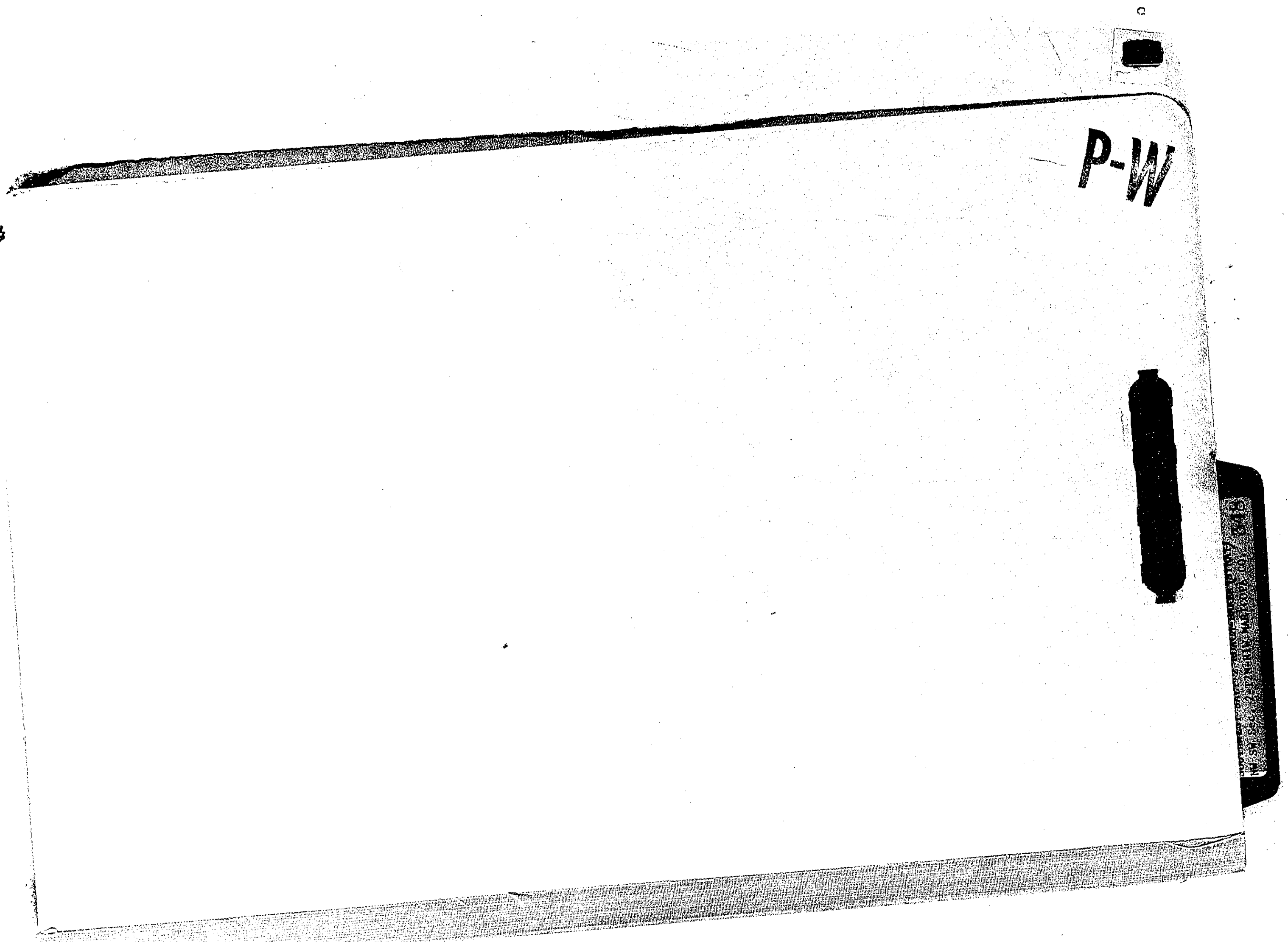
P-W

COUNTY Maricopa AREA NE by N Litchfield Park LEASE NO. Roach-Baker Fee

WELL NAME Southwest Salt Company #2 - Roach-Baker (Strat)

LOCATION NW SW SEC 2 TWP 2N RANGE 1W FOOTAGE 566' E/FWL - 1735' [redacted] FSL

ELEV 1085' GR ____ KB SPUD DATE 11-2-70 STATUS [redacted] COMP. DATE 1-71 TOTAL DEPTH 3425

P&A 6/3/90

CONTRACTOR J. O. Barnes

CASING SIZE	DEPTH	CEMENT	LINER SIZE & DEPTH
20"	17	8 SKS	NA
10"	1310	350 SKS	
6"	2240	None	

DRILLED BY ROTARY X

DRILLED BY CABLE TOOL ____

PRODUCTIVE RESERVOIR ____

INITIAL PRODUCTION Salt 3212-2240

ABANDONED SALT SOLUTION MINING WELL

FORMATION TOPS	DEPTHS	SOURCE L.L.	SOURCE E.L.	REMARKS
Valley Fill	0 - 800'			*The cement around the 10" csg was calculated to cover 750'. Assuming the calculations to ~~be reasonably correct this would bring the~~ cement top to 550' which is well above the Anhy stringer at 800' - two strings of tbg. ~~have been run - 6 5/i to 2300' 3" to 3395'.~~ This well was cored from 3412 to 3425
Anhydrite	800'			
Top of Salt	1000'			
All samples are in possession of U.S.G.S.				

ELECTRIC LOGS	PERFORATED INTERVALS	PROD. INTERVALS
None	NA	NA

SAMPLE LOG ____
SAMPLE DESCRP. ____
SAMPLE NO. 1681 - 1030'
CORE ANALYSIS ____
DSTs ____

REMARKS ____

APP. TO PLUG YES
PLUGGING REP. YES
COMP. REPORT X

WATER WELL ACCEPTED BY ____

BOND CO. Fidelity & Deposit Company of Maryland BOND NO. 84-18-292

BOND AMT. $ 5,000 CANCELLED 8/27/90 DATE ORGANIZATION REPORT 1-19-69

FILING RECEIPT 2882 LOC. PLAT X WELL BOOK X PLAT BOOK X

API NO. 02-013-20002 DATE ISSUED 10-27-70 DEDICATION None (Strat

PERMIT NUMBER ~~548~~

(over)

DRILL STEM TEST

NO.	FROM	TO	RESULTS

CORE RECORD

NO.	FROM	TO	RECOVERY	REMARKS

REMEDIAL HISTORY

DATE STARTED	COMPLETED	WORK PERFORMED	NEW PERFORATIONS

ADDITIONAL INFORMATION

4.

WELL COMPLETION OR RECOMPLETION REPORT AND WELL LOG

DESIGNATE TYPE OF COMPLETION:

New Well [X] Work-Over [ ] Deepen [ ] Plug Back [ ] Same Reservoir [ ] Different Reservoir [ ] Oil [ ] Gas [ ] Dry [ ]

DESCRIPTION OF WELL AND LEASE

Operator	Address
SOUTHWEST SALT CO.	Box 1237, Litchfield Park, Arizona 86432

Federal, State or Indian Lease Number or name of lessor if fee lease	Well Number	Field & Reservoir
Roach & Baker (lease)	2	Salt

Location	County
540' E of WSL and 1650' N of SSL	Maricopa

Sec. TWP-Range or Block & Survey: T2N R1W, G&SRB&M

Date spudded	Date total depth reached	Date completed, ready to produce	Elevation (DF, RKB, RT or Gr.) feet	Elevation of casing hd. flange feet
11-2-70	3425	1-71	1085 Gr.	1086

Total depth	P.B.T.D.	Single, dual or triple completion?	If this is a dual or triple completion, furnish separate report for each completion.
3425			

Producing interval (s) for this completion	Rotary tools used (interval)	Cable tools used (interval)
3212 - 2240	all	

Was this well directionally drilled?	Was directional survey made?	Was copy of directional survey filed?	Date filed
no	no	no	

Type of electrical or other logs run (check logs filed with the commission)	Date filed
none	

CASING RECORD

Casing (report all strings set in well—conductor, surface, intermediate, producing, etc.)

Purpose	Size hole drilled	Size casing set	Weight (lb./ft.)	Depth set	Sacks cement	Amt. pulled
Surface	24"	20"		17'	8	none
	14"	10"	32.4	1310'	350	none
Tubing		6"	24	2240'	none	none

TUBING RECORD

Size	Depth set	Packer set at
3 1/2" in.	3212 ft.	-- ft.

LINER RECORD

Size	Top	Bottom	Sacks cement	Screen (ft.)
-- in.	-- ft.	-- ft.	--	--

PERFORATION RECORD

Number per ft.	Size & type	Depth Interval
	NONE	----------

ACID, SHOT, FRACTURE, CEMENT SQUEEZE RECORD

Am't. & kind of material used	Depth Interval

INITIAL PRODUCTION

Date of first production	Producing method (indicate if flowing, gas lift or pumping—if pumping, show size & type of pump:)
NOT APPLICABLE	

Date of test	Hrs. tested	Choke size	Oil prod. during test bbls.	Gas prod. during test MCF	Water prod. during test bbls.	Oil gravity ° API (Corr)

Tubing pressure	Casing pressure	Cal'ted rate of Production per 24 hrs.	Oil bbls.	Gas MCF	Water bbls.	Gas—oil ratio

Disposition of gas (state whether vented, used for fuel or sold):

CERTIFICATE: I, the undersigned, under the penalty of perjury, state that I am the SECRETARY of the SOUTHWEST SALT CO. (company), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated therein are true, correct and complete to the best of my knowledge.

April 27, 1971
Date

John E. Savoy
Signature

RECEIVED
JUN 1971
O & G CONS. COMM.

Permit No. 548

STATE OF ARIZONA
OIL & GAS CONSERVATION COMMISSION
Well Completion or Recompletion Report and Well Log
File One Copy
Form No. 4

(Complete Reverse Side)

DETAIL OF FORMATIONS PENETRATED

Formation	Top	Bottom	Description*
Valley Fill	0	800'	
Anhydrite	800'	1000'	
Top of Salt	1000'		
All samples in possession of U.S.G.S.			

* Show all important zones of porosity, detail of all cores, and all drill-stem tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures, and recoveries.

INSTRUCTIONS:

Attach drillers log or other acceptable log of well.

This Well Completion or Recompletion report and well log shall be filed with the State of Arizona Oil & Gas Conservation Commission not later than thirty days after project completion.

Form No. 4

PLUGGING RECORD

Operator	Address
Southwest Salt Co./Morton International, Inc.	13000 W. Glendale Ave., Glendale, AZ 85307

Federal, State, or Indian Lease Number or lessor's name if fee lease.	Well No.	Field & Reservoir
Roach-Baker	2	N/A

Location of Well	Sec-Twp-Rge or Block & Survey	County

Application to drill this well was filed in name of	Has this well ever produced oil or gas	Character of well at completion (initial production): Oil (bbls/day)	Gas (MCF/day)	Dry?
Southwest Salt Company	No	N/A	N/A	N/A

Date plugged:	Total depth	Amount well producing when plugged: Oil (bbls/day)	Gas (MCF/day)	Water (bbls/day)
June 5, 1990	968 Feet	N/A	N/A	N/A

Name of each formation containing oil or gas. Indicate which formation open to wellbore at time of plugging	Fluid content of each formation	Depth interval of each formation	Size, kind & depth of plugs used. Indicate zones squeeze cemented, giving amount of cement.
None			

AZ OIL & GAS CONSERVATION COMMISSION
JUL 6 1990

CASING RECORD

Size pipe	Put in well (ft.)	Pulled out (ft.)	Left in well (ft.)	Give depth and method of parting casing (shot, ripped, etc.)	Packers and shoes
See attachments to Form No. 25 for pertinent details on the well and plugging.					

Was well filled with heavy drilling mud, according to regulations?	Indicate deepest formation containing fresh water.
N/A	N/A

NAMES AND ADDRESSES OF ADJACENT LEASE OPERATORS OR OWNERS OF THE SURFACE

Name	Address	Direction from this well:
Roach and Baker Ranches	7033 N. Dysart, Glendale, AZ 85307	

In addition to other information required on this form, if this well was plugged back for use as a fresh water well, give all pertinent details of plugging operations to base of fresh water sand, perforated interval to fresh water sand, name and address of surface owner, and attach letter from surface owner authorizing completion of this well as a water well and agreeing to assume full liability for any subsequent plugging which might be required.

N/A

Use reverse side for additional detail.

CERTIFICATE: I, the undersigned, under the penalty of perjury, state that I am the Director of Manufacturing-Evap. of the Morton International, Inc. (company) and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated therein are true, correct and complete to the best of my knowledge.

July 3, 1990
Date

Signature

Permit No. 548

STATE OF ARIZONA
OIL & GAS CONSERVATION COMMISSION
Plugging Record
File One Copy
Form No. 10

4/82

SUNDRY NOTICES AND REPORTS ON WELLS

1. Name of Operator Southwest Salt Co./Morton International, Inc.

2. OIL WELL ☐ GAS WELL ☐ OTHER [X] (Specify) Solution Mining (Salt Brine)

3. Well Name Roach-Baker No. 2

Location SW ¼ Section, 590 Ft East of West Line, 1,700 Ft North of South Line

Sec. 2 Twp. 2N Rge. 1W County Maricopa, Arizona.

4. Federal, State or Indian Lease Number, or lessor's name if fee lease Roach-Baker

5. Field or Pool Name N/A

6. Check Appropriate Box to Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	MONTHLY PROGRESS	☐
FRACTURE TREAT	☐	DIRECTIONAL DRILL	☐	FRACTURE TREATMENT	☐	REPAIRING WELL	☐
SHOOT OR ACIDIZE	☐	PERFORATE CASING	☐	SHOOTING OR ACIDIZING	☐	ALTERING CASING	☐
REPAIR WELL	☐	CHANGE PLANS	☐			ABANDONMENT	X
(OTHER)				(OTHER)			

(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

7. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)

The attached sheets detail the plugging and abandonment of Roach-Baker No. 2.

8. I hereby certify that the foregoing is true and correct.

Signed [signature] Title Director of Manufacturing -Evap. Date 7/3/90

Permit No. 548

STATE OF ARIZONA
OIL & GAS CONSERVATION COMMISSION
Sundry Notices and Reports On Wells
Form No. 25 File One Copy

Attachment to Form No. 25
State of Arizona
Oil and Gas Conservation Commission

Plug and Abandon - Actual
Roach-Baker No. 2 (Arizona Permit No. 548)
Glendale, Arizona

Roach-Baker No. 2 well (Arizona Permit No. 548) plugging and abandonment was completed on June 5, 1990, when cement was circulated to the surface. The following is the sequence of events leading to the successful plugging and abandonment.

May 2 - May 16:

The 5-1/2", 7" and 8-5/8" casings were removed from inside the 10-3/4" casing. Swaging was required at a depth of 320' inside the 10-3/4" casing due to extreme damage. The 10-3/4" casing was found to a depth of 1,305'.

May 30:

Schlumberger ran a CBL-VDL log, attached as Figure 1. The top of the cavity in the salt was located at 991'. Cement behind the 10-3/4" casing appeared good from 700' down to the top of the cavity. The probable top of cement was picked at a depth of 642'. Note: The repeat section of this log is 10' low and was not used in subsequent work.

May 31:

An inflatable packer was set inside the 10-3/4" casing at a depth of 1,164', to prevent loss of the TDT logging tool into the solution mining cavity. Schlumberger ran a TDT log, attached as Figure 2, from a depth of 1,150' to 100' to look for hydrocarbons from the oil pad reported in the well. The log confirmed the cavity roof of 991', but the sigma curve of the TDT log showed no sign of hydrocarbons. The inflatable packer was removed.

June 1:

The 10-3/4" casing was swaged again to open up a tight spot at 190' and reopen the area at 320'. The next step was to perforate the 10-3/4" casing to attempt recovery of the hydrocarbon blanket in the cavity. The inflatable packer was reinstalled in the well at a depth of 714' with 7-5/8" casing above it inside the 10-3/4" casing. The purpose of the packer was to isolate the bad and suspected bad sections of the 10-3/4" casing so that if any hydrocarbon was released from the

cavity it could not get into the formation, but instead be contained in the 7-5/8" casing for bailing. A gamma ray/CCL log was then run to tie back to the Schlumberger TDT log, to assure that perforating would be done at the top of the solution mined cavity. Tape markers were put on the wireline as a double-check against the CCL. Since no hydrocarbon was indicated on the TDT log, the plan required perforations at the top of the cavity. A copy of the log used to tie back to the TDT log is attached as Figure 3. An 11-1/2' string containing 48 perforation shots was centered on 991' and shot.

June 2:

Bailing commenced at 7:00 a.m. A bailer with a capacity of 18.5 gallons made 28 runs in 2 hours to bail the top of the fluid column in the 7-5/8" casing. No oil was bailed out of the hole. The inflatable packer was pulled out of the hole. An inflatable bridge plug was set at 968'. Three feet of sand and 12' of Portland Type II neat cement slurry at a weight of 15.6 lb/gallon were placed on the bridge plug. The cement was placed using a dump bailer. Figure 4 presents a summary drawing of all cement lifts.

June 3:

Tagged cement at 948'. Ran a CCL log to correlate subsequent perforating runs. Perforated with 16 shots in the interval 928-932'. Placed 143 sacks of cement with tubing to fill the hole from 948-650'. An inflatable packer was then set at 525' to squeeze the cement just placed. The time between cement placement and packer setting was 1 hour 20 minutes. The tubing was pressured to 56 psi with water. That pressure held steady for 30 minutes indicating that no cement was squeezing. The packer was released and pulled out of the hole.

June 4:

Cement was tagged at 662', slightly lower than expected indicating that a small amount of cement left the casing. Five sets of perforations of eight shots each were centered on depths of 637, 511, 405, 351 and 101'. A CCL log was run to confirm the perforations and is attached as Figure 5. Tubing was run in the hole and used to place 240 sacks of cement. This is equivalent to 500' of fill-up in the 10-3/4" casing (662' - 162'). After waiting eight hours, the cement was tagged at 342'. This indicates that cement was exiting the casing to fill-up the original drill hole which was not cemented at this level. An additional 240 sacks of cement (500' of fill-up) were placed with no return to the surface. Again the cement exited the casing to fill original drill hole.

June 5:

Tag cement at 165'. An additional 130 sacks of cement slurry were pumped into the well with cement circulating to the surface. Thin cement was bailed out of the cellar until good cement was present. The tubing was removed from the well. Cementing was now complete.

A picture of the identification placard placed on the well is shown on Figure 6. This marker will be coated to minimize corrosion and will be buried below the surrounding ground surface as approved by the A.O.G.C.C. due to the on-going nature of the business.

J. H. Huizingh
062890

FIGURE 4

ROACH-BAKER No. 2 AS PLUGGED

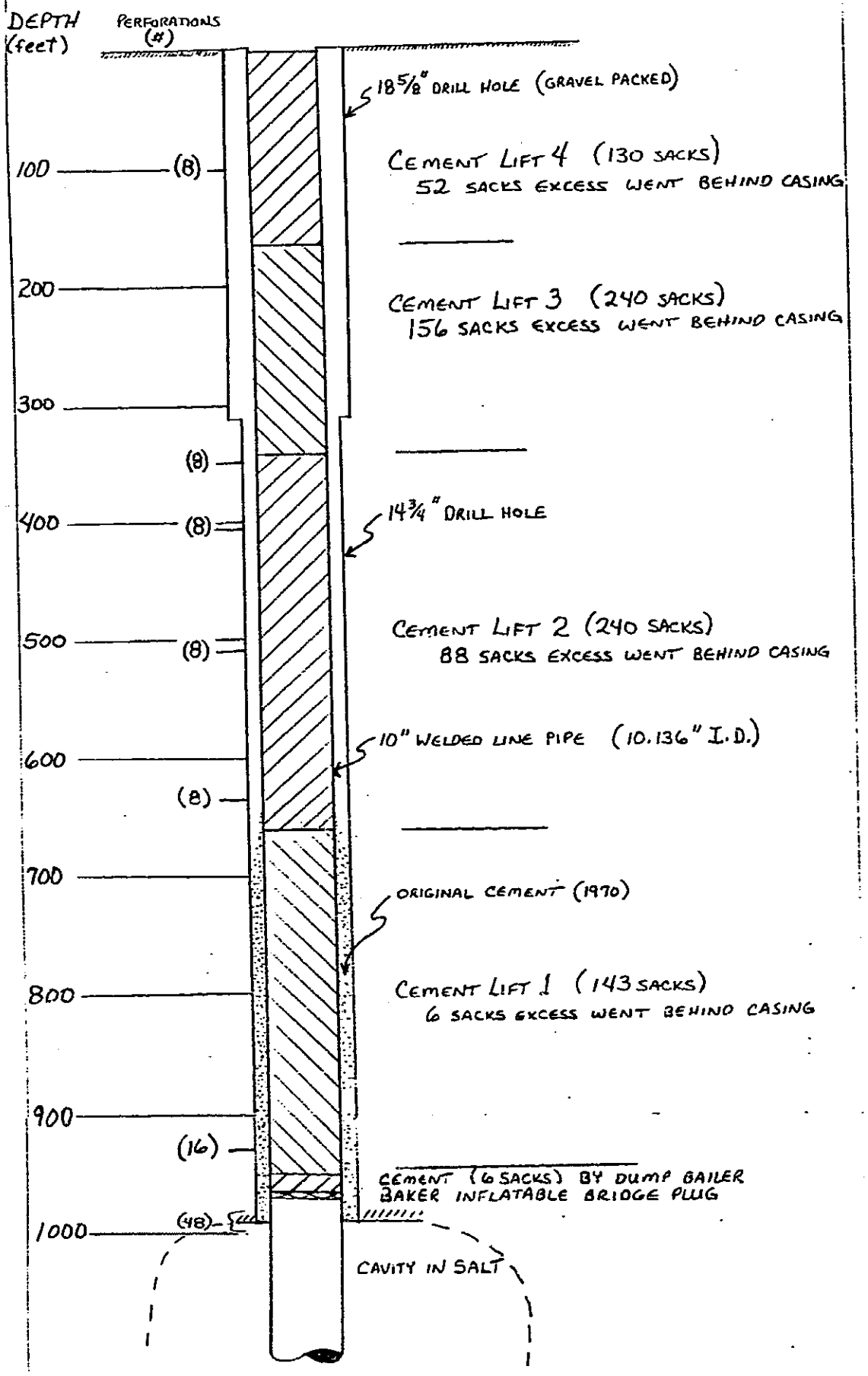

FIGURE 6

ABANDONED WELL MARKER FOR
ROACH - BAKER No. 2
GLENDALE, AZ. FACILITY

APPLICATION TO PLUG AND ABANDON

FIELD Roach Baker

OPERATOR Southwest Salt Co. ADDRESS 13000 W. Glendale Ave. Glendale, AZ 85307

Federal, State or Indian Lease Number or Lessor's Name if Fee Lease ____ WELL NO. 2

LOCATION T2N, R1W, Sec. 2, SW ¼ Sec., 590 ft. East of West Line

1700 ft. North of South Line

TYPE OF WELL Brine Production (Oil, Gas or Dry Hole) TOTAL DEPTH 3200 ft.

