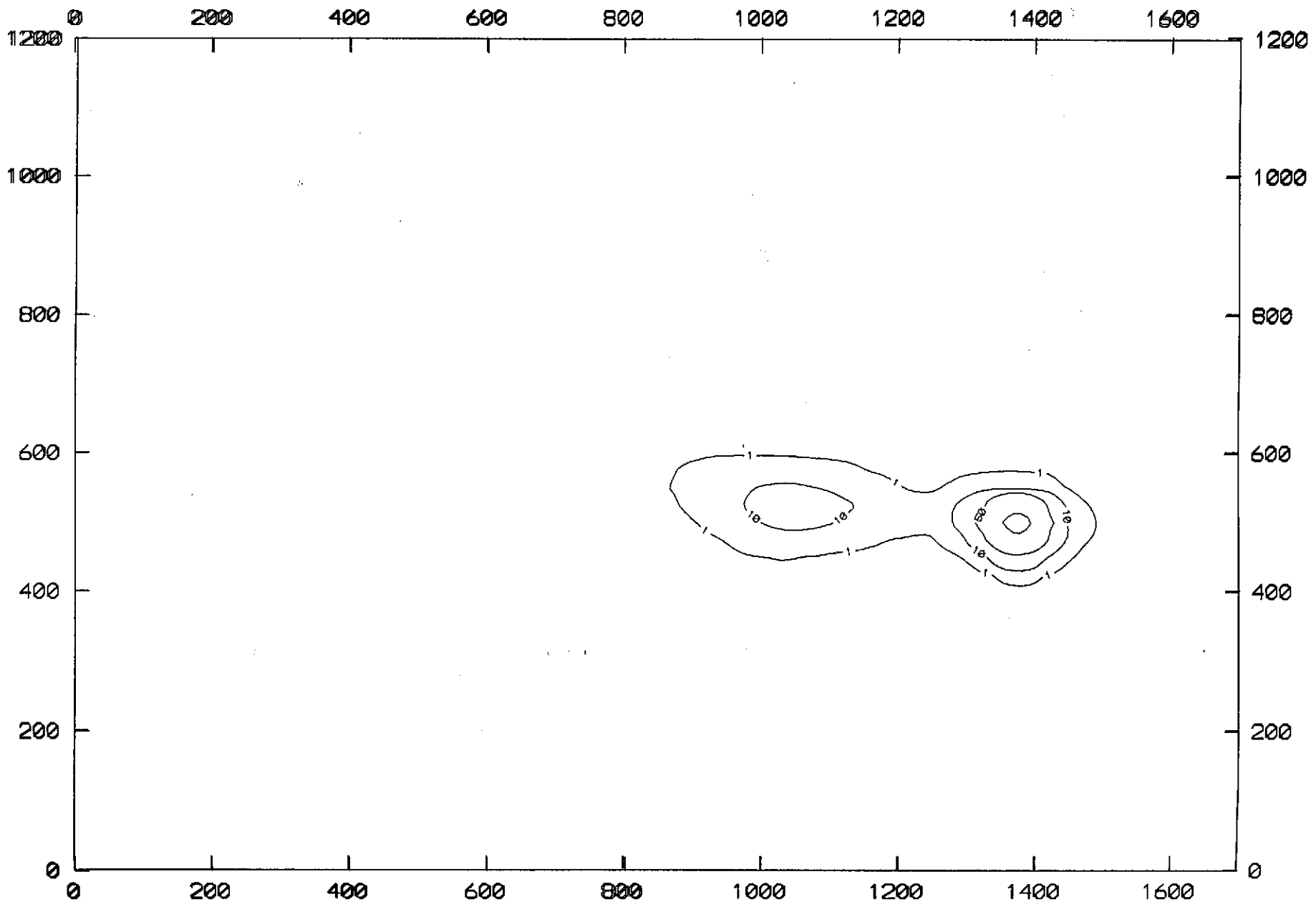
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