

Manitoba**Memorandum**

Date July 22, 1991

To John Fox
Chief Petroleum Engineer
PetroleumFrom Bruce Dunning
Senior Petroleum
Inspector

Telephone

Subject

~~AGRICULTURAL IMPACT OF CHEVRON DALY UNIT #3 REDUCED~~
ACREAGE SITES

I talked with Bill Haskett this morning. He stated that he had already inspected the proposed sites with Glenn Ross (Chevron Environmental Tech.) and the surveyor, and had made all changes necessary to accommodate his farming practices.

He stated that he had neither the time or the desire to review these sites in conjunction with our impact assessment.

He reiterated that he is totally satisfied with the site and access road locations and said there is no need for our involvement.

Based on this and the results of the last assessment done on this land (1987), I recommend we accept the landowner's decisions and not require further agricultural impact study.

Bruce Dunning

BD/cg

First | Fold

SURFACE LOCATIONS

EA-12-10-28

- ACCESS ACROSS CROP LANDS FROM S-12, OPTION
DOWN FENCE LINE FROM 12A-12

12A-12 10-28

ACCESS ACROSS CROP LANDS FROM 5A-12, OPTION
ACCESS WEST OF ROAD BETWEEN 6-12 & 11-12
- ACCESS THROUGH CROPS TO FENCE LINE OR ONTO
PASTURE TO THE EAST AT 11B-12 OR 6C-12

5B-12 WELL SITE ALONG MUNICIPAL ROW, OFFSET
FROM IN BUSH

13B-12-10-28

- 45 m offset from municipal 12A, low run
through lease

12B-12-10-28

45 m offset from municipal 12A

14B-12-10-28

wellside
fence

in

crop land close to

access road through farm yard, close to fence line,
offset to provide length of access road, access
from 14-12 along fence line or from 11-12



Chevron Canada Resources Limited

500 - Fifth Avenue S.W., Calgary, Alberta T2P 0L7

July 16, 1991



Daly Infill Project

W-1/2 12-10-28 WPM

**Our files: 102180, 102181, 102182, 102183,
102184 and 102185**

**Manitoba Energy & Mines
Petroleum Branch
Attention: J. N. Fox, Chief Petroleum Engineer
555 - 330 Graham Avenue
Winnipeg, Manitoba
R3C 4E3**

Gentlemen:

In support of our application for reduced spacing and drilling licences for the above captioned project. Enclosed is a copy of a letter from the Rural Municipality of Wallace allowing our well sites within 125 feet of the government road allowance. Also enclosed is a copy of a Letter of Consent from the occupant, Mr. William B. Haskett, agreeing to the locations of the above captioned well sites.

We trust you will find all to be in order and look forward to receiving the licences to drill in due course.

Yours very truly,

**I. C. ROSS
Land Representative
Field Land Operations**

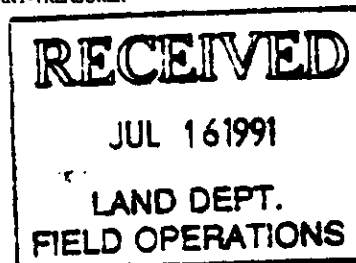
**ICR/brm
Enclosure**

Rural Municipality of Wallace

D. H. STEPHENSON
SECRETARY-TREASURER

Phone 748-1239
P.O. Box 2200
Virden, Manitoba
Canada
R0M 2C0

Chevron Canada Resources Ltd.
500 - Fifth Avenue S.W.
Calgary, Alberta
T2P 0L7



Our File No. _____

Your File No. _____

Attention: I.C. Ross, Land Representative
Negotiations and Acquisitions

July 9th 1991

Dear Sir/Madam:

Re: Proximity Request, Daly Infill Project
W¹ 12-10-28WPM

In response to your letter of June 10, 1991; in which you have requested permission for the construction of your wellsites within 50m of the municipal road, please be informed that the R.M. of Wallace Planning Scheme would allow structures up to 125 feet from the property line. The R.M. of Wallace would therefore consent to the construction of your wellsites up to 125 feet from the road allowance and the property line.

Trusting this to be satisfactory.

Yours Truly,
R.M. of Wallace

A handwritten signature in cursive script, appearing to read "Don Stephenson".

Don Stephenson
Secretary-Treasurer

DHS/crd

91.07.16
Original - M. McBride
cc: P. Childs
cc: B. Ross - Virden
File [initials]
cc: J. Fox - P. Branch

July 10, 1991

Letter of Consent
Chevron Daly Infill Program
Chevron Daly 5A, 5B, 12A, 12B,
13B and 14B-12-10-28
W-1/2 12-10-28 WPM
Our files: 102180, 102181, 102182, 102183,
102184 and 102185

Manitoba Energy and Mines
Petroleum Branch
Attention: Mr. John Fox
Chief Petroleum Engineer
555 - 330 Graham Avenue
Winnipeg, Manitoba
R3C 4E3

I, William B. Haskett, Occupant of the above captioned lands, hereby advise the Petroleum Branch of Manitoba Energy and Mines that I am in agreement with the location of the above described well sites and access roads thereto, as more particularly described on the attached plans of survey.

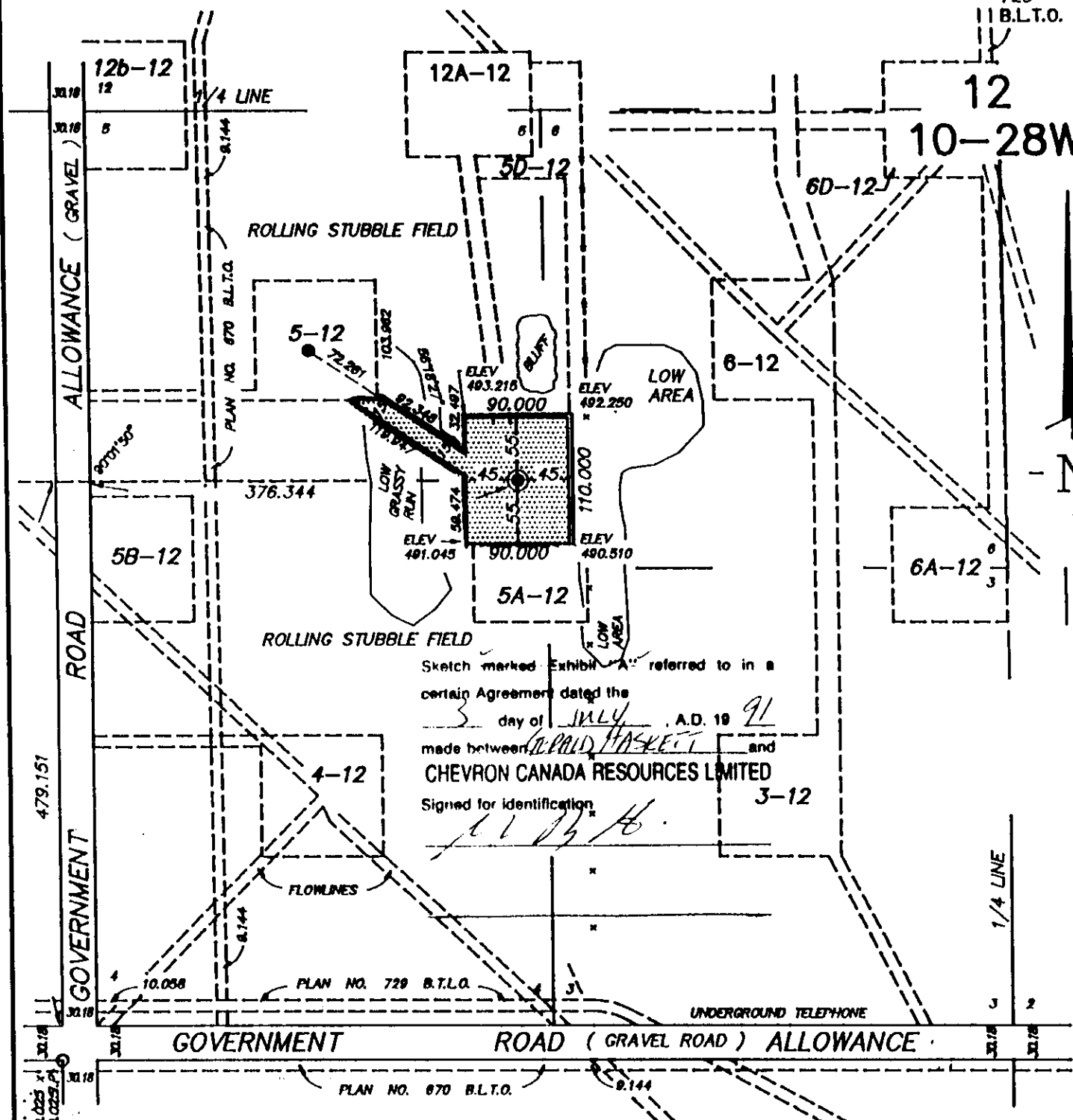
I further advise that I have no objection to the issuance of Drilling Licenses for these wells.



WILLIAM B. HASKETT

Scale 1: 5000

12
10-28W.



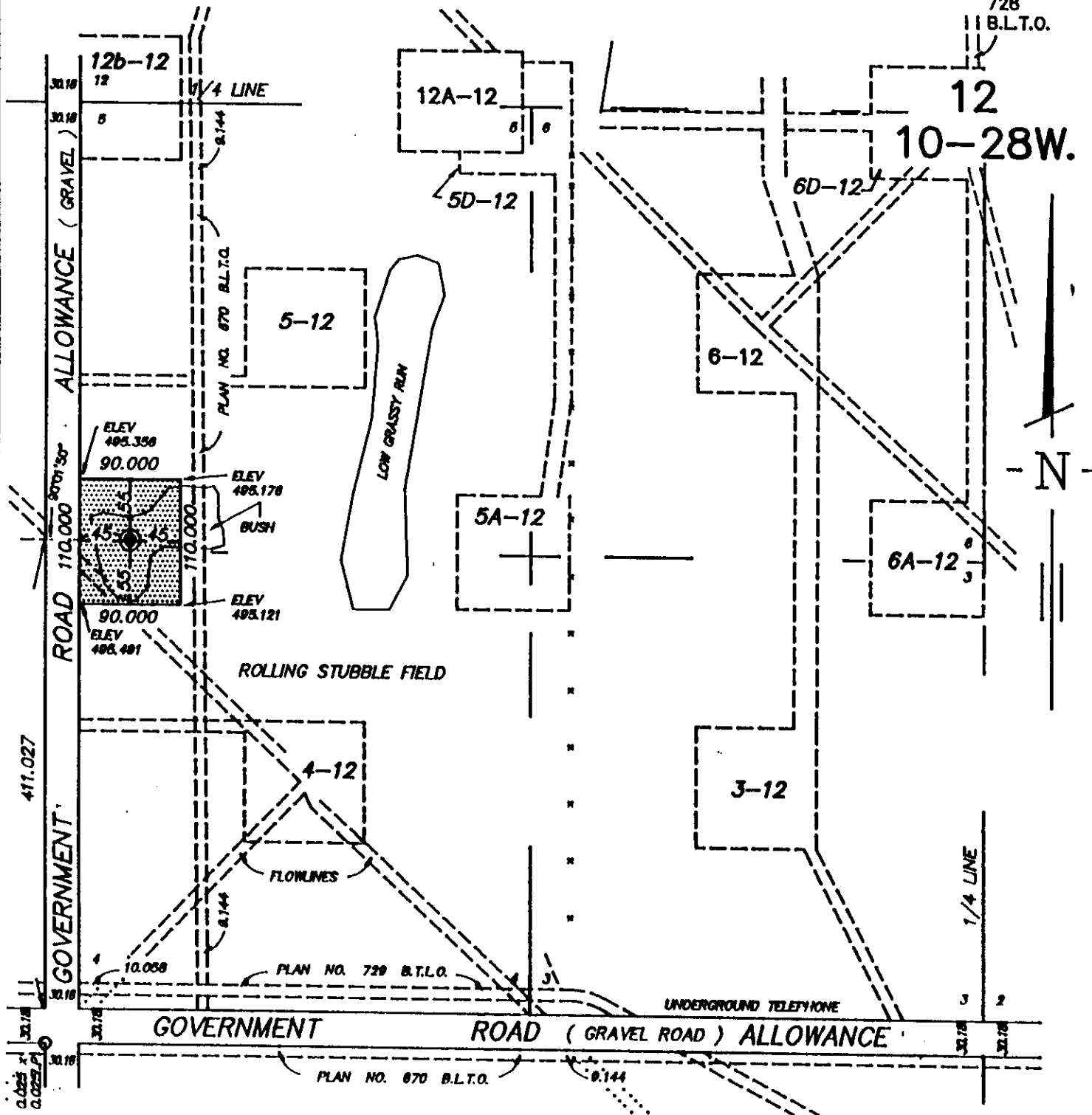
JOB No. 91-0688

PLAN OF WELL SITE LOCATION CHEVRON DALY





LSD. 5B SEC. 12 TP. 10 RGE. 28 W.P.M.
MANITOBA

Scale 1: 5000

PLAN
728
B.L.T.O.



NOTES

All distances are in metres or decimals of a metre and may be converted to feet by multiplying by 3.28084
Well location is shown thus 
Area required is shown outlined thus 
Survey monuments found are shown thus 
Iron posts planted are shown thus 
Well Coordinates: 411.027 N. OF S. BDY. OF SEC. 12
45.000 E. OF W. BDY. OF SEC. 12

Ground elevation at well: 495.158
Areas Well Site 0.990 ha., 2.45 acres
Access Road 0.000 ha., 0.00 acres
Total 0.990 ha., 2.45 acres

Plan and Survey
certified correct
this 17th day of May, 1991.

Richard C. Perin
Manitoba Land Surveyor

D. J. Hester
Witness

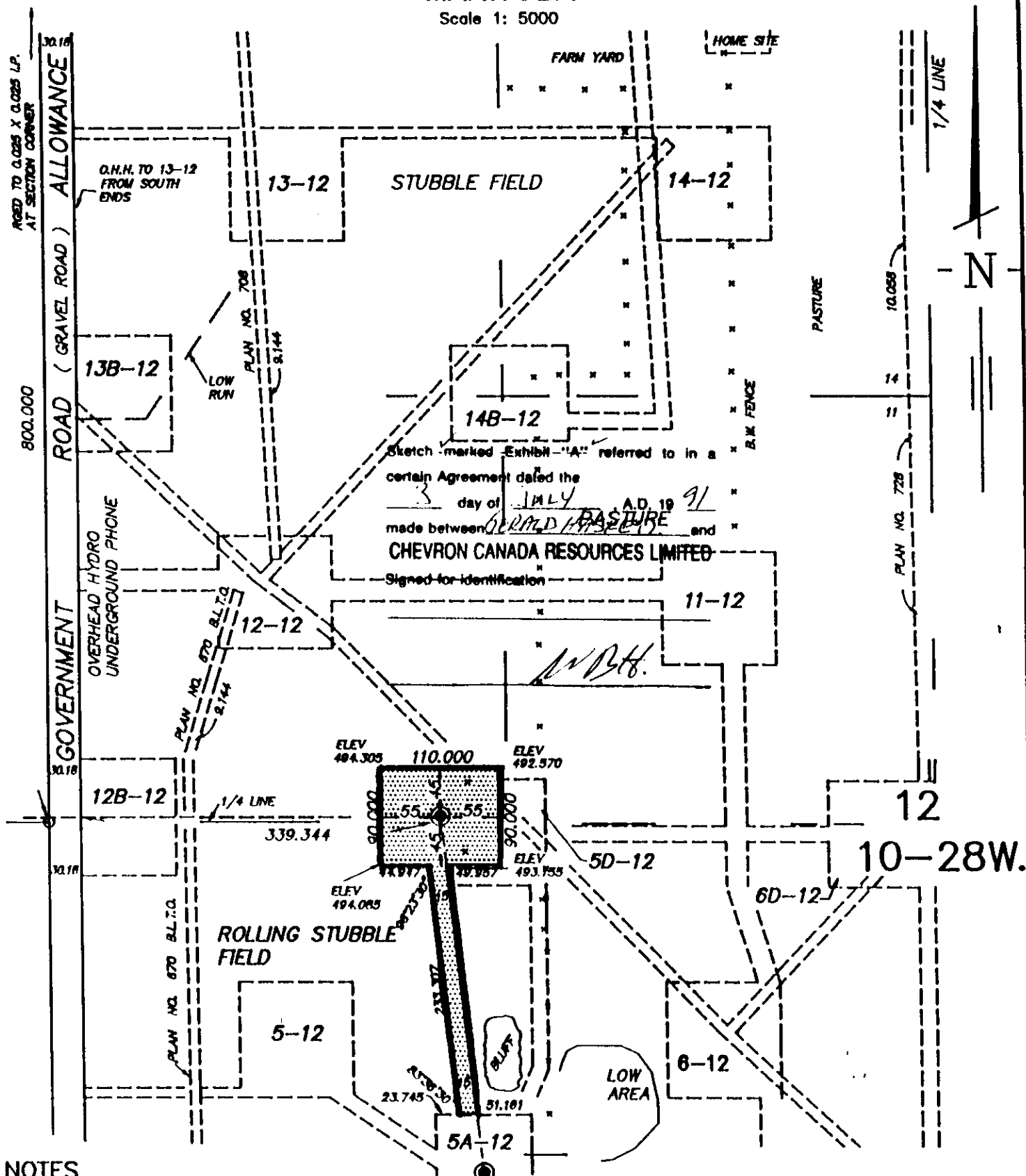
LENNON SURVEYS
P.O. Box 1348, 1840 Rosser Avenue
Brandon, Manitoba R7A0N2
(204) 727-0651
FAX (204) 727-5247

CHEVRON DALY

LSD. 12A SEC. 12 TP. 10 RGE. 28 W.P.M.

MANITOBA

Scale 1: 5000



NOTES

All distances are in metres or decimals of a metre and may be converted to feet by multiplying by 3.28084

Well location is shown thus

Area required is shown outlined thus

Survey monuments found are shown thus

Iron posts planted are shown thus

Well Coordinates: 800.000 S. OF N. BDRY. SEC. 12
339.344 E. OF W. BDRY. SEC. 12

Ground elevation at well: 494.032
Areas Well Site 0.990 ha., 2.45 acres
Access Road 0.350 ha., 0.86 acres
Total 1.340 ha., 3.31 acres

Plan and Survey
certified correct
this 17th day of May, 1991.