ALLOWABLE (If Assigned) N.A.

LAST PRODUCTION TEST OIL N.A. (Bbls.) WATER N.A. (Bbls.)

GAS N.A. (MCF) DATE OF TEST N.A.

PRODUCING HORIZON Luke Salt Deposit PRODUCING FROM 1050 TO 1800 ft.

1. COMPLETE CASING RECORD.

   a. 20" conductor casing set to 30 ft.

   b. 10 3/4" production casing set and cemented surface to 1300 ft.

   c. 8 5/8" liner casing set surface to 840 ft.

   d. Single string at 7" and 5½" tubing set surface to 1100 ft.

2. FULL DETAILS OF PROPOSED PLAN OF WORK.

See attached plugging plan.

DATE COMMENCING OPERATIONS May 2, 1990

NAME OF PERSON DOING WORK United Drilling, Inc. ADDRESS P.O. Box 2488 Roswell, N.M. 88201
Barbie Drilling, Inc. 1008 E. Baseline, No. 845 Tempe, AZ 85283

D. M. Barbie
Signature

Facility Manager
Title

13000 W. Glendale Ave. Glendale, AZ 85307
Address

5-2-90
Date

Date Approved May 2, 1990

STATE OF ARIZONA
OIL & GAS CONSERVATION COMMISSION

By: David Hamm

Permit No. 548

STATE OF ARIZONA
OIL & GAS CONSERVATION COMMISSION
Application to Plug and Abandon
File Two Copies

Form No. 9

4/82

Plugging Plan for Roach-Baker #2
Revised by Morton Salt
January 16, 1990

For all cementing: cement will be Class A or B or Type 2. Cement may be purchased locally and mixed and pumped with rig equipment. It will be neat cement mixed with water and no other additions. Wait-on-cement time will be at least eight hours. After each stage of cementing, the top of the cement will be tagged. If the cement is hard, proceed to the next step; if top of cement is not found, repeat procedures as necessary until a hard cement plug is established.

Notification: The Arizona Oil and Gas Commission and the U.S. EPA will be notified one week in advance of the start of the work.

1. Remove 5" and 7" tubing at least to 1,050'. If it will not come free by conventional means, may run a freepoint and cut where tubing is free. May need to pull in sections.

2. Remove 8-5/8" liner. May need to cut in sections and remove as above. Well will now be clear to at least 1,050'.

3. Run cement bond log deep enough to pick up the top of the cavity and high enough to pick up the top of the fluid level. If the tubing is only cleared to 1,050', and the log shows that the top of the cavity is below that, an attempt will be made to clear the tubing and find the top of the cavity. If the cement bond log does not clearly indicate the top of the cavern, another log type, as determined by Morton Salt, will be run.

4. Run a density interface type log from below top of the cavity to the surface. This type of log will pick up any pockets of oil as a lower density fluid. Exact specifications of log will depend on which logging contractor is selected. Logging contractor will be qualified to interpret all logs that are run. Evidence of qualification will be provided once the logging contractor is selected.

5. If oil is found, perforate the 10-3/4" casing with at least 40 holes or 10' with 4 jets per foot and attempt to remove all of the oil. If no oil is found perforate at

the top of cavity as that is where any oil trapped in the cavity would collect. If there is any oil in the cavity it will flow to the top of the fluid level as the lower density oil makes its way into the casing.

After a waiting period of eight hours, begin bailing the casing; continue bailing until there is a two hour period in which no oil is recovered. Any oil that is found will be directed into a reserve pit and disposed of properly.

6. Set a regular cast-iron bridge plug 20' above the perforations completed in step No. 5. If the casing conditions and size are unknown, set an inflatable bridge plug. Using tubing, break circulation and clean hole. Place 10' to 20' of Class A or B or Type 2 cement on plug. Cement may be purchased locally and mixed and pumped with rig equipment. It will be neat cement, mixed with water and no other additions. Wait-on-cement time will be at least eight hours.

   Tag top of cement. If cement is hard, proceed to next step. If top of cement is not found, repeat procedures as necessary until a hard cement plug is established in the hole.

7. Perforate 10-3/4" casing with eight shots per foot over a four foot section. This will be done at approximately 960', above the plug, and as low as possible in the anhydrite confining zone above the salt. Eight shots per foot will probably be accomplished by two runs at four shots per foot.

8. Set packer at 800' and attempt to squeeze from 960' to just below 800'. If formation will not take squeeze fluid, fill with cement to just below 800'.

9. If the cement bond log shows uncemented volumes behind the 10-3/4" casing at approximately 800', consult the Commission Representative on-site on the number and location of perforations to fill this void and perforate accordingly. Also, consult the Commission and U.S. EPA Representatives for any perforations that are appropriate between 800' and 400', and perforate accordingly. Fill with cement to 400'. Wait at least eight hours for the cement to harden. Tag the top of the cement; if it has fallen back, refill to 400'. Repeat the filling, waiting, tagging, sequence until the casing is cemented to 400'.

10. If the cement bond log shows uncemented volumes behind the 10-3/4" casing above 400', consult the Commission and U.S. EPA Representatives on-site on the number and location of perforations to fill this void. The section above the fluid level will be perforated a couple of times just in case there are uncemented sections above this point. Fill with cement to surface. Wait at least eight hours for the cement to harden. If it has fallen back, refill to the surface. Repeat the filling and waiting sequence until the casing is cemented to the surface.

11. Cut off casing and install plugged well marker in accord with R12-7-127.

In the event of unexpected complications, the program will be revised as directed by the Commission and U.S. EPA Representatives on-site.

111589

D. Brennan

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

In Reply
Refer to: W-6-2

June 19, 1989

John E. Goodbrake
Director of Manufacturing
Morton Thiokol, Inc.
Morton Salt Division
110 North Wacker Drive
Chicago, Illinois, 60606-1555

RE: Southwest Salt Roach Baker #2
Plugging and Abandonment Plan

Dear Mr. Goodbrake:

We have reviewed the attached plugging and abandonment plan for Roach-Baker #2 submitted on March 14, 1989 by Martha Stover of your office (Attachment 1). The plan is approved provided the following conditions or changes are incorporated (see below and also Attachment 2):

Step No. 3

If the Cement Bond Log does not clearly indicate the top of the cavern, then run a Sonar Survey.

Step No. 5

Perforate at least 40 holes or 10 feet with 4 jets per foot.

Step No. 6

A regular cast-iron bridge plug should be set 20 feet above the perforations completed in Step No. 5. Dump 10 feet of cement on the plug. If the casing conditions and size are unknown, set an inflatable bridge plug.

NOTE: At this point, a pressure test of the 10 3/4 inch casing should be performed to prove mechanical integrity of the casing. If the casing leaks, determine the location of the leak and repair by cementing prior to proceeding with the plugging procedure.

Step No. 7

The perforations at 960± feet should be cemented at this time to ensure that this interval is plugged off. A retainer or packer should be set immediately below the proposed perforations as stated in Step No. 8. This will leave a full column of cement from the next proposed perforation to 960 feet.

Step No. 8

If bonding is questionable at the base of the USDW (800 feet), it is recommended that the interval be perforated and squeezed.

Step No. 9

Delete.

Step No. 11

The bottom squeeze should be performed separately to ensure that all of the cement in this step does not go out at 400± feet and leave a void in the casing.

If you have any questions concerning these requirements please call Lester Kaufman, Chief, Underground Injection Control Section, at (415) 974-0893.

Sincerely,

Keith Takata

Harry Seraydarian
Director
Water Management Division

Attachments

cc: Martha Stover - Morton Thiokol (w/Attachments)
Daniel Brennan - Arizona Oil & Gas Commission (w/Attachments)

Attachment 1

Plugging Plan Submitted by Morton Thiokol
Morton Salt - Roach Baker #2

1. Remove 5" and 7" tubing at least to 1050 ft. If it will not come free by conventional means, may run a freepoint and cut where tubing is free. May need to pull in sections.

2. Remove 8-5/8" liner. May need to cut in sections and remove as above. Well will now be clear to at least 1050 ft.

3. Run Cement Bond Log deep enough to pick up the top of the cavity and high enough to pick up the top of the fluid level. If the tubing is only cleared to 1050 ft., and the log shows that the top of the cavity is below that, an attempt will be made to clear the tubing and find the top of the cavity.

4. Run a density interface type log from below top of the cavity to the surface. This type of log will pick up any pockets of oil as a lower density fluid. Exact specifications of log will depend on which logging contractor is selected. Logging contractor will be qualified to interpret both cement bond and density interface log. Evidence of qualification will be provided once the logging contractor is selected.

5. If oil is found, perforate the 10-3/4" casing and attempt to remove all of the oil. If no oil is found perforate at the top of cavity as that is where any oil trapped in the cavity would collect. If there is any oil in the cavity it will flow to the top of the fluid level as the lower density oil makes its way into the casing.

   After a waiting period of eight hours begin bailing the casing. Continue bailing until there is a two hour period in which no oil is recovered. Any oil that is found will be directed into a reserve pit and disposed of properly.

6. Set a plug in the 10-3/4" casing as close to the top of the cavern as possible. A petal basket type plug will probably be used as we do not know the condition and clearance in the casing. 5-10 ft. of gravel and sand will be dropped in the casing to seal off petal basket. If casing clearances seem favorable a conventional bridge plug may be used. If so, no gravel will be dropped to seal the plug.

7. Perforate 10-3/4" casing with eight shots per foot over a four foot section. This will be done at approximately 960 feet, above the plug and as low as possible in the anhydrite confining zone above the salt. Eight shots per foot will probably be accomplished by two runs at four shots per foot.

8. If the cement bond log shows uncemented volumes behind the 10-3/4" casing, the Commission representative on site will be consulted on the number and location of perforations to fill this void. The area above the fluid level will be perforated a couple of times just in case there are uncemented sections above this point.

9. Using tubing, break circulation and clean hole. Place 10-20 feet of Class A or B or Type 2 cement on plug. Cement will be purchased locally and mixed and pumped with rig equipment. It will be neat cement, mixed with water with no other additions. Wait on cement time will be at least eight hours.

10. Tag top of cement. If cement is hard, proceed to next step. If top of cement is not found repeat procedures as necessary until a hard cement plug is established in the hole.

11. Using cement mix as above, pump cement through the tubing to fill the well to surface (approximately 450 sacks). by filling the well to surface the weight of the cement will put 770 psi pressure on the perforations at 960 feet. This will accomplish any squeeze job required.

12. Wait at least eight hours and tag top of cement. Refill with cement any volume that has been squeezed off into either set of perforations. Repeat until cement remains at surface after eight hours of waiting time.

13. Cut off casing and install plugged well marker in accord with R12-7-127.

Attachment 2

Plugging Plan Revised by US EPA Region 9
Morton Salt - Roach Baker #2

1. Remove 5" and 7" tubing at least to 1050 ft. If it will not come free by conventional means, may run a freepoint and cut where tubing is free. May need to pull in sections.

2. Remove 8-5/8" liner. May need to cut in sections and remove as above. Well will now be clear to at least 1050 ft.

3. Run Cement Bond Log deep enough to pick up the top of the cavity and high enough to pick up the top of the fluid level. If the tubing is only cleared to 1050 ft., and the log shows that the top of the cavity is below that, an attempt will be made to clear the tubing and find the top of the cavity. **If the Cement Bond Log does not clearly indicate the top of the cavern, then run a Sonar Survey.**

4. Run a density interface type log from below top of the cavity to the surface. This type of log will pick up any pockets of oil as a lower density fluid. Exact specifications of log will depend on which logging contractor is selected. Logging contractor will be qualified to interpret both cement bond and density interface log. Evidence of qualification will be provided once the logging contractor is selected.

5. If oil is found, perforate the 10-3/4" casing with **at least 40 holes or 10 feet with 4 jets per foot** and attempt to remove all of the oil. If no oil is found perforate at the top of cavity as that is where any oil trapped in the cavity would collect. If there is any oil in the cavity it will flow to the top of the fluid level as the lower density oil makes its way into the casing.

   After a waiting period of eight hours begin bailing the casing. Continue bailing until there is a two hour period in which no oil is recovered. Any oil that is found will be directed into a reserve pit and disposed of properly.

6. ~~Set a plug in the 10-3/4" casing as close to the top of the cavern as possible. A petal basket type plug will probably be used as we do not know the condition and clearance in the casing. 5 10 ft. of gravel and sand will be dropped in the casing to seal off petal basket. If casing clearances seem favorable a conventional bridge plug may be used. If so, no gravel will be dropped to seal the plug.~~

   A regular cast-iron bridge plug should be set 20 feet above the perforations completed in Step No. 5. Dump 10 feet of cement on the plug. If the casing conditions and size are unknown, set an inflatable bridge plug.

NOTE: At this point, a pressure test of the 10 3/4 inch casing should be performed to prove mechanical integrity of the casing. If the casing leaks, determine the location of the leak and repair by cementing prior to proceeding with the plugging procedure.

7. Perforate 10-3/4" casing with eight shots per foot over a four foot section. This will be done at approximately 960 feet, above the plug and as low as possible in the anhydrite confining zone above the salt. Eight shots per foot will probably be accomplished by two runs at four shots per foot. **The perforations at 960± feet should be cemented at this time to ensure that this interval is plugged off. A retainer or packer should be set immediately below the proposed perforations as stated in Step No. 8. This will leave a full column of cement from the next proposed perforation to 960 feet.**

8. If the cement bond log shows uncemented volumes behind the 10-3/4" casing, the Commission representative on site will be consulted on the number and location of perforations to fill this void. The area above the fluid level will be perforated a couple of times just in case there are uncemented sections above this point. **If bonding is questionable at the base of the USDW (800 feet), it is recommended that the interval be perforated and squeezed.**

9. **Delete.**

~~Using tubing, break circulation and clean hole. Place 10-20 feet of Class A or B or Type 2 cement on plug. Cement will be purchased locally and mixed and pumped with rig equipment. It will be neat cement, mixed with water with no other additions. Wait on cement time will be at least eight hours.~~

10. **Delete.**

~~Tag top of cement. If cement is hard, proceed to next step. If top of cement is not found repeat procedures as necessary until a hard cement plug is established in the hole.~~

11. ~~Using cement mix as above,~~ Using Class A or B or Type 2 cement, pump cement through the tubing to fill the well to surface (approximately 450 sacks). By filling the well to surface the weight of the cement will put 770 psi pressure on the perforations at 960 feet. This will accomplish any squeeze job required. **The bottom squeeze should be performed separately to ensure that all of the cement in this step does not go out at 400± feet and leave a void in the casing.**

12. Wait at least eight hours and tag top of cement. Refill with cement any volume that has been squeezed off into either set of perforations. Repeat until cement remains at surface after eight hours of waiting time.

13. Cut off casing and install plugged well marker in accord with R12-7-127.

April 29, 1974

Memo From W. E. Allen, Director
Enforcement Section

Memo to File #548
Southwest Salt #2 Roach-Baker Strat
NW/SW Sec 2-T2N-R1W
Maricopa County

On Friday, April 26, 1974, Fenix & Scisson pumped 2000 gallons of propane down the 10" casing. This propane supposedly will form a blanket around the bottom of the 10" casing. There was no propane return to the surface.

rlb

August 16, 1971

Memo from W. E. Allen, Director
Enforcement Section

Re: Southwest Salt #2 Roach-Baker Strat
NW/4 SW/4 Sec. 2-T2n-R1W
Maricopa County
Our File #548

Jerry Grott called this date and was very upset concerning the letters he had received from me requesting samples from this well. I attempted to tell Jerry that they were responsible for furnishing the Commission with the samples and that it was not our responsibility to go to the U.S.G.S. and request that they share the samples from this well, that they have in their possession, with us. Jerry claimed that we had no authority to request samples or for that matter anything else, and that the information they gave was strickly voluntary in nature and share with the Commission in a spirit of cooperation. He further stated that this was a verbal agreement between him and John Bannister. At this point I requested John to get on the phone and join in the conversation. John reaffirmed to Jerry that so long as the Southwest Salt Mining operations was under the jurisdiction of the O.&GCC, they would of neccessity have to abide by our rules and regulations. Jerry than said that he would contact Mr. Schuman with U.S.G.S. in an effort to secure the samples that we needed.

STATE OF ARIZONA
30th LEGISLATURE
2nd REGULAR SESSION

SENATE

S.B. 1306
INTRODUCED
February 8, 1972

REFERENCE TITLE: Water Pollution - Monitoring Sources

Referred to	Date	Reported Out
Rules		

Committee of Whole _____
3rd Reading ____ Aye ____ No ____ Absent ____
House Action _____
_____
Sent to Governor _____ Action _____

Introduced by Majority of Committee on Public Health and Welfare

AN ACT

RELATING TO PUBLIC HEALTH AND SAFETY; AUTHORIZING THE DEPARTMENT OF HEALTH TO REQUIRE MONITORING OF WATER POLLUTION SOURCES; PROVIDING FOR CONFIDENTIALITY OF RECORDS, AND AMENDING SECTION 36-1863, ARIZONA REVISED STATUTES.

Be it enacted by the Legislature of the State of Arizona:

Section 1. Purpose

The purpose of this act is to provide for monitoring of water pollution sources.

Sec. 2. Section 36-1863, Arizona Revised Statutes, is amended to read:

36-1863. Inspections and investigations; maintenance of records; monitoring; confidentiality

A. The department or its duly authorized representative shall have the power to enter at reasonable times upon any private or public property which is the source of waste or is reasonably believed to be the source of waste being discharged into waters of the state, and the owner, managing agent or occupant of any such property shall permit such entry for the purpose of inspecting and investigating conditions relating to pollution or the possible pollution of any waters of the state, and to have access to such records as the department may require under subsection B of this section.

548

B. The department may require the maintenance of records relating to the operation of disposal systems, and any authorized representative of the department may examine and copy any such records or memoranda pertaining to the operation of disposal systems. Copies of such records shall be submitted to the department upon its request.

C. THE OWNER, LESSEE OR OPERATOR OF A SOURCE OF WASTES SHALL PROVIDE, INSTALL, MAINTAIN AND OPERATE SUCH MONITORING DEVICES AS ARE REASONABLE, NECESSARY AND REQUIRED TO DETERMINE COMPLIANCE IN A MANNER ACCEPTABLE TO THE DEPARTMENT AND SHALL SUPPLY MONITORING INFORMATION AS DIRECTED IN WRITING BY THE DEPARTMENT. SUCH DEVICES SHALL BE AVAILABLE FOR INSPECTION AT ALL REASONABLE TIMES.

D. ANY RECORDS OR OTHER INFORMATION FURNISHED TO OR OBTAINED BY THE DEPARTMENT CONCERNING ONE OR MORE SOURCES OF WASTE WHICH RECORDS AND INFORMATION RELATE TO PRODUCTION OR SALES FIGURES OR TO THE PROCESSES OR PRODUCTION UNIQUE TO THE OWNER OR OPERATOR, OR WHICH WOULD TEND TO ADVERSELY AFFECT THE COMPETITIVE POSITION OF SUCH OWNER OR OPERATOR, SHALL BE ONLY FOR THE CONFIDENTIAL USE OF THE DEPARTMENT IN THE ADMINTRATION OF THIS CHAPTER, UNLESS SUCH OWNER OR OPERATOR SHALL EXPRESSLY AGREE TO THEIR PUBLICATION OR AVAILABILITY TO THE PUBLIC. NO PROVISION OF THIS SECTION MAY BE CONSTRUED TO PROHIBIT THE APPROPRIATE GOVERNMENTAL AGENCY FROM PUBLISHING QUANTITATIVE AND QUALITATIVE STATISTICS PERTAINING TO THE DISCHARGE OF WASTES.

U. S. Geol[illegible]cal Survey
WRD Subdistrict
Rm. 5017, Federal Bld[illegible]
230 N. [illegible]
Phoenix, Arizona 85025

Samples are on file in the Tucson office.

(H.H. Schumann)

LITH. LOG P. #548

2-2N-1W. NW SW SW

WRD Exp. (GW)
April 1966

Well No. (B-2-1) 2 ccb
SALT MINE WELL #2

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD

Record by T.N. WIDDISON Source of data field & owner Date Nov. 9-70 Map EL MIRAGE 7½'

State ARIZONA 04 County (or town) MARICOPA

Latitude: 33 23 25 N Longitude: 112 20 18 Sequential number: 1

Lat-long accuracy: 2 T 2 S R 1 E Sec 2 . NW ¼ . SW ¼ . SW ¼ G&SR. B & M

Local well number: Other number: SALT MINE #2

Local use: Owner or name: GROTT, SOUTHWEST SALT CO.

Owner or name: Address:

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co., (P) Private, (S) State Agency, (W) Water Dist

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other SALT MINE

Use of well: (A) Anode, (D) Drain, (C) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed.

DATA AVAILABLE: Well data Freq. W/L meas.: Field aquifer char.

Hyd. lab. data: #2897 D

Qual. water data: type:

Freq. sampling: Pumpage inventory: yes / no, period:

Aperture cards: yes

Log data: drill cuttings (collected 11/5/70 USWG) 0-3412 G

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 342.5 ft Meas. 3425 rep. accuracy 6

Depth cased; (first perf.) ft Casing type: ; Diam. in

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., screen, sd. pr., (T) shored, (W) open hole, (Z) other

Method Drilled: (A) air rot, (B) bored, cable, (C) dug, (D) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other

Date Drilled: Nov 1970 9 7 0 Pump intake setting: ft

Driller: name address

Lift (type): (A) air, (B) bucket, cent, (C) jet, (L) multiple, (cent.), (M) multiple, (turb.), (N) nose, (P) piston, (R) rot, submerg, (S) turb, (T) other Deep Shallow

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. Trans. or meter no.

Descrip. MP ft above below LSD, Alt. MP

Alt. LSD: 1086 1 0 8 6 Accuracy: (source) topo map ±5' 3

Water level ft above below MP; Ft above below LSD Accuracy:

Date meas: Yield: gpm Method determined

Drawdown: ft Accuracy: Pumping period hrs

QUALITY OF WATER DATA: Iron ppm Sulfate ppm Chloride ppm Hard. ppm

Sp. Conduct K x 10^6 Temp. °F Date sampled

Taste, color, etc.

Well No.

Well No. (B-2-1) 2 ccb

Latitude-longitude 33 d 32 m 25 s / 112 d 20 m 18 s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD | Physiographic Province: Basin & Range | Section: Sonoran

Desert | Drainage Basin: | Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (Q) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat — V

MAJOR AQUIFER: ____ system, ____ series, ____ aquifer, formation, group

Lithology: | Origin: | Aquifer Thickness: ____ ft

Length of well open to: ____ ft | Depth to top of: ____ ft

MINOR AQUIFER: ____ system, ____ series, ____ aquifer, formation, group

Lithology: | Origin: | Aquifer Thickness: ____ ft

Length of well open to: ____ ft | Depth to top of: ____ ft

Intervals Screened:

Depth to consolidated rock: ____ ft | Source of data:

Depth to basement: ____ ft | Source of data:

Surficial material: | Infiltration characteristics:

Coefficient Trans: ____ gpd/ft | Coefficient Storage:

Coefficient Perm: ____ gpd/ft²; Spec cap: ____ gpm/ft; Number of geologic cards:

2

CORE SAMPLES COLLECTED 3412-3425' (SOLID ROCK SALT).