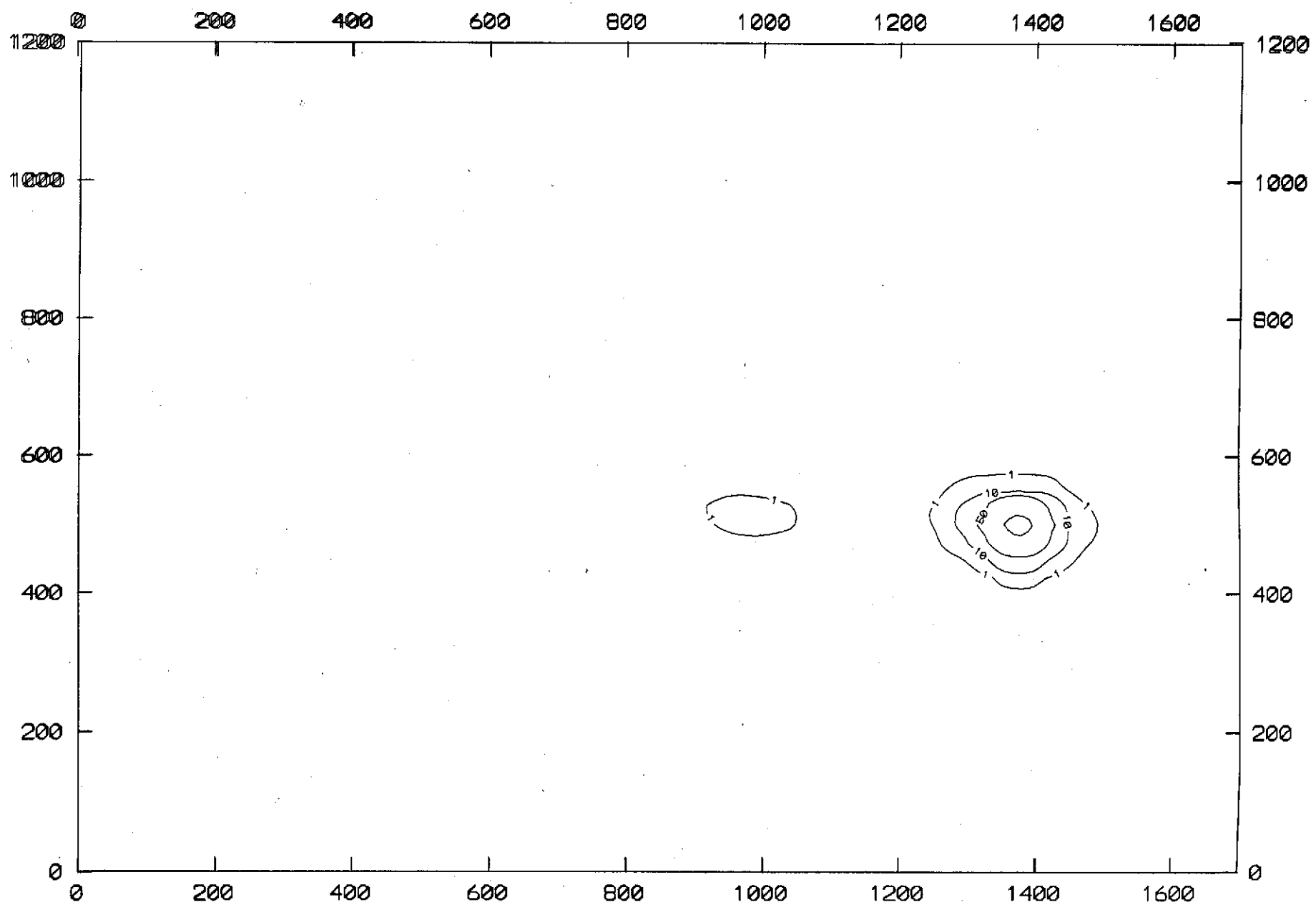
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