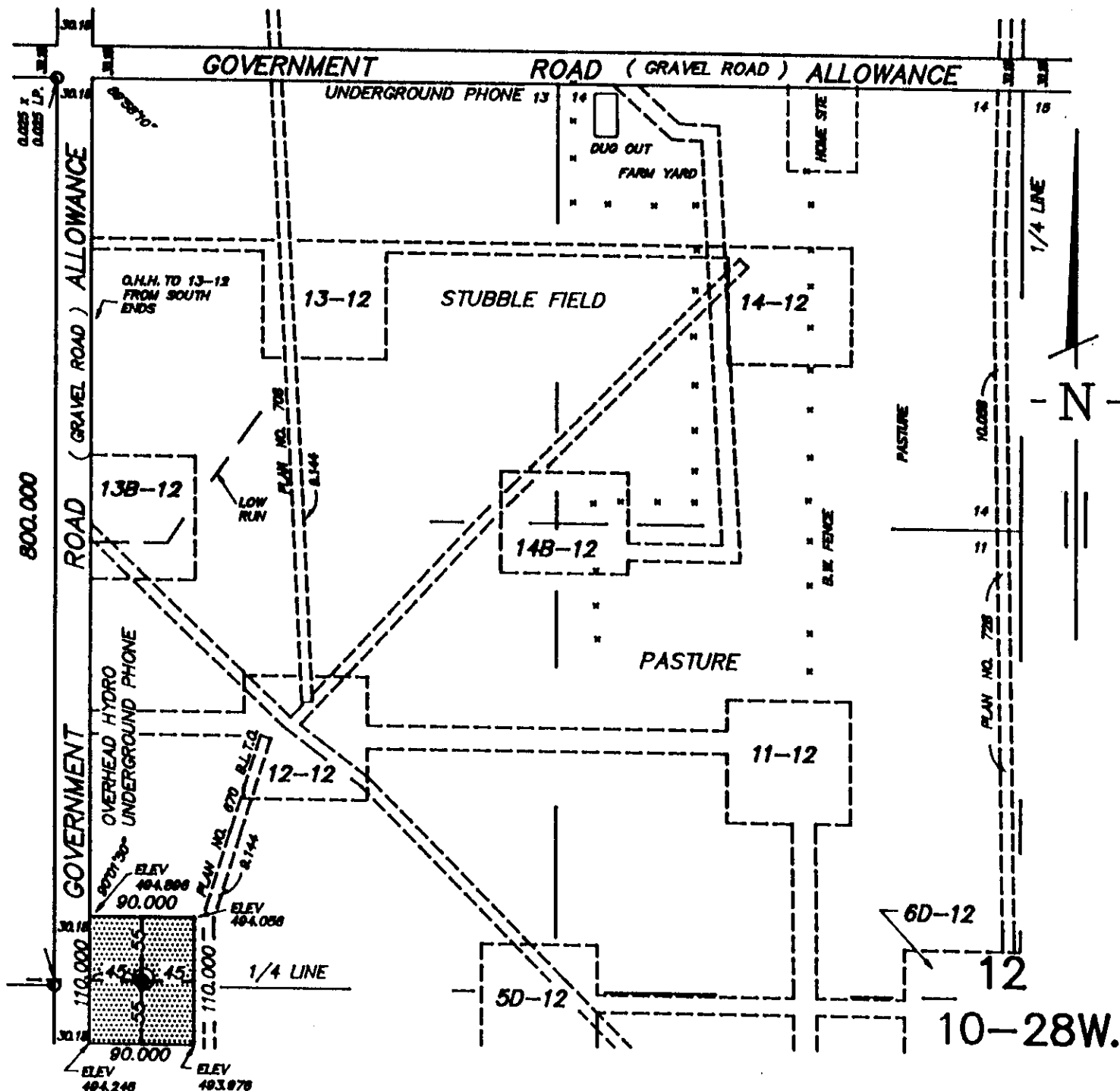
Richard C. Percival
Manitoba Land Surveyor

[Signature]
Witness





LENNON SURVEYS
P.O. Box 1346, 1640 Rossier Avenue
Brandon, Manitoba R7A6N2
(204) 727-0651
FAX (204) 727-5247

PLAN OF WELL SITE LOCATION CHEVRON DALY LSD. 12B, SEC. 12, TP. 10, RGE. 28 W.P.M. MANITOBA

Scale 1: 5000



NOTES

All distances are in metres or decimals of a metre and may be converted to feet by multiplying by 3.28084
Well location is shown thus 
Area required is shown outlined thus 
Survey monuments found are shown thus 
Iron posts planted are shown thus 
Well Coordinates: 800.000 S. OF N. BDRY. SEC. 12
45.000 E. OF W. BDRY. SEC. 12

Ground elevation at well: 494.436
Areas Well Site 0.990 ha., 2.45 acres
Access Road 0.000 ha., 0.00 acres
Total 0.990 ha., 2.45 acres

Plan and Survey
certified correct
this 13th day of May, 1991.

Richard C. Lennon
Manitoba Land Surveyor

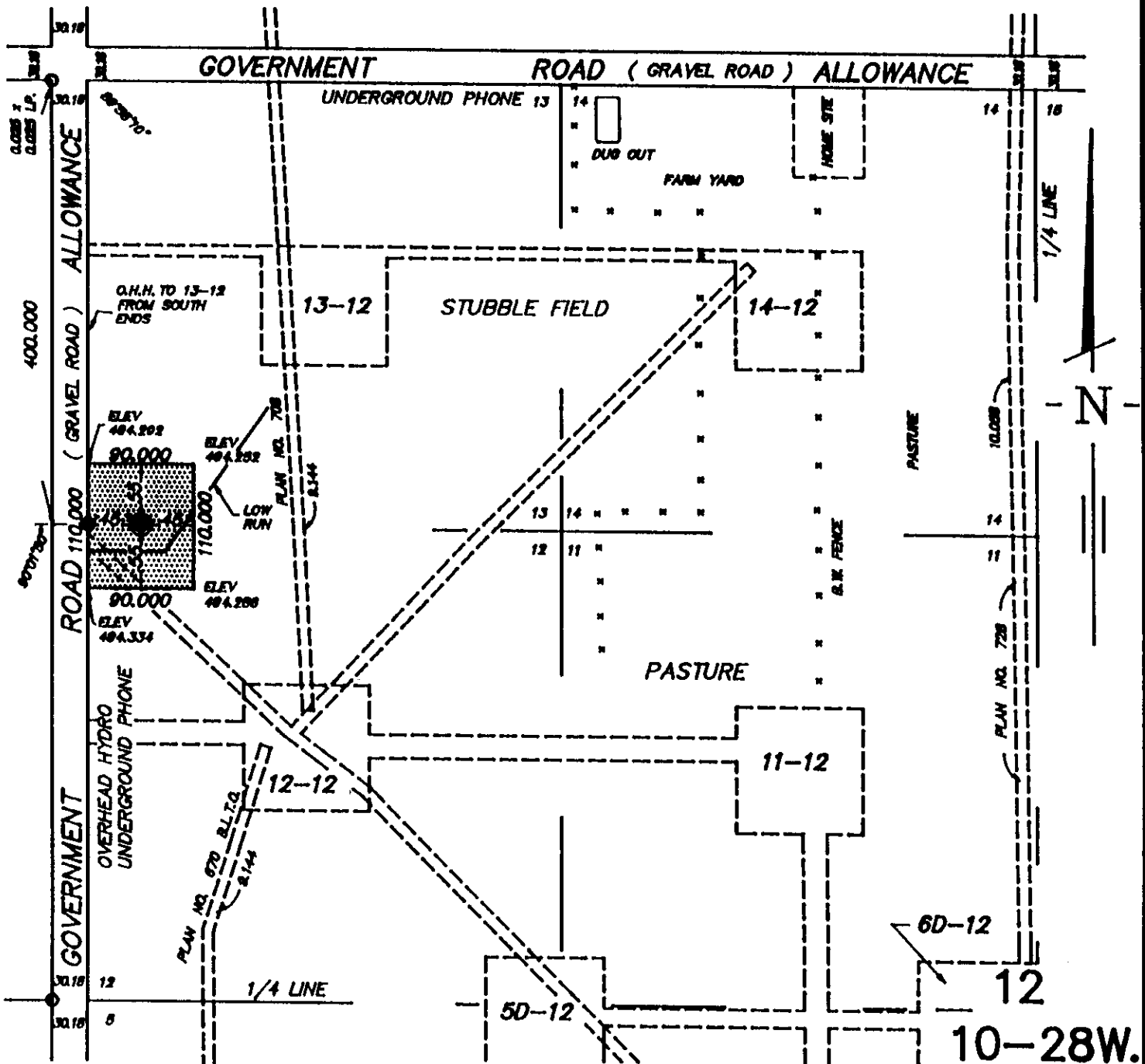
M. J. Lennon
Witness

LENNON SURVEYS
P.O. Box 1346, 1640 Rosser Avenue
Brandon, Manitoba R7A6N2
(204) 727-0851
FAX (204) 727-5247





PLAN OF WELL SITE LOCATION

CHEVRON DALY

LSD. 13B, SEC. 12, TP. 10, RGE. 28 W.P.M.
MANITOBA
 Scale 1: 5000



NOTES

All distances are in metres or decimals of a metre and may be converted to feet by multiplying by 3.28084
 Well location is shown thus 
 Area required is shown outlined thus 
 Survey monuments found are shown thus 
 Iron posts planted are shown thus 
 Well Coordinates: 400.000 S. OF N. BDRY. SEC. 12
 45.000 E. OF W. BDRY. SEC. 12

Ground elevation at well: 494.760
 Areas Well Site 0.990 ha., 2.45 acres
 Access Road 0.000 ha., 0.00 acres
 Total 0.990 ha., 2.45 acres

Plan and Survey
 certified correct
 this 13th day of May, 1991.

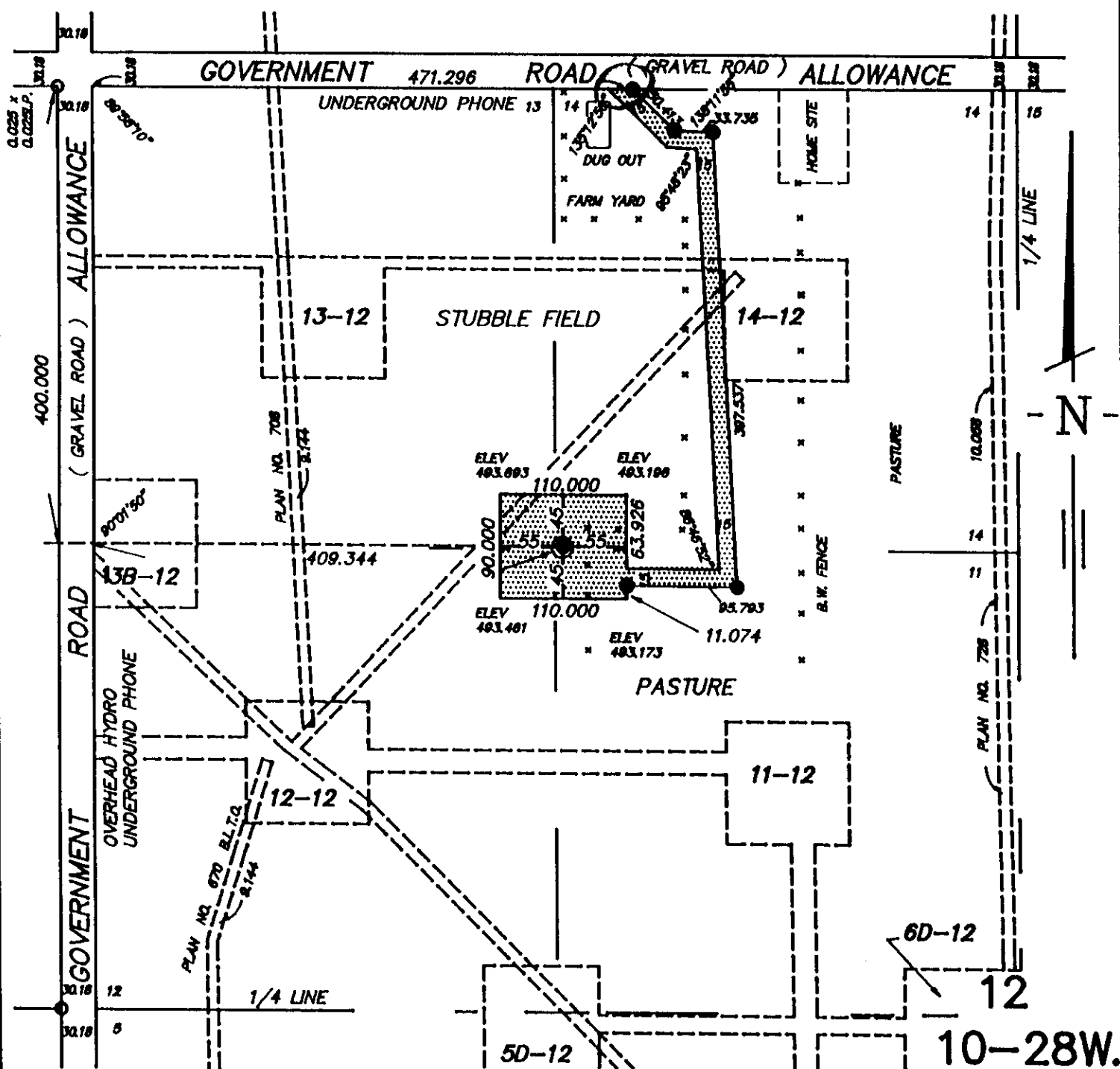

 Manitoba Land Surveyor


 Witness





LENNON SURVEYS
 P.O. Box 1346, 1640 Rosser Avenue
 Brandon, Manitoba R7A6N2
 (204) 727-0851
 FAX (204) 727-5247

PLAN OF WELL SITE LOCATION CHEVRON DALY LSD. 14B, SEC. 12, TP. 10, RGE. 28 W.P.M. MANITOBA

Scale 1: 5000

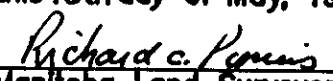


NOTES

All distances are in metres or decimals of a metre and may be converted to feet by multiplying by 3.28084
Well location is shown thus 
Area required is shown outlined thus 
Survey monuments found are shown thus 
Iron posts planted are shown thus 
Well Coordinates: 400.000 S. OF N. BDRY. SEC. 12
409.344 E. OF W. BDRY. SEC. 12

Ground elevation at well: 493.906
Area Well Site 0.990 ha., 2.45 acres
Access Road 0.842 ha., 2.08 acres
Total 1.832 ha., 4.53 acres

Plan and Survey
certified correct
this 13th day of May, 1991.


Manitoba Land Surveyor


Witness

LENNON SURVEYS
P.O. Box 1346, 1640 Rossar Avenue
Brandon, Manitoba R7A8N2
(204) 727-0851
FAX (204) 727-5247



Chevron Canada Resources

500 - Fifth Avenue S.W., Calgary, Alberta T2P 0L7
Phone (403) 234-5000 Fax (403) 234-5947

W.H. Garman
Manager
Drilling Division

Calgary, Alberta
July 15, 1991

Manitoba Energy and Mines
Petroleum Branch
555 - 330 Graham Avenue
Winnipeg, Manitoba
R3C 4E3

Attention: Mr. John N. Fox

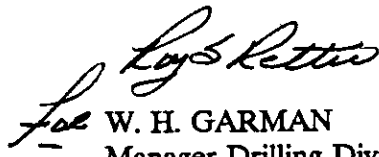
Gentlemen:

Attached is a copy of the Chevron "Chain of Command, Well Control Contingency Plan and Shut-In Procedures for the following six (6) Chevron Daly Unit No. 3 development wells:

Chevron Daly Unit #3	05a-12-10-28 WPM
Chevron Daly Unit #3	05b-12-10-28 WPM
Chevron Daly Unit #3	12a-12-10-28 WPM
Chevron Daly Unit #3	12b-12-10-28 WPM
Chevron Daly Unit #3	13b-12-10-28 WPM
Chevron Daly Unit #3	14b-12-10-28 WPM

Should you require any further information, contact Mr. R. S. Rettie at (402) 234-5522.