THIS HOLE WILL BE USED ONLY AS A SALT MINE (SOLUTION PROCESS) NOT TO WITHDRAW GROUND WATER.

Well No. (B-2-1) 2 ccb

GPO 857-700

Page 1 of 6

U.S. Geological Survey Water Resources Division

WELL-CUTTINGS ANALYSIS FORM

Location (B-2-1)2CCB

LAB # 2897

Owner: GROTT; S.WEST SCT.CO. Driller:

Depth: 3425'

Method drilled: Rotary

Depth	Pan No.	Munsell color Dry	Munsell color Wet	%Fines	%Sand	% Gravel	% Mud-stone	HCL reaction*	Max. size	Remarks
10	1	10YR 7/2 lt. Gray	10YR 5/3 Brown	52(75)	24	24(1)	23	W		10'-30'
20	2	"	"	48(75)	24	28 (1)	27	W		Some calcite and
30	3	"	"	53(74)	25	22(1)	21	W		cemented sand
40	4	"	7.5YR 4/2 Dk Brown	18(20)	27	55(53)	2	W	1/8"	40-90' Sand - light brown [illegible]
50	5	"	"	21 (23)	36	43(41)	2	W		fine grains - gravel size
60	6	"	"	19(21)	41	40(38)	2	W		is 1/8" average
70	7	"	"	30(32)	38	32(30)	2	W		[illegible]
80	8	"	"	28 (30)	38	34(32)	2	W		[illegible] 30%
90	9	"	"	25(27)	40	35(33)	2	W		Volcanics 30 [illegible] 10
100	10	10YR 6/2 lt. Br. Gray	"	6	13	81	—	0	1/4"	100'-130'
110	11	"	"	5	22	73	—	0		Absence of [illegible]
120	12	"	"	19	22	59	—	W		Sand - medium
130	13	"	"	11	28	61		W		[illegible] - sub. angular
140	14	10YR 7/2 lt. Gray	"	24(29)	16	60(55)	5	W	1/4"	140'-210'
150	15	"	"	35 (50)	25	40(25)	15	W		Mudstone [illegible]
160	16	"	"	31 (54)	27	39(19)	20	W		sand is fine
170	17	"	"	21 (31)	10	69 (59)	10	W		Quartzite 40%
[illegible]	[illegible]	"	"	26 (36)	10	64(54)	10	W		[illegible] 30%
[illegible]	[illegible]	"	"	44 (57)	23	33(23)	10	W		[illegible]

*S-strong; M-moderate; W-weak; O-none

ANAL. BY [illegible] DATE 7/8/71

Page 2 of 6

U. S. Geological Survey Water Resources Division

WELL-CUTTINGS ANALYSIS FORM

Location

LAB # 2877

Owner: Driller: Depth: Method drilled:

Depth	Pan No.	Munsell color Dry	Munsell color Wet	%Fines	%Sand	% Gravel	% Mud-stone	HCL reaction*	Max. size	Remarks
200	20	"	"	42(47)	23	35(30)	5	W	↓	Fine Quartz 10%
210	21	"	"	32(35)	14	53(50)	3	W		Granules + sub-rounded
220	22	"	"	57(72)	23	20(5)	15	W	1/2"	sub-angular Red
230	23	"	"	59(77)	22	19(1)	18	W	1/4"	220'-370'
240	—	—	—	No SAMPLE	—	—	—	—	1/4"	Increase in mudstone
250	24	"	"	50(64)	34	16(2)	14	W	1/2	Quartzite 30%
260	25	"	"	60(65)	30	10(5)	5	W	1/2	Volcanics 25%
270	26	"	"	52(62)	28	20(10)	10	W	1/2	Quartz 20%
280	27	"	"	57(64)	29	14(7)	7	W	1/2	Granites 25%
290	28	"	7.5YR 7/4	56(72)	33	11(6)	5	W	3/4	Angular - subrounded
300	—	—	—	No SAMPLE	—	—	—	—		Sand is white
310	29	"	"	41(51)	37	22(12)	10	W	1/8	Brown sand grains
320	30	"	"	61(66)	27	12(7)	5	W	1/8	Fine-medium
330	31	"	"	62(67)	28	10(5)	5	W	↓	
340	32	"	"	62(67)	29	9(4)	5	W		
350	33	"	"	67(75)	21	12(4)	8	W		
360	34	"	"	64(70)	29	7(1)	6	W		
370	35	"	"	80(92)	17	3(1)	2	W		
380	36	"	"	62(77)	23	15(6)	15	W		380'-516'

*S-strong; M-moderate; W-weak; O-none

ANAL. BY DATE

Page 3 of 6

U. S. Geological Survey Water Resources Division

WELL-CUTTINGS ANALYSIS FORM

Location

LAB # 2897

Owner: Driller: Depth: Method drilled:

Depth	Pan No.	Munsell color Dry	Munsell color Wet	%Fines	%Sand	% Gravel	% Mud-stone	HCL reaction*	Max. size	Remarks
390	—	—	—	— No	Sample	—	—	—		No change in sand
400	37	"	"	1 56(64)	36	8 (0)	8	W		fraction.
410	38	"	"	1 68(74)	25	7 (1)	6	W		Mostly mudstone
420	39	"	"	1 63 (61)	35	2 (1)	1	W		
430	40	"	"	1 54(61)	38	8 (1)	7	W		
440	41	"	"	1 59(66)	34	7 (0)	7	W		
450	42	"	7.5YR 7/2 Pink	1 54 (58)	38	8 (4)	4	W		
460	43	"	"	1 62(64)	35	3 (1)	2	W		
470	44	"	"	1 40	60	0	—	W		
480	45	"	"	1 46	53	1	—	W	3/8	
490	46	"	7.5YR 8/4 Pink	1 66 (68)	31	3 (1)	2	W		
500	—	—	—	—	No Sample	—	—	—		
510	47	"	"	1 46(47)	52	2(1)	1	W	1/2	Rock
520	48	"	"	1 40	60	0		W		520'- 600'
530	—	—	—	— No	Sample	—	—	—	—	No Brown sand
540	49	"	"	1 43	57	0		W		mudstone dispersion
550	50	"	"	1 44	56	0		W		Sand as Very fine
560	51	"	"	1 40	60	0		W		fine
570	52	"	"	1 43	57	0		W		

*S-strong; M-moderate; W-weak; O-none

ANAL. BY DATE

U.S. Geological Survey Water Resources Division

WELL-CUTTINGS ANALYSIS FORM

Location

LAB # 2897

Owner:

Driller:

Depth:

Method drilled:

Depth	Pan No.	Munsell color Dry	Munsell color Wet	%Fines	%Sand	% Gravel	% Mud-stone	HCL reaction*	Max. size	Remarks
580	53	"	"	42	58	0		W		
590	54	"	"	43	57	0		W		
600	55	"	"	42	58	0		W		Bu[illegible]
610	56	10YR 7/3 V. Pale Br.	"	54(59)	40	6 (1)	5	W		610' - 640'
620	—	—	—	No	Sample	—	—	—	—	Mudstone appears again
630	57	"	"	53(61)	38	9 (1)	8	W	•	with some fine
640	58	"	"	58(63)	36	6 (1)	5	W		[illegible]
650	59	"	"	60(63)	36	4 (1)	3	W		[illegible]
660	60	"	"	59(65)	[illegible]	7 (1)	6	W		
670	—	—		No	Sample	—	—	—	—	
680	61	"	"	57(65)	31	12(4)	8	W		
690	62	"	"	57(67)	30	13(5)	10	W		Bu[illegible]
700	63	"	"	41(46)	26	33(18)	15	W	1/4"-1/2"	700' - 780'
710	64	"	"	50(62)	23	27(15)	12	W		[illegible]
720	65	"	"	40(45)	21	39(31)	5	W		[illegible]
730	—	—	—	No	Sample	—	—	—		and [illegible]
740	66	"	"	47(48)	23	30(29)	1	W		traces of [illegible]
750	67	10YR 7/2 Lt. Gray	"	53(56)	33	14(1)	3	W		[illegible]
[illegible]					No	Sample				

*S-strong; M-moderate; W-weak; 0-none

ANAL. BY ________ DATE ________

U.S. Geological Survey Water Resources Division — Location _____

Page 5 of 6 — WELL-CUTTINGS ANALYSIS FORM — LAB # 2897

Owner: — Driller: — Depth: — Method drilled:

Depth	Pan No.	Munsell color Dry	Munsell color Wet	%Fines	%Sand	% Gravel	% Mud-stone	HCL reaction*	Max. size	Remarks
770	68	"	"	1 60(62)	25	15(13)	2	W	1/4	
780	69	"	"	1 54(56)	24	22(20)	2	W	1/4	
790	—	—	—	—	No Sample	—	—	—	—	Rock
800	70	10YR 8/1 White	"	1 46(47)	13	41(40)	1	W	1/4	800'-840' Gypsum & quartz
810	71	"	"	1 33(35)	47	20(18)	2	W		trace of quartz,
820	72	"	"	1 30(35)	46	24(19)	5	W		Volcanics and
830	73	"	"	1 35(46)	42	23(18)	5	W		Granites in minor
840	74	"	"	1 31(41)	43	26(16)	10	W	↓	amounts. Rock
850	75	10YR 6/1 Gray	10YR 3/2 V. DK. G. Br.	1 59	41	0		W		850'-900' Gypsum
860	76	"	"	1 62	38	0		W		Small fraction of quartz
870	77	"	"	1 62	38	0		W		sand and fine gravel
880	78	"	"	1 61	39	0		W		Sand & gravel and
890	—	—	—	No	Sample	—	—	—	—	Very fine to fine grained
900	79	"	10YR 4/2 DK. Gr. Br.	1 70	30	0		W		some volcanics (cont.)
910	—	—	—	No	Sample	—	—	—	—	910'-1020'
920	—	—	—	No	SAMPLE	—	—	—	—	Gypsum & Caliche
930	80	10YR 8/1 White	10YR 5/3 Brown	0 49	51	0		W		
940	81	"	"	0 62	38	0		W		
950	82	"	10YR 8/2 White	0 41	59	0		W		

*S-strong; M-moderate; W-weak; O-none

ANAL. BY _____ DATE _____

Page 6 of 6

U. S. Geological Survey Water Resources Division

WELL-CUTTINGS ANALYSIS FORM

Location

LAB # 2897

Owner: Driller: Depth: Method drilled:

Depth	Pan No.	Munsell color Dry	Munsell color Wet	%Fines	%Sand	% Gravel	% Mud-stone	HCL reaction*	Max. size	Remarks
950	83	"	"	31	32	37		W		
975	84	"	"	35	29	36		W		
990	85	"	"	56	44	0		W		
990	—	—	—	No Sample	—	—	—	—		
1000	86	10YR 7/3 V. Pale Br.	10YR 4/3 Dk. Br.	39	21	40		W		
1010	87	"	"	39	24	37		W		
1236	88	"	"	56	25	19		W		
1040			Samples	from	here	on	are			
				not	exam.	(shale)				
↓										
3425										

*S-strong; M-moderate; W-weak; O-none

ANAL. BY DATE

LITHO LOG

RECEIVED 2-2N-1W
NW SW SW
AUG 3 1971
Aug 6 1971
O & G CONS. COMM.

USGS Exp. (GW)
April 1966

Well No. (B-2-2)2 ccb
SALT MINE WELL #2
Permit #548

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD

Record by TMMorgan Source of data field & owner Date Nov 9-70 Map El Mirage 7½'

State Arizona (04) County (or town) Maricopa

Latitude: 33°32'25"N Longitude: 112°20'18" Sequential number: 1

Lat-long accuracy: 2 T 2 S R 1 E Sec 2, NW ¼, SW ¼, SW ¼ G&SR. B & M

Local well number: Other number: SALT MINE #2

Local use: Owner or name: GROFF, SOUTHWEST SALT CO.

Owner or name: Address:

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co., (P) Private, (S) Agency, (W) Water Dist

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (F) Power, (H) Fire, (I) Dom, (M) Irr, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other SALT MINE

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Exc, (O) Obs, (Q) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed.

DATA AVAILABLE: Well data Freq. W/L meas.: Field aquifer char.

Hyd. lab. data: #2897 D

Qual. water data: type:

Freq. sampling: Pumpage inventory: yes no period:

Aperture cards: yes

Log data: drill cuttings (collected 11/5/70 thru) 0-3412 G

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 3425 ft Meas. 3125 reg accuracy 6

Depth cased (first perf.): ft Casing type: ; Diam. in

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallary, (O) open end, (P) perf., screen, sd. pt., (S) shored, (T) open hole, (Z) other

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, trenching, (T) driven, (V) drive wash, (Z) other

Date Drilled: Nov 1970 9:7:0 Pump intake setting: ft

Analysis by Gallagher, USGS.

Driller: name address

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (U) other Deep Shallow

Power (type): diesel, elec, gas, gasoline, hand, gas, wind; H.P. LP gas Trans. or meter no.

Descrip. MP ft above below LSD, Alt. MP

Alt. LSD: 1086 1:0:8:6 Accuracy: (source) topo map ±5' 3

Water Level ft above below MP; Ft above below LSD Accuracy: Method determined

Date meas: Yield: gpm Pumping period hrs

Drawdown: ft Accuracy: gpm

QUALITY OF WATER DATA: Iron ppm Sulfate ppm Chloride ppm Hard. ppm Date sampled

Sp. Conduct K x 10^6 Temp. °F

Taste, color, etc.

2-2n-1w
Southwest Salt Co
#2

Well No. (B-2-1) 2 ccb

Latitude-longitude 33 d 32 m 25 s N 112 d 20 m 18 s W

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD | Physiographic Province: Basin & Range [12] | Section: Sonoran

Desert [B] Drainage Basin: _____ [13-15] | Subbasin: _____ [16]

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat [V] [17]

MAJOR AQUIFER: _____ system, _____ series [28-29] _____ aquifer, formation, group [30-31]

Lithology: _____ [32-33] Origin: _____ [34] Aquifer Thickness: _____ ft

[35-37] Length of well open to: _____ ft [38-40] Depth to top of: _____ ft [41-43]

MINOR AQUIFER: _____ system, _____ series [44-45] _____ aquifer, formation, group [46-47]

Lithology: _____ [48-49] Origin: _____ [50] Aquifer Thickness: _____ ft

[51-53] Length of well open to: _____ ft [54-56] Depth to top of: _____ ft [57-59]

Intervals Screened: _____

Depth to consolidated rock: _____ ft [60-63] Source of data: _____ [64]

Depth to basement: _____ ft [65-68] Source of data: _____ [69]

Surficial material: _____ [70-71] Infiltration characteristics: _____ [72]

Coefficient Trans: _____ gpd/ft [73-75] Coefficient Storage: _____ [76-78]

Coefficient Perm: _____ gpd/ft^2; Spec cap: _____ gpm/ft; Number of geologic cards: _____ [79]

Core samples collected 3412-3425'
(solid rock salt).

This hole will be used only as a salt mine (solution process) not to withdraw ground water.

	2	
①		

Well No. (B-2-1) 2 ccb

GPO 857--700

Page 1 of 6

U. S. Geological Survey Water Resources Division

WELL-CUTTINGS ANALYSIS FORM

Location (B-2-1)2CCB

LAB # 2897

Owner: GROFF, S. WEST SCOTCH Driller: Depth: 3425' Method drilled: ROTARY

Depth	Pan No.	Munsell color Dry	Munsell color Wet	%Fines	%Sand	% Gravel	% Mud-stone	HCL reaction*	Max. size	Remarks
10	1	10YR 7/2 Lt. Gray	10 YR 5/3 Brown	52(75)	24	24(1)	23	W		10'-30'
20	2	"	"	48(75)	24	28(1)	27	W		Some calcite and
30	3	"	"	53(74)	25	22(1)	21	W		carbonized sand
40	4	"	7.5Y 4/2 Dk. Brown	18(20)	27	55(53)	2	W	1/8"	40-90' sand-light brown silt
50	5	"	"	21(23)	36	43(41)	2	W		Lite grains - granite size
60	6	"	"	19(21)	41	40(38)	2	W		to 1/2" across
70	7	"	"	30(32)	38	32(30)	2	W		Some [illegible]
80	8	"	"	28(30)	38	34(32)	2	W		[illegible]
90	9	"	"	25(27)	40	35(33)	2	W	1/4	[illegible]
100	10	10YR 6/2 Lt. Brown Gray	"	6	13	81	—	O	1/4"	100'-130'
110	11	"	"	5	22	73	—	O		[illegible]
120	12	"	"	19	22	59	—	W		Sand - medium
130	13	"	"	11	28	61	—	W		[illegible]
140	14	10YR 7/2 Lt. Gray	"	24(29)	16	60(55)	5	W	1/4"	140'-210'
150	15	"	"	35(50)	25	40(25)	15	W		[illegible]
160	16	"	"	31(57)	27	39(19)	20	W		sand size
170	17	"	"	21(31)	10	69(59)	10	W		Quartz 45%
180	18	"	"	26(36)	10	64(54)	10	W		[illegible]
190	19	"	"	14(57)	23	33(23)	10	W		[illegible]

*S-strong; M-moderate; W-weak; O-none

ANAL. BY [illegible] DATE 7/8/71

Page 2 of 6

U.S. Geological Survey Water Resources Division

WELL-CUTTINGS ANALYSIS FORM

Location

LAB # 2877

Owner: Driller: Depth: Method drilled:

Depth	Pan No.	Munsell color Dry	Munsell color Wet	%Fines	%Sand	% Gravel	% Mud-stone	HCL reaction*	Max. size	Remarks
200	20	"	"	42(47)	23	35(30)	5	W	↓	[illegible] Quartz 10%
210	21	"	"	32(35)	14	53(50)	3	W	↓	Angular to Sub-round[illegible]
220	22	"	"	57(72)	23	20(5)	15	W	1/2"	[illegible] Bld[illegible]
230	23	"	"	59(77)	22	19(1)	18	W	1/4"	220'– 370'
240	—	—	—	No SAMPLE					1/4"	Increase in mudstone
250	24	"	"	50(64)	34	16(2)	14	W	1/2	Quartzite 30%
260	25	"	"	60(65)	30	10(5)	5	W	1/2	Volcanics 25%
270	26	"	"	52(62)	28	20(10)	10	W	1/2	Quartz 20%
280	27	"	"	57(64)	29	14(7)	7	W	1/2	Granitics 25%
290	28	"	7.5YR 4/ brown	56(61)	33	11(6)	5	W	3/4	Angular to subround[illegible]
300	—	—	—	No SAMPLE						Sand is a [illegible]
310	29	"	"	41(51)	37	22(12)	10	W	1/8	[illegible] and [illegible]
320	30	"	"	61(66)	27	12(7)	5	W	1/4	[illegible]
330	31	"	"	62(67)	28	10(5)	5	W	│	
340	32	"	"	62(67)	29	9(4)	5	W	│	
350	33	"	"	67(75)	21	12(4)	8	W	│	
360	34	"	"	64(70)	29	7(1)	6	W	↓	
370	35	"	"	80(92)	17	3(1)	2	W		
380	36	"	"	62(77)	23	15(0)	15	W		380'– 510'

*S-strong; M-moderate; W-weak; O-none

ANAL. BY ________ DATE

Page 3 of 6

U.S. Geological Survey Water Resources Division

WELL-CUTTINGS ANALYSIS FORM

Location

LAB # 2897

Owner: Driller: Depth: Method drilled:

Depth	Pan No.	Munsell color Dry	Munsell color Wet	%Fines	%Sand	% Gravel	% Mud-stone	HCL reaction*	Max. size	Remarks
390	—	—	—	— No	Sample	—	—	—		No change in sand
400	37	"	"	1 56(64)	36	8 (0)	8	W		fraction.
410	38	"	"	1 68(74)	25	7 (1)	6	W		mostly mudstone
420	39	"	"	1 63 (61)	35	2 (1)	1	W		
430	40	"	"	1 54(61)	38	8 (1)	7	W		
440	41	"	"	1 59(66)	34	7 (0)	7	W		
450	42	"	7.5 YR 4/2 Brown	1 54 (58)	38	8 (4)	4	W		
460	43	"	"	1 62(64)	35	3 (1)	2	W		
470	44	"	"	1 40	60	0	—	W		
480	45	"	"	1 46	53	1	—	W	3/8	
490	46	"	7.5 YR 5/4 Brown	1 66 (68)	31	3 (1)	2	W		
500	—	—	—	—	No SAMPLE		—	—		
510	47	"	"	1 46(47)	52	2(1)	1	W	1/2	Rock
520	48	"	"	1 40	60	0		W		520'~ 600'
530	—	—	—	— No	Sample	—	—	—		No Gravel and
540	49	"	"	1 43	57	0		W		mudstone disappears.
550	50	"	"	1 44	56	0		W		Sand is very fine
560	51	"	"	1 40	60	0		W		Lime
570	52	"	"	1 43	57	0		W		

*S-strong; M-moderate; W-weak; O-none

ANAL. BY DATE

Page 1 of 6

U. S. Geological Survey Water Resources Division

WELL-CUTTINGS ANALYSIS FORM

Location

LAB # 2297

Owner: Driller: Depth: Method drilled:

Depth	Pan No.	Munsell color Dry	Munsell color Wet	%Fines	%Sand	% Gravel	% Mud-stone	HCL reaction*	Max. size	Remarks
580	53	"	"	1 42	58	0		W		
590	54	"	"	1 43	57	0		W		
600	55	"	"	1 42	58	0		W		Rule 2.
610	56	10YR 7/3 to 6/4	"	1 54(59)	40	6 (1)	5	W		610' - 690'
620	—	—	—	No	Sample		—	—	—	Mudstone appears again
630	57	"	"	1 53(61)	38	9 (1)	8	W		mixed zone [illegible]
640	58	"	"	1 58(63)	36	6 (1)	5	W		quartz
650	59	"	"	1 60(65)	36	4 (1)	3	W		[illegible]
660	60	"	"	1 59(65)	34	7 (1)	6	W		
670	—	—	—	No	Sample		—	—	—	
680	61	"	"	1 57(65)	31	12 (4)	8	W		
690	62	"	"	1 57(67)	30	13 (5)	10	W		Rule 2.
700	63	"	"	1 41(46)	26	33 (18)	15	W	½-¼	700' - 780'
710	64	"	"	1 50(62)	23	27 (15)	12	W		[illegible]
720	65	"	"	1 40(95)	21	39 (36)	5	W		[illegible]
730	—	—	—	No	Sample		—	—	—	and volcanic
740	66	"	"	1 47(48)	23	30 (29)	1	W		[illegible]
750	67	10YR 7/2 to 6/3	"	1 53(56)	33	14 (11)	3	W		[illegible]
					No	Sample				