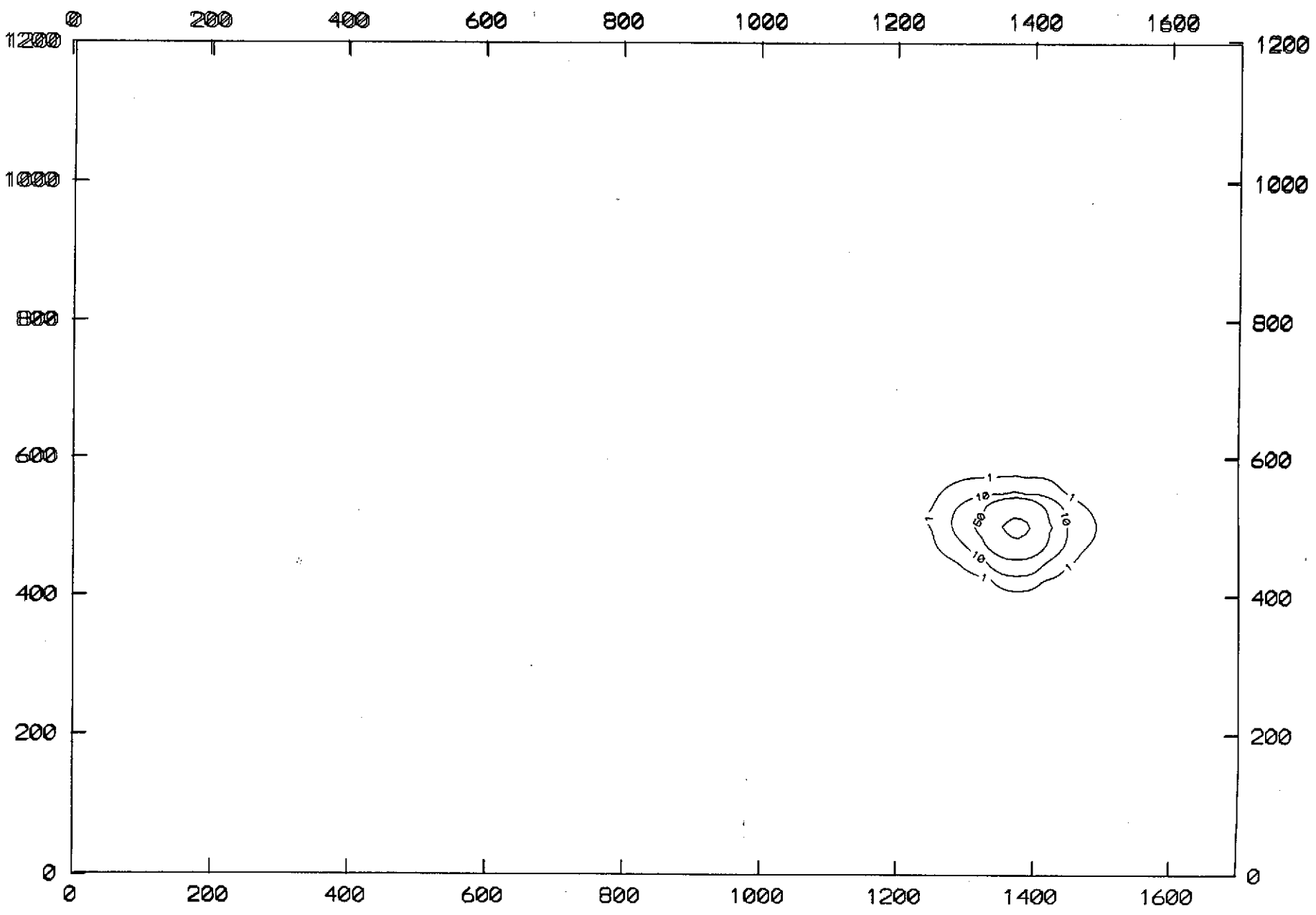
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