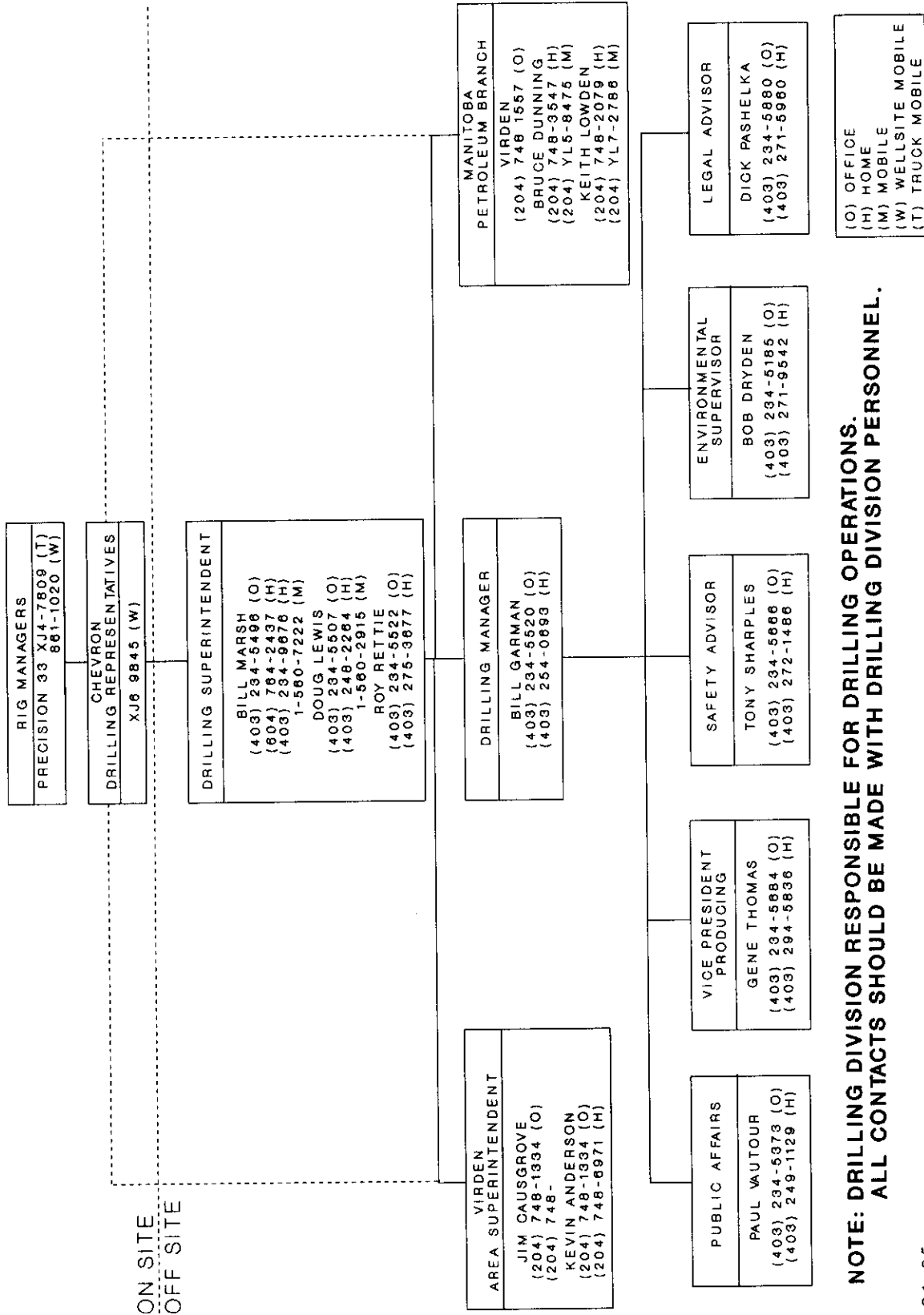
Yours very truly,


W. H. GARMAN
Manager Drilling Division

JJF.1/im

cc: J. E. Causgrove
R. L. Dryden
A. R. Young
W. V. Marsh
D. G. Lewis
On-Site Drilling Reps

CHEVRON CANADA RESOURCES **DAILY UNIT NO. 3 DRILLING PROGRAM**



**NOTE: DRILLING DIVISION RESPONSIBLE FOR DRILLING OPERATIONS.
 ALL CONTACTS SHOULD BE MADE WITH DRILLING DIVISION PERSONNEL.**



Chevron Canada Resources

500 - Fifth Avenue S.W., Calgary, Alberta T2P 0L7
Phone (403) 234-5000 Fax (403) 234-5947

W.H. Garman
Manager
Drilling Division

July 12, 1991

Manitoba Energy and Mines
Petroleum Branch
555-330 Graham Avenue
R3C 4E3

Attention: Mr. John Fox

Gentlemen:

RE: Contingency Plan For Well Control At Chevron Daly Unit #3

Chevron Canada Resources will be incorporating a "hard" shut-in procedure to minimize the size of the influx and thereby reduce the initial shut-in casing pressure. This method will lower the casing pressures at all points during the circulation and reduces the chance of formation breakdown and an underground blowout.

Intermediate casing will be set 2-3 m into the Watrous Evaporites. This is approximately 20 m above the Watrous Red Beds where the high pressure salt water flow was encountered at the well Chevron Daly 6a-12-10-28 WPM in March, 1987.

Prior to drilling out the surface casing of any of the Chevron Daly Unit #3 wells, we shall rig up a 25 m³ pre-mix tank filled with kill weight drilling fluids, three 400 bbl salt water storage tanks and a salt water disposal line tied to the injection line at 12-12-10-28 WPM (see Figure 1). In the event a well kicks prior to setting intermediate casing, the well would be shut-in and the kill weight drilling fluids circulated to restore well control. Should shut-in pressures exceed the maximum allowable shut-in pressure (MACP) as determined by the leak-off test at the first well (12b-12-10-28 WPM), the well would be opened to the MACP and allowed to flow into the storage tanks until the well could be safely shut-in. Excessive water would be trucked from location to the 'non-unit' injection plant at 12-29-9-28 WPM for reinjection. Should the flow be too

excessive to be trucked from location, it would be diverted to the rig tanks and pumped via the disposal line to the injector at 12-12-10-28 WPM and back along the injection line to the injection plant at 15-1-10-28 WPM. Here, it would be reinjected into the 15-1 well at 250 m3/day as well as diverted to an existing 1000 m3 plastic lined pit. Excess water would be trucked from the pit to the injection plant at 12-29-9-28 WPM (500 m3/day) and the Scallion injection plant at 11-16-11-26 WPM (250 m3/day) if required. As a further contingency, flow could also be diverted to the injectors along the 'west injection line' at 125 m3/day (see Figure 1). Salt water disposal capabilities total over 1100 m3/day with over 1100 m3 storage capacity. This exceeds the maximum anticipated flow of 800 m3/day measured during workover operations at the 8-12-10-28 WPM well in November, 1989.


Main hole will be drilled using a rotating head and weighted mud system. In the event a well kicks, the well would be shut-in and killed with required kill weight drilling fluid. Should shut-in pressures exceed the maximum allowable shut-in pressure as determined by the leak-off/pressure integrity test at the first well, the well will be allowed to flow as above while drilling operations continue until the well can be safely shut-in. If necessary, the production casing will be cemented using the constant bottom hole pressure method (see attached procedures to shut off high pressure waterflows).

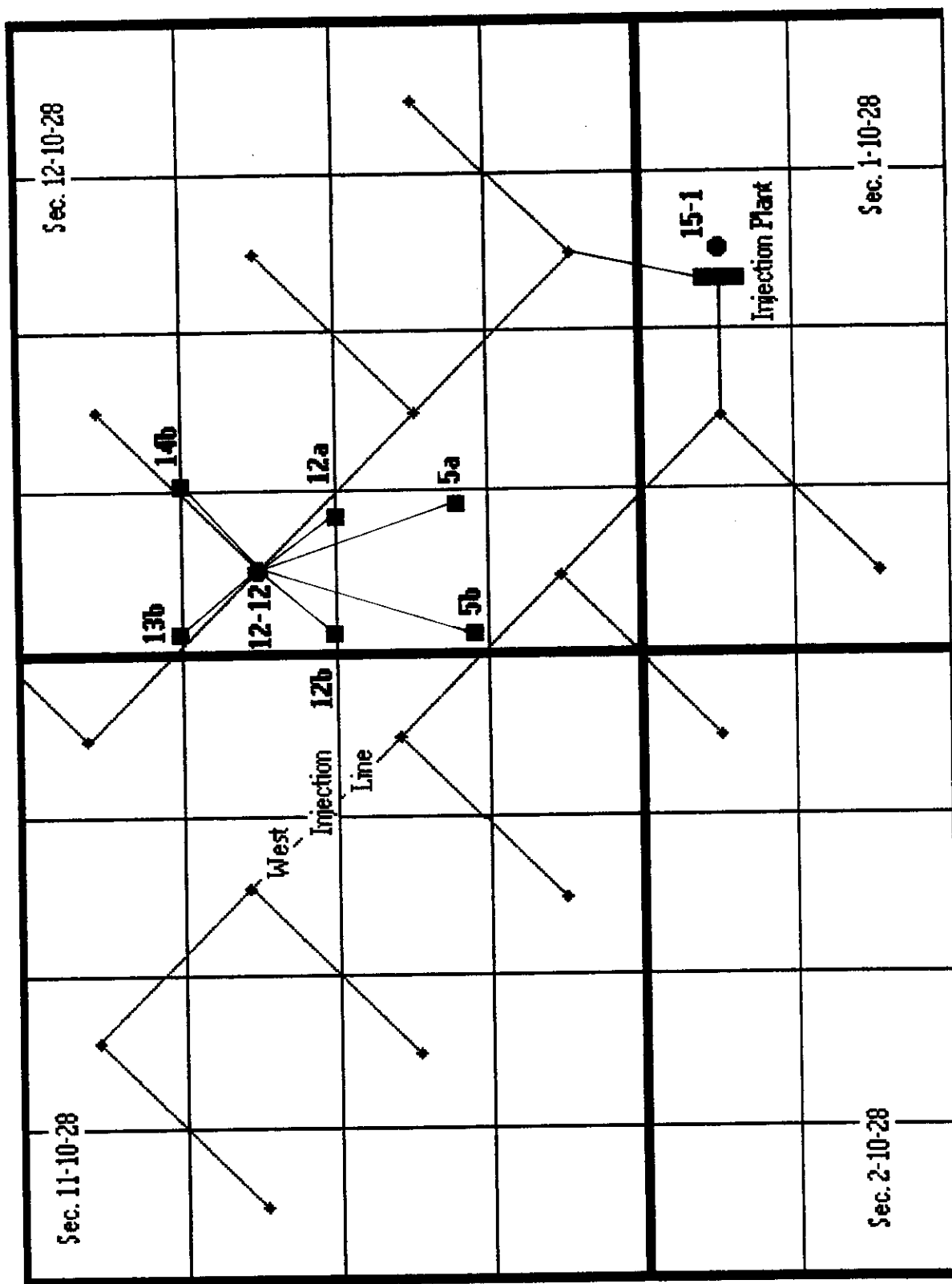
All injectors in section 12-10-28 WPM as well as the four closest injectors in section 11-10-28 WPM have been shut-in since May 13, 1991. To date, the highest pressure in the area has bled off from 14900 kPa prior to shut-in, to 13600 kPa. Pressures are expected to bled off even further by the time drilling commences.

Our policy requires all of the contractor's drillers and toolpushers to hold a valid First Line Supervisor's Blowout Prevention Certificate. In addition, all Chevron (onsite) Drilling Representatives have valid Second Line Supervisor's Blowout Prevention Certificates.

We anticipate spudding the first well on or about July 23, 1991, subject to government approvals and site preparation. Should you have any further questions please contact Mr. Roy S. Rettie at (403) 234-5522.

Yours very truly,


W. H. Garman
Manager Drilling Division



■ Proposed Locations
 ♦ Injectors
 — Disposal Line

FIGURE 1

Daly Unit #3 Injection Wells Shut-in Since May 13, 1991

2-12-10-28 WPM

4-12-10-28 WPM

6-12-10-28 WPM

8-12-10-28 WPM

10-12-10-29 WPM

12-10-10-29 WPM

14-12-10-28 WPM

2-11-10-28 WPM

8-11-10-28 WPM

10-11-10-28 WPM

16-11-10-28 WPM

A PROCEDURE TO SHUT OFF HIGH PRESSURE
WATERFLOWS DURING PRIMARY CEMENTING

presented at the
1989 Drilling Engineers Conference
Houston, TX

by
R. K. Mitchell
G. S. Salvo

I)

INTRODUCTION

The need to shut off water flows during primary cementing is considered critical. Currently, most regulatory agencies require protection of all fresh water zones and prohibit pressure on casing string annuli. Casing corrosion, out of zone crossflow, mud contamination, and excessive hole washout are often the result of improperly cemented waterflows. These problems can significantly increase drilling costs and often require remedial cementing procedures. Experience in several areas have shown that remedial cementing work is expensive and time consuming, especially when dealing with washed out salt sections and corroded casing.

Existing methods for controlling waterflows have met with limited success in the past. The need to develop a simple, yet cost effective procedure to handle a multitude of complications that can occur while cementing was needed. Complications which include lost circulation, waterflow/cement incompatibility, and associated gas make most of the conventional cementing techniques impractical. Therefore it was decided to develop a cementing procedure that was similar to existing well control methods which could handle these complications. Use of constant bottom hole pressure (BHP) methods of well control along with sound cementing practices lead to development of a technique to control waterflows while cementing.

II)

REVIEW OF EXISTING PROCEDURES

Over the years several methods for controlling and cementing off waterflows have been utilized. All have been used frequently, but there applications are limited and their success rates, poor. The most commonly used technique is the barrel in/barrel out method which holds back pressure on the annulus while cementing. Water influx is limited by holding pressure on the annulus based on volume. Pressure is held through use of a choke so that the annular returns are equal to that of the cement and displacement mud pumped. The main problem with this technique is that it does not allow for gas expansion. This can result in excessive back pressure and loss of circulation. In addition, if returns are lost while cementing using this procedure, the volume control is lost and no sound way of minimizing the water influx exists.

Another common method of cementing waterflows is to cement the well conventionally and then bullhead cement from surface down the annulus. This procedure usually results in good cement bonding above and below the water-flow but none across it. Corrosion in the uncemented section is then accelerated and remedial cementing is often required. The use of external casing packers (ECP's) and multiple stage cementing tools (more commonly called DV tools) can minimize the uncemented area but does not actually shut off the waterflow. Other problems associated with this procedure include cement contamination above the waterflow and formation breakdown above the waterflow while bullheading. In several areas, regulatory agencies prohibit bullheading practices due to these problems.

Other methods of controlling waterflows include open hole cementing and polymer squeeze jobs. Both have been used successfully but are often expensive and time consuming. In addition, success is very difficult to achieve in long or washed out intervals. As can be seen, all of these procedures have applications but rarely are wellbore conditions ideal for utilization. The need for a cementing procedure to handle a multitude of wellbore conditions was required.

III) FRAC GRADIENTS/CONSTANT BHP PROCEDURES

The planning process for wells in waterflow areas should include defining the zones of possible waterflow and its associated surface and bottom hole pressures. It should also include fracture gradients for zones that will be exposed prior to cementing. If this information is not available, it is recommended to perform pressure integrity tests ± 200 psi above the anticipated waterflow surface pressure. Test should be run at the previous casing shoe and at suspected weak zones. This procedure is not recommended for areas in which the formations do not heal after obtaining a leakoff. Determination of fracture gradients prior to encountering the flow is very important because it will help predict crossflow zones and determine if a two stage cement job is required. The well should also be shut in after encountering the flow to determine the actual pressures.

Many waterflows are a direct result of water injection out of the intended zone in nearby wells. It is recommended to shut down injection wells in the vicinity of the subject well. This has helped reduce the waterflow pressures and rates in some cases. It is also advisable to get a waterflow sample for compatibility testing. The water may pick up soluble minerals that can be incompatible with a particular cement system. If the water sample has any chloride or magnesium content it should be tested in 5% to 25% solutions with the selected slurry because this concentration will most likely cause the setting process to accelerate.

Constant BHP Procedures

Two constant bottomhole pressure methods have been used to successfully shutoff waterflows during primary cementing operations. They are both simple and consistent with accepted well control procedures. Each procedure requires some planning, but are adaptable to several complications such as loss of circulation and associated gas.

The first method is the reverse engineers method. This procedure is listed below (see graph 1):

- A) With casing on bottom the well is shut in and a stabilized annular pressure is recorded.
- B) Start mixing and pumping cement slurries while holding the annular pressure constant by adjusting the choke until cement reaches the waterflow depth on the annulus side (This maintains a constant pressure on the water flow zone) Constant pump speed is important to the success of any constant BHP well control procedure.
- C) Record the internal casing pressure and adjust this pressure, by manipulating the choke, for either increases or decreases in internal hydrostatic pressure, depending on whether cement or displacement mud is being pumped.

- D) When the plug is bumped the well should be shut in with a 100-200 psi safety factor above the final circulating pressure. This can be accomplished by pinching the choke just prior to bumping the plug.
- E) Leave the well shut in until the cement takes its initial set (50 psi compressive strength - minimum shut in time).

The advantages of the reverse engineers method are:

- 1) Cement does not have to be circulated to surface.
- 2) Multiple slurries can be used.

The disadvantages are:

- 1) Volumes and associated heights and hydrostatic pressures must be calculated for adjustments to the internal casing pressure. This becomes tedious with multiple slurries, but is not difficult.
- 2) A good handle on hole gage is required to determine the approximate hydrostatic pressure exerted by the cement column.

The other procedure is the second circulation of the drillers method. The steps for this procedure are listed as follows (see graph 2):

- A) With casing on bottom the well is shut in and a stabilized annular pressure is recorded.
- B) Start mixing and pumping cement while holding the annular pressure and pump rate constant until cement reaches the waterflow depth on the annulus side.
- C) While continuing to pump cement at a constant rate, record the internal circulating pressure and hold it constant until cement is circulated to surface.
- D) Record the annular pressure and hold it constant while displacing at the same pump rate.
- E) After bumping the plug the well should be shut in with a 100-200 psi safety factor above final circulating pressure until the cement takes its initial set.