*S-strong; M-moderate; W-weak; O-none

LOG. BY DATE

Page 5 of 6

U. S. Geological Survey Water Resources Division

WELL-CUTTINGS ANALYSIS FORM

Location

LAB # 2897

Owner: Driller: Depth: Method drilled:

Depth	Pan No.	Munsell color Dry	Munsell color Wet	%Fines	%Sand	% Gravel	% Mud-stone	HCL reaction*	Max. size	Remarks
770	68	"	"	1 60(62)	25	15(13)	2	W	1/4	
780	69	"	"	1 54(56)	24	22(20)	2	W	1/4	
790	—	—	—	—	No Sample	—	—	—	—	Red
800	70	10YR 8/1 w.l.gy.	"	1 46(47)	13	41(40)	1	W	1/4	790'-840' Gypsum & quartz
810	71	"	"	1 33(35)	47	20(18)	2	W		trace of mudstone
820	72	"	"	1 30(35)	46	24(19)	5	W		Volcanic and
830	73	"	"	1 35(40)	42	23(18)	5	W		granite in sand
840	74	"	"	1 31(41)	43	26(16)	10	W	↓	sample. Red
850	75	10YR 6/1 Gray	10YR 3/2 V. DK. G.Br.	1 59	41	0		W		840'-900' Gypsum
860	76	"	"	1 62	38	0		W		Small fragments of sandstone
870	77	"	"	1 62	38	0		W		sand and fine
880	78	"	"	1 61	39	0		W		Sand & gyp and
890	—	—	—	No Sample	—	—	—	—	—	Very fine to fine grained
900	79	"	10YR 4/2 DK. Gr. Br.	1 70	30	0		W		some volcanics
910	—	—	—	No Sample	—	—	—	—		900'-1020'
920	—	—	—	No Sample	—	—	—	—		Gypsum & sandstone
930	80	10YR 7/1 w.l.gy.	10YR 5/3 Brown	0 49	51	0		W		
940	81	"	"	0 62	38	0		W		
950	82	"	10YR 8/2 w.l.gy.	0 41	59	0		W		

*S-strong; M-moderate; W-weak; O-none

ANAL. BY DATE

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U. S. Geological Survey Water Resources Division

WELL-CUTTINGS ANALYSIS FORM

Location _____

LAB # 2897

Owner: Driller: Depth: Method drilled:

Depth	Pan No.	Munsell color Dry	Munsell color Wet	%Fines	%Sand	% Gravel	% Mud-stone	HCL reaction*	Max. size	Remarks
960	83	"	"	° 31	32	37		W		
970	84	"	"	° 35	29	36		W		
980	85	"	"	° 56	44	0		W		
990	—	—	—	No Samples	—	—	—	—		
1000	86	10YR 7/3 V. Pale Br.	10YR 4/3 Dk. Br.	1 39	21	40		W		
1010	87	"	"	1 39	24	37		W		
1020	88	"	"	1 56	25	19		W		
1040			Samples	from	this	on	are			
				not	over.	(Jabite)				
↓										
3425										

*S-strong; M-moderate; W-weak; O-none

ENTD. BY _____ DATE _____

October 6, 1970

Memo from John Bannister

Memo to: Southwest Salt Company#1 State
SW/4 SW/4 Sec. 2-T2N-R1W
Maricopa County
Our File #527

John Savoy telephoned this date at 2 p.m. to advise that Southwest Salt Company intended to drill a new well for mining purposes. A permit will be submitted in the near future and they are, at this time, getting a bond issued. A survey of the location of the well will be forwarded in the near future. Inasmuch as this is not an oil and gas well, I verbally gave permission that the survey could come in, if necessary, at a date somewhat later than normally.

The above well is to be plugged and abandoned. I instructed Savoy to see that Grott contacted this office prior to any ~~any~~ plugging operations being commenced so that a proper and safe plugging procedure could be worked out.

9

January 22, 1971

Memo from W. E. Allen, Director
Enforcement Section

Memo to Southwest Salt #2 Roach-Baker Strat
NW/4 SW/4 Sec. 2-T2N-R1W
Maricopa County
Our File #548

Jerry Grott has given up retrieving the last approximately 180' of 6" casing from this well. The top of the fish is 3225'. He has now run 3" tubing to 3210'. After the 3" lands at 3210' he will temporarily cease operations until such time as there has been a water well completed to supply water for his salt mining operations.

Jerry Grott informs me that the rancher who is cultivating the acreage immediately north of the #2 salt well is drilling the water well that will supply water for the mining operation.

January 11, 1971

Memo from W. E. Allen, Director
Enforcement Section

Memo to: Southwest Salt #2 Roach-Baker Strat
NW/4 SW/4 Sec. 2-T2N-R1W
Maricopa County
Our File #548

I Visited the #2 well location on the above date. The operators were still attempting to clean up this well. All but approximately 307' of the 6" pipe which had been lost in the hole has been recovered. At the time I was on location they were attempting to catch the fish the top of which was at 3118' with an overshot.

WELL SITE CHECK

By WGC
Date 10-21-70

Contractor J.O. Barnes
Person(s) Contacted ~~Barnes~~ & J. Groff

Spud date 10-15-70

Type Rig Rotary — Rotary ___ Cable ___

Present Operations Making Trip

Samples ___

Pipe None

Drilling with Air ___ Mud ✓

Water Zones 350-400

Size Hole 14½"

Lost Circ. Zones ___

Size Drill Pipe 4½

Formation Tops ___

Type Bit OWC

Cores, Logs, DST ___

No. Bit ___ Drilling Rate ___

Formation Anhydrite

Crews ___

Lithology ___

REMARKS, PHOTO, MAP

548

WELL NAME Southwest Salt Co #2

Permit No. 548
Confidential: Yes No

APPLICATION FOR PERMIT TO DRILL OR RE-ENTER

APPLICATION TO DRILL ☒ RE-ENTER OLD WELL ☐

SOUTHWEST SALT CO.
NAME OF COMPANY OR OPERATOR

Post Office Box 1237 | Litchfield Park | Arizona
Address | City | State

J. O. Barnes
Drilling Contractor

Casa Grande, Arizona
Address

DESCRIPTION OF WELL AND LEASE

Federal, State or Indian Lease Number, or if fee lease, name of lessor	Well number	Elevation (ground)
Roach-Baker	No. 2	1085' GR.

Nearest distance from proposed location to property or lease line:	Distance from proposed location to nearest drilling, completed or applied—for well on the same lease:
566'E of WL feet	1290 feet
Number of acres in lease: 320	**Number of wells on lease, including this well, completed in or drilling to this reservoir:** 2

If lease, purchased with one or more wells drilled, from whom purchased: Name — Address: Not Applicable

Well location (give footage from section lines)	Section—township—range or block and survey	Dedication (Comply with Rule 105)
566'E of W$L; 1735' N of S$L.	Section 2, T2N, R1W	N. A.

Field and reservoir (if wildcat, so state)	County
Not applicable	

Distance, in miles, and direction from nearest town or post office
w miles NE by N from Litchfield Park, Arizona

Proposed depth:	Rotary or cable tools	Approx. date work will start
3500'	rotary	October 14, 1970
Bond Status submitted herewith **Amount** $5,000.	**Organization Report** On file X Or attached	**Filing Fee of $25.00** Attached X

Remarks:

CERTIFICATE: I, the undersigned, under the penalty of perjury, state that I am the Secretary of the SOUTHWEST SALT CO. (company), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated therein are true, correct and complete to the best of my knowledge.

John E. Savoy
Signature

JOHN E. SAVOY

October 19, 1970
Date

Permit Number: 548
Approval Date: 10-22-70
Approved By: John Bannister

Notice: Before sending in this form be sure that you have given all information requested. Much unnecessary correspondence will thus be avoided.

STATE OF ARIZONA
OIL & GAS CONSERVATION COMMISSION
Application to Drill or Re-enter
File Two Copies

Form No. 3

RECEIVED OCT 20 1970 STATE O & G CONS. COMM.

(Complete Reverse Side)

1. Operator shall outline the dedicated acreage for *both* oil and gas wells on the plat. No dedicated acreage as this is a salt well.

2. A registered professional engineer or land surveyor registered in the State of Arizona or approved by the Commission shall show on the plat the location of the well and certify this information in the space provided.

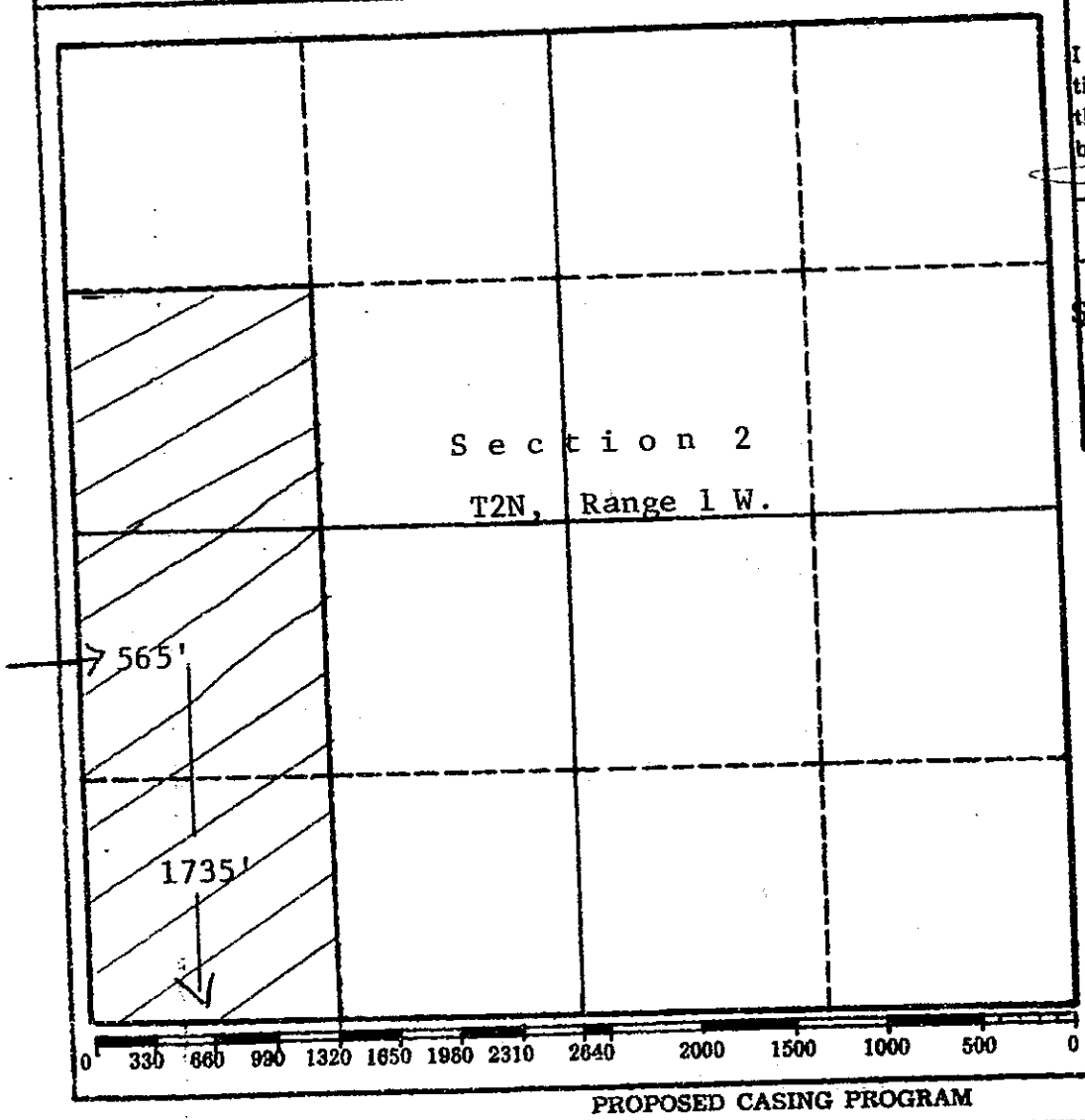
3. All distances shown on the plat must be from the outer boundaries of the Section.

4. Is the Operator the only owner in the dedicated acreage outlined on the plat below? YES NA NO _____

5. If the answer to question four is "no," have the interests of all the owners been consolidated by communitization agreement or otherwise? YES NA NO _____ If answer is "yes," Type of Consolidation _____

6. If the answer to question four is "no," list all the owners and their respective interests below:

Owner	Land Description
NA	



CERTIFICATION

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

Name: Secretary

Position: Southwest Salt Co.

Company: October 19, 1970

Date

I hereby certify that the well location shown on the plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed

Registered Professional Engineer and/or Land Surveyor

Certificate No.

PROPOSED CASING PROGRAM

Size of Casing	Weight	Grade & Type	Top	Bottom	Cementing Depths	Sacks Cement
10'			0	1200	800-1200	as required

PERMIT TO DRILL

This constitutes the permission and authority from the

OIL AND GAS CONSERVATION COMMISSION,
STATE OF ARIZONA,

To: Southwest Salt Company
(OPERATOR)

to drill a well to be known as

Southwest Salt Company #2 Roach-Baker [redacted]
(WELL NAME)

located 566' FWL & 1735' FSL

Section 2 Township 2N Range 1W, Maricopa County, Arizona.

The none (strat) of said
Section, Township and Range is dedicated to this well.

Said well is to be drilled substantially as outlined in the attached Application and must be drilled in full compliance with all applicable laws, statutes, rules and regulations of the State of Arizona.

Issued this 2nd day of October, 1970.

OIL AND GAS CONSERVATION COMMISSION

By John Bannister wkc
EXECUTIVE SECRETARY

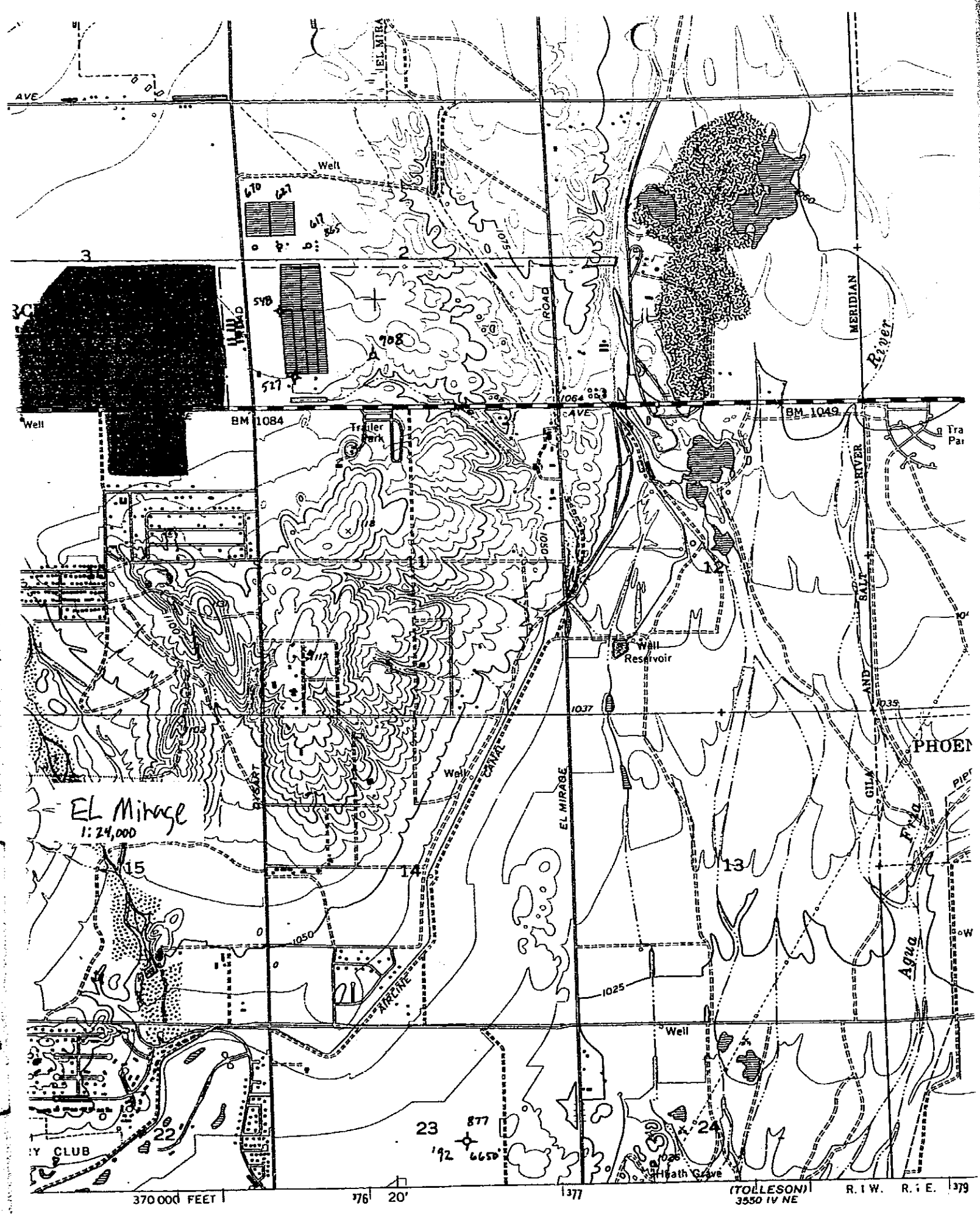
PERMIT No. 548

RECEIPT NO. 2882
API NO. 02-013-20002

State of Arizona
Oil & Gas Conservation Commission
Permit to Drill

FORM NO. 27

SAMPLES ARE REQUIRED


EL MIRA
AVE
Well
670
627
617
865
1075
3
2
SYB
527
708
ROAD
MERIDIAN
River
1064
Well
BM 1084
Trailer Park
AVE
BM 1049
Tra
Par
RIVER
1050
12
Well
Reservoir
SALT
AND
1037
1035
PHOEI
Well
CANAL
EL MIRAGE
GILA
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665'
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1026
Heath Grave
22
Y CLUB
370 000 FEET
376
20'
377
(TOLLESON)
3550 IV NE
R. 1 W.
R. 1 E.
379

Survev

HILL & SAVOY PHOENIX, ARIZONA

PAYEE: DETACH THIS STATEMENT BEFORE DEPOSITING CHECK.

DATE	DESCRIPTION	AMOUNT	DISC'T. OR DEDUCTION	NET AMOUNT
10/20/70 JES/ch	Application for Drilling Well Re: Southwest Salt Company			25.00

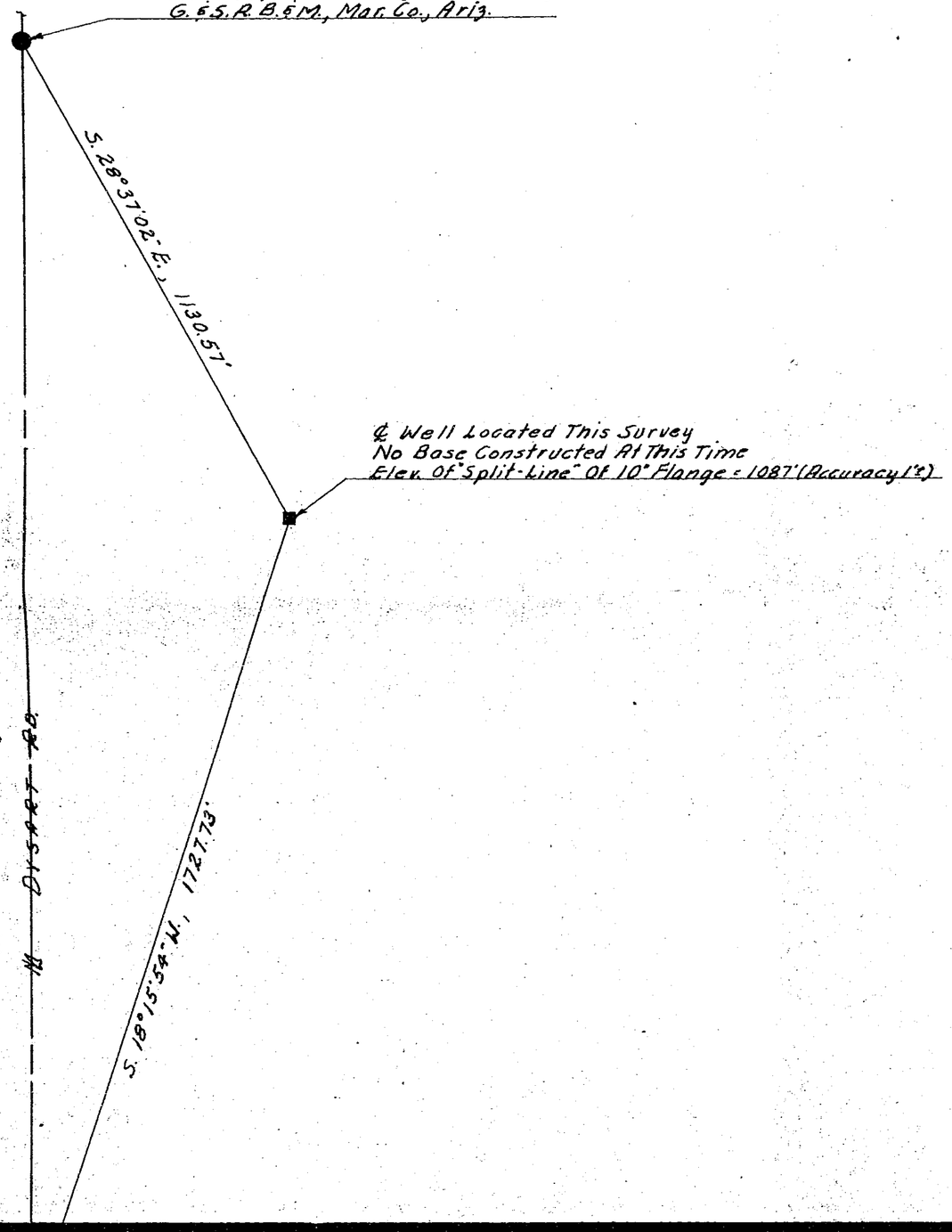
REPORT OF SURVEY

FOR

SOUTHWEST SALT COMPANY

P.O. Box 1237, Litchfield Park, Arizona

Showing the location of a well situated in the W.½, N.E. ¼, Sec. 2, T.2N., R.1W., G. & S.R.B. & M., Maricopa County, Arizona.



Scale: 1" = 200'

N

LEGEND

- ● = Monument Found
- ● = Iron Pipe or Iron Bar Found
- ○ = 1/2" I.D. Iron Pipe Tagged L.S. 1681 Set This Survey
- R = Data From Maricopa County Records
- CR = Calculated From R
- M = Measured in Field
- CM = Calculated From M
- -x-x-x- = Wire or Wood Fence
- -o-o-o- = Chain Link Fence
- = Block or Stone Wall

CERTIFICATION: This will certify that the survey shown hereon was done under my supervision during the month of February, 1971.