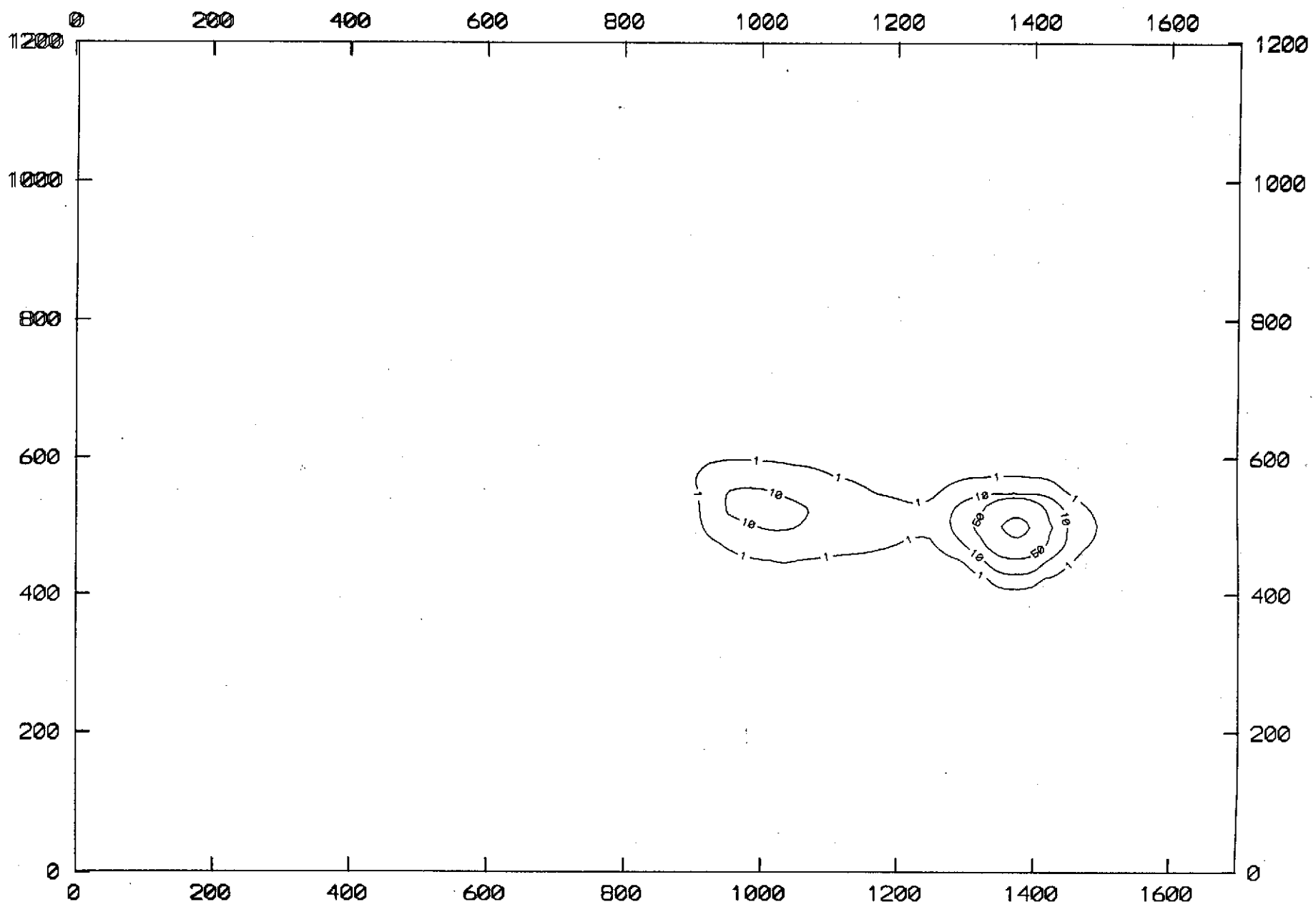
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