The advantages of the drillers method are:

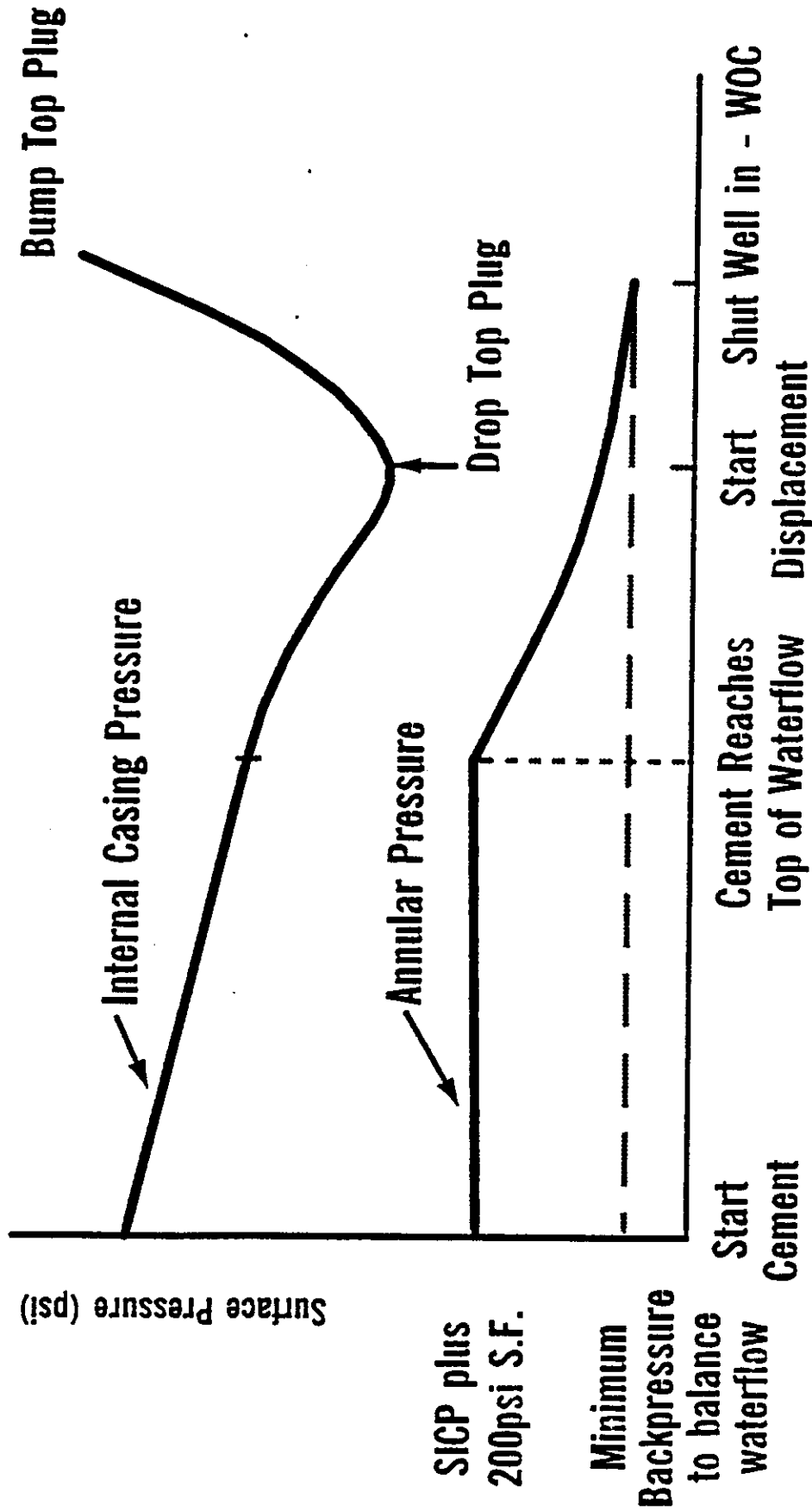
- 1) Very few calculations are necessary.
- 2) Contaminated cement is circulated to surface.

The disadvantages of the drillers method are:

- 1) Only slurries of the same density can be used.
- 2) Requires excess cement to be pumped.

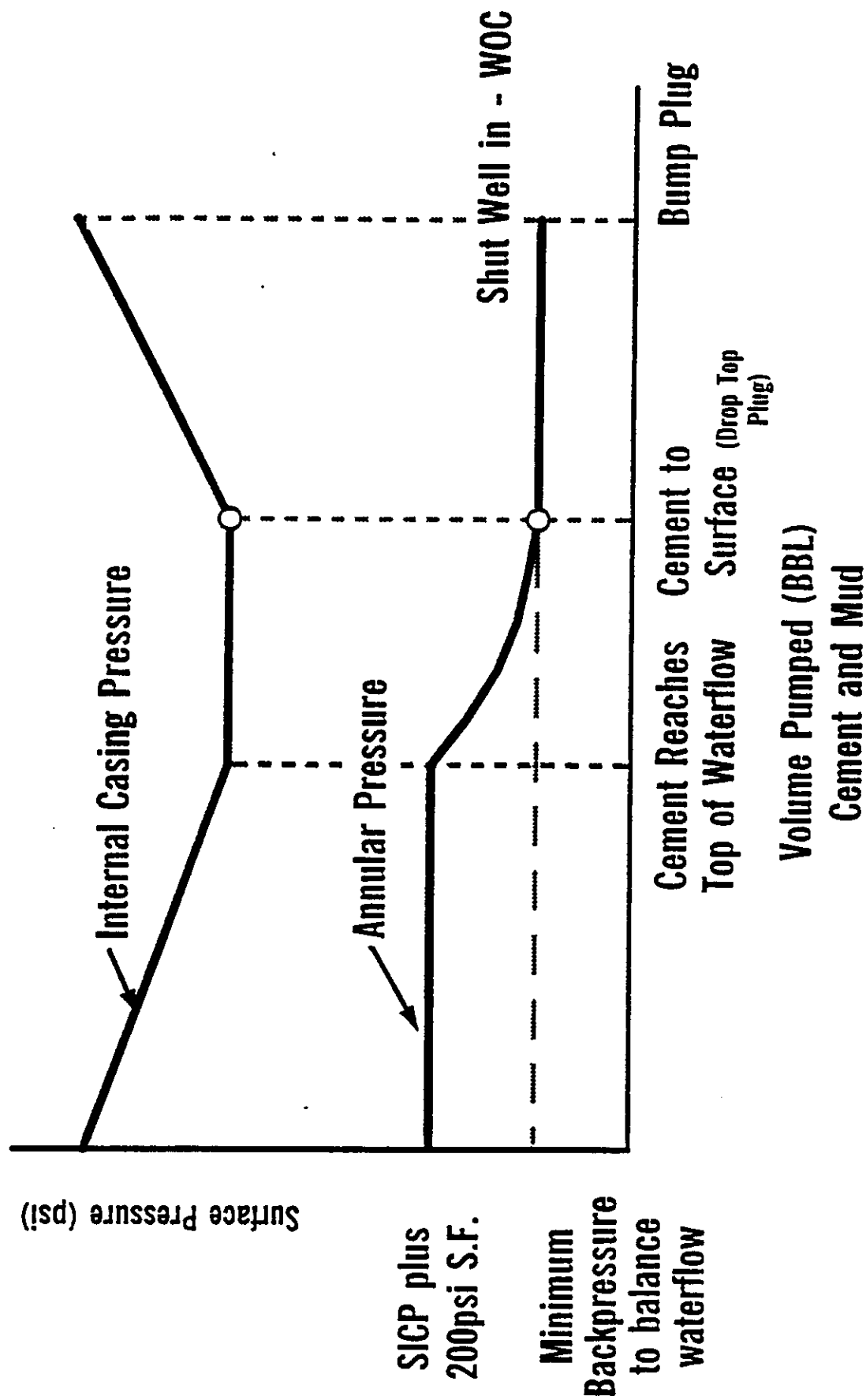
Both methods can be used with loss circulation and associated gas. They can also be used to kill the well with slurries that are below the required kill weight density. Both procedures have been used successfully and efficiently to shut off waterflows in the field.

Surface Pressure vs. Volume Pumped Reverse Engineers Method



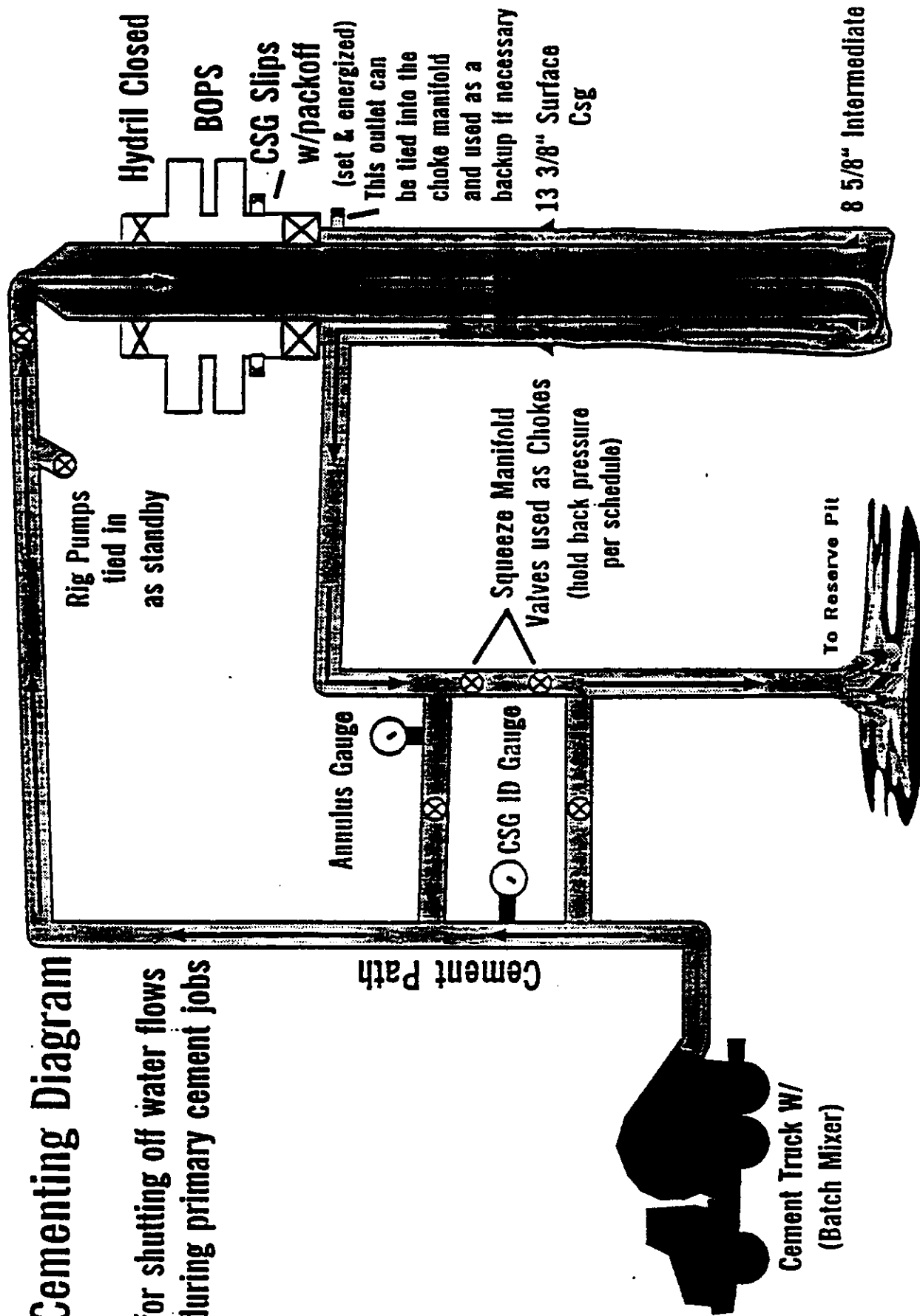
Volume Pumped (BBL)
Cement and Mud

Surface Pressure vs. Volume Pumped Drillers Method



Cementing Diagram

for shutting off water flows
during primary cement jobs



8 5/8" Intermediate

CHEVRON SHUT-IN PROCEDURES FOR SURFACE STACK

Chevron requires the use of a hard shut-in procedure, which is designed to reduce the size of the influx. Although some concern may be directed to the possibility of a hydrostatic shock, it should be minimal due to the closing time of the bag preventer.

Note that the HCR and hydraulic choke are always closed during normal operations.

Shut-in Procedure While Drilling

The initial action to be taken after the first indication of a kick:

1. Sound alarm
2. Pull kelly out of preventers, then stop pumps. Ensure tool joints are clear of all BOPs.
3. Close bag-type preventer
4. Open HCR to closed choke
5. Read and record the following:
 - a) S.I.D.P.P. every minute
 - b) S.I.C.P. every minute
 - c) Volume of mud gained
6. If pipe is to be stripped or reciprocated, adjust regulator valve to reduce pressure on bag.

Shut-in Procedure While Tripping

The initial action to be taken when kick is detected:

1. Sound alarm
2. Position tool joint above table, set slips and unlatch elevators
3. Install full open safety valve and latch elevators
4. Close safety valve and then close bag preventer
5. Open HCR to closed choke
6. Read and record the following:
 - a) S.I.D.P.P. every minute
 - b) S.I.C.P. every minute
 - c) Volume of mud gained
7. If pipe is to be stripped or reciprocated, adjust regulator valve to reduce pressure on bag.

1. BOP Equipment Function Tests

*All function tests are to be recorded in the Tour Book.

- (a) Annular preventer and pipe rams are to be function tested daily and blind rams every time pipe is out of hole. Record closing and opening times.
- (b) Remote BOP controls are to be function tested at least once a week.
- (c) Motor air shut-offs are to be function tested at least once a week.

- (d) All bolts on BOP flanges must completely fill the nuts and are to be checked for tightness weekly, after pressure tests, and prior to penetrating potential producing zones.
- (e) The HCR valve(s) must be function tested weekly.

Note: The above function test is to be conducted by one of the following methods:

- 1) Visual Check (for HCRs where the valve stem movement can be visually witnessed).
- 2) During the CCR routine weekly BOP stack and equipment pressure test.
- 3) By use of a hydraulic hand pump which is to be tied into the manifold allowing fluid to be pumped from the manifold up against the HCR valve when in the closed position and visually into the stack bore when in the open position.

*Function tests are not done until they are recorded in Tour Book.

2. Accumulator Units

- (a) Accumulator bottle pressures to be kept at the rated working pressure of the system. The manifold and annular pressure on the accumulator are to be kept at 10 500 kPa for fast shut-in while drilling. Regulate for stripping, etc.
- (b) Primary accumulator control valves for the BOP stack are to be left in the open position while conducting normal operations except the control valve for the HCR valve which will be kept in the closed position.
- (c) Accumulator units and nitrogen bottles are to be sized and maintained according to Chevron Canada Resources General Instructions and Requirements for Blowout Prevention Equipment, attached.
- (d) Must be capable of closing any ram or annular preventer within 20 seconds.

3. Kick Control

- (a) Drilling Supervisor to run a "pit drill" prior to drilling out surface casing. Below surface casing "pit drills" and BOP closing time checks are to be run on a surprise basis at least twice a week with each crew and prior to coring, testing and during tripping operations. Record crew check, BOP operation and times in the Tour Book.
- (b) After drilling out below surface casing, the pump is to be run at half speed and the standpipe pressure recorded in Tour Book and Well Control Handbook. This procedure is to be repeated daily on daylight tour.
- (c) All kellys are to be equipped with upper and lower kelly cocks.
- (d) A full opening stabbing valve in the open position with pick-up handles and a Hydril checkguard inside BOP must be available on the rig in a readily accessible location. This valve is not to be used as the lower kelly cock.
- (e) The hole is to be kept full at all times while tripping and a permanent hole fill record kept for each trip. Drilling Representatives are to observe the first 10 stands being pulled off bottom to ensure the hole is not swabbing.
- (f) When seasonal weather conditions are below 0°C: the BOP manifold and all lines upstream and downstream of the manifold (from HCR to degasser) will be filled with Arctic-grade diesel; steam traced and insulated; the control panel for the hydraulic disc type choke will be located in the doghouse or an enclosed heated area on the rig floor.
- (g) Procedures, calculations, formulas and current data required to control a kick are to be posted in the doghouse and at the choke controls.
- (h) A drill string float topped with a 5 mm hole is to be run directly above the bit on all wells.



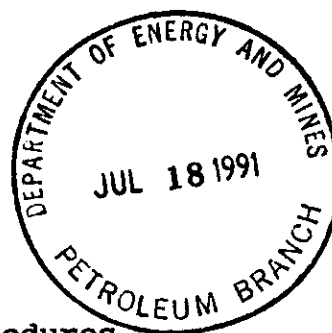
Chevron Canada Resources

500 - Fifth Avenue S.W., Calgary, Alberta T2P 0L7
Phone (403) 234-5000 Fax (403) 234-5947

W.H. Garman
Manager
Drilling Division

July 12, 1991

Daly Unit # 3
Leak-off Test Procedures



Manitoba Energy and Mines
Petroleum Branch
555-330 Graham Avenue
Winnipeg, Manitoba
R3C 4E3

Attention: Mr. John Fox

Gentlemen:

Chevron intends to conduct a leak-off test after drilling out the surface casing on the first of the six infill wells drilled (12B-12-10-28 WPM). Chevron also intends to conduct a leak-off/pressure integrity test after drilling out the intermediate casing on this well.

After drilling out the surface casing shoe, a maximum of 10 m new hole will be drilled using water and a leak-off test conducted (see attached Leak-off Test Procedures).

After drilling out the intermediate casing shoe, a maximum of 3 m new hole will be opened up and a leak-off/pressure integrity test will be conducted using water. The test will be taken to a maximum pressure gradient of 22.0 kPa/m. This gradient exceeds the maximum equivalent circulating density that is anticipated to be seen at the intermediate casing shoe for all six infill wells.

The Manitoba Department of Energy and Mines Virden District Office will be notified 24 hours prior to commencing each of these tests.

Should you require any additional information, please contact Mr. Roy S. Rettie at (403) 234-5522.

Yours very truly,


W. H. Garman

Manager Drilling Division

LEAK-OFF TEST PROCEDURES

After surface casing (or intermediate casing) has been cemented and the BOP equipment installed and pressure tested as per Standard Drilling Practices, complete the following:

1. Drill out the surface (or intermediate) casing shoe as per drilling program.
2. Circulate until a known density fluid (water) is to the bottom of the drill string.
3. Pick up into the casing ± 10 m and ensure hole is full.
4. Close top pipe rams or annular.

Note: Check the position of the tool joint prior to closing the top pipe rams.

5. Use a high pressure, low volume pump with a pressure recorder equipped with a 4 hour clock and pressure rating 3 to 5 times anticipated surface pressure. Begin pumping down the drill pipe at ± 40 L per minute.

Note: If the pump is not equipped with a pressure chart record the pressure using the most accurate gauge available. This is normally the drill pipe pressure gauge on the remote choke panel.

6. Continue pumping at a constant rate to establish a pressure build up trend. This trend should be a straight line.

Note: If a chart is not being used, record pump pressure after every 20 L pumped.

7. When the trend begins to drop over (drop in slope), stop pumping. This is the leak-off pressure. (Applied surface pressure plus hydrostatic pressure of the fluid will equal the maximum pressure the formation at the casing can withstand.)

8. Hold pressure for 5 minutes and record.

Note: If pressure does not bleed off, the leak-off pressure has not been reached and the test should be continued to obtain a true leak-off pressure.

For the intermediate casing shoe leak-off/pressure integrity test, do not exceed a pressure gradient of 22.0 kPa/m if leak-off has not already occurred.