Eugene V. Stanley

REPORT OF SURVEY

FOR

SOUTHWEST SALT COMPANY

P.O. Box 1237, Litchfield Park, Arizona

Showing the location of a well situated in the W.½, S.W.¼, Sec. 2, T.2N., R.1W., G. & S.R.B. & M., with the S.W. Cor. of the above said Sec. 2 bearing S.18°15'54"W., 1727.73 feet and the W.¼ Cor. of the above said Sec. 2 bearing N.28°37'02"W., 1130.57 feet from the center of the above said well. The basis of the herein recited bearings being North (Assumed Bearing), 2633.14 feet from the S.W. Cor. Sec 2 to the W.¼ Cor. of said Sec. 2.

Fd. Mar. Co. B.C. In Handhole
The W¼ Cor. Sec. 2, T.2N., R.1W.,
G.&S.R.B.&M., Mar. Co., Ariz.

N 28°37'02" E., 1130.57'

℄ Well Located This Survey
No Base Constructed At This Time
Elev. Of "Split-Line" Of 10" Flange = 1087' (Accuracy 1')

S. 18°15'54" W., 1727.73'

Scale: 1" = 200'

N

LEGEND

- ● = Monument Found
- ● = Iron Pipe or Iron Bar Found
- ○ = 1/2" I.D. Iron Pipe Tagged L.S. 1681 Set This Survey
- R = Data From Maricopa County Records
- CR = Calculated From R
- M = Measured in Field
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- = Block or Stone Wall

CERTIFICATION: This will certify that the survey shown hereon was done under my supervision during the month of February, 1971.

REGISTERED LAND SURVEYOR

State of Arizona

SOUTH
NW SW Sec

SOUTHWEST SALT COMPA
P.O. Box 1237, Litchfield Park, Arizon

Fd. Mar. Co. B.C. In Handhole
The W1/4 Cor. Sec. 2, T. 2 N., R. 1 W.,
G. & S. R. B. & M., Mar. Co., Ariz.

S. 28°37'02" E., 1130.57'

℄ Well Located This Survey
No Base Constructed At This Time
Elev. Of "Split-Line" Of 10" Flange = 1087' (Accuracy 1')

North (Assumed Bearing) 2633.14'

N. 1st Street Rd.

S. 18°15'54" W., 1727.73'

Fd. 3/4" Iron Pin In Handhole
The S. W. Cor. Sec. 2, T. 2 N., R. 1 W.,
G. & S. R. B. & M. - Mar. Co. Hg'wy El. = 1084.19'

N. GLENDALE AVE.

Scale: 1" = 200'

N

LEGEND

- ● = Monument Found
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- ○ = 1/2" I.D. Iron Pipe Tagged L.S. 1681 Set This Su
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- -x-x-x- = Wire or Wood Fence
- -o-o-o- = Chain Link Fence
- = Block or Stone Wall

CERTIFICATION: This will certify that the survey shown he
done under my supervision during the month of February, 19

Eugene V. Sheely
Feb 10, '71

ARIZONA SURVEYING SERVI
5704 N. 27th AVENUE, PHOENIX, ARIZO
Drawing No. L-71-1629, Phone: 277-3

SOUTHWEST SALT COMPANY
P.O. Box 1237, Litchfield Park, Arizona

Showing the location of a well situated in the W.½, S.W.¼, Sec. 2, T.2N., R.1W., G. & S.R.B. & M., with the S.W. Cor. of the above said Sec. 2 bearing S.18°15'4,"W., 1727.73 feet and the W.¼ Cor. of the above said Sec. 2 bearing N.18°37'02"W., 2130.57 feet from the center of the above said well. The basis of the herein recited bearings being North (Assumed bearing), 2633.14 feet from the S.W. Cor. Sec 2 to the W.¼ Cor. of said Sec. 2.

Mar. Co. B.C. In Handhole
W¼ Cor. Sec. 2, T. 2N., R. 1W.,
G.S.R.B.&M., Mar. Co., Ariz.

2130.57'

℄ Well Located This Survey
No Base Constructed At This Time
Elev. Of "Split-Line" Of 10" Flange = 1087' (Accuracy 1'±)

S.18°15'W., 1727.73'

Fd. 3/4" Iron Pin In Handhole
The S.W. Cor. Sec. 2, T.2N., R.1W.,
G.&S.R.B.&M. - Mar.Co. Hg'wy El.= 1084.19'

½ GLENDALE AVE.

Scale: 1" = 200'

N

LEGEND

- ● = Monument Found
- ● = Iron Pipe or Iron Bar Found
- ○ = 1/2" I.D. Iron Pipe Tagged L.S. 1681 Set This Survey
- R = Data From Maricopa County Records
- CR = Calculated From R
- M = Measured in Field
- CM = Calculated From M
- -x-x-x- = Wire or Wood Fence
- -o-o-o- = Chain Link Fence
- = Block or Stone Wall

CERTIFICATION: This will certify that the survey shown hereon was done under my supervision during the month of February, 1971.

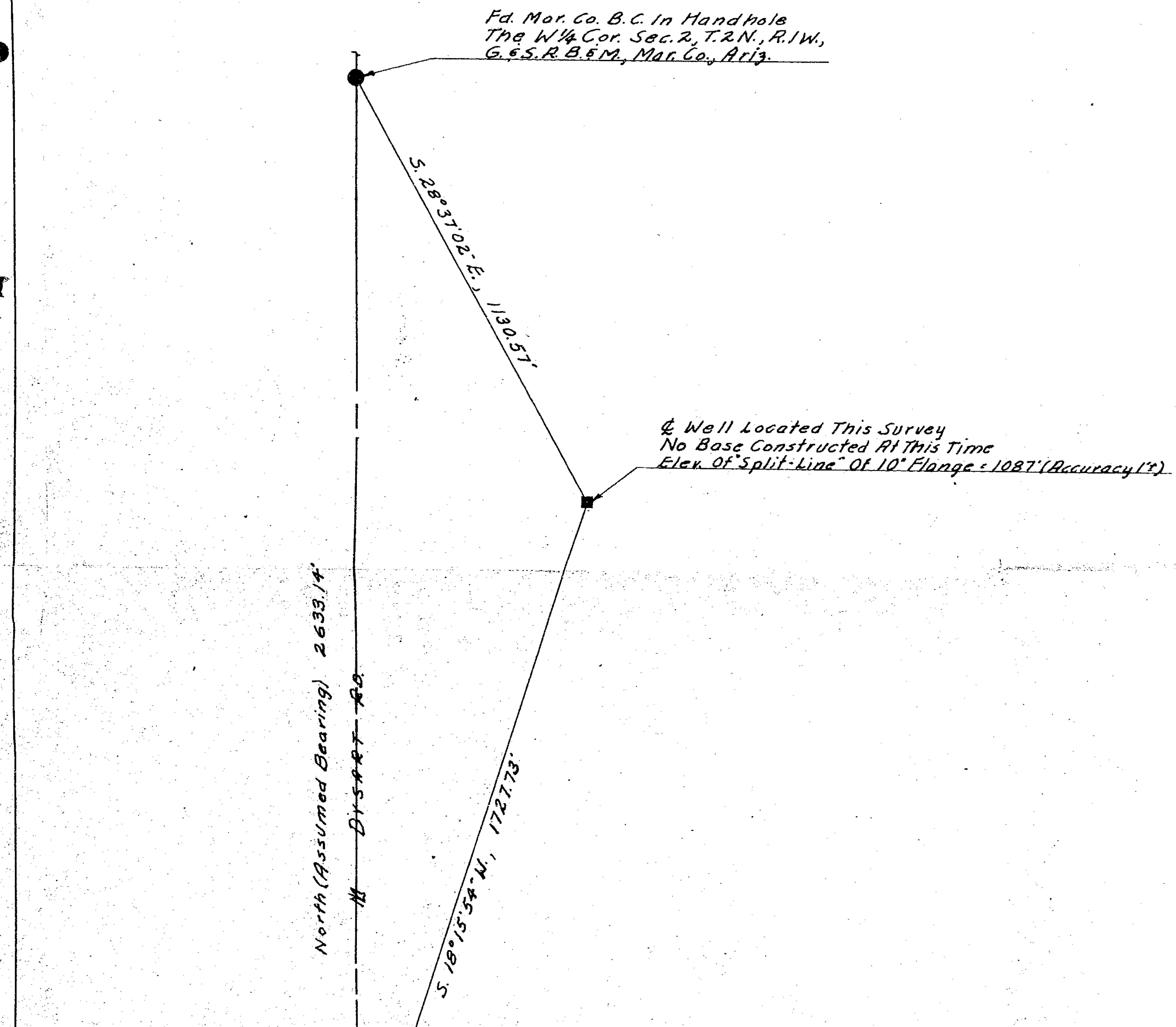
Eugene M. Skelley

REGISTERED LAND SURVEYOR
CERTIFICATE NO. 1681
SKELLEY
ARIZONA U.S.A.
Date Signed Feb 19 '71

ARIZONA SURVEYING SERVICE
5704 N. 27th AVENUE, PHOENIX, ARIZONA
Drawing No. L-71 — 1629, Phone: 277-3904

State of Arizona
Geological Survey

SOUTH
NW SW Sec



REPORT OF SURVEY

FOR

SOUTHWEST SALT COMPANY

P.O. Box 1237, Litchfield Park, Arizona

Showing the location of a well situated in [illegible] Sec. 2, T.2N., R.1W., [illegible] M., [illegible] above said Sec. [illegible] W.¼ Cor. of the above said Sec. 2 bearing [illegible] feet from the center of the above said well. [illegible] herein recited bearings [illegible] feet from the S.W. Cor. Sec 2 to the W.¼ [illegible] 2.

Scale: 1" = 200'

N

LEGEND

- ● = Monument Found
- ● = Iron Pipe or Iron Bar Found
- ○ = 1/2" I.D. Iron Pipe Tagged L.S. 1681 Set This Survey
- R = Data From Maricopa County Records
- CR = Calculated From R
- M = Measured in Field
- CM = Calculated From M
- —x—x— = Wire or Wood Fence
- —o—o— = Chain Link Fence
- ıııııııı = Block or Stone Wall

CERTIFICATION: This will certify that [illegible]

REPORT OF SURVEY

FOR

SOUTHWEST SALT COMPANY

P.O. Box 1237, Litchfield Park, Arizona

Showing the location of a well situated in the W.½, S.W.¼, Sec. 2, T.2N., R.1W., G. & S.R.B. & M., with the S.W. Cor. of the above said Sec. 2 bearing S.18°15'54"W., 1727.73 feet and the W.¼ Cor. of the above said Sec. 2 bearing N.28°37'02"W., 1130.57 feet from the center of the above said well. The basis of the herein recited bearings being North (Assumed Bearing), 2633.14 feet from the S.W. Cor. Sec 2 to the W.¼ Cor. of said Sec. 2.

Fd. Mar. Co. B.C. In Handhole
The W¼ Cor. Sec. 2, T.2N., R.1W.,
G.&S.R.B.&M., Mar. Co., Ariz.

S. 28°37'02" E., 1130.57'

℄ Well Located This Survey
No Base Constructed At This Time
Elev. Of "Split-Line" Of 10" Flange = 1087' (Accuracy 1')

S. 18°15'54" W., 1727.73'

Scale: 1" = 200'

N

LEGEND

- ● = Monument Found
- ● = Iron Pipe or Iron Bar Found
- ○ = 1/2" I.D. Iron Pipe Tagged L.S. 1681 Set This Survey
- R = Data From Maricopa County Records
- CR = Calculated From R
- M = Measured in Field
- CM = Calculated From M
- -x-x-x- = Wire or Wood Fence
- -o-o-o- = Chain Link Fence
- ▭▭▭ = Block or Stone Wall

CERTIFICATION: This will certify that the survey shown hereon was done under my supervision during the month of February, 1971.

REGISTERED LAND SURVEYOR CERTIFICATE

State of Arizona

SOUTHWEST
NW SW S

SOUTHWEST SALT COMP
P.O. Box 1237, Litchfield Park, Arizo

Fd. Mar. Co. B.C. In Handhole
The W¼ Cor. Sec. 2, T. 2 N., R. 1 W.,
G. & S. R. B. & M., Mar. Co., Ariz.

S. 28° 37' 02" E., 1130.57'

℄ Well Located This Survey
No Base Constructed At This Time
Elev. Of "Split-Line" Of 10" Flange = 1087' (Accuracy 1')

North (Assumed Bearing) 2633.14'

Mc DUFFEE RD.

S. 18° 15' 54" W., 1727.73'

Fd. ¾" Iron Pin In Handhole
The S. W. Cor. Sec. 2, T. 2 N., R. 1 W.,
G. & S. R. B. & M. - Mar. Co. Hg'wy E'l. = 1084.19'

Mc GLENDALE AVE.

Scale: 1" = 200'

N

LEGEND

- ● = Monument Found
- ● = Iron Pipe or Iron Bar Found
- ○ = 1/2" I.D. Iron Pipe Tagged L.S. 1681 Set This S
- R = Data From Maricopa County Records
- CR = Calculated From R
- M = Measured in Field
- CM = Calculated From M
- -x-x-x- = Wire or Wood Fence
- -o-o-o- = Chain Link Fence
- = Block or Stone Wall

CERTIFICATION: This will certify that the survey shown
done under my supervision during the month of February,

Eugene W. Stanley
Feb 10, '71

ARIZONA SURVEYING SERV
5704 N. 27th AVENUE, PHOENIX, ARIZ
Drawing No. L-71-1629, Phone: 277-

SOUTHWEST SALT COMPANY

P.O. Box 1237, Litchfield Park, Arizona

d. Mar. Co. B.C. In Handhole
he W¼ Cor. Sec. 2, T. 2N., R. 1W.,
. & S.R.B.&M., Mar. Co., Ariz.

Showing the location of a well situated in the W.½, N.E.¼, Sec. 2, T.2N., R.1W., G. & S.R.B. & M., with the S.W. Cor. of the above said Sec. 2 bearing S.18°15'54"W., 1727.73 feet and the W.¼ Cor. of the above said Sec. 2 bearing N.38°33'02"W., 1130.57 feet from the center of the above said well. The basis of the herein recited bearings being North (Assumed bearing), 2633.14 feet from the S.W. Cor. Sec 2 to the W.¼ Cor. of said Sec. 2.

1130.57'

℄ Well Located This Survey
No Base Constructed At This Time
Elev. Of "Split-Line" Of 10" Flange = 1087' (Accuracy 1')

S.18°15'54"W., 1727.73'

Scale: 1" = 200'

N

LEGEND

- ● = Monument Found
- ● = Iron Pipe or Iron Bar Found
- ○ = 1/2" I.D. Iron Pipe Tagged L.S. 1681 Set This Survey
- R = Data From Maricopa County Records
- CR = Calculated From R
- M = Measured in Field
- CM = Calculated From M
- x x x x = Wire or Wood Fence
- o o o o = Chain Link Fence
- ▭▭▭▭ = Block or Stone Wall

CERTIFICATION: This will certify that the survey shown hereon was done under my supervision during the month of February, 1971.

Eugene V. Skelley
REGISTERED LAND SURVEYOR
CERTIFICATE NO. 1681
SKELLEY
Feb 10, '71
ARIZONA U.S.A.

Fd. 3/4" Iron Pin In Handhole
The S.W. Cor. Sec. 2, T.2N., R.1W.,
G.&S.R.B.&M. - Mar.Co. Hg'wy E.I. = 1084.19'

GLENDALE AVE.

ARIZONA SURVEYING SERVICE

5704 N. 27th AVENUE, PHONEIX, ARIZONA
Drawing No. L-71—1629, Phone: 277-3904

State of Arizona

SOUTHWEST
NW. SW. Sec.

SONAR CALIPER REPORT

SØNAR & WELL TESTING SERVICES, INC.

SØNAR CALIPER SURVEY

TREATMENT NØ: 0020 JØB NØ: 2244

WELL DATA

T.D. SØNAR:	1847 FT.	T.D. ØPERATØR:	1850 FT.
CASING SIZE:	10-3/4 IN.	CASING DEPTH:	1304 FT.
INTERMEDIATE SIZE:	*****	INTER. DEPTH:	*****
TUBING SIZE:	5-1/2 & 7 IN.	TUBING DEPTH:	1140 FT.

MØRTØN SALT CØMPANY
RØACH BAKER NØ. 2
PHØENIX, ARIZØNA
APRIL 15, 1985

GENERAL CØMMENTS:

ZERØ AT THE BHF.

FØUND THE 10-3/4 IN. PIPE AT 1306.5 FT. - CØRRECTED TØ 1304 FT.

MAILING ADDRESS:

110 NØRTH WACKER DRIVE
CHICAGØ, ILLINØIS
60606

ATTENTION: MR. ED WILLSE

CUSTØMER REP:

MR. ED WILLSE

SØNAR ENGINEER:

HL VAN METRE

SONAR & WELL TESTING SERVICES, INC.

SONAR CALIPER SURVEY

MORTON SALT COMPANY

ROACH BAKER NO. 2

PHOENIX, ARIZONA

VOLUME CALCULATIONS

APRIL 15, 1985

JOB NO: 2244

	DEPTH	INCR CU FT	TOTAL CU FT	INCR BBLS	BBLS
ABOVE	1310	2684279.	2684279.	478091.	478091.
	1315	146214.	2830494.	26042.	504132.
	1320	126488.	2956982.	22529.	526661.
	1330	223507.	3180489.	39808.	566469.
	1340	190119.	3370608.	33862.	600331.
	1350	152362.	3522970.	27137.	627468.
	1360	123116.	3646086.	21928.	649396.
	1370	117456.	3763542.	20920.	670316.
	1380	128644.	3892186.	22912.	693228.
	1390	123257.	4015443.	21953.	715181.
	1400	104036.	4119479.	18530.	733711.
	1410	93536.	4213015.	16659.	750370.
	1420	112529.	4325544.	20042.	770412.
	1430	129475.	4455019.	23060.	793473.
	1440	109997.	4565015.	19591.	813064.
	1450	94931.	4659946.	16908.	829972.
	1460	89107.	4749053.	15871.	845843.
	1470	85907.	4834960.	15301.	861143.
	1480	91100.	4926060.	16226.	877369.
	1490	96623.	5022684.	17209.	894578.
	1500	92183.	5114867.	16418.	910997.
	1510	89438.	5204305.	15930.	926926.
	1520	89321.	5293626.	15909.	942835.
	1530	87484.	5381110.	15582.	958417.
	1540	86255.	5467365.	15363.	973779.
	1550	87337.	5554702.	15555.	989335.
	1560	91146.	5645848.	16234.	1005568.
	1570	98283.	5744130.	17505.	1023073.
	1580	103667.	5847798.	18464.	1041537.
	1590	101838.	5949635.	18138.	1059675.
	1600	97922.	6047557.	17441.	1077116.
	1610	94979.	6142536.	16916.	1094032.
	1620	91911.	6234447.	16370.	1110403.

VOLUME CALCULATIONS

DEPTH	INCR CU FT	TOTAL CU FT	INCR BBLS	BBLS
1630	89795.	6324242.	15993.	1126396.
1640	95746.	6419988.	17053.	1143449.
1650	101905.	6521894.	18150.	1161599.
1660	99706.	6621600.	17758.	1179357.
1670	96690.	6718291.	17221.	1196579.
1680	96176.	6814467.	17130.	1213708.
1690	97225.	6911692.	17317.	1231025.
1700	98915.	7010607.	17618.	1248642.
1710	99884.	7110491.	17790.	1266433.
1720	99292.	7209783.	17685.	1284117.
1730	97140.	7306923.	17301.	1301419.
1740	87820.	7394742.	15641.	1317060.
1750	77175.	7471917.	13745.	1330805.
1760	71220.	7543137.	12685.	1343490.
1770	69310.	7612448.	12345.	1355835.
1780	66974.	7679421.	11929.	1367763.
1790	62583.	7742004.	11146.	1378910.
1800	59677.	7801681.	10629.	1389539.
1810	52918.	7854599.	9425.	1398964.
1820	42774.	7897373.	7618.	1406582.
1830	36823.	7934196.	6558.	1413141.
1840	32972.	7967168.	5873.	1419013.
1845	11997.	7979165.	2137.	1421150.
1847	1227.	7980392.	218.	1421369.