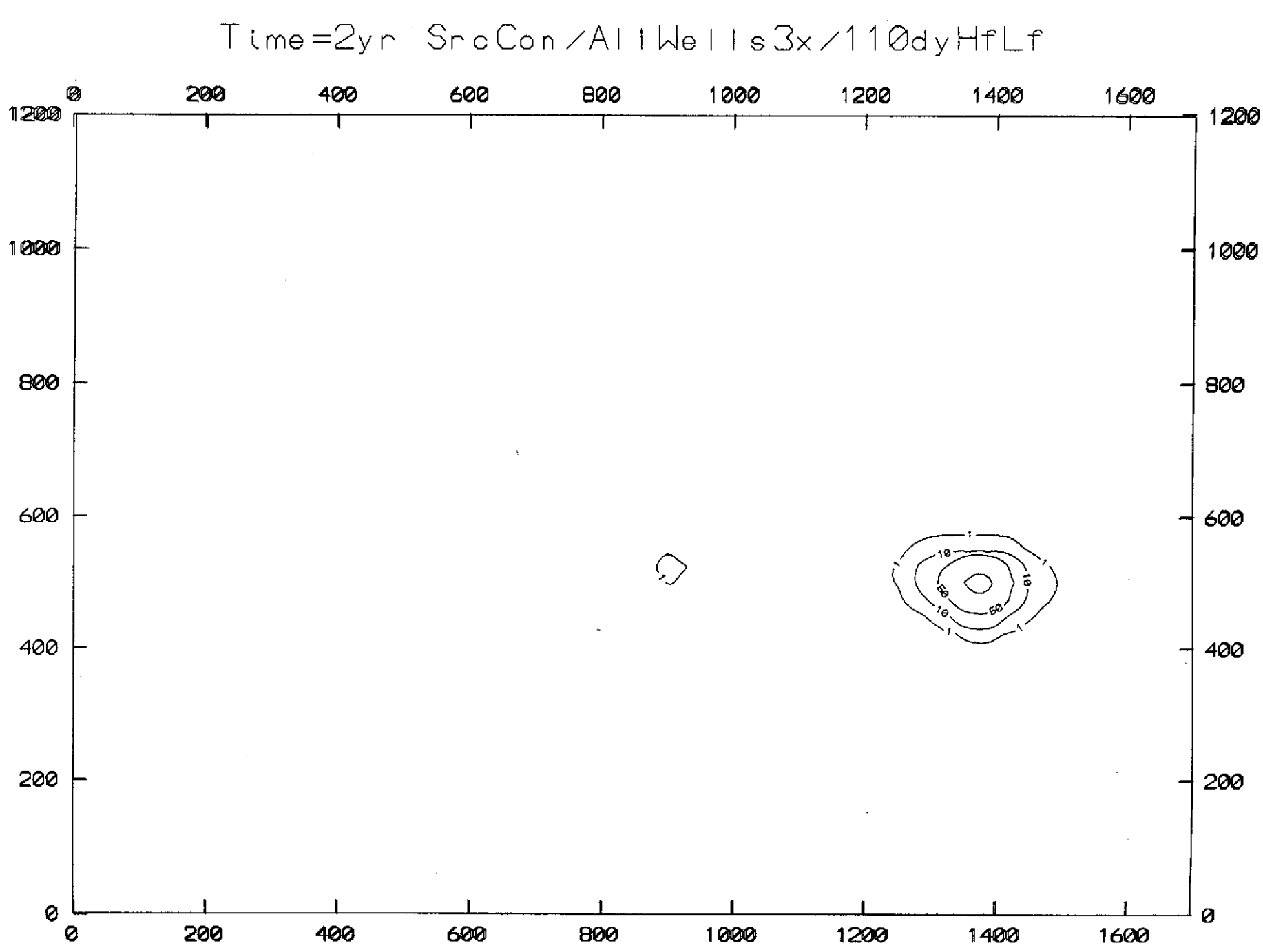
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