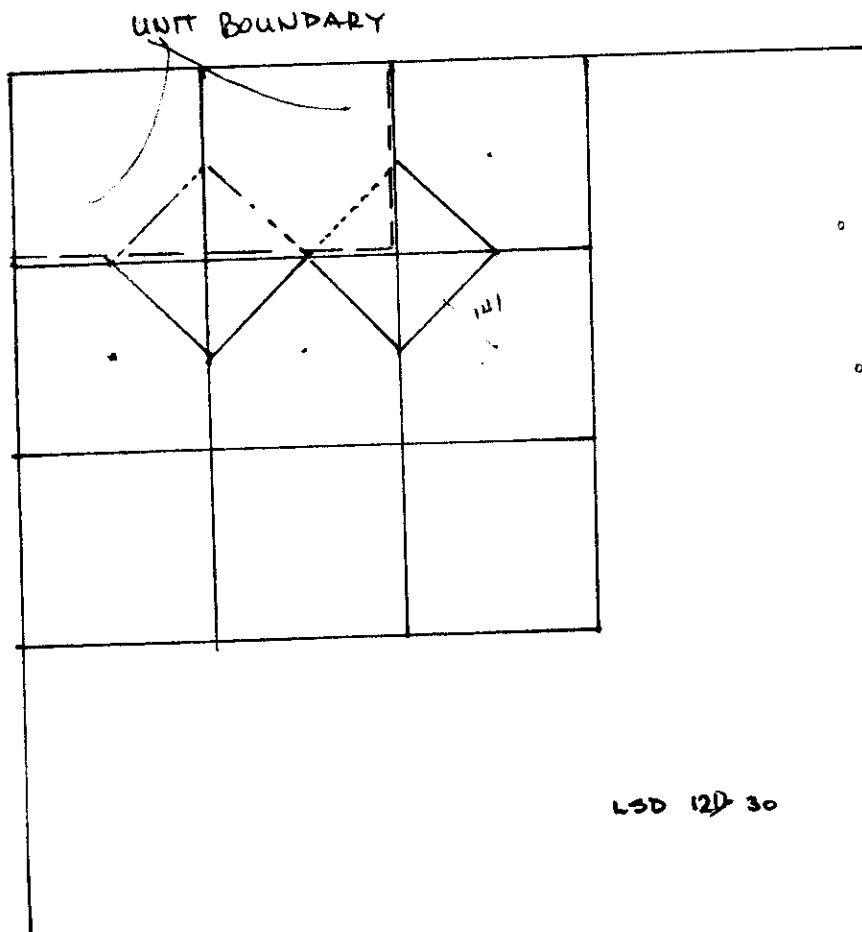
9. Bleed pressure from the system. If the test is inconclusive, repeat the test. If any doubt exists consult the Calgary office.

Note: If a drill pipe float is being used, bleed the pressure from the system using the remote choke.

10. From this information, the following can be calculated:

- (a) Fracture gradient at the casing shoe
- (b) Maximum allowable surface pressure
- (c) Equivalent mud density

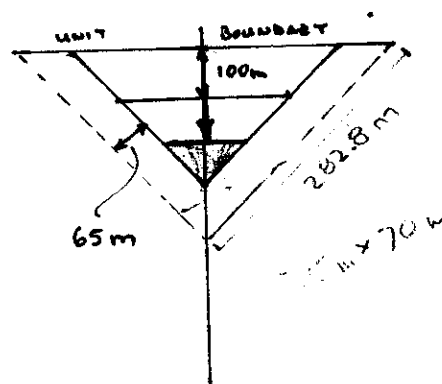
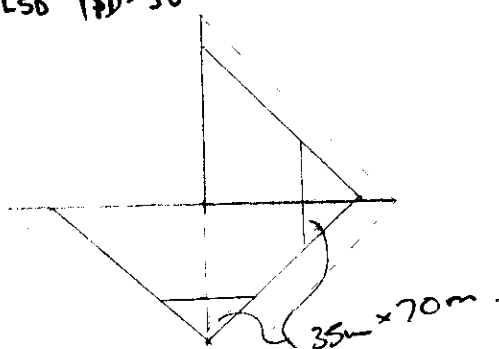
Note: The results of these tests are to be used on the remaining wells. Ensure results are well documented.



- WAIVER OF DIRECTIONAL SURVEY
- APPLY ^{TO BOARD} UNDER 523(4) FOR WAIVER OF TARGET PENALTY

LSD 12D-30

LSD 15D-30



LOCATIONS

10-30	632m S	236m E
11-30	603m S	228m E
12-30	605m S	201m E
13-30	201m S	180m E



Chevron Canada Resources

500 - Fifth Avenue S.W., Calgary, Alberta T2P 0L7
Phone (403) 234-5000 Fax (403) 234-6212

K.G. Matieshin
Manager
Environment, Safety and Regulations

June 19, 1991

**Application to Waive
Directional Survey Requirements for:
Chevron Daly 5A-12-10-28 WPM
Chevron Daly 12A-12-10-28 WPM and
Chevron Virden Roselea Unit #18B-30-10-25 WPM**

**Manitoba Energy and Mines
Petroleum Branch
555 - 330 Graham Avenue
Winnipeg, Manitoba
R3C 4E3**

Attention: Mr. John Fox

Dear Mr. Fox,



Chevron Canada Resources applies under Section 31 of the Manitoba Energy and Mines Petroleum Regulations for authorization to drill the wells Chevron Daly 5A-12-10-28 WPM, Chevron Daly 12A-12-10-28 WPM and Chevron Virden Roselea Unit #1 8B-30-10-25 WPM without making directional surveys.

The three wells are located approximately 82 m North North West, 61 m West and 66 m North East, respectively, of the centre of their corresponding target areas.

Should you have any questions or require further information, please contact Dean Tucker at (403) 234-6102. Thank you for your consideration in this matter.

Yours very truly,


for K. G. MATIESHIN, P.Eng.

JDT/lat



Chevron Canada Resources

500 - Fifth Avenue S.W., Calgary, Alberta T2P 0L7
Phone (403) 234-5000 Fax (403) 234-6212

June 19, 1991

K.G. Matieshin
Manager
Environment, Safety and Regulations

Application to Waive
Directional Survey Requirements for:
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Yours very truly,


for K. G. MATIESHIN, P.Eng.

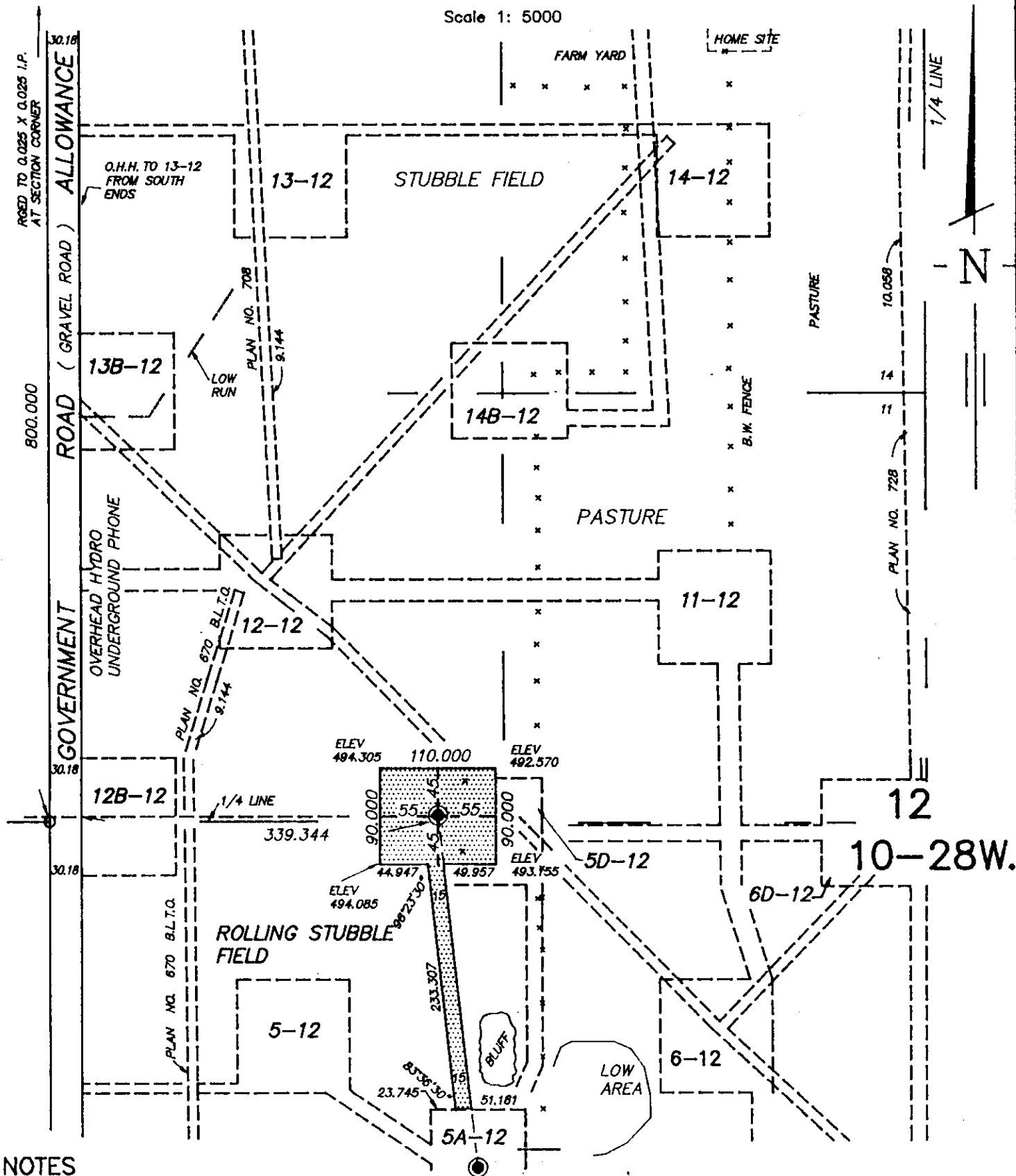
JDT/lat

PLAN OF WELL SITE LOCATION





CHEVRON DALY

LSD. 12A SEC. 12 TP. 10 RGE. 28 W.P.M.
MANITOBA

Scale 1: 5000



NOTES

All distances are in metres or decimals of a metre and may be converted to feet by multiplying by 3.28084
Well location is shown thus 
Area required is shown outlined thus 
Survey monuments found are shown thus 
Iron posts planted are shown thus 
Well Coordinates: 800.000 S. OF N. BDRY. SEC. 12
339.344 E. OF W. BDRY. SEC. 12

Ground elevation at well: 494.032
Areas Well Site 0.990 ha., 2.45 acres
Access Road 0.350 ha., 0.86 acres
Total 1.340 ha., 3.31 acres

Plan and Survey
certified correct
this 17th day of May, 1991.

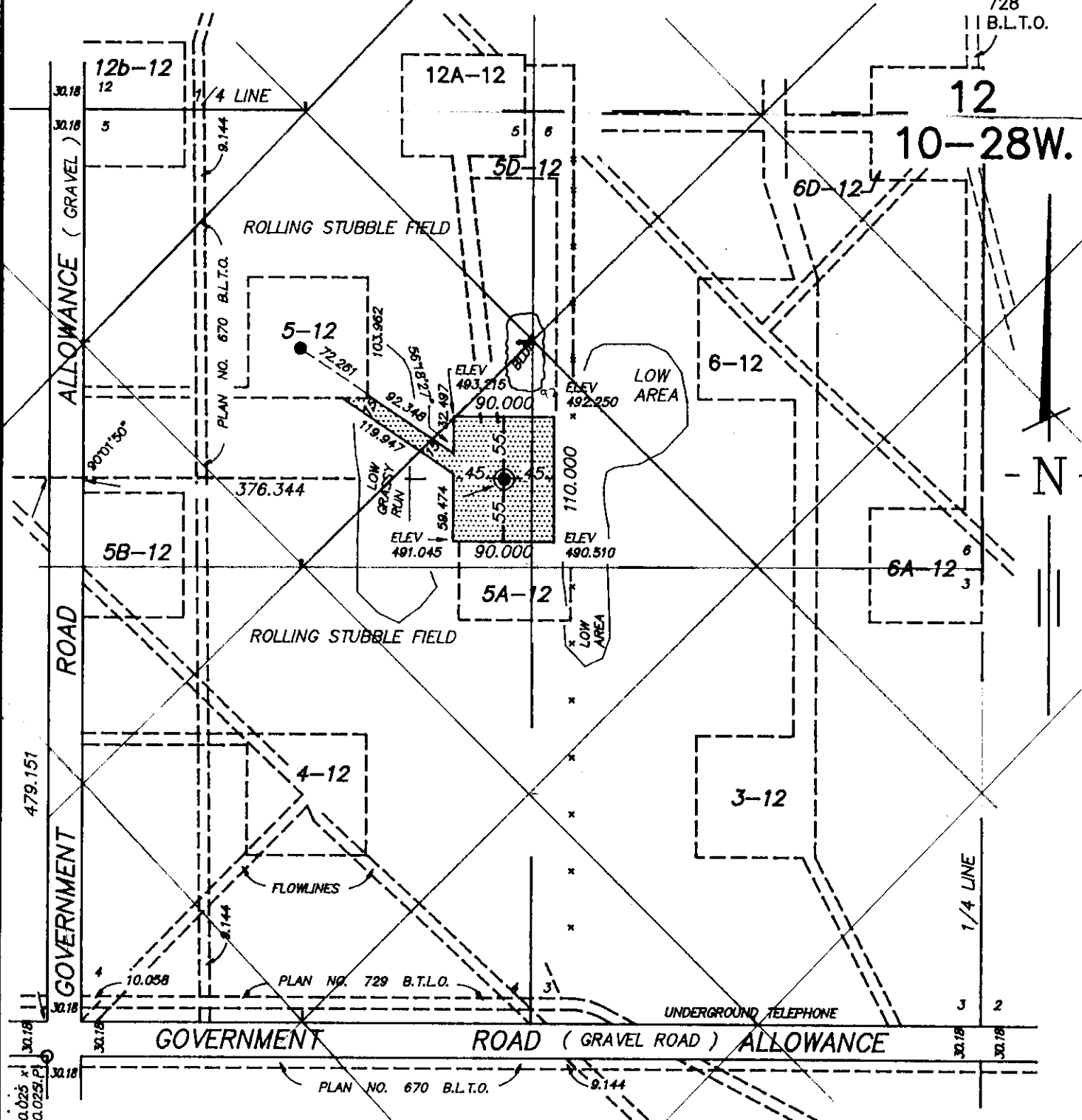
Richard C. Lennon
Manitoba Land Surveyor

[Signature]
Witness

LENNON SURVEYS
P.O. Box 1348, 1840 Rossar Avenue
Brandon, Manitoba R7A8N2
(204) 727-0651
FAX (204) 727-5247

LSD. 5A SEC. 12 TP. 10 RGE. 28 W.P.M.
MANITOBA

PLAN
728
B.L.T.O.



LENNON SURVEYS
P.O. Box 1346, 1640 Rosser Avenue
Brandon, Manitoba R7A6N2
(204) 727-0651
FAX (204) 727-5247



Date June 7, 1991

Memorandum

To Ian Haugh
Deputy Minister
Energy and Mines
309 Legislative Building

From H. Clare Moster
Assistant Deputy Minister
Energy Division

Telephone

Subject **REDUCED SPACING - DALY UNIT No. 3**

For your information.

In 1986, after a long hearing by the Oil and Natural Gas Conservation Board, reduced spacing (i.e: 8 ha or 20 acre) in Daly Unit No. 3 was approved.

In the spring of 1987, Chevron drilled the first of a planned series of reduced spacing wells. The well, 6A-12-10-28 WPM, encountered a higher than anticipated downhole pressure related to the high pressure waterflood in the Unit. The result was a controlled release of salt water along with an associated salt water spill. The well was not completed and to date, no further drilling has occurred.

Chevron met with Petroleum Branch staff this week, and have advised they will be proceeding with six (6) reduced spacing wells in the Unit in July.

Chevron's revised drilling program should be more than adequate to handle the worst case scenario.

No further Board approvals are required.

A handwritten signature in cursive script, reading "Clare", written over a horizontal line.

HCM:p
2102T

*John
- For your
file*

June 6, 1991

H. Clare Moster
Assistant Deputy Minister
Energy Division

Bob Dubreuil
Director
Petroleum Branch

Re: Chevron's Plans to Drill in Daly Unit 3

John, Bruce and I met with Chevron drilling engineers to discuss Chevron's plans to drill in Daly Unit 3 and to control the high pressures.

The wells will have a 7" intermediate string at the top of the Lower Amaranth anhydrite and a 4 1/2 production string at TD, both cemented to surface. Drill site storage equivalent to more than one day of the worst anticipated flow will be provided and will be tied in to the injection system.

Six wells are planned for drilling commencing in mid July. A small triple rig will be used to provide increased pumping requirements.

Final locations of wells will be subject to joint review of the land owner and an inspector. As the Board has approved reduced spacing for the entire unit, no further approval is required.

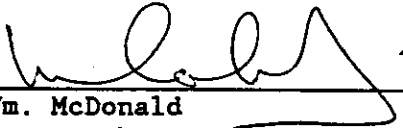
Bob

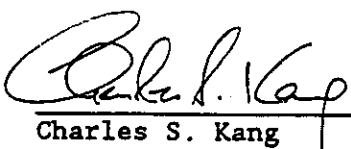
Conditions of Reduced Spacing Approval

1. The proposed wellsites and other facilities shall be located and installed in accordance with the Placement Criteria provided in Exhibit No. 45AB entitled "Impact Minimization of Reducing Spacing Units in the Daly Field" by R.A. Berrien Associates (Rural) Ltd. (hereinafter referred to as "the Berrien Report").
2. Notwithstanding Condition No. 1, the following specific criteria shall be utilized in locating and installing new facilities:
 - a) Electric power will be installed underground.
 - b) Wherever practicable in conjunction with new facilities, existing power lines will be installed underground and access roads will be modified or relocated to lessen their impact on agricultural operations.
 - c) All facilities located within 200 metres of any aircraft runway will be appropriately marked or painted so as to be clearly visible from the air.
 - d) Wherever practicable, facilities will be located so as to take full advantage of any existing obstacles and thereby minimize the impact of the facility on agricultural operations.