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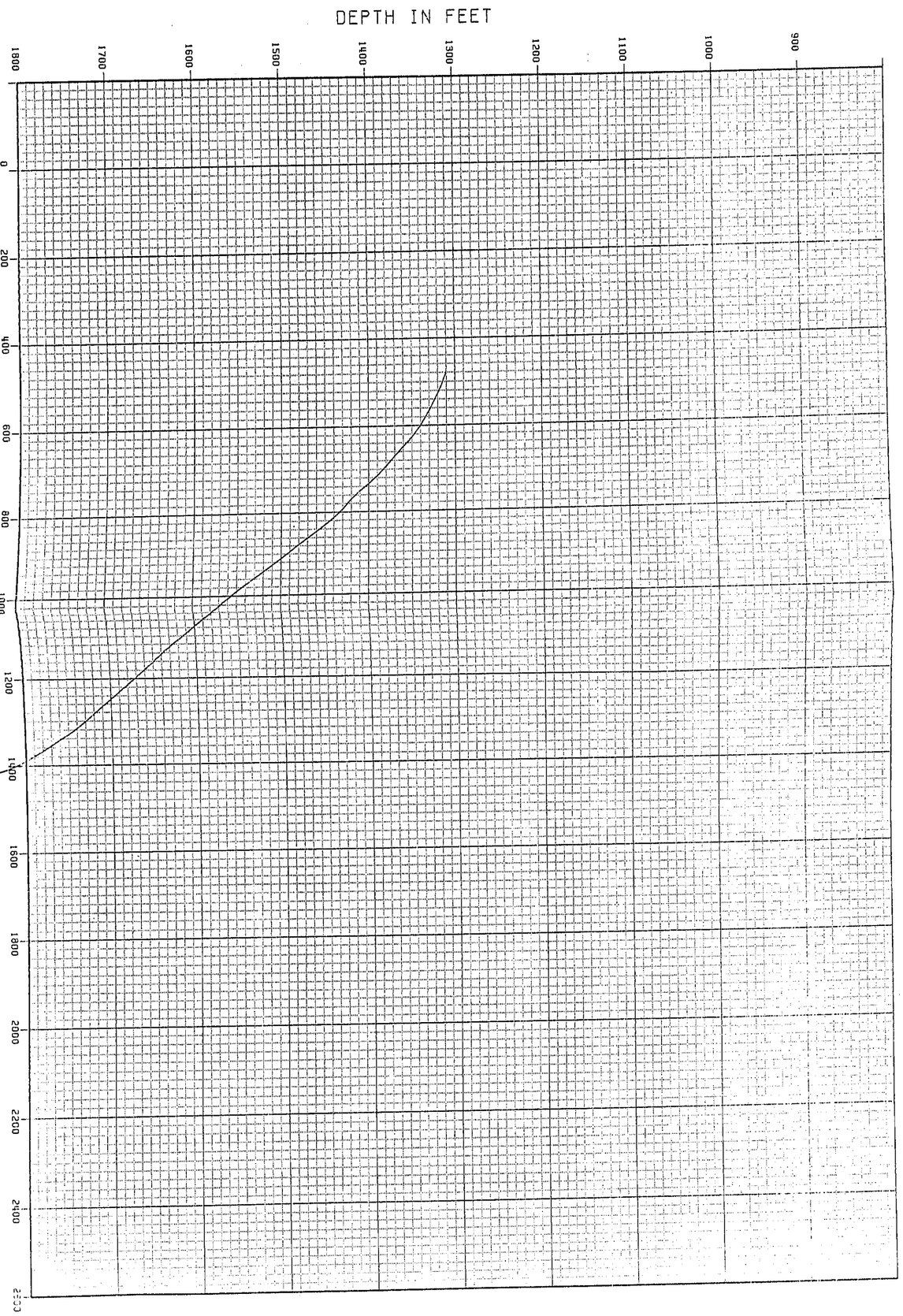
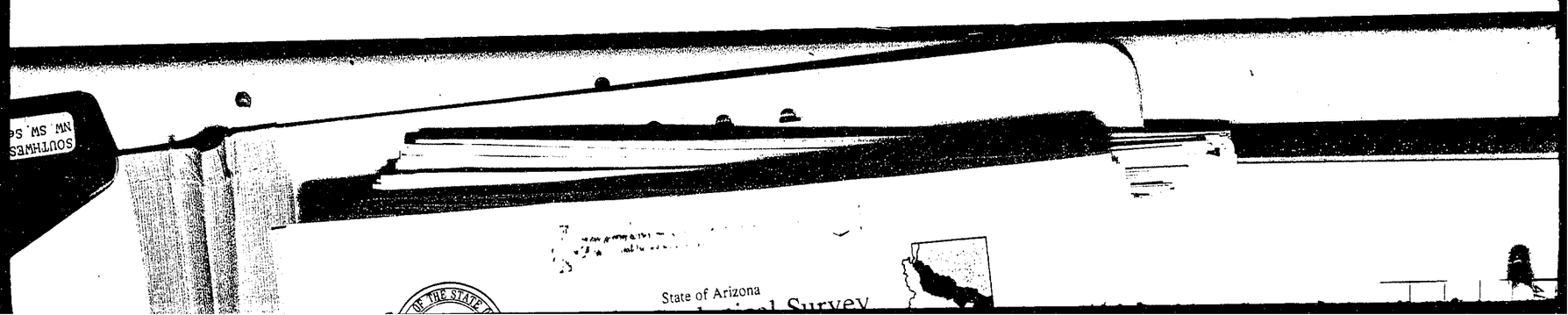
DEPTH VS. VOLUME

MORTON SALT COMPANY
PHOENIX, ARIZONA
ROACH BAKER NO. 2
APRIL 15, 1985





SONAR & WELL TESTING SERVICES, INC.

SONAR CALIPER SURVEY

APRIL 15, 1985

MORTON SALT COMPANY

JOB NO: 2244

ROACH BAKER NO. 2

RADII IN FEET

DEPTH	ANGLE	N	S	E	W	NE	SW	SE	NW
1310	90	93.3	98.9	125.1	92.6	94.4	100.7	116.3	90.3
1315	90	93.7	93.7	88.7	92.3	92.4	96.7	91.4	90.6
1320	90	90.7	86.8	82.4	89.3	85.8	92.4	80.2	88.0
1330	90	86.1	80.7	77.2	85.9	75.5	86.1	69.0	85.9
1340	90	78.0	71.4	64.1	81.6	64.8	83.2	65.1	82.0
1350	90	57.9	62.9	51.4	77.5	57.8	76.8	54.3	78.0
1360	90	58.3	54.8	61.0	70.7	59.5	65.1	46.8	61.8
1370	90	67.0	49.7	73.2	56.7	89.9	53.7	49.2	57.3
1380	90	73.9	47.9	77.5	57.0	93.7	53.7	48.3	59.1
1390	90	70.2	48.0	66.3	55.0	65.8	53.2	52.9	58.6
1400	90	59.5	47.2	54.7	55.6	61.3	52.9	51.9	59.4
1410	90	55.9	47.1	51.6	54.9	56.7	52.6	48.4	57.2
1420	90	64.9	49.3	83.3	55.6	101.2	56.7	47.3	56.5
1430	90	72.1	47.2	68.7	55.8	76.0	50.9	58.7	59.3
1440	90	65.0	46.6	58.0	56.5	59.2	50.7	58.1	56.3
1450	90	59.7	44.3	54.9	54.5	59.2	47.5	53.1	56.8
1460	90	59.6	44.3	53.2	52.4	56.1	47.7	51.1	56.9
1470	90	58.3	44.0	51.6	53.3	49.2	47.1	49.2	55.3
1480	90	63.9	47.6	57.5	53.3	65.8	48.4	46.1	62.3
1490	90	60.5	46.7	53.6	55.2	61.0	50.3	48.1	62.5
1500	90	62.5	45.2	49.7	56.6	54.1	50.8	42.8	59.2
1510	90	66.9	43.6	47.5	55.1	58.3	51.7	41.9	59.6
1520	90	66.1	42.4	45.3	55.8	59.7	50.1	40.6	59.5
1530	90	63.0	42.4	42.7	56.5	51.0	49.3	39.5	63.7
1540	90	59.8	42.6	43.7	58.1	57.9	47.8	38.7	63.0
1550	90	67.6	42.9	47.8	58.6	54.0	49.3	40.2	63.0
1560	90	69.3	44.2	46.6	57.2	60.4	49.6	42.2	62.6
1570	90	69.7	45.9	50.1	59.6	63.7	51.8	44.2	66.5
1580	90	65.5	46.4	53.0	61.6	60.4	52.1	45.3	78.1
1590	90	62.3	44.9	50.7	60.8	59.2	52.3	44.2	71.9
1600	90	63.4	45.2	49.0	61.5	57.1	51.9	43.3	68.4
1610	90	62.8	45.7	45.6	61.6	55.0	53.6	42.3	67.0

2600

RADII IN FEET

DEPTH	ANGLE	N	S	E	W	NE	SW	SE	NW
1620	90	62.2	44.4	42.3	63.5	50.9	52.2	41.7	66.7
1630	90	58.4	44.9	41.6	63.8	50.5	52.4	40.4	66.1
1640	90	61.9	45.2	53.7	62.8	67.4	51.8	40.5	66.6
1650	90	64.0	46.1	52.8	64.4	62.2	51.7	39.8	67.4
1660	90	63.0	45.3	49.4	65.2	58.8	52.6	40.1	66.2
1670	90	60.9	44.6	46.7	64.6	54.4	54.1	40.2	66.8
1680	90	62.3	53.5	43.6	64.7	51.4	58.4	40.8	68.1
1690	90	60.0	55.3	42.9	66.6	50.1	56.2	43.8	70.1
1700	90	60.5	51.3	44.1	67.6	52.0	57.6	46.2	69.1
1710	90	62.0	48.0	45.0	66.2	52.5	56.0	43.8	68.3
1720	90	61.7	47.5	42.8	64.6	52.4	53.4	42.4	70.4
1730	90	62.3	46.2	41.2	62.5	49.8	51.4	45.0	71.7
1740	90	59.3	43.9	38.9	59.4	43.6	44.6	41.6	66.3
1750	90	56.7	42.2	36.4	55.9	39.6	42.2	39.3	65.3
1760	90	53.8	43.5	34.3	54.8	38.5	41.3	37.2	63.7
1770	90	53.7	42.4	32.9	54.6	42.8	40.2	36.1	61.9
1780	90	53.1	38.5	31.2	52.8	41.4	38.9	35.1	60.7
1790	90	52.1	38.2	30.4	53.6	39.5	36.2	34.7	60.1
1800	90	50.9	37.1	31.0	52.6	39.1	35.8	33.4	59.3
1810	90	46.0	33.1	24.2	45.2	28.8	33.0	28.8	56.3
1820	90	39.9	25.9	21.1	43.4	25.7	29.5	21.1	56.2
1830	90	40.4	20.5	17.1	43.2	23.0	25.4	15.3	56.7
1840	90	43.4	7.6	14.0	42.9	22.3	17.4	7.2	53.9
1845	90	30.8	2.8	5.5	28.8	17.7	4.9	3.6	47.5
1847	90	0.5	0.5	0.5	0.4	0.5	0.4	0.5	0.5

RADII IN FEET

DEPTH	ANGLE	N	S	E	W	NE	SW	SE	NW
1330	1	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9
1330	5	249.2	220.5	247.9	249.9	250.8	248.7	261.9	246.6
1330	10	202.1	198.4	200.6	217.5	222.0	220.3	214.9	220.9
1330	15	171.8	154.8	160.3	203.4	173.0	194.6	155.0	197.7
1330	20	145.4	131.6	139.3	155.5	147.3	132.4	134.4	146.5
1330	25	127.8	107.6	128.0	109.4	130.2	97.1	122.3	123.2
1330	30	97.3	99.1	93.0	103.0	97.8	99.0	92.4	127.4
1330	35	84.5	95.9	90.4	84.5	93.0	97.0	87.3	85.7
1330	40	84.3	89.4	93.5	86.5	92.2	87.4	90.4	76.6
1330	45	80.6	88.4	99.9	81.7	90.4	82.5	95.1	71.0
1330	50	78.6	89.0	103.3	74.5	87.9	84.8	98.9	66.7
1330	55	79.6	92.0	110.3	69.0	86.9	88.9	105.4	65.5
1330	60	78.5	106.4	124.2	68.2	85.3	91.7	122.6	69.3
1330	65	85.7	98.8	109.5	70.3	84.4	103.0	116.5	77.4
1330	70	87.1	96.6	114.6	76.2	86.6	104.6	106.1	81.7
1330	75	98.9	105.1	131.7	97.5	101.8	103.6	121.4	96.0
1330	80	94.3	95.7	99.1	93.4	93.9	97.5	96.3	91.7

SONAR & WELL TESTING SERVICES, INC.

SONAR CALIPER SURVEY

APRIL 15, 1985

MORTON SALT COMPANY

JOB NO: 2244

ROACH BAKER NO. 2

DEPTH- 1310 90 DEGREES

RADII IN FEET

AZ									
0	93.3	93.2	93.8	94.1	93.6	93.3	92.7	92.5	93.5
45	94.4	95.0	93.8	92.2	91.3	91.4	95.1	107.9	120.9
90	125.1	126.8	127.2	126.0	125.2	124.4	123.3	119.0	117.6
135	116.3	114.8	112.1	110.4	108.5	107.1	105.2	102.3	101.1
180	98.9	98.2	96.7	96.5	96.6	96.4	97.1	97.6	99.1
225	100.7	100.7	100.2	99.8	98.4	96.5	95.5	93.9	92.8
270	92.6	93.0	93.2	92.3	92.1	92.1	92.0	90.9	90.5
315	90.3	90.4	90.4	90.2	91.4	91.4	91.9	92.6	92.2

DEPTH- 1315 90 DEGREES

RADII IN FEET

AZ									
0	93.7	93.2	93.3	93.1	93.5	93.3	92.9	90.6	92.7
45	92.4	91.2	89.8	89.7	89.6	90.1	89.9	89.4	88.9
90	88.7	88.6	89.5	90.8	90.4	90.6	90.3	91.1	90.2
135	91.4	92.1	90.8	90.0	90.1	91.3	93.0	93.9	94.0
180	93.7	92.5	91.9	92.6	92.6	93.4	93.5	94.7	96.1
225	96.7	97.4	97.6	97.3	95.8	94.4	93.4	93.0	92.4
270	92.3	91.6	91.6	91.4	90.9	91.3	91.5	91.6	91.0
315	90.6	90.3	89.9	90.0	90.2	90.7	91.5	92.8	92.4

DEPTH- 1320 90 DEGREES

RADII IN FEET

AZ									
0	90.7	90.0	90.7	91.9	92.5	92.0	89.3	85.7	85.3
45	85.8	86.6	87.5	87.7	87.6	86.3	85.3	83.6	82.6
90	82.4	82.2	83.0	84.2	84.6	84.0	83.4	82.8	81.3
135	80.2	79.5	79.5	79.6	80.9	82.4	84.3	85.7	86.4
180	86.8	87.2	86.8	87.0	87.9	88.6	89.8	90.6	91.5
225	92.4	93.6	94.9	94.5	92.4	90.8	90.2	89.3	88.8
270	89.3	89.1	88.0	87.8	87.9	87.4	87.6	88.2	88.2
315	88.0	87.7	88.3	88.3	88.8	89.7	90.2	90.7	90.7

DEPTH- 1330 90 DEGREES

RADII IN FEET

AZ									
0	86.1	85.9	84.9	84.3	82.7	81.5	80.4	79.0	76.6
45	75.5	76.7	78.1	78.0	76.9	76.8	78.0	78.4	78.5
90	77.2	76.8	75.8	74.6	74.0	73.0	72.6	71.1	69.5
135	69.0	68.7	69.5	69.5	71.0	73.7	77.2	79.1	80.2
180	80.7	80.6	80.7	81.1	82.1	83.7	84.7	85.2	85.3
225	86.1	87.1	87.0	86.6	86.5	86.0	86.0	86.4	86.1
270	85.9	85.6	85.9	86.3	86.7	86.1	85.7	85.9	86.7
315	85.9	85.7	85.9	85.8	86.1	86.5	87.2	87.2	86.2

DEPTH- 1340 90 DEGREES

RADII IN FEET

AZ									
0	78.0	75.2	73.3	71.8	70.0	70.4	70.1	69.1	66.9
45	64.8	63.0	62.2	61.6	61.4	62.1	62.7	63.2	63.6
90	64.1	64.7	64.8	65.0	66.4	67.0	66.5	66.0	65.0
135	65.1	66.1	67.0	67.2	67.1	68.1	69.7	71.0	71.6
180	71.4	73.8	75.5	76.0	77.2	78.2	79.0	80.3	82.0
225	83.2	83.3	83.8	83.3	82.4	82.0	82.0	81.5	81.6
270	81.6	82.0	82.4	82.1	82.4	82.2	82.6	83.3	82.1
315	82.0	81.6	82.1	82.4	80.8	80.7	80.9	80.8	79.7

DEPTH- 1350 90 DEGREES

RADII IN FEET

AZ									
0	57.9	57.4	57.8	59.1	59.2	59.8	59.8	59.7	59.4
45	57.8	56.3	55.0	54.4	53.6	53.5	53.3	52.2	51.9
90	51.4	51.4	51.3	50.9	50.8	50.9	51.2	51.9	52.8
135	54.3	54.6	55.9	57.0	57.8	59.4	60.9	62.0	62.4
180	62.9	63.8	65.0	65.4	65.5	66.0	67.8	71.4	74.6
225	76.8	78.0	76.5	75.8	76.9	77.1	76.4	76.5	77.2
270	77.5	77.8	77.9	78.5	78.4	78.1	77.7	78.0	79.0
315	78.0	73.5	72.6	70.9	69.9	67.0	64.8	62.0	59.0

JOB NO: 2244

DEPTH- 1360 90 DEGREES

AZ	RADII IN FEET								
0	58.3	58.3	58.9	59.1	59.5	59.4	60.0	60.1	59.6
45	59.5	58.2	58.4	62.2	66.3	68.5	70.3	68.2	64.9
90	61.0	58.5	56.7	51.9	49.7	49.0	48.0	47.6	46.9
135	46.8	47.2	47.1	47.1	47.5	48.1	49.0	50.5	52.1
180	54.8	56.0	56.7	58.3	59.3	60.2	61.5	63.3	64.3
225	65.1	65.9	67.6	68.1	68.3	68.7	69.7	71.1	71.3
270	70.7	70.6	69.8	68.6	67.5	66.8	66.2	65.6	64.1
315	61.8	59.7	58.6	59.4	59.8	59.9	59.5	59.1	59.3

DEPTH- 1370 90 DEGREES

AZ	RADII IN FEET								
0	67.0	66.8	65.4	65.8	66.4	68.5	73.5	84.8	89.8
45	89.9	91.0	93.5	93.2	87.4	81.5	78.3	75.8	73.4
90	73.2	62.1	58.0	55.3	53.2	51.9	50.9	50.2	49.9
135	49.2	49.0	48.8	48.8	48.9	48.7	48.5	48.8	49.1
180	49.7	50.0	50.5	50.7	51.3	51.5	52.0	52.8	52.8
225	53.7	54.3	54.5	54.4	54.8	55.2	55.5	56.1	56.6
270	56.7	57.4	57.5	58.1	56.1	55.5	55.7	56.8	57.0
315	57.3	57.8	58.1	58.7	59.3	62.2	64.5	66.1	66.6

DEPTH- 1380 90 DEGREES

AZ	RADII IN FEET								
0	73.9	76.2	78.5	83.2	87.6	89.5	91.0	92.2	93.2
45	93.7	94.7	93.8	92.9	90.7	87.9	84.9	81.5	79.2
90	77.5	74.3	72.3	70.4	68.5	67.1	65.2	61.0	49.4
135	48.3	47.7	47.4	47.2	46.9	47.3	47.6	47.2	47.7
180	47.9	48.1	48.3	49.2	49.6	50.1	51.3	52.4	53.2
225	53.7	53.8	53.6	53.4	54.4	54.6	54.9	55.4	56.0
270	57.0	57.3	57.8	58.3	58.5	58.7	58.8	59.0	59.1
315	59.1	59.8	59.9	59.4	59.9	62.5	65.8	68.3	71.2

DEPTH- 1390 90 DEGREES

AZ	RADII IN FEET								
0	70.2	69.0	68.9	68.5	67.8	67.6	67.5	66.7	66.5
45	65.8	65.3	64.4	63.3	62.5	62.8	63.6	64.8	66.1
90	66.3	66.4	66.2	65.8	65.0	65.2	63.8	60.8	56.4
135	52.9	50.9	50.2	49.4	49.0	48.5	47.8	47.8	48.0
180	48.0	48.5	49.1	49.5	50.3	51.0	51.4	52.2	52.7
225	53.2	54.1	54.1	54.0	53.8	53.6	53.7	54.1	54.6
270	55.0	55.6	56.2	56.4	56.9	57.3	57.7	57.9	58.3
315	58.6	59.0	59.6	61.4	64.2	65.3	67.0	68.3	69.8

DEPTH- 1400 90 DEGREES

AZ	RADII IN FEET								
0	59.5	60.4	61.4	62.5	63.2	64.1	63.9	63.2	62.1
45	61.3	60.6	60.0	59.5	58.9	57.8	57.1	56.1	55.1
90	54.7	54.3	53.8	52.9	52.3	51.9	51.6	51.8	52.1
135	51.9	51.2	50.5	49.4	48.7	48.0	47.8	47.4	47.2
180	47.2	47.5	48.2	48.9	49.0	50.0	50.8	52.4	53.1
225	52.9	53.6	53.5	53.7	53.5	54.1	54.3	54.5	55.1
270	55.6	55.8	55.8	56.4	57.1	57.6	57.5	58.2	58.8
315	59.4	60.2	60.6	62.0	63.1	63.1	62.8	62.1	60.8

DEPTH- 1410 90 DEGREES

AZ	RADII IN FEET								
0	55.9	56.0	56.4	56.3	57.2	58.4	59.0	58.7	57.7
45	56.7	56.0	55.7	55.5	55.3	54.9	53.8	53.3	52.8
90	51.6	51.0	50.6	50.0	49.3	49.0	48.7	48.4	48.4
135	48.4	48.3	48.5	48.4	48.2	48.0	47.5	47.3	47.0
180	47.1	47.2	47.6	48.2	48.9	49.6	50.7	51.8	52.2
225	52.6	53.0	52.8	52.7	52.6	52.7	52.8	53.3	53.9
270	54.9	55.3	55.5	55.9	56.2	56.6	56.7	57.0	57.3
315	57.2	57.6	57.2	57.5	57.4	57.4	57.1	56.6	56.5

DEPTH- 1420 90 DEGREES

AZ	RADII IN FEET								
0	64.9	69.5	73.2	77.5	83.2	88.4	92.5	96.7	99.2
45	101.2	102.6	102.7	102.1	99.4	95.6	93.6	95.1	90.5
90	83.3	79.6	74.2	62.6	55.9	50.9	48.4	46.9	46.7
135	47.3	47.7	47.4	47.6	47.4	48.0	48.5	49.2	49.3
180	49.3	49.6	50.2	50.3	51.3	52.4	52.9	54.9	56.0
225	56.7	55.9	54.7	54.3	54.5	54.7	55.1	55.2	55.8
270	55.6	56.1	56.5	56.8	57.2	57.4	57.2	57.4	57.2
315	56.5	56.3	56.1	55.8	55.6	54.9	55.7	58.1	61.0

JOB NO: 2244

DEPTH- 1430 90 DEGREES
RADII IN FEET

AZ									
0	72.1	75.2	78.8	81.6	82.2	80.9	78.7	77.1	76.7
45	76.0	75.5	75.3	74.0	72.4	70.9	69.3	67.9	67.7
90	68.7	70.4	72.2	73.4	72.9	72.5	68.8	65.5	62.4
135	58.7	55.2	52.2	48.7	46.6	46.5	46.2	46.0	47.0
180	47.2	47.7	47.7	48.5	49.2	49.1	49.3	49.6	50.1
225	50.9	51.6	52.1	52.9	53.0	53.3	53.6	53.9	54.6
270	55.8	56.5	57.2	58.6	59.3	60.1	60.1	60.0	59.3
315	59.3	58.9	57.9	58.3	59.2	59.7	60.9	62.5	66.8

DEPTH- 1440 90 DEGREES
RADII IN FEET

AZ									
0	65.0	67.8	65.5	64.2	63.8	63.8	63.2	62.0	59.8
45	59.2	58.7	58.5	58.3	58.4	58.0	57.7	57.5	57.8
90	58.0	58.1	58.4	58.6	59.4	59.3	59.3	59.5	59.3
135	58.1	54.7	52.1	49.3	47.2	46.5	46.5	46.4	46.5
180	46.6	47.1	46.9	47.1	47.7	48.5	49.1	49.6	50.5
225	50.7	50.5	50.6	51.3	51.4	52.5	53.6	54.1	55.3
270	56.5	57.3	57.9	59.0	59.8	60.2	60.1	58.6	57.1
315	56.3	56.1	56.1	56.0	56.2	56.3	57.5	58.7	60.8