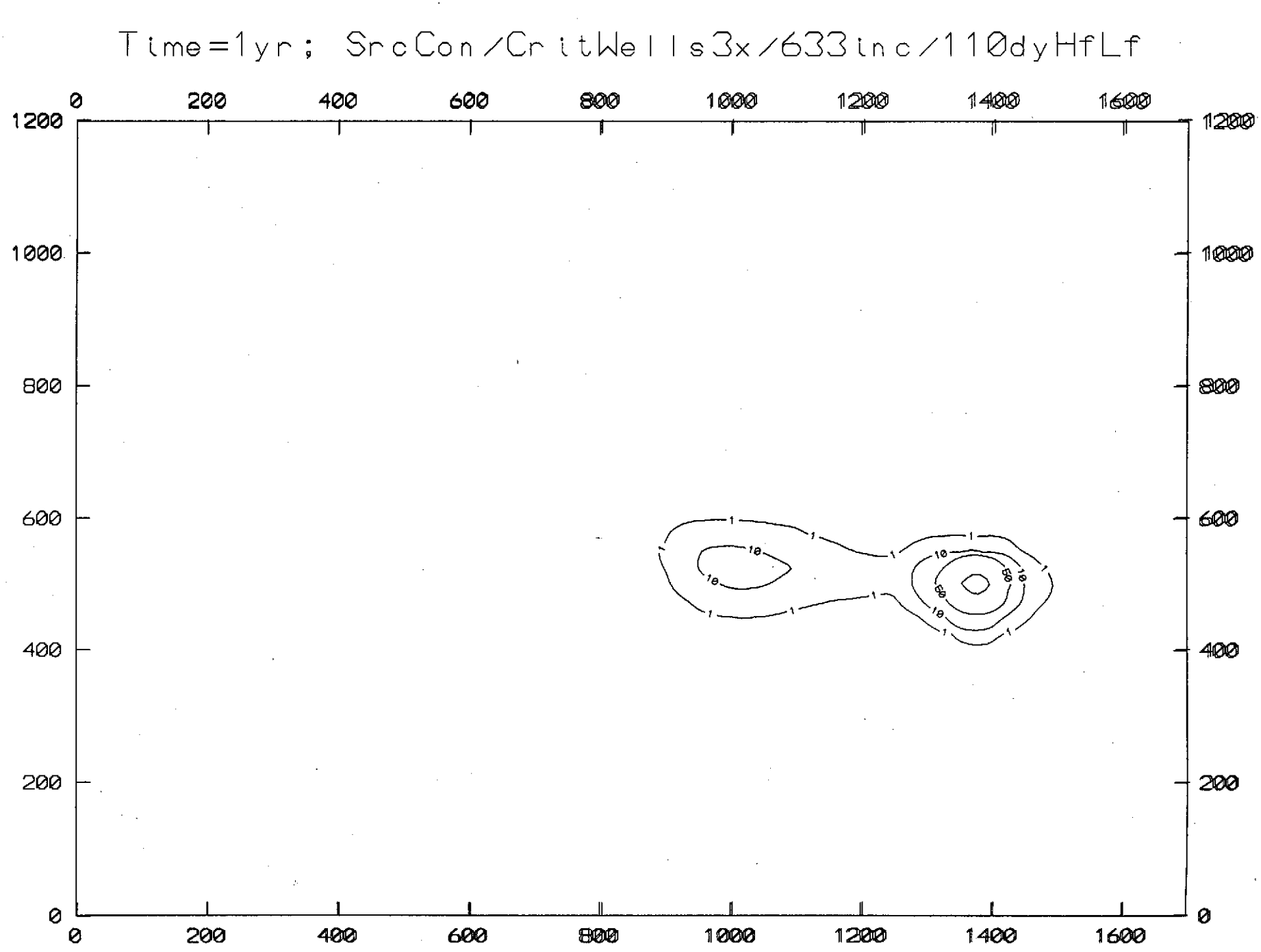
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