- e) If in the opinion of the landowner and the Executive Director of the Petroleum Division, the proposed location of a wellsite would result in a significant impact on agricultural operations, the wellsite shall be relocated to a suitable surface location to be determined as indicated below, and the proposed well drilled directionally if necessary.
 - f) Wherever practicable, lease access will be through use of non built-up trails instead of built-up roads.
- 3. Prior to commencement of surveying for construction of any new facilities related to these approvals, Chevron shall submit to the Winnipeg Office of the Petroleum Division complete details of location and type of planned facility. Such details should employ and be accompanied by the appropriate Section map or maps from the Berrien Report. Any departure from the recommendations of the Berrien Report shall be clearly noted and justified.
 - 4. The proposed facility site shall be jointly inspected by the landowner and an authorized representative of the Petroleum Division.
 - 5. If the landowner indicates his general agreement with the location of the proposed facility, the Executive Director of the Petroleum Division will notify Chevron that an application may be submitted for a drilling license or for approval to construct the proposed facility.

6. If the landowner and the representative of the Petroleum Division are of the opinion that agricultural impacts can be significantly reduced by relocation of the proposed facility, the Executive Director of the Petroleum Division will request Chevron to consider the recommended relocation.
7. If Chevron declines to relocate a proposed facility to alleviate concerns expressed by the landowner and the representative of the Petroleum Division, the Executive Director of the Petroleum Division shall determine if the degree of impact caused by the facility is acceptable. If the degree of impact is deemed to be acceptable, the Executive Director shall notify Chevron to make application for approval of the facility. If the degree of impact is deemed to be unacceptable, the Executive Director shall inform Chevron that he is not prepared to approve the facility unless it is relocated to a suitable location.
8. Upon application for approval of a surface facility which is proposed to be located less than fifty metres from a government road allowance, Chevron shall submit, in support of the application, written evidence that the Rural Municipality or the Department of Highways, as the case may be, concurs with the proposed location of the facility.


Wm. McDonald
Deputy Chairman


Charles S. Kang
Chairman

9/106/03

CHEVRON DALT GA-12-10-28 (UPP) DALT UNIT NO. 3 NOTES

MAR 7/87 Kick @ 681 m. top of Lodgepole

- SIWP 4000 kPa (700 kPa above FRC pressure @ 149 L.

- PIT DESIGN - CAPACITY

- PREVENT WASHOUT

- ADDITIONAL DYKING FOR CONTAINMENT

- ANTICIPATED RESERVOIR PRESSURE

- DESIGN MUD WEIGHT, VOLUME OF WEIGHTED MATERIAL
1700-2200 kg/m³ used to try & kill well - Revised program mud wt 2500 kg/m³

- SEE DRILLING PROGRAM PRECAUTIONS

* 1. SI INJECTORS - CONDUCT FALL-OFF TESTS OR BLEED
OFF WELLHEAD PRESSURE?

* 2. INTERMEDIATE RCQ SAYS ABOVE HIGH PRESSURE ZONE
WHERE

* 3. LEAK-OFF TEST (IS TESTING SURFACE CASING BEEDER OF
ERCB USE 1700 PSI (17000 PSI) ANY VALUE) GA-12 SURF. CG @ 149 L

* 4. ADEQUATE SURFACE STORAGE PITS/TANK 1000 b/m
WHAT FLOW RATE
WHAT VOLUME?

* 5. ADEQUATE WEIGHTING MATERIAL

* 6. CONTINGENCY PLAN AND LIST OF CONTACTS

7. PIT VOLUME TOTALIZERS & ALARMS

WELL
- SITING CRITERIA & CONDITIONS (SEE BOARD CONDITIONS)

* CHEVRON COMMITTED TO ABOVE

REPORT

CHEVRON DALY 6A-12-10-28 (WPM)

The Well

The well, Chevron Daly 6A-12-10-28 (WPM) is the first well in the recently approved reduced spacing project in the Daly Unit No. 3. The well is offset to the northwest and to the southeast by active water injection wells, both of which are approximately 250 metres from the well.

The Incident

While drilling the well on March 7, 1987 at a depth of 681 metres, a "kick" or inflow of fluid to the wellbore was observed. Blow out prevention equipment on the well was immediately shut in. Upon shut in, pressures in the wellbore rapidly exceeded safe limits to ensure wellbore integrity and the company decided to flow the well to relieve pressure. The well was flowed to an on-lease flare pit, but the force of the flow caused the back of the pit to erode away and resulted in a spill of well fluids off the wellsite. The spill fluids flowed in a westerly direction and collected in a low area on the east side of a north-south lease road. Although some fluid did escape through a culvert in the lease road, sampling of snow and run-off in a nearby water run at the south boundary of the same quarter section indicates no sign of spill fluids.

It is estimated that 150 cubic metres of salt water may have been spilled. Over 3 300 cubic metres of fluid (including snow melt) have been picked up from the spill site and storage pits and disposed through other disposal wells in the Virden area.

Subsequent to the spill incident, additional pits were dug on the lease and no further off lease spill occurred.

Over the next several days, several attempts were made to "kill" the well. During this time, the well was briefly flowed to the pits several times but for the most part remained shut in. On March 16 Chevron succeeded in setting a string of intermediate casing and shutting off the high pressure zone.

A number of different cementing operations and other evaluation methods have been performed on the well to determine its downhole condition.

Reasons for the Incident

The incident occurred because the pressures encountered were substantially higher than anticipated. Consequently, sufficient weighted mud material and surface storage capacity was not available on lease.

While reservoir pressure data available did not clearly indicate that such pressures could be expected, such a possibility should have been considered due to the proximity of injection wells.

When the well flowed and high well pressures were observed, Chevron was faced with a dilemma. It could shut in the well and eliminate a surface spill. However, in doing this, it was likely to cause downhole damage which could result in ground water contamination. On the other hand, by letting the well flow, the wellbore would remain intact but a surface spill would result.

The incident could have been prevented by the following:

1. Better design of the drilling program by Chevron, and closer scrutiny of the program by the Department, prior to approval.
2. Quicker action by Chevron to construct additional pits or procure tanks to provide adequate storage capacity.

Another factor in the incident was Chevron's failure to provide the Department with timely and complete reports of the incident. This was

compounded to some extent by failure of the Department's representatives to fully investigate the incident immediately after it was initially reported. It should be noted, however, that neither of these factors is likely to have had a significant effect on the outcome of the incident.

Problem Resolution

Subsequent actions by Chevron and the Department have resulted in resolution of the downhole problem and adequate clean-up of the spill area. While final completion/abandonment of the well has not been completed and while the spill site will require future rehabilitation, all possible actions have been proceeded with.

The landowner involved was informed of the incident and appears to be satisfied with the operations carried out following the incident.

Prevention

The most effective means of preventing a recurrence of this type of problem is to build-in appropriate precautions to the drilling program. The main precautions which have been recommended, discussed and agreed to by Chevron for future wells in the project are as follows:

1. Shut in surrounding water injection wells during drilling operations.
2. Use of an intermediate string of casing to be run and cemented to surface before the high pressure zone is penetrated. This would allow higher well pressures without the risk of wellbore damage.
3. Perform a wellbore pressure test (below surface casing shoe) on next well drilled in project to better define safe pressure levels in the wellbore.
4. Provision of adequate surface storage (tanks or pits) and supply of adequate mud weighting materials on the well site.

5. Designation of a single Chevron contact person and immediate notification of Department representatives of any significant incident.
6. Equip rig with pit volume totalizers and alarms.

Current Status

The well has been shut-in and will be monitored by a continuous pressure recorder to confirm the flow shut off.

With spring break-up and the imposition of road bans, further operations at the well will be postponed to permit a thorough review and evaluation of the well's future. (The Department has indicated it is prepared to permit the well to be shut-in for up to six (6) months before final completion or abandonment).

Snow melt run off water at the site has been monitored to confirm no further contamination is occurring. Soil reclamation procedures have already begun at the main spill site and reclamation plans for the lease site are being monitored.

Chevron has indicated that a complete review and evaluation of their reduced spacing drilling program will probably be undertaken based on the results of this well. The increased costs associated with drilling in such a high pressure environment may make continuation of the project uneconomical.

Chevron has been informed that prior to being authorized to drill further wells in the project, that a revised drilling program including the items listed under Prevention will have to be submitted and approved.



Chevron Canada Resources Limited

500 - Fifth Avenue S.W., Calgary, Alberta T2P 0L7

R.C. Richardson
Manager
Drilling Division

Calgary, Alberta
1987-03-16



Manitoba Energy & Mines
555 - 330 Graham Avenue
Winnipeg, Manitoba
R3C 4E3

Attention: Mr. H. Clare Moster
Executive Director
Petroleum Division

Dear Sir:

RE: Chevron Daly 6A-12-10-28 WPM

Attached please find a copy of the report written by Mr. D. Tucker (wellsite Drilling Representative) on the events which occurred at the subject well.

Chevron's wellsite Drilling Representative failed to notify the Manitoba Department of Mines and Energy because he was too involved in the operations that were in progress and unaware of the necessary 24 hour notice. In future it will be emphasized to all Drilling Representatives that any future occurrence, regardless of the size will be reported as soon as possible to the Manitoba Department of Mines and Energy.

Chevron's communications between the area office and the Calgary office were normal, it is planned to amend the drilling program to accomodate the possibility of abnormal pressures on future wells.

Additional information, if required, may be obtained by contacting the undersigned at the letterhead address or by telephoning (403) 234-5522.

Yours very truly,

R. C. RICHARDSON
Manager Drilling Division

DGL/ju

cc: K. Matieshin
Virden Office

RE: Summary of Events for the Salt Water
Kick at Chevron Daly 6A-12-10-28 WPM

MR. R. C. RICHARDSON:

On 1987-03-07, at approximately 19:00 hrs an influx of fluid into the wellbore at Chevron Daly 6A-12-10-28 WPM was observed and the well was immediately shut-in.

The pressure observed on the casing pressure gauge was much greater than that which could be safely held by the formation at the casing shoe. Therefore, action was taken to relieve the high shut-in casing pressure in the form of attempted circulation thru the #1 manual choke, which plugged off with shale almost immediately. The #2 manual choke was then opened which also plugged off. This left only one other option, flowing the salt water straight through the manifold to the flare pit.

The flare pit was constructed such that a berm was present, behind and to the sides of the pit. However, the pressure and velocity of the salt water issuing from the flare line was so great that it blew a hole through the back of the berm causing salt water to leak from the pit onto the surrounding farm land. Awareness of the situation was obtained when a check of the water level in the flare pit was made.

As soon as this leak was discovered, Chevron's Calgary office (Mr. D. G. Lewis) was contacted, and advised Chevron rig site personel to shut the well in again rather than let the spill continue. After shutting in the well, a larger pit was constructed with higher and stronger berms, and from that time onward no more spillage of any kind occurred.

This spillage was stopped at approximately 22:00 to 23:00 hrs. on 1987-03-07. From that time till 23:00 hrs on 1987-03-08 the efforts and energy of Chevron personel at the rig site were concentrated on trying to successfully kill the well. At 23:00 hrs on 1987-03-08 the Chevron Virden office (Mr. J. Cook) was informed of the incident at which time they advised that the Manitoba Energy and Mines Petroleum Branch in Virden be contacted. However, due to the late hour it was also advised that contacting them in the morning would be quite adequate.

At 09:00 hrs. on 1987-03-09 copies of the Chevron tour and daily reports were delivered to the Virden office of the Department of Energy and Mines Petroleum branch (Mr. B. Dunning) at which time a detailed account of all that had happened since surface casing was cemented on 1987-03-06 was reported, including details of the salt water spill. No great concern or interest was expressed by Mr. B. Dunning. No course of action recommended, therefore as soon as the well was under control, it was planned to clean up whatever spillage had occurred.

It should be noted that the Petroleum Branch was promptly informed of spud time and date; was given two hours notification prior to cementing surface casing, and copies of the tour and daily reports were delivered to the Virden office prior to 10:00 Monday morning, as required by Energy and Mines regulations. Every effort was made to comply with all regulations set forth by the Energy and Mines Petroleum Branch, including notification of the said salt water spill.

J. D. TUCKER



March 23, 1987

Mr. R. C. Richardson
Manager Drilling Division
Chevron Canada Resources Limited
500 - Fifth Avenue S.W.
Calgary, Alberta
T2P 0L7

Dear Mr. Richardson:

Re: Chevron Daly 6A-12-10-28 WPM

Your letter of March 16, 1987 and attached summary of events (by D. Tucker) at the subject well is acknowledged.

Upon review of the report and of the tour reports for March 7, 1987, we note that the level of detail provided does not permit an accurate understanding of what happened and how it was handled. Some of the questions that the report does not answer or provide specifics on are:

1. How was the kick observed and could it have been observed and acted upon sooner?
2. When the well was initially shut in, for how long did the casing pressure exceed MACP?
3. What was the time period the well was flowed to the flare pit?
4. How much time elapsed between noticing leakage from flare pit and the second time the well was shut in?
5. What volume of water escaped from the flare pit, how was the volume estimated and what was the chlorides content of that water?
6. Why was there no notification to the Virden Office of Energy and Mines or even to the Chevron Virden Office until 26 hours after the kick had occurred?
7. What special reclamation plans do you have for the pit area?

With respect to the reporting of the spill, I have questioned Mr. Dunning at length about the incident and I find it hard to accept that a detailed report on the spill had been made. Rather, it seems that it was mentioned that the

are pit dyke washed out and the well was subsequently shut in. Mr Dunning calls no mention that the spill had gone off lease and no estimate given of the volumes spilled. In fact, when told that a larger pit had been dug and was being used to flow the well, Mr. Dunning specifically cautioned the engineer not to allow any fluid off lease. It is further apparent that Chevron's Virden Office was not fully aware of the spill until some days later.

Based on the foregoing, I question whether the report made to our office could be considered detailed and I also question whether adequate communication was in fact in place between Chevron's Virden Office and the Drilling Department.

You have not provided any specific precautions which are planned to prevent a recurrence of an incident such as the one that occurred. Prior to being authorized to spud the next well in the program, a full summary of such precautions and planned changes in the drilling program for future wells is required. Some of the specific precautions you should consider are:

1. Use of intermediate casing.
2. Shutting in of nearby injection wells prior to drilling.
3. Provision of extra storage capacity and weight material at the drill site.
4. Run a surface casing leak off test on the next well to determine the maximum allowable pressure.
5. Designation of a single contact person as the responsible agent in the field, with all information and reports channeled through him/her.
6. Immediate notification of Department inspectors if any significant incident occurs.

In summary, you are advised that no further drilling is to be commenced in this project until a full clarification of the items listed above has been provided and until specific prevention measures have been submitted to and reviewed and approved by the Department.

Yours sincerely,

Original Signed by H. C. Moster

H. Clare Moster, P. Eng.
Executive Director
Petroleum Division
LRD/HCM/lk

c.c. Hon. Wilson D. Parasiuk
K. Matieshin (Chevron, Virden)
B. Dunning, (E & M, Virden)

b.c. Charles S. Kang
Wm. McDonald



Chevron Canada Resources Limited

500 - Fifth Avenue S.W., Calgary, Alberta T2P 0L7

R.C. Richardson
Manager
Drilling Division

Calgary, Alberta
1987-03-24

Manitoba Energy and Mines
555 - 330 Graham Avenue
Winnipeg, Manitoba
R3C 4E3

Attention: Mr. H. Clare Moster
Executive Director
Petroleum Division

Dear Sir:

RE: Chevron Daly 6A-12-10-28 WPM

The following is submitted in response to questions raised in your letter of 1987-03-23:

1. The kick was observed as an increase in pit volume. The initial pit volume increase prior to shutting in was estimated at 3 to 4 m³, which is good response time in any drilling situation. The pit volume increase could possibly have been detected slightly faster if the rig had been equipped with pit volume totalizers and alarms. Chevron will install this equipment at future infill wells in this area.
2. The casing pressure exceeded MACP for about 5 minutes, the length of time required to read the casing pressure and open the well back up to the pit.
3. The well was flowed to the pit from about 1987-03-07-19:05 hrs until approximately 1987-03-07-22:30 hrs.
4. Approximately 15 minutes elapsed from the time the flare pit leakage was observed until the well was shut in for the second time.
5. We are uncertain of the exact volume of water that escaped from the flare pit, but we have estimated it at 150 m³. We have picked up about 130 m³ to date. The water washed a hole through the berm at the rear of the flare pit, ran across a field and mostly collected in a road-side low area to the West of the wellsite. The chloride content of the flowing water was measured at 69 000 ppm.
6. We apologize for our failure to notify the Virden Office of Energy and Mines until 26 hours after the kick had occurred. This was an oversight on our part. Our concern was directed entirely at efforts to control the well, and we inadvertently neglected to notify your office.

Chevron's Virden office was in fact formally advised of the problem at least as early as Sunday forenoon, 1987-03-08. Chevron's Drilling Supervisor, Mr. Doug Lewis, called Chevron's Virden Area Superintendent, Mr. Kevin Matieshin on Sunday morning to advise him of the incident. Mr. Matieshin was already aware that a problem existed, having been contacted the night before by a Chevron Battery Operator who had been requested to shut-in offsetting water injection wells.

7. We will in all likelihood reclaim the pit area by subsurface disposal of the salt water coupled with chemical treatment of the contaminated soil. We have not yet had time to address the specifics of this matter, but we have had considerable experience reclaiming salt water damaged soil in the area.

It is possible that Chevron did not provide a sufficiently detailed report of the incident to your Virden office. However, if we did not it was certainly only because we do not know what specifics you require. We apologize for any misunderstanding that may have occurred.

It is important to understand that Chevron Canada Resources Limited is organized by function, not by area. Our drilling function and all of our drilling expertise is centrally located in the Drilling Division in Calgary. Our Area personnel are expert in producing operations, not in drilling. Accordingly, all drilling operations report directly to Drilling Division supervisors, not to Area Offices. It is therefore not surprising that a very critical matter such as this incident would be reported to a Drilling Supervisor immediately and not to the Area Office until the next morning since the single most important task to be accomplished was to regain control of the well and responsibility for this rests in the Drilling Division.