DEPTH- 1450 90 DEGREES
RADII IN FEET

AZ									
0	59.7	62.5	63.2	62.7	61.9	61.5	61.2	60.5	59.7
45	59.2	58.4	58.1	57.5	57.1	56.5	55.8	55.3	55.2
90	54.9	54.6	53.7	53.0	52.7	52.3	52.3	52.6	53.0
135	53.1	51.7	50.3	48.6	46.4	45.6	45.5	44.9	44.6
180	44.3	44.7	44.7	45.2	45.7	46.1	46.7	46.8	47.2
225	47.5	48.3	48.8	49.5	50.3	51.0	51.8	52.7	53.7
270	54.5	55.2	56.0	56.9	57.2	57.7	58.6	58.8	57.8
315	56.8	55.9	55.3	54.8	55.2	55.8	56.6	57.0	57.9

DEPTH- 1460 90 DEGREES
RADII IN FEET

AZ									
0	59.6	60.0	59.9	59.6	58.8	58.3	58.3	57.4	56.9
45	56.1	55.6	55.0	54.9	54.9	54.5	54.2	53.6	53.3
90	53.2	53.6	53.1	52.6	52.1	51.3	51.2	51.0	50.9
135	51.1	50.1	48.3	46.5	45.9	44.8	44.8	44.6	44.3
180	44.3	44.3	44.5	44.8	45.2	45.9	46.4	46.7	47.3
225	47.7	48.0	48.6	49.3	49.7	50.0	50.5	50.9	51.4
270	52.4	53.9	54.9	55.5	56.3	57.3	57.9	58.2	57.4
315	56.9	56.2	55.9	55.7	55.5	55.7	56.4	57.4	58.2

DEPTH- 1470 90 DEGREES
RADII IN FEET

AZ									
0	58.3	57.9	57.2	56.5	54.9	53.2	51.9	51.0	50.0
45	49.2	48.7	48.1	50.5	53.7	54.9	55.3	53.7	52.4
90	51.6	52.5	54.3	55.9	55.4	52.3	50.1	49.4	49.3
135	49.2	48.7	47.6	45.9	44.7	44.3	43.8	43.9	43.9
180	44.0	44.4	44.5	44.8	45.4	45.4	45.9	46.5	46.8
225	47.1	47.6	48.4	48.9	49.8	50.6	50.9	51.7	52.6
270	53.3	53.7	54.6	55.0	55.6	55.6	55.6	55.0	55.2
315	55.3	56.8	61.5	63.4	63.0	59.6	57.3	57.6	58.0

DEPTH- 1480 90 DEGREES
RADII IN FEET

AZ									
0	63.9	63.7	63.6	63.4	63.0	66.3	67.5	67.4	66.9
45	65.8	64.4	59.8	56.9	56.8	58.5	61.8	61.5	59.8
90	57.5	55.2	53.8	52.9	52.4	52.1	51.7	49.5	47.4
135	46.1	45.0	44.0	43.0	44.2	45.4	46.1	47.0	47.1
180	47.6	47.6	47.4	47.0	46.8	46.9	46.8	47.2	47.8
225	48.4	49.1	49.8	50.4	50.6	51.2	51.4	51.7	52.5
270	53.3	53.9	54.3	55.4	56.5	57.8	60.5	62.5	61.6
315	62.3	63.8	63.8	63.8	63.8	64.0	63.9	63.7	63.7

DEPTH- 1490 90 DEGREES
RADII IN FEET

AZ									
0	60.5	60.5	61.2	62.5	63.6	63.7	63.3	63.5	62.9
45	61.0	58.8	57.5	56.1	54.9	54.6	54.2	53.8	53.9
90	53.6	53.2	52.8	52.2	52.2	52.0	50.8	49.6	48.4
135	48.1	48.0	47.3	47.6	47.6	47.7	47.3	47.1	46.8
180	46.7	46.4	46.8	47.2	47.5	48.4	49.4	49.5	49.7
225	50.3	51.4	52.2	52.6	53.3	53.5	53.4	53.8	54.4
270	55.2	56.5	57.5	58.2	58.9	59.6	60.0	60.4	60.7
315	62.5	62.9	62.1	61.6	61.6	62.0	62.2	62.0	61.0

DEPTH- 1500 90 DEGREES

RADII IN FEET

AZ									
0	62.5	61.6	61.4	60.7	59.7	59.2	58.2	57.1	56.0
45	54.1	52.7	51.8	51.3	50.5	49.8	50.0	50.0	49.9
90	49.7	48.9	48.2	47.5	46.7	46.1	45.3	44.5	43.7
135	42.8	42.8	43.0	43.1	43.3	42.8	42.1	43.0	44.5
180	45.2	46.0	46.1	45.9	46.3	47.8	49.1	50.1	50.3
225	50.8	52.6	53.8	54.0	54.0	54.1	54.8	55.4	55.9
270	56.6	58.0	58.7	58.9	59.0	58.6	58.5	58.7	58.6
315	59.2	59.2	59.9	61.7	63.1	63.3	63.3	63.3	63.2

DEPTH- 1510 90 DEGREES

RADII IN FEET

AZ									
0	66.9	65.2	63.1	61.3	59.8	59.0	58.1	57.8	57.8
45	58.3	58.4	55.1	53.8	51.2	48.5	48.1	47.9	47.8
90	47.5	47.4	46.0	44.8	44.6	44.2	43.8	43.1	42.3
135	41.9	42.0	42.1	42.3	42.4	42.6	42.6	42.9	43.2
180	43.6	44.1	44.4	44.4	45.2	46.4	47.6	48.7	49.9
225	51.7	53.4	54.1	54.6	55.0	55.1	55.1	55.1	55.1
270	55.1	55.2	55.9	56.7	56.9	57.3	57.6	58.4	58.7
315	59.6	60.7	62.5	69.2	68.9	67.3	67.7	68.7	67.7

DEPTH- 1520 90 DEGREES

RADII IN FEET

AZ									
0	66.1	64.8	63.4	61.5	60.1	58.4	59.2	59.4	59.6
45	59.7	58.5	56.7	54.3	51.8	49.6	47.9	46.5	45.6
90	45.3	44.8	44.3	44.0	43.6	43.1	42.3	41.5	40.9
135	40.6	40.7	40.7	41.1	41.5	42.0	42.2	42.3	42.5
180	42.4	43.2	43.5	44.3	45.2	46.0	47.1	48.4	49.4
225	50.1	51.3	52.1	53.0	53.5	53.8	53.8	54.3	55.0
270	55.8	56.1	56.3	56.6	57.2	57.7	58.4	58.9	59.1
315	59.5	60.4	67.7	66.6	65.9	65.8	66.3	67.1	66.8

DEPTH- 1530 90 DEGREES

RADII IN FEET

AZ									
0	63.0	62.5	62.1	61.1	58.6	57.9	57.1	55.0	51.7
45	51.0	51.6	51.8	51.2	49.0	47.2	45.6	44.4	43.4
90	42.7	42.1	41.5	41.1	41.0	40.8	40.2	40.0	39.8
135	39.5	39.9	40.1	40.4	40.7	41.4	41.7	41.9	42.2
180	42.4	43.0	43.9	44.3	44.8	45.6	46.6	47.6	48.2
225	49.3	50.5	51.8	52.4	52.9	53.3	54.4	54.9	55.5
270	56.5	58.1	59.7	60.0	59.5	59.7	59.6	59.6	60.6
315	63.7	67.9	72.2	70.3	67.8	66.5	65.2	64.0	63.4

DEPTH- 1540 90 DEGREES

RADII IN FEET

AZ									
0	59.8	58.7	58.3	58.3	59.8	60.6	60.2	59.0	58.5
45	57.9	57.0	55.1	52.5	50.3	49.0	47.8	46.7	45.2
90	43.7	42.5	41.4	40.2	38.7	38.4	38.3	38.4	38.5
135	38.7	39.0	39.2	39.5	39.9	40.0	40.5	41.1	41.9
180	42.6	43.3	43.9	44.6	44.9	45.5	46.0	46.1	46.8
225	47.8	49.0	50.1	51.5	52.4	53.9	55.2	56.3	58.0
270	58.1	58.9	59.9	60.2	60.5	60.6	61.0	61.8	62.1
315	63.0	63.3	63.2	63.4	63.1	67.4	68.0	65.0	62.3

DEPTH- 1550 90 DEGREES

RADII IN FEET

AZ									
0	67.6	66.5	62.9	62.0	58.6	57.3	56.3	54.7	53.8
45	54.0	54.1	53.9	53.0	52.2	51.3	50.9	50.4	49.7
90	47.8	46.1	44.5	43.5	42.2	41.4	40.7	40.1	40.0
135	40.2	40.3	40.5	40.7	41.2	41.4	41.7	42.1	42.4
180	42.9	43.7	44.4	45.2	45.8	46.4	47.3	48.0	48.6
225	49.3	50.5	51.7	53.6	54.6	55.5	56.1	57.2	57.7
270	58.6	60.8	61.1	60.9	60.8	61.7	61.9	61.9	62.3
315	63.0	62.1	61.1	62.6	62.6	62.4	61.3	59.9	67.7

DEPTH- 1560 90 DEGREES

RADII IN FEET

AZ									
0	69.3	70.9	71.2	67.8	65.9	64.1	62.2	61.1	60.9
45	60.4	59.2	55.4	51.7	50.9	50.1	49.4	48.8	47.8
90	46.6	45.0	43.8	43.3	43.6	44.0	44.5	43.3	42.6
135	42.2	42.1	42.1	42.4	42.9	42.8	42.7	43.2	43.7
180	44.2	44.4	44.9	45.3	46.1	46.9	47.6	48.5	49.4
225	49.6	51.1	53.0	54.6	55.4	55.5	55.5	55.8	56.4
270	57.2	56.0	57.0	59.0	60.0	61.5	62.4	62.5	62.3
315	62.6	63.7	64.3	65.1	65.2	65.9	67.2	68.1	68.6

JOB NO: 2244

DEPTH- 1570 90 DEGREES

AZ	RADII IN FEET								
0	69.7	69.6	68.2	66.6	65.6	64.6	64.0	64.0	64.0
45	63.7	61.3	59.0	57.4	57.7	57.2	56.9	55.7	53.0
90	50.1	47.7	46.6	46.4	46.0	45.8	45.5	45.0	44.4
135	44.2	44.0	43.9	44.3	44.5	45.0	45.1	45.5	45.5
180	45.9	46.3	47.1	47.8	48.2	48.8	49.5	50.2	50.7
225	51.8	52.7	53.6	54.6	55.9	56.6	57.7	58.4	59.4
270	59.6	60.5	61.4	62.0	64.3	66.3	67.6	68.8	67.9
315	66.5	67.5	68.4	69.4	69.7	69.5	68.9	68.1	68.4

DEPTH- 1580 90 DEGREES

AZ	RADII IN FEET								
0	65.5	63.1	62.6	63.1	61.6	60.3	60.7	61.0	61.2
45	60.4	59.3	58.5	58.1	57.6	56.9	56.0	55.2	54.6
90	53.0	50.3	48.8	48.6	47.8	47.3	46.9	46.0	45.5
135	45.3	44.8	44.3	44.3	44.6	44.5	45.4	46.7	46.7
180	46.4	46.7	46.9	47.7	48.4	48.7	49.2	49.8	50.9
225	52.1	53.5	54.8	55.9	56.8	58.6	59.4	60.5	61.3
270	61.6	61.6	61.9	63.2	66.4	69.9	70.1	71.9	76.7
315	78.1	77.8	76.3	69.2	67.4	65.9	65.4	65.7	66.2

DEPTH- 1590 90 DEGREES

AZ	RADII IN FEET								
0	62.3	62.0	61.8	61.5	60.6	59.7	59.3	59.1	59.1
45	59.2	58.8	57.0	55.2	55.3	55.0	54.6	53.9	52.9
90	50.7	47.9	46.4	45.5	45.3	45.1	45.0	44.8	44.4
135	44.2	44.4	44.4	44.3	44.5	44.4	44.2	43.9	44.4
180	44.9	45.6	46.1	47.1	47.6	48.1	49.5	50.6	51.4
225	52.3	53.6	54.4	55.4	56.1	56.7	57.5	58.5	59.7
270	60.8	62.2	63.7	63.4	64.8	68.2	71.9	73.4	73.1
315	71.9	70.9	68.2	66.8	65.7	65.1	64.3	63.8	63.0

DEPTH- 1600 90 DEGREES

AZ	RADII IN FEET								
0	63.4	62.4	61.9	61.2	60.2	59.5	58.8	58.5	58.2
45	57.1	56.1	54.6	53.7	52.7	51.8	51.4	50.7	49.9
90	49.0	47.9	46.1	44.7	44.3	44.1	43.5	43.3	43.3
135	43.3	43.4	43.8	44.1	44.5	44.8	45.0	44.9	45.0
180	45.2	45.2	45.7	46.3	46.9	47.6	48.7	49.7	50.7
225	51.9	52.9	54.0	55.0	56.4	57.7	58.5	59.5	60.4
270	61.5	62.4	63.6	64.6	65.4	66.8	67.8	67.9	68.2
315	68.4	68.2	67.6	66.8	65.7	65.7	65.6	65.2	64.5

DEPTH- 1610 90 DEGREES

AZ	RADII IN FEET								
0	62.8	62.7	61.9	60.8	59.9	58.3	56.9	56.1	55.8
45	55.0	53.1	51.6	50.5	49.1	48.2	47.1	46.7	46.2
90	45.6	45.1	44.2	43.3	42.8	42.6	42.4	42.1	42.2
135	42.3	42.3	42.5	43.1	43.4	43.6	44.0	44.5	44.4
180	45.7	47.7	48.3	48.8	49.0	49.2	49.9	50.6	51.4
225	53.6	54.8	54.9	55.6	56.4	57.2	58.3	59.5	60.5
270	61.6	62.2	62.8	63.4	63.8	65.2	66.2	67.3	67.2
315	67.0	66.8	65.8	64.8	64.4	63.8	63.7	63.8	63.2

DEPTH- 1620 90 DEGREES

AZ	RADII IN FEET								
0	62.2	60.3	58.3	56.6	55.4	53.9	52.8	52.2	51.9
45	50.9	49.1	47.5	46.9	46.2	45.1	44.3	43.6	42.9
90	42.3	41.9	41.4	41.1	40.9	40.7	40.8	40.7	40.8
135	41.7	43.6	45.2	45.5	43.7	43.4	43.3	43.6	43.8
180	44.4	45.1	45.7	46.6	47.6	48.2	49.3	50.3	51.4
225	52.2	53.2	54.8	56.5	57.9	60.0	60.7	61.7	62.7
270	63.5	64.0	64.6	65.4	65.9	66.2	66.4	66.7	66.9
315	66.7	66.3	65.7	65.3	64.9	64.7	64.8	64.2	63.0

DEPTH- 1630 90 DEGREES

AZ	RADII IN FEET								
0	58.4	57.8	57.0	55.5	54.2	53.3	52.5	51.7	51.3
45	50.5	49.5	48.1	47.4	46.4	45.3	44.3	43.4	42.4
90	41.6	41.4	40.7	40.4	40.4	40.3	40.1	40.2	40.4
135	40.4	40.6	40.8	41.3	41.9	42.3	42.7	43.3	44.2
180	44.9	45.3	45.8	46.2	47.6	49.2	50.1	50.8	51.5
225	52.4	55.3	57.7	58.8	60.2	61.0	61.7	62.2	63.1
270	63.8	64.1	64.8	66.4	66.3	66.5	66.3	66.2	66.0
315	66.1	65.4	65.0	64.2	63.6	62.7	61.9	61.0	60.1

JOB NO: 2244

DEPTH- 1640 90 DEGREES
RADII IN FEET

AZ									
0	61.9	60.9	61.3	61.5	63.0	64.6	65.6	66.4	67.0
45	67.4	67.9	67.6	66.4	64.8	62.9	60.3	58.4	56.2
90	53.7	51.7	49.9	48.0	44.5	40.6	40.2	40.5	40.4
135	40.5	40.4	40.6	40.7	40.9	42.5	43.5	44.1	44.6
180	45.2	45.8	46.2	46.5	46.9	47.7	48.4	49.4	51.0
225	51.8	53.2	55.1	57.4	58.8	59.7	60.3	61.1	62.2
270	62.8	63.5	66.3	66.8	66.6	66.2	66.8	66.9	66.9
315	66.6	66.5	66.0	66.0	65.4	64.5	63.5	62.7	62.7

DEPTH- 1650 90 DEGREES
RADII IN FEET

AZ									
0	64.0	63.8	63.7	63.7	63.4	63.5	63.0	62.6	62.5
45	62.2	61.0	59.7	59.1	58.8	57.7	56.4	55.4	54.3
90	52.8	51.8	51.0	49.2	46.1	42.8	41.0	40.2	39.9
135	39.8	40.0	40.2	40.8	41.9	42.3	43.0	44.0	45.4
180	46.1	47.0	47.3	47.0	47.0	47.3	48.1	49.0	50.3
225	51.7	53.3	54.9	57.1	59.1	61.6	63.4	64.5	64.6
270	64.4	65.8	66.5	66.3	65.9	66.7	67.0	67.3	67.2
315	67.4	67.2	67.0	66.2	65.5	64.4	63.8	63.7	63.9

DEPTH- 1660 90 DEGREES
RADII IN FEET

AZ									
0	63.0	62.8	62.5	61.8	61.6	61.3	61.0	60.6	59.8
45	58.8	58.2	57.4	56.0	54.9	53.2	52.0	50.9	50.1
90	49.4	48.8	47.8	44.8	42.7	41.6	41.0	40.5	39.9
135	40.1	40.5	41.1	41.3	42.1	42.8	43.3	43.8	44.4
180	45.3	46.1	46.6	47.3	47.9	48.9	49.9	50.5	51.3
225	52.6	53.8	55.4	57.5	59.0	60.9	64.4	65.6	65.3
270	65.2	65.1	65.3	66.0	66.6	67.2	67.0	67.0	66.7
315	66.2	65.7	65.9	65.7	65.3	64.6	63.7	63.6	63.2

DEPTH- 1670 90 DEGREES
RADII IN FEET

AZ									
0	60.9	60.1	59.4	59.0	58.7	58.5	57.8	56.0	55.1
45	54.4	53.6	52.9	52.9	51.9	50.4	49.2	48.6	47.5
90	46.7	46.2	45.5	44.3	42.3	40.7	40.4	40.5	40.1
135	40.2	40.3	40.6	40.9	41.2	41.9	42.3	42.8	43.8
180	44.6	45.3	46.3	47.4	48.5	49.2	52.1	54.5	53.7
225	54.1	55.0	56.4	58.8	60.3	61.6	63.0	63.6	63.9
270	64.6	65.2	66.0	66.7	66.8	67.8	68.0	67.1	66.6
315	66.8	66.3	66.3	66.0	65.3	64.4	63.5	62.3	61.6

DEPTH- 1680 90 DEGREES
RADII IN FEET

AZ									
0	62.3	61.0	58.9	57.5	57.0	56.7	54.9	52.7	51.8
45	51.4	50.7	50.0	49.7	49.3	48.3	47.5	45.9	44.2
90	43.6	43.1	42.4	41.4	40.9	40.7	40.6	40.4	40.7
135	40.8	40.9	41.3	43.3	45.1	47.2	48.0	48.1	48.8
180	53.5	55.8	56.1	55.9	54.3	51.7	49.8	51.5	54.2
225	58.4	59.3	58.5	57.6	58.9	60.4	61.2	62.2	63.1
270	64.7	65.7	66.2	66.3	67.2	67.6	67.8	67.9	68.0
315	68.1	67.7	67.5	67.2	67.0	66.4	65.8	64.4	63.3

DEPTH- 1690 90 DEGREES
RADII IN FEET

AZ									
0	60.0	59.3	58.2	56.0	55.7	55.3	52.9	51.4	50.8
45	50.1	49.2	48.8	48.1	47.4	46.4	45.4	44.9	44.0
90	42.9	42.3	41.4	40.7	40.5	40.4	40.8	42.4	43.3
135	43.8	44.5	45.3	46.2	47.5	48.3	49.6	51.7	53.7
180	55.3	54.3	52.9	52.2	52.6	52.5	52.4	52.7	55.9
225	56.2	56.6	56.7	57.2	58.2	59.0	62.2	63.5	65.2
270	66.6	67.9	69.0	69.5	68.9	69.1	69.4	69.5	69.9
315	70.1	69.1	68.1	66.2	65.4	64.5	63.1	62.3	61.1

DEPTH- 1700 90 DEGREES
RADII IN FEET

AZ									
0	60.5	59.5	58.7	58.1	57.2	56.4	55.4	54.2	53.0
45	52.0	51.1	50.3	49.7	48.7	47.8	47.2	46.5	45.5
90	44.1	43.3	42.5	42.1	41.5	41.7	43.8	45.7	46.3
135	46.2	45.7	45.8	47.4	47.9	48.3	48.1	48.5	49.7
180	51.3	51.6	52.1	53.0	53.8	54.0	53.5	54.6	56.7
225	57.6	57.5	57.3	57.2	57.9	62.3	63.3	64.8	66.4
270	67.6	68.7	69.8	70.7	71.4	71.7	71.9	71.8	70.9
315	69.1	67.7	67.7	67.0	66.1	64.9	64.2	62.7	61.7

DEPTH- 1710 90 DEGREES

RADII IN FEET

AZ									
0	62.0	60.8	59.4	58.0	57.4	57.0	56.5	56.9	57.2
45	52.5	52.3	52.1	51.2	50.0	48.9	47.4	46.2	45.5
90	45.0	44.3	44.0	43.3	42.9	42.6	42.3	42.4	43.0
135	43.8	44.4	44.6	45.3	45.7	46.2	46.7	47.3	47.7
180	48.0	48.9	50.0	51.2	51.4	50.8	50.4	51.1	53.1
225	56.0	58.0	56.8	56.0	58.9	62.4	63.2	64.0	65.2
270	66.2	67.4	68.5	70.0	71.0	71.2	70.6	70.0	69.1
315	68.3	67.8	68.3	67.6	67.5	66.4	65.6	64.5	63.5

DEPTH- 1720 90 DEGREES

RADII IN FEET

AZ									
0	61.7	61.2	60.8	59.7	58.0	56.2	55.1	54.1	53.5
45	52.4	49.6	49.4	48.8	48.5	47.3	45.8	44.2	43.3
90	42.8	42.7	42.8	42.8	42.7	42.5	42.1	42.0	42.3
135	42.4	43.0	43.3	43.8	44.2	45.3	46.1	47.5	47.8
180	47.5	47.8	48.6	49.3	49.5	49.7	49.9	50.5	52.2
225	53.4	53.5	53.9	54.6	55.3	58.9	61.6	63.8	64.0
270	64.6	64.8	65.8	67.2	69.1	70.0	69.7	69.7	70.1
315	70.4	71.9	72.3	71.9	71.3	72.4	75.7	78.5	82.1

DEPTH- 1730 90 DEGREES

RADII IN FEET

AZ									
0	62.3	60.5	59.9	57.9	57.5	57.9	60.3	61.6	56.4
45	49.8	45.7	44.2	44.1	43.9	43.1	41.4	41.0	40.8
90	41.2	41.4	41.4	41.2	40.9	40.8	40.5	41.1	43.1
135	45.0	46.7	47.5	47.8	48.1	48.2	48.7	48.4	47.2
180	46.2	45.8	46.3	46.8	47.1	47.5	48.6	49.8	51.4
225	51.4	51.5	51.6	52.0	53.2	55.4	57.7	59.4	61.3
270	62.5	63.9	64.8	66.0	66.9	67.5	67.5	68.5	69.9
315	71.7	72.8	73.0	71.0	69.8	71.7	72.3	70.1	66.0