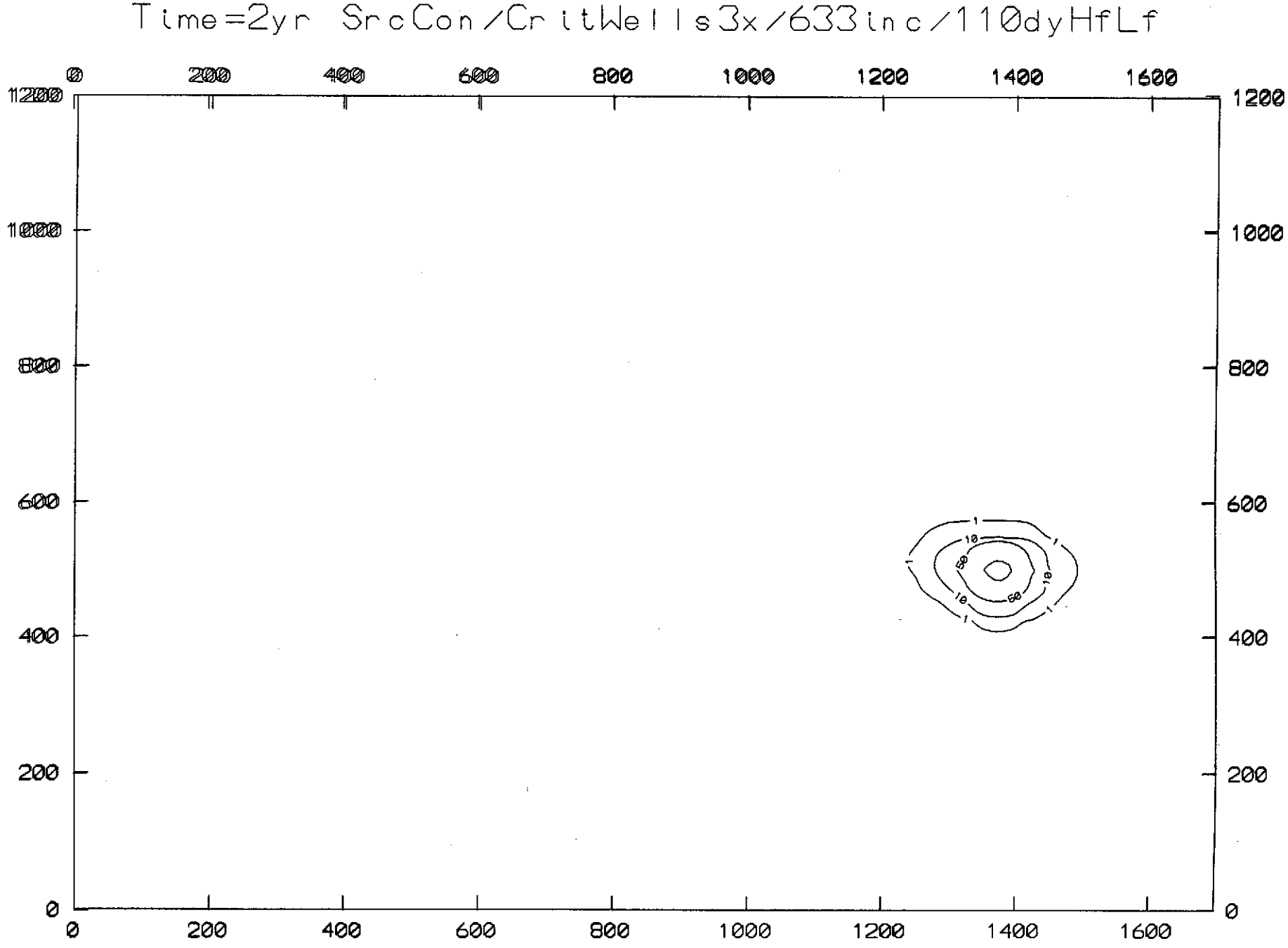
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