With regard to your suggested precautions to prevent a recurrence of this type of incident at future wells, we certainly agree with your recommendations as they constitute normal oilfield practice in over-pressured areas. Revised drilling programs incorporating these changes will be submitted with a covering letter requesting authorization to drill the remaining infill wells in this project at a later date. We would suggest that the contact person in the field be our Drilling Representative, as shown on the Manitoba Application for Licence to Drill a Well, to avoid conflicting reports from multiple sources. Our Drilling Representatives will be instructed to notify Department inspectors immediately if any significant incident occurs.

We hope that this letter has addressed your specific concerns. We look forward to discussing this matter with you on Tuesday, 1987-03-31. If further information is required prior to our meeting, please contact me in Calgary at (403) 234-5522.

Yours very truly,

A handwritten signature in dark ink, appearing to read "R. C. Richardson", is written over the typed name.

R. C. RICHARDSON
Manager Drilling Division

WHG/ju

9 5/8" SURF CSG @ 150 m.

7" INTER INTO ANARANTH OVAROITE 2-3 L
@ ±680 L.

4 1/2" PROD FROM TD TO SURFACE 25 L.

- drill out 7" with wt. and 25m.

- GA-12 top of loggipole on base of
Lower Anarant

INJECTION WELLS SI - 3 WEEKS AGO

2-12, 4-12, 6-12, 10-12, 12-12, 14-12, 2-11, 8-11, 10-11

PROPOSED LOCATIONS

16-11

SA-12

SB-12

12A-12

12B-12

13B-12

14B-12

DRILL SITE TANKAGE

TIE IN @ 12-12 INJECTOR WELL TO INJECTION
LINE TO 15-1 INJECTION PLANT, 6000 bbl
ENOUGH STORAGE PIT

BAWITE WEIGHTING MATERIAL MUD FOR 700 KPa
SMALL TRIPLE RIG ROTATING HEAD TO DRILL 7"

KENTING OR PRECISION
SIMMONS

1st Well LEAK-OFF TEST SURF CSG & INTER. CSG.
Check to propose maximum leak-off pressure

- mid-July ~~Start~~

- WHERE IS WATER GOING?

URU #1

PLANNED

10B-30

7D-30

6C-30

11D-30

CONTINGENCY

8B-30

2C-30

12D-30

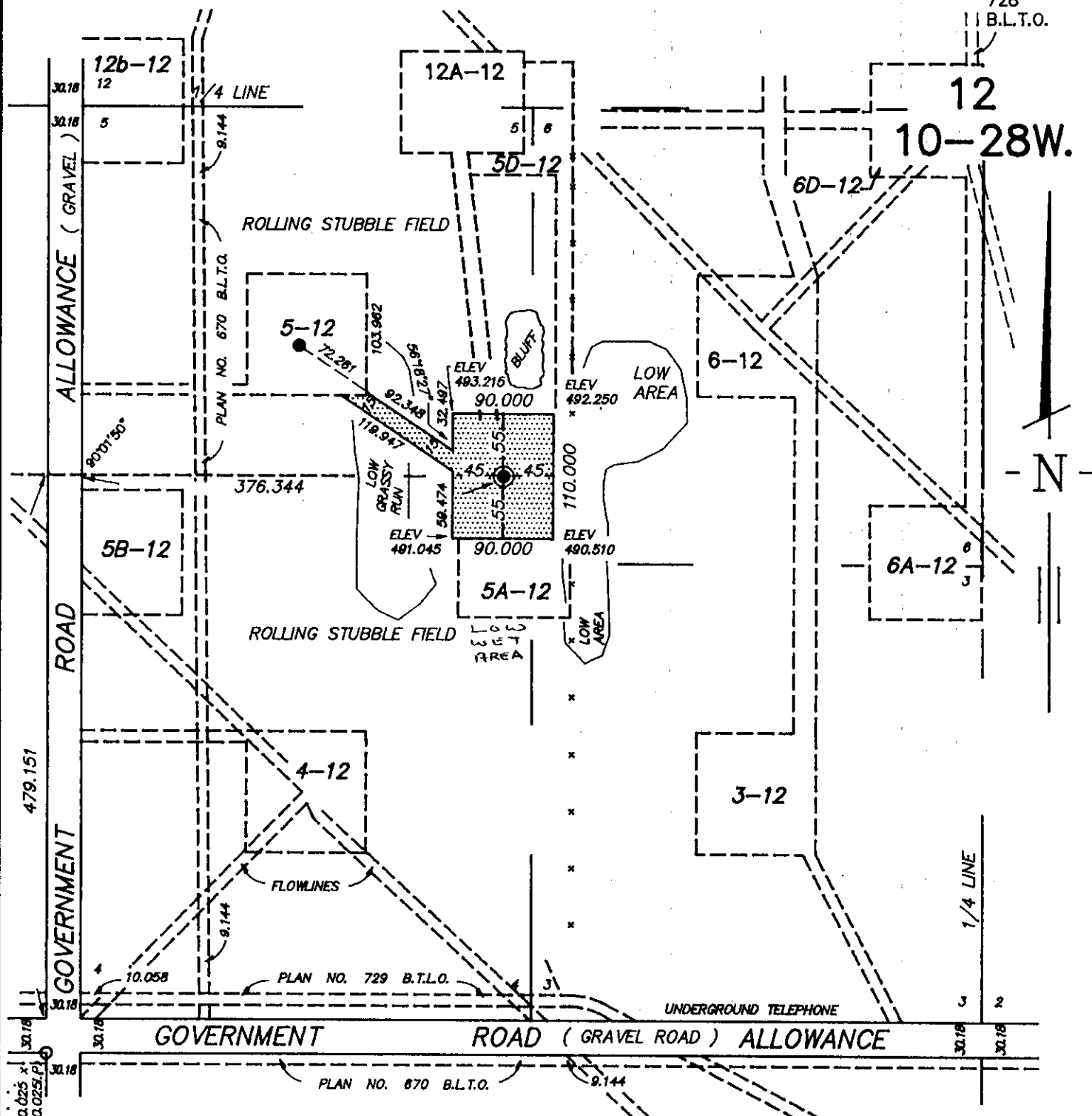
PLAN OF WELL SITE LOCATION

CHEVRON DALY





LSD. 5A SEC. 12 TP. 10 RGE. 28 W.P.M.
MANITOBA

Scale 1: 5000

PLAN
728
B.L.T.O.



NOTES

All distances are in metres or decimals of a metre and may be converted to feet by multiplying by 3.28084
Well location is shown thus 
Area required is shown outlined thus 
Survey monuments found are shown thus 
Iron posts planted are shown thus 
Well Coordinates: 479.151 N. OF S. BDRY. OF SEC. 12
376.344 E. OF W. BDRY. OF SEC. 12

Ground elevation at well: 493.536
Areas Well Site 0.990 ha., 2.45 acres
Access Road 0.156 ha., 0.39 acres
Total 1.146 ha., 2.84 acres

Plan and Survey
certified correct
this 17th day of May, 1991.

Richard C. Purvis
Manitoba Land Surveyor

[Signature]
Witness

LENNON SURVEYS
P.O. Box 1346, 1640 Rosser Avenue
Brandon, Manitoba R7A6N2
(204) 727-0651
FAX (204) 727-5247

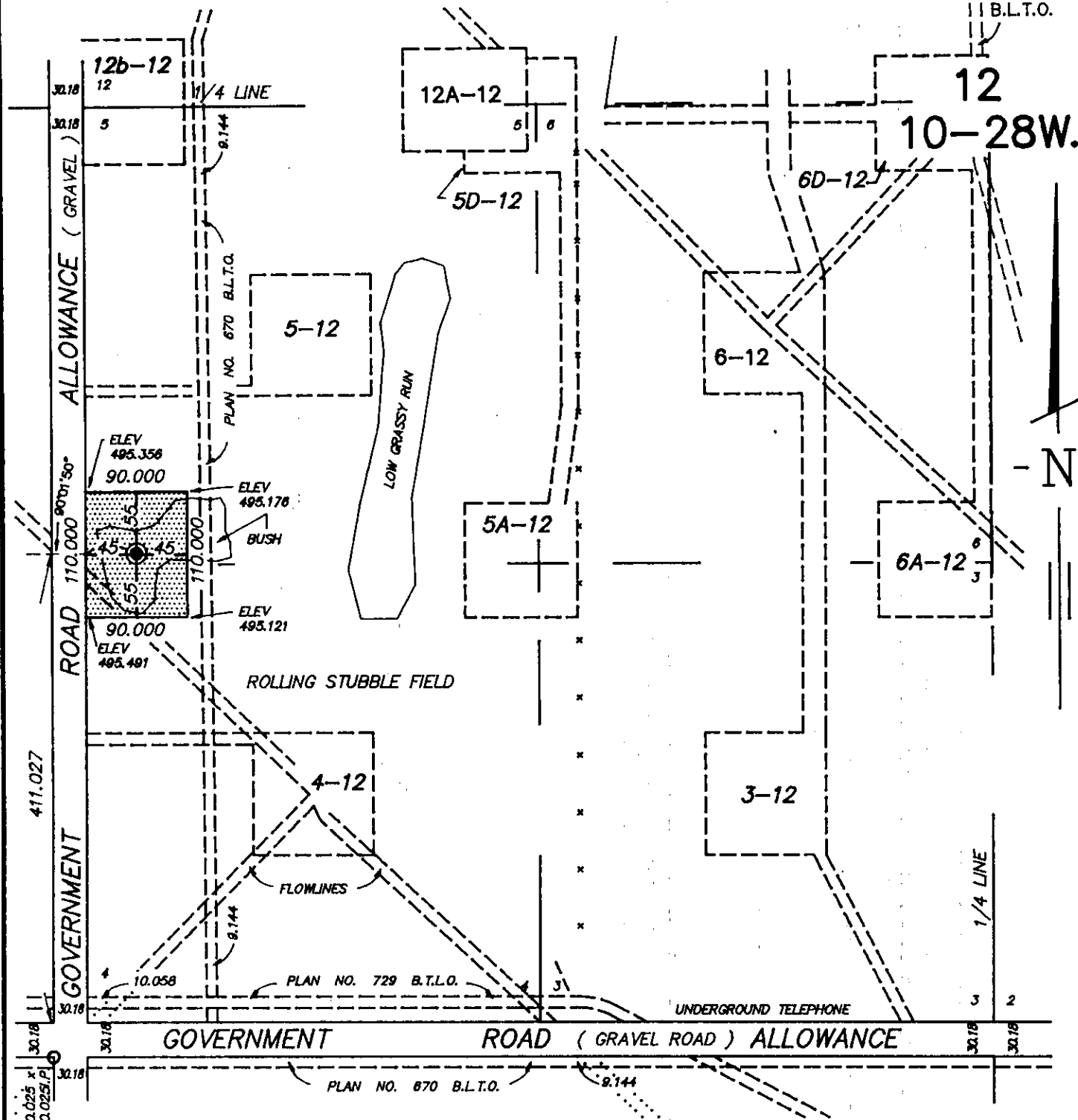
PLAN OF WELL SITE LOCATION

CHEVRON DALY

LSD. 5B SEC. 12 TP. 10 RGE. 28 W.P.M.
MANITOBA

Scale 1: 5000

PLAN
728
B.L.T.O.



NOTES

All distances are in metres or decimals of a metre and may be converted to feet by multiplying by 3.28084
Well location is shown thus
Area required is shown outlined thus
Survey monuments found are shown thus
Iron posts planted are shown thus
Well Coordinates: 411.027 N. OF S. BDRY. OF SEC. 12
45.000 E. OF W. BDRY. OF SEC. 12

Ground elevation at well: 495.156
Areas Well Site 0.990 ha., 2.45 acres
Access Road 0.000 ha., 0.00 acres
Total 0.990 ha., 2.45 acres

Plan and Survey
certified correct
this 17th day of May, 1991.

Richard C. Porcino
Manitoba Land Surveyor

J. A. Koller
Witness

LENNON SURVEYS
P.O. Box 1346, 1840 Rossar Avenue
Brandon, Manitoba R7A8N2
(204) 727-0851
FAX (204) 727-5247

Scale 1: 5000



JOB No. 101-068CR
SC04687C
FFF-601

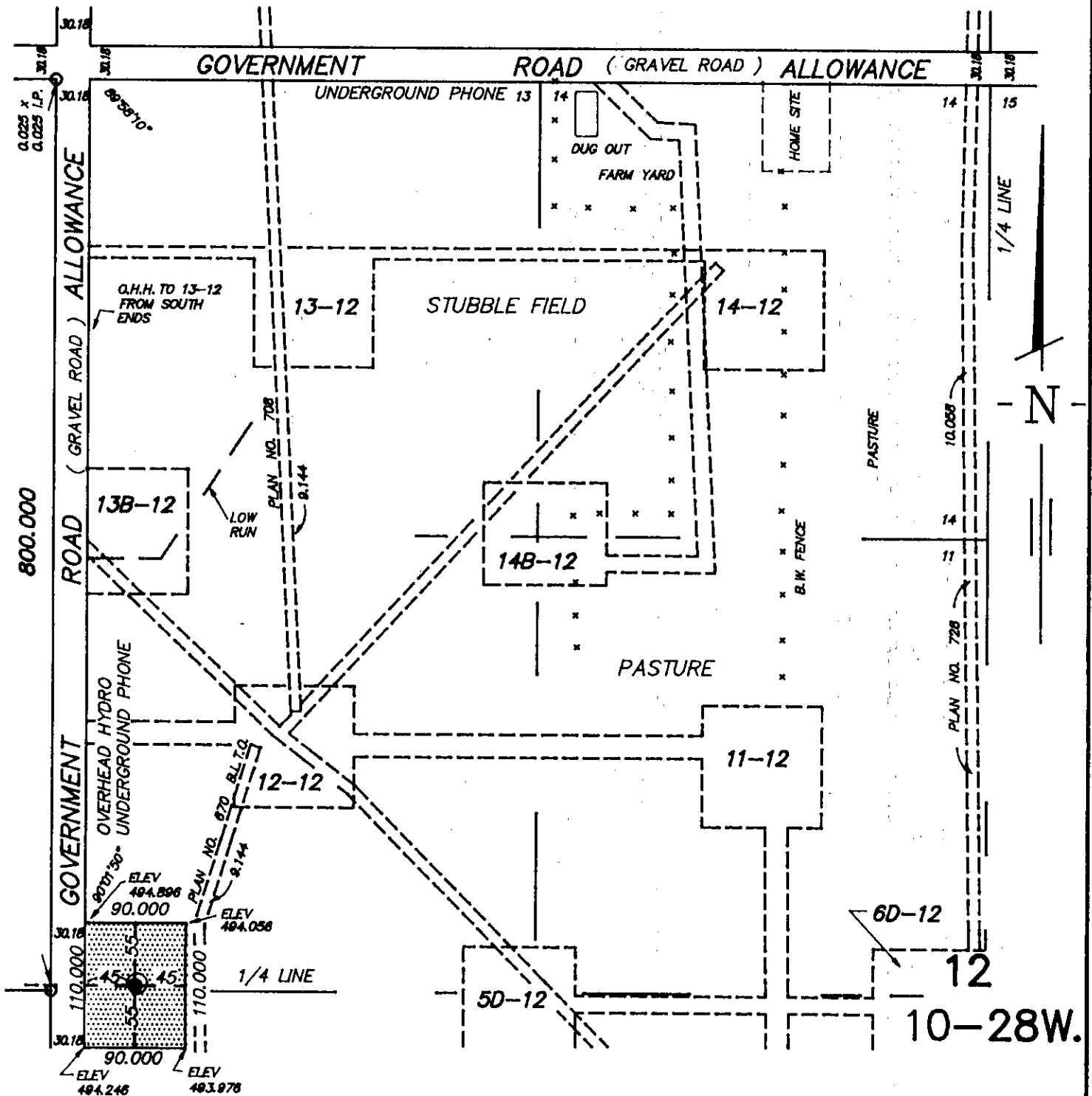
PLAN OF WELL SITE LOCATION

CHEVRON DALY





LSD. 12B, SEC. 12, TP. 10, RGE. 28 W.P.M.

MANITOBA

Scale 1: 5000



NOTES

All distances are in metres or decimals of a metre and may be converted to feet by multiplying by 3.28084
Well location is shown thus 
Area required is shown outlined thus 
Survey monuments found are shown thus 
Iron posts planted are shown thus 
Well Coordinates: 800.000 S. OF N. BDY. SEC. 12
45.000 E. OF W. BDY. SEC. 12

Ground elevation at well: 494.436
Area Well Site 0.990 ha., 2.45 acres
Access Road 0.000 ha., 0.00 acres
Total 0.990 ha., 2.45 acres

Plan and Survey
certified correct
this 13th day of May, 1991.

Richard C. Lemire
Manitoba Land Surveyor

M. J. [Signature]
Witness

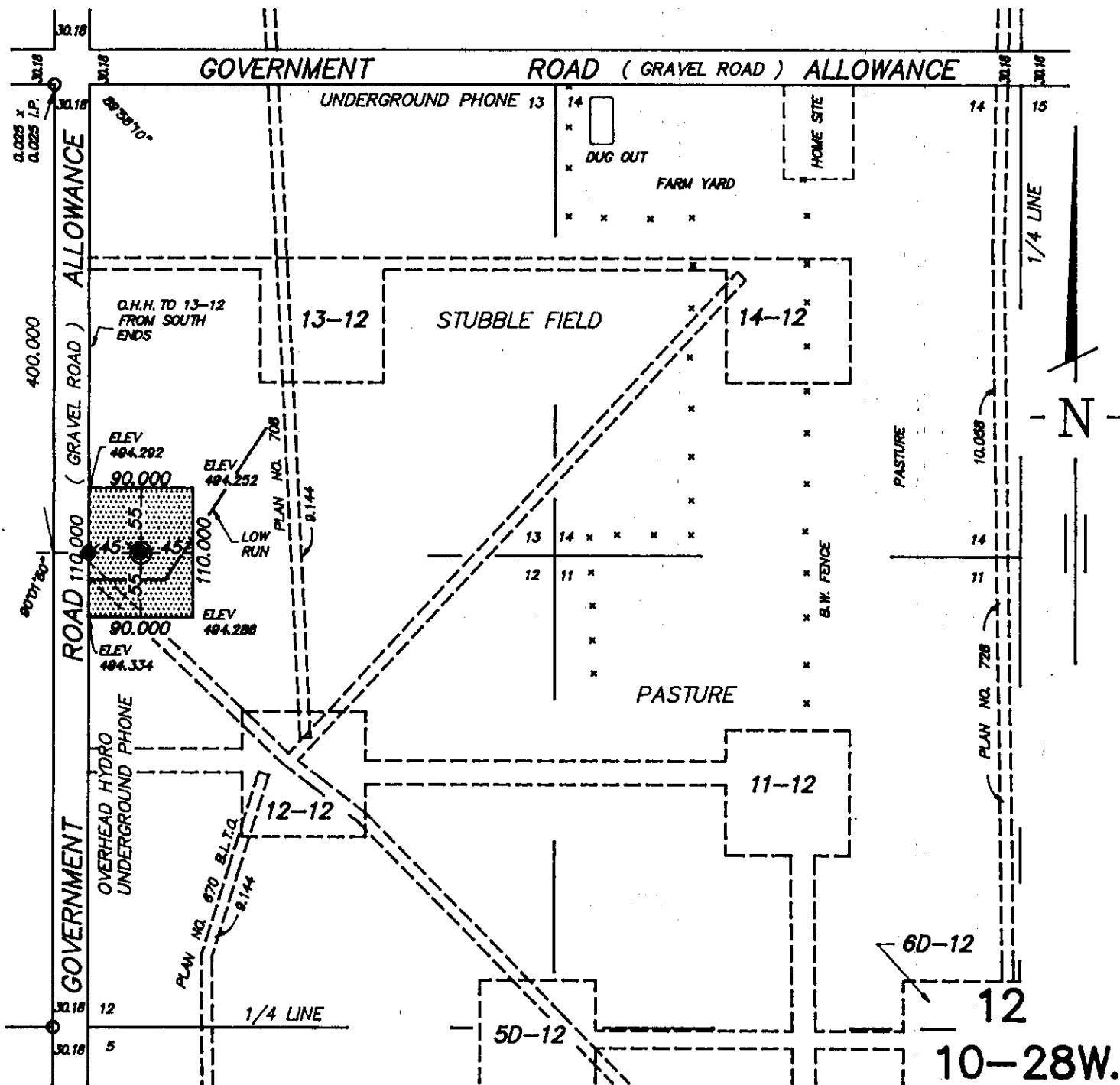
LENNON SURVEYS
P.O. Box 1346, 1640 Rosser Avenue
Brandon, Manitoba R7A6N2
(204) 727-0651
FAX (204) 727-5247

PLAN OF WELL SITE LOCATION

CHEVRON DALY

LSD. 13B, SEC. 12, TP. 10, RGE. 28 W.P.M.
MANITOBA

Scale 1: 5000



NOTES

All distances are in metres or decimals of a metre and may be converted to feet by multiplying by 3.28084

Well location is shown thus

Area required is shown outlined thus

Survey monuments found are shown thus

Iron posts planted are shown thus

Well Coordinates: 400.000 S. OF N. BDRY. SEC. 12
 45.000 E. OF W. BDRY. SEC. 12

Ground elevation at well: 494.760

Area Well Site 0.990 ha., 2.45 acres

Access Road 0.000 ha., 0.00 acres

Total 0.990 ha., 2.45 acres

Plan and Survey
 certified correct
 this 13th day of May, 1991.

Richard C. Penner
 Manitoba Land Surveyor

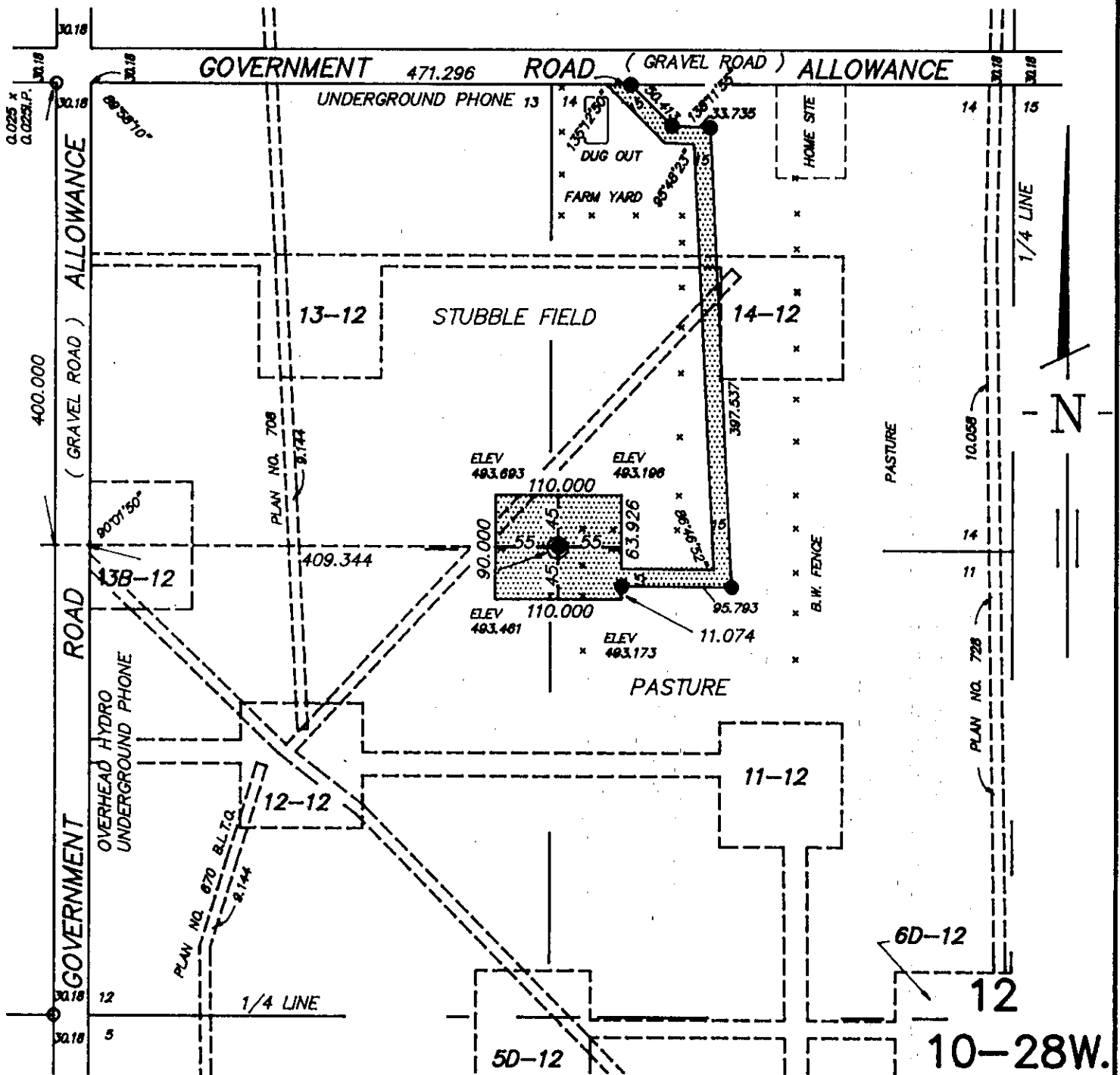
M. Don
 Witness

LENNON SURVEYS
 P.O. Box 1346, 1640 Rossar Avenue
 Brandon, Manitoba R7A6N2
 (204) 727-0651
 FAX (204) 727-5247

PLAN OF WELL SITE LOCATION CHEVRON DALY

LSD. 14B, SEC. 12, TP. 10, RGE. 28 W.P.M.
MANITOBA

Scale 1: 5000



NOTES

All distances are in metres or decimals of a metre and may be converted to feet by multiplying by 3.28084

Well location is shown thus

Area required is shown outlined thus

Survey monuments found are shown thus

Iron posts planted are shown thus

Well Coordinates: 400.000 S. OF N. BDY. SEC. 12

409.344 E. OF W. BDY. SEC. 12

Ground elevation at well: 493.906

Area Well Site 0.990 ha., 2.45 acres

Access Road 0.842 ha., 2.08 acres

Total 1.832 ha., 4.53 acres

Plan and Survey
certified correct
this 13th day of May, 1991.

Richard C. Pomeroy
Manitoba Land Surveyor

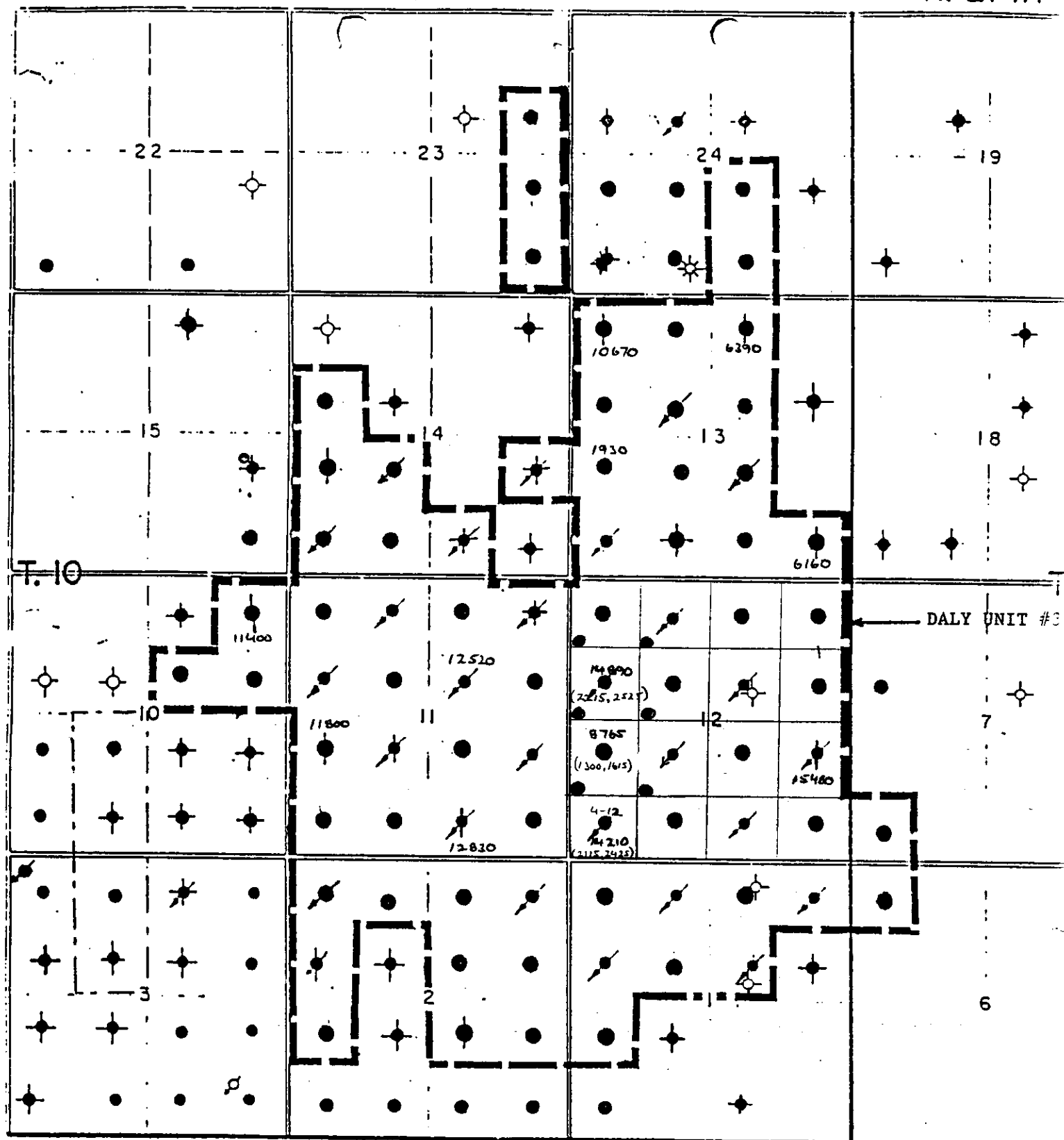
Witness

LENNON SURVEYS

P.O. Box 1346, 1640 Rosser Avenue
Brandon, Manitoba R7A6N2

(204) 727-0651

FAX (204) 727-5247



LEGEND

- OILWELL
- ⊕ SUSPENDED OILWELL
- ⊕ INJECTION WELL
- ⊕ ABANDONED OILWELL

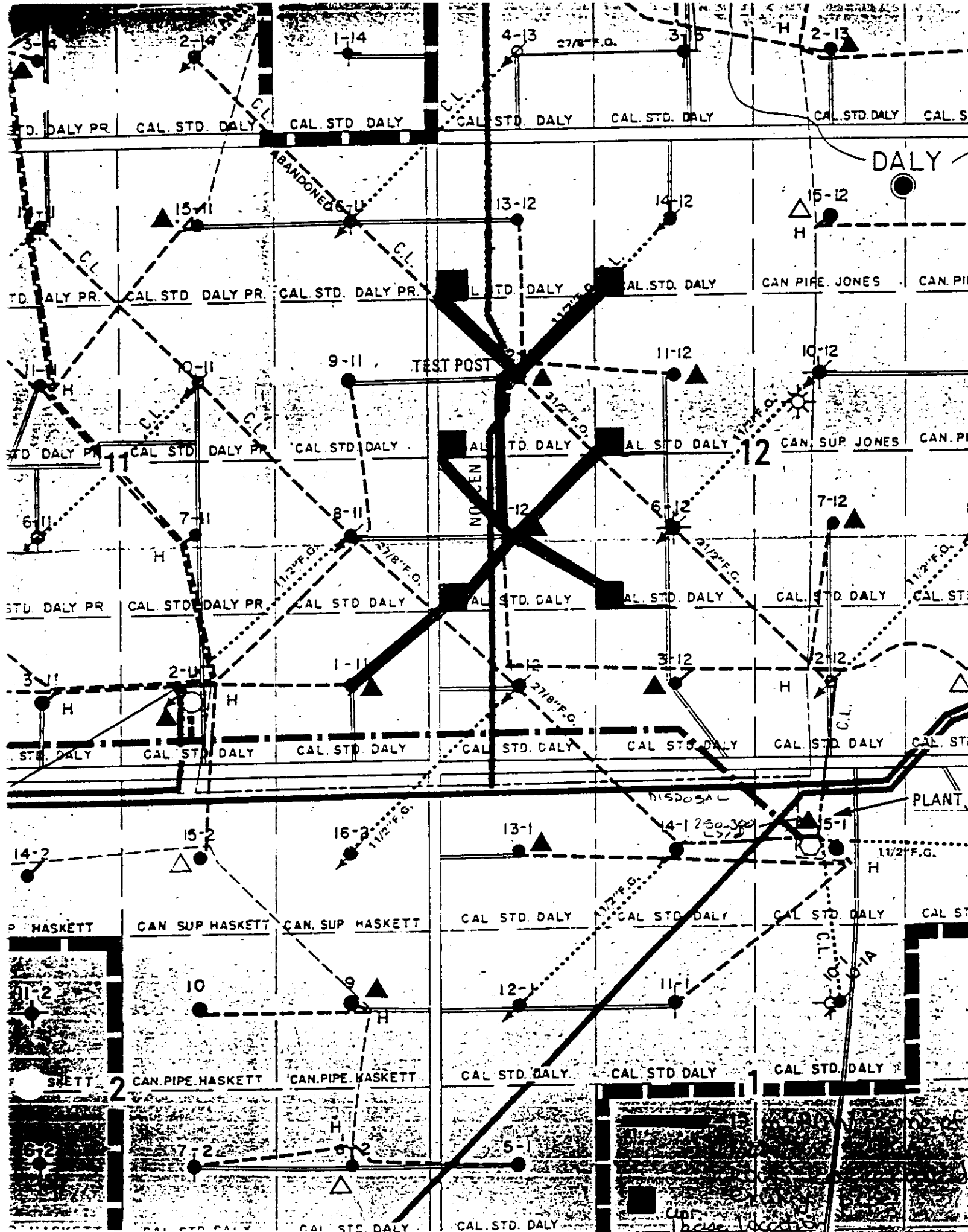
FIGURE 1 Bleed down of 2000 kPa → 300 kPa
decrease mud wt

DALY UNIT No. 3

MAP OF AREA

1984 - 12 - 31

226 → 2200 kPa





Chevron Canada Resources

500 - Fifth Avenue S.W., Calgary, Alberta T2P 0L7
Phone (403) 234-5000 Fax (403) 234-5947

Calgary, Alberta
June 5, 1991

Manitoba Energy & Mines
555 - 330 Graham Avenue
Winnipeg, Manitoba
R3C 4E3

Attention: L. R. Dubreuil

Dear Sir:



A blanket approval for the waiver of uphole logging requirements on the Virden Roselea Unit #1 and Daly Unit #3 infill programs is required by the Units Operator, Chevron Canada Resources. The approval would apply only to those locations listed below.

Under a new casing plan being proposed by the Chevron Drilling Department, intermediate casing would be landed at depth, possibly in the Amaranth or Mississippian formations. This procedure would ensure that the porous upper Cretaceous sand units would be safely behind casing prior to entering the critical underlying formations. The remainder of the well would then be completed and logged as per standard government regulations. In all cases a gamma-neutron log would be run from the base of the intermediate casing to surface casing.

Virden Roselea Unit #1 - Infill Program

Chevron Virden Roselea Unit #1

7B-30-10-25 WPM
11B-30-10-25 WPM
7D-30-10-25 WPM
8B-30-10-25 WPM
10B-30-10-25 WPM
11D-30-10-25 WPM
12D-30-10-25 WPM

OPENHOLE

LOGGING PROGRAM

Daly Unit #3 - Infill Program

Chevron Daly Unit #3

5A-12-10-28 WPM
5B-12-10-28 WPM
12A-12-10-28 WPM
12B-12-10-28 WPM
13B-12-10-28 WPM
14B-12-10-28 WPM

Should you require any additional information in regards to this matter, please contact the undersigned at (403) 234-5060.

Yours truly,

B. W. Glover
Supervisor, Geological Operations