DEPTH- 1740 90 DEGREES

RADII IN FEET

AZ									
0	59.3	57.0	55.5	54.5	52.8	49.4	46.0	45.0	44.5
45	43.6	42.4	41.3	40.4	39.9	39.5	39.6	39.6	39.2
90	38.9	39.0	39.2	39.4	39.2	39.3	39.4	40.1	40.7
135	41.6	42.7	43.6	44.5	44.8	44.8	43.9	43.3	43.5
180	43.9	44.1	44.4	44.5	44.9	45.5	45.8	45.0	44.5
225	44.6	45.1	46.4	47.8	49.6	52.1	54.0	55.5	57.6
270	59.4	60.4	61.2	61.9	63.1	63.6	63.7	64.5	66.0
315	66.3	66.2	66.5	66.0	65.2	65.2	66.2	66.0	63.6

DEPTH- 1750 90 DEGREES

RADII IN FEET

AZ									
0	56.7	55.0	52.8	50.6	47.5	45.3	43.3	41.9	40.8
45	39.6	38.3	37.6	37.0	36.3	35.9	35.9	36.0	36.2
90	36.4	36.5	36.7	36.5	36.4	36.4	36.7	37.4	38.3
135	39.3	39.9	40.2	40.7	41.3	42.1	42.4	42.4	42.5
180	42.2	42.5	43.0	43.3	44.1	45.4	45.8	45.9	42.1
225	42.2	42.7	43.6	44.9	46.7	49.3	50.9	52.5	54.6
270	55.9	57.4	58.6	59.9	60.7	61.7	63.0	64.2	64.8
315	65.3	65.4	65.4	65.3	63.8	63.6	63.3	61.8	58.6

DEPTH- 1760 90 DEGREES

RADII IN FEET

AZ									
0	53.8	51.3	48.9	47.0	44.6	42.7	41.5	41.4	39.8
45	38.5	36.9	36.2	35.6	35.5	35.0	34.7	34.6	34.5
90	34.3	34.1	34.4	34.2	34.5	34.8	35.3	36.0	36.3
135	37.2	38.1	39.3	39.8	40.1	41.4	42.4	42.8	43.1
180	43.5	43.5	44.0	43.9	42.8	41.9	41.4	41.3	41.2
225	41.3	41.9	42.4	43.6	44.6	45.9	48.1	50.4	53.0
270	54.8	56.3	58.2	60.5	61.9	62.4	62.6	62.8	63.0
315	63.7	63.8	63.4	62.7	61.9	61.1	60.4	57.8	55.4

DEPTH- 1770 90 DEGREES

RADII IN FEET

AZ									
0	53.7	54.1	55.5	56.0	55.2	53.9	50.7	45.1	43.3
45	42.8	41.8	41.7	41.3	40.5	39.8	38.1	34.3	32.9
90	32.9	33.2	33.5	33.6	33.8	34.0	34.3	34.4	35.1
135	36.1	36.8	37.8	38.5	39.6	40.4	41.3	41.8	42.4
180	42.4	42.4	42.2	42.2	41.8	41.0	40.5	40.2	40.0
225	40.2	40.9	41.4	42.7	44.6	46.6	48.5	50.7	52.4
270	54.6	56.0	57.6	59.5	60.9	61.0	60.4	61.0	61.3
315	61.9	62.1	61.7	60.8	59.0	58.3	58.4	55.0	53.8

JOB NO: 2244

DEPTH- 1780 90 DEGREES

RADII IN FEET

AZ									
0	53.1	52.9	52.3	51.8	50.3	47.3	44.0	42.3	41.7
45	41.4	40.3	39.6	38.1	36.4	35.4	33.5	31.8	31.3
90	31.2	31.2	31.3	31.8	32.2	32.6	33.0	33.6	34.2
135	35.1	35.7	36.4	37.0	37.4	37.6	37.6	38.0	38.4
180	38.5	38.7	38.8	38.7	39.0	39.2	39.2	39.0	38.9
225	38.9	39.2	40.2	41.7	43.6	45.3	47.3	49.1	50.8
270	52.8	54.4	56.2	57.9	59.3	59.7	59.3	60.0	60.4
315	60.7	61.0	61.5	61.0	60.4	58.8	55.4	54.0	53.6

DEPTH- 1790 90 DEGREES

RADII IN FEET

AZ									
0	52.1	50.8	49.2	46.6	43.0	40.8	40.7	40.5	39.9
45	39.5	37.7	36.0	35.7	35.3	34.3	33.3	31.9	30.8
90	30.4	30.6	31.1	31.7	31.9	32.1	32.6	32.9	33.8
135	34.7	35.6	36.5	37.1	37.7	38.0	38.5	38.5	38.5
180	38.2	38.1	38.1	37.9	37.4	37.3	37.0	36.6	36.4
225	36.2	37.0	38.4	41.0	42.4	44.2	46.6	48.2	51.0
270	53.6	56.1	57.8	59.0	59.1	58.7	59.1	59.9	60.2
315	60.1	60.0	59.5	58.0	56.9	54.8	53.3	53.2	52.8

DEPTH- 1800 90 DEGREES

RADII IN FEET

AZ									
0	50.9	49.8	49.2	48.1	46.5	42.7	39.7	40.0	40.1
45	39.1	38.0	36.8	35.8	34.4	32.9	31.6	30.7	30.7
90	31.0	31.3	31.4	31.4	31.3	31.7	32.1	32.5	32.9
135	33.4	33.7	34.1	34.9	35.2	35.6	36.0	36.3	36.9
180	37.1	37.1	36.7	36.4	35.9	35.1	34.9	35.1	35.3
225	35.8	36.8	38.4	39.7	41.8	43.7	45.3	47.1	49.8
270	52.6	54.2	55.3	56.6	57.2	57.5	57.9	58.5	59.1
315	59.3	59.4	58.7	57.4	55.8	54.2	52.2	51.5	52.0

DEPTH- 1810 90 DEGREES

RADII IN FEET

AZ									
0	46.0	45.8	45.7	45.2	43.3	40.3	37.0	33.4	30.8
45	28.8	27.8	27.3	26.8	26.3	25.5	24.8	24.3	24.1
90	24.2	24.5	25.8	27.5	27.7	28.0	28.3	28.4	28.5
135	28.8	29.4	30.6	31.3	32.0	32.7	33.2	33.2	32.8
180	33.1	33.8	33.9	33.7	33.7	33.7	33.4	32.8	32.7
225	33.0	33.1	33.8	35.5	37.0	38.2	40.0	41.8	43.8
270	45.2	47.3	49.4	51.0	52.6	53.8	54.9	55.4	55.6
315	56.3	56.2	56.0	55.1	54.1	51.5	48.9	48.0	47.0

DEPTH- 1820 90 DEGREES

RADII IN FEET

AZ									
0	39.9	36.8	34.4	32.0	31.3	30.9	29.9	28.3	26.6
45	25.7	25.0	24.2	23.5	22.4	22.0	21.5	21.3	21.3
90	21.1	21.1	21.0	21.1	21.1	21.4	21.5	21.2	21.0
135	21.1	21.8	22.7	23.2	23.5	23.5	23.6	23.7	25.1
180	25.9	26.3	27.9	29.0	29.8	29.5	29.2	29.1	29.0
225	29.5	30.6	32.0	33.0	33.6	35.0	37.1	39.6	41.7
270	43.4	44.2	45.4	48.5	50.4	51.8	53.7	55.8	56.4
315	56.2	55.2	54.9	53.4	51.8	50.4	48.4	45.7	42.6

DEPTH- 1830 90 DEGREES

RADII IN FEET

AZ									
0	40.4	37.8	36.6	35.2	33.3	31.0	28.1	24.6	23.3
45	23.0	22.2	20.7	19.9	19.4	18.6	17.6	17.3	17.2
90	17.1	16.9	16.6	16.4	16.2	15.8	15.5	15.3	15.1
135	15.3	16.1	16.6	17.8	19.1	19.8	20.1	20.3	20.5
180	20.5	21.1	22.2	22.9	23.4	24.1	24.2	24.4	24.7
225	25.4	26.7	28.2	30.3	33.1	35.0	36.7	38.7	41.1
270	43.2	45.1	47.0	48.7	54.3	55.9	57.1	57.7	57.8
315	56.7	55.3	54.1	52.6	51.5	50.1	48.9	47.0	44.0

DEPTH- 1840 90 DEGREES

RADII IN FEET

AZ									
0	43.4	40.7	37.8	34.7	31.2	28.1	25.8	23.9	23.0
45	22.3	21.0	19.2	17.3	16.2	15.8	15.5	15.0	14.6
90	14.0	13.3	12.5	12.0	11.4	10.8	9.8	8.4	7.8
135	7.2	6.9	6.5	6.5	6.4	6.4	6.5	6.8	7.2
180	7.6	8.4	14.0	15.7	16.8	17.0	16.8	16.9	17.0
225	17.4	18.7	20.7	22.3	26.8	30.8	33.8	37.5	40.2
270	42.9	44.9	46.9	50.0	54.8	54.7	53.8	54.0	54.3
315	53.9	53.6	53.2	52.2	51.3	50.1	48.8	47.1	45.0

JOB NO: 2244

DEPTH- 1845 90 DEGREES
RADII IN FEET

AZ									
0	30.8	27.1	26.3	26.2	26.4	26.4	24.7	21.7	19.4
45	17.7	15.6	12.8	10.0	8.4	7.2	6.7	6.1	5.7
90	5.5	5.3	5.1	4.8	4.6	4.6	4.3	4.2	4.0
135	3.6	3.5	3.4	3.0	2.9	2.8	2.7	2.6	2.8
180	2.8	2.8	2.9	3.1	3.2	3.3	3.8	4.0	4.4
225	4.9	5.4	5.7	6.6	7.7	17.5	21.5	23.9	25.9
270	28.8	32.1	37.0	41.2	43.2	43.4	44.1	46.5	47.8
315	47.5	46.5	45.5	44.4	43.7	42.7	41.0	38.9	36.1

DEPTH- 1847 90 DEGREES
RADII IN FEET

AZ									
0	0.5	0.5	0.5	0.6	0.6	0.5	0.6	0.6	0.5
45	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
90	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
135	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
180	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
225	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4
270	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5
315	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.5

JOB NO: 2244

DEPTH- 1330 1 DEGREES
RADII IN FEET

AZ									
0	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9
45	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9
90	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9
135	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9
180	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9
225	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9
270	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9
315	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9	332.9

DEPTH- 1330 5 DEGREES
RADII IN FEET

AZ									
0	249.2	249.9	248.4	248.2	247.0	248.5	249.8	250.7	250.2
45	250.8	251.8	251.0	250.7	250.0	250.2	249.0	247.3	248.2
90	247.9	250.2	250.9	251.4	250.3	251.5	254.7	258.2	259.9
135	261.9	264.1	266.3	266.9	265.8	262.0	249.5	233.0	223.6
180	220.5	222.2	224.9	229.6	234.8	238.7	245.0	247.7	248.0
225	248.7	246.8	246.5	245.0	243.9	241.7	242.9	242.9	243.2
270	249.9	255.6	254.1	255.0	255.1	253.9	253.7	254.0	255.0
315	246.6	239.7	240.8	246.7	249.0	246.8	248.2	247.7	247.7

DEPTH- 1330 10 DEGREES
RADII IN FEET

AZ									
0	202.1	200.8	200.8	201.5	199.6	198.9	199.7	215.6	220.7
45	222.0	221.9	218.1	202.0	199.9	202.6	202.9	202.6	201.5
90	200.6	202.1	202.1	202.3	202.0	200.8	199.8	198.3	201.6
135	214.9	223.4	225.4	226.1	224.6	221.2	217.9	206.4	199.4
180	198.4	196.8	197.3	196.8	195.8	198.9	208.9	216.6	219.6
225	220.3	218.8	217.2	217.6	218.5	218.4	217.9	217.0	216.4
270	217.5	217.2	216.0	213.8	214.8	215.2	221.3	220.9	220.5
315	220.9	215.1	204.4	200.2	200.4	199.8	200.5	201.9	202.5

DEPTH- 1330 15 DEGREES
RADII IN FEET

AZ									
0	171.8	172.3	171.1	171.7	174.0	174.8	173.7	174.2	173.7
45	173.0	170.8	163.4	158.7	156.8	156.8	156.9	157.2	157.9
90	160.3	160.6	162.2	162.9	162.9	160.9	159.5	156.9	156.3
135	155.0	155.9	156.1	154.2	151.7	152.6	153.2	153.5	153.1
180	154.8	155.8	158.3	167.3	183.2	193.0	193.8	193.6	193.2
225	194.6	195.8	198.5	200.2	202.3	202.3	204.4	204.2	204.5
270	203.4	203.2	203.4	201.8	201.5	201.6	200.3	200.8	199.7
315	197.7	193.5	185.5	181.1	180.9	181.7	179.5	177.3	172.4

DEPTH- 1330 20 DEGREES
RADII IN FEET

AZ									
0	145.4	145.1	145.3	144.7	145.2	145.6	146.4	146.9	146.9
45	147.3	146.7	147.5	146.9	145.9	145.4	143.3	140.7	140.0
90	139.3	137.8	137.4	136.4	135.5	135.9	137.0	136.5	136.0
135	134.4	134.6	134.1	132.7	132.8	132.6	132.7	132.5	132.7
180	131.6	131.9	133.1	133.5	133.7	134.5	134.6	134.2	132.7
225	132.4	133.5	137.4	145.6	152.3	153.8	155.7	156.1	154.9
270	155.5	148.6	140.9	136.0	136.8	137.8	140.6	143.3	145.8
315	146.5	147.7	149.2	149.4	149.3	147.4	146.8	146.8	4

DEPTH- 1330 25 DEGREES
RADII IN FEET

AZ									
0	127.8	128.2	129.7	130.2	130.4	130.3	130.1	130.7	130.7
45	130.2	129.1	128.6	128.5	127.0	126.7	127.2	127.7	127.9
90	128.0	126.6	126.2	125.5	125.9	125.8	124.5	123.6	122.8
135	122.3	121.7	120.9	118.4	117.0	115.6	114.0	111.3	109.5
180	107.6	106.5	104.2	102.3	100.5	99.5	98.8	97.9	97.3
225	97.1	98.1	103.3	104.4	103.6	102.4	102.3	104.6	106.7
270	109.4	110.6	112.0	113.6	113.8	114.8	118.7	120.5	122.3
315	123.2	122.4	123.7	124.7	125.8	126.5	127.2	126.1	126.1

DEPTH- 1330 30 DEGREES
RADII IN FEET

AZ									
0	97.3	97.1	97.1	96.3	96.1	95.5	95.8	96.7	97.1
45	97.8	98.7	98.9	97.8	98.1	94.9	93.4	92.7	92.5
90	93.0	92.9	93.6	94.4	95.2	95.7	95.0	93.6	93.2
135	92.4	91.9	119.7	119.8	119.0	117.4	113.9	108.0	101.1
180	99.1	100.0	100.3	100.1	100.1	100.4	100.3	99.5	99.7
225	99.0	98.3	95.4	90.4	88.5	87.6	88.0	91.5	95.9
270	103.0	107.1	108.3	112.4	114.7	115.6	122.6	125.8	127.0
315	127.4	128.0	91.5	93.1	95.4	96.5	97.2	97.5	97.7

JOB NO: 2244

DEPTH- 1330 35 DEGREES
RADII IN FEET

AZ									
0	84.5	84.7	85.1	85.2	86.0	88.1	90.2	91.5	92.2
45	93.0	92.8	92.4	92.2	92.5	92.5	92.8	91.9	90.9
90	90.4	90.3	90.2	90.2	89.6	89.1	87.4	86.8	86.7
135	87.3	88.0	88.4	89.3	89.7	90.7	91.8	92.6	93.6
180	95.9	101.7	104.3	106.8	106.0	105.3	104.2	101.8	99.5
225	97.0	92.3	88.2	86.4	85.8	85.7	84.5	84.5	84.7
270	84.5	84.9	85.3	85.2	84.6	83.7	83.3	83.0	84.0
315	85.7	84.9	83.3	83.1	83.0	82.9	82.6	82.5	83.5

DEPTH- 1330 40 DEGREES
RADII IN FEET

AZ									
0	84.3	84.1	85.0	85.5	86.7	88.2	89.1	90.2	91.7
45	92.2	93.1	94.7	97.7	98.0	96.7	95.6	94.6	93.6
90	93.5	93.5	92.9	92.3	91.8	91.5	91.9	90.8	89.9
135	90.4	90.3	89.7	88.6	88.8	88.4	89.0	89.0	89.8
180	89.4	88.5	86.6	84.7	83.9	86.8	91.9	90.4	88.6
225	87.4	86.1	86.6	86.4	86.9	86.9	87.0	87.0	86.4
270	86.5	85.5	83.8	83.0	82.2	81.0	79.7	77.3	76.4
315	76.6	75.9	75.7	75.2	74.9	76.0	78.1	81.2	84.0

DEPTH- 1330 45 DEGREES
RADII IN FEET

AZ									
0	80.6	82.3	83.9	85.1	85.9	86.3	86.1	86.3	88.5
45	90.4	92.5	98.5	103.0	104.6	105.6	105.2	102.5	101.0
90	99.9	99.2	99.2	98.9	97.5	97.0	95.8	95.3	94.8
135	95.1	95.1	93.5	92.6	92.4	92.6	93.1	92.1	90.3
180	88.4	88.2	87.9	87.0	85.2	84.5	85.0	87.2	85.8
225	82.5	81.6	81.6	81.9	82.5	83.8	84.1	83.9	83.3
270	81.7	80.9	79.6	77.4	76.0	73.4	72.8	71.8	70.9
315	71.0	70.4	70.1	70.8	71.3	72.5	74.7	77.2	79.0

DEPTH- 1330 50 DEGREES
RADII IN FEET

AZ									
0	78.6	80.1	81.0	81.6	82.2	82.3	82.0	83.1	84.4
45	87.9	94.4	100.3	105.4	109.0	108.5	106.7	105.7	104.9
90	103.3	102.3	101.9	101.8	101.5	100.7	100.6	100.1	99.3
135	98.9	97.1	96.1	95.5	94.6	94.7	93.9	92.8	91.1
180	89.0	88.6	88.4	87.8	86.9	86.0	85.8	85.2	85.1
225	84.8	84.4	83.5	82.4	80.8	79.9	78.6	77.4	76.5
270	74.5	73.3	71.9	70.4	69.3	68.0	67.2	66.8	66.5
315	66.7	67.0	67.2	67.2	66.7	67.5	69.1	72.1	75.3

DEPTH- 1330 55 DEGREES
RADII IN FEET

AZ									
0	79.6	82.5	83.2	82.9	83.6	84.7	85.8	85.6	86.3
45	86.9	86.1	84.8	83.5	85.8	112.7	115.2	113.8	111.4
90	110.3	110.3	110.6	110.0	108.8	108.1	108.2	106.8	105.5
135	105.4	105.1	103.9	103.5	102.4	100.5	98.2	94.9	93.0
180	92.0	91.6	91.9	91.6	92.2	92.6	93.0	92.0	90.2
225	88.9	88.3	87.6	86.3	83.1	79.6	78.2	75.9	71.0
270	69.0	67.4	66.8	66.0	65.3	65.0	65.2	65.3	65.2
315	65.5	65.7	66.0	65.6	65.8	67.3	68.3	71.2	75.9

DEPTH- 1330 60 DEGREES
RADII IN FEET

AZ									
0	78.5	82.3	84.5	85.7	86.6	87.8	88.1	87.6	86.8
45	85.3	83.6	82.5	81.7	82.3	85.2	93.1	120.5	123.0
90	124.2	125.4	125.6	123.3	122.1	122.9	125.1	126.2	125.1
135	122.6	118.3	113.8	108.7	106.9	107.2	107.7	106.8	106.4
180	106.4	107.7	105.9	101.2	98.4	96.7	96.7	94.9	92.5
225	91.7	90.3	89.8	89.2	87.6	87.4	83.5	75.4	70.0
270	68.2	67.6	67.4	67.7	67.0	67.1	67.9	68.9	69.2
315	69.3	70.1	71.4	70.8	70.7	71.9	73.3	74.8	76.4

DEPTH- 1330 65 DEGREES
RADII IN FEET

AZ									
0	85.7	84.6	83.9	85.7	87.9	88.9	89.1	88.4	86.4
45	84.4	83.0	82.2	83.6	91.1	91.4	91.9	94.6	100.5
90	109.5	115.2	115.6	115.3	115.5	118.3	121.4	121.7	120.0
135	116.5	112.4	106.6	102.4	102.2	102.5	102.0	100.4	99.1
180	98.8	98.7	99.1	94.6	90.5	90.9	93.8	101.1	103.2
225	103.0	103.2	103.0	103.2	102.0	94.9	86.0	83.1	76.5
270	70.3	71.1	70.9	72.3	73.6	75.0	75.7	76.4	77.1
315	77.4	77.7	78.2	77.6	78.2	81.1	83.6	86.0	87.0

JOB NO: 2244

DEPTH- 1330 70 DEGREES

AZ	RADII IN FEET								
0	87.1	87.3	87.3	87.6	88.2	88.7	88.3	87.7	86.9
45	86.6	93.0	97.5	102.9	104.7	104.3	101.4	103.5	108.3
90	114.6	115.6	110.5	106.8	105.9	106.1	107.4	108.0	107.6
135	106.1	103.6	100.1	99.5	99.7	100.4	100.7	99.7	98.7
180	96.6	94.5	93.2	92.1	93.8	97.1	101.4	102.9	105.0
225	104.6	105.0	106.8	106.2	102.3	96.2	87.4	82.2	78.8
270	76.2	75.6	75.8	76.9	78.3	79.2	80.3	81.5	81.4
315	81.7	81.9	81.7	82.1	82.3	84.3	85.8	87.1	87.8

DEPTH- 1330 75 DEGREES

AZ	RADII IN FEET								
0	98.9	100.3	106.2	112.0	116.2	116.8	115.6	113.1	108.0
45	101.8	97.5	97.8	105.0	111.4	117.4	120.2	127.4	131.2
90	131.7	131.7	131.4	131.3	130.4	128.2	124.7	122.4	122.8
135	121.4	117.6	114.4	113.4	111.2	110.8	108.5	107.0	106.1
180	105.1	103.5	101.9	100.1	100.6	101.4	101.6	102.4	103.2
225	103.6	104.6	105.4	105.0	100.6	98.1	98.2	98.4	97.7
270	97.5	97.6	96.9	96.5	96.3	96.6	96.0	95.8	95.7
315	96.0	96.2	96.4	97.2	98.1	100.0	100.4	100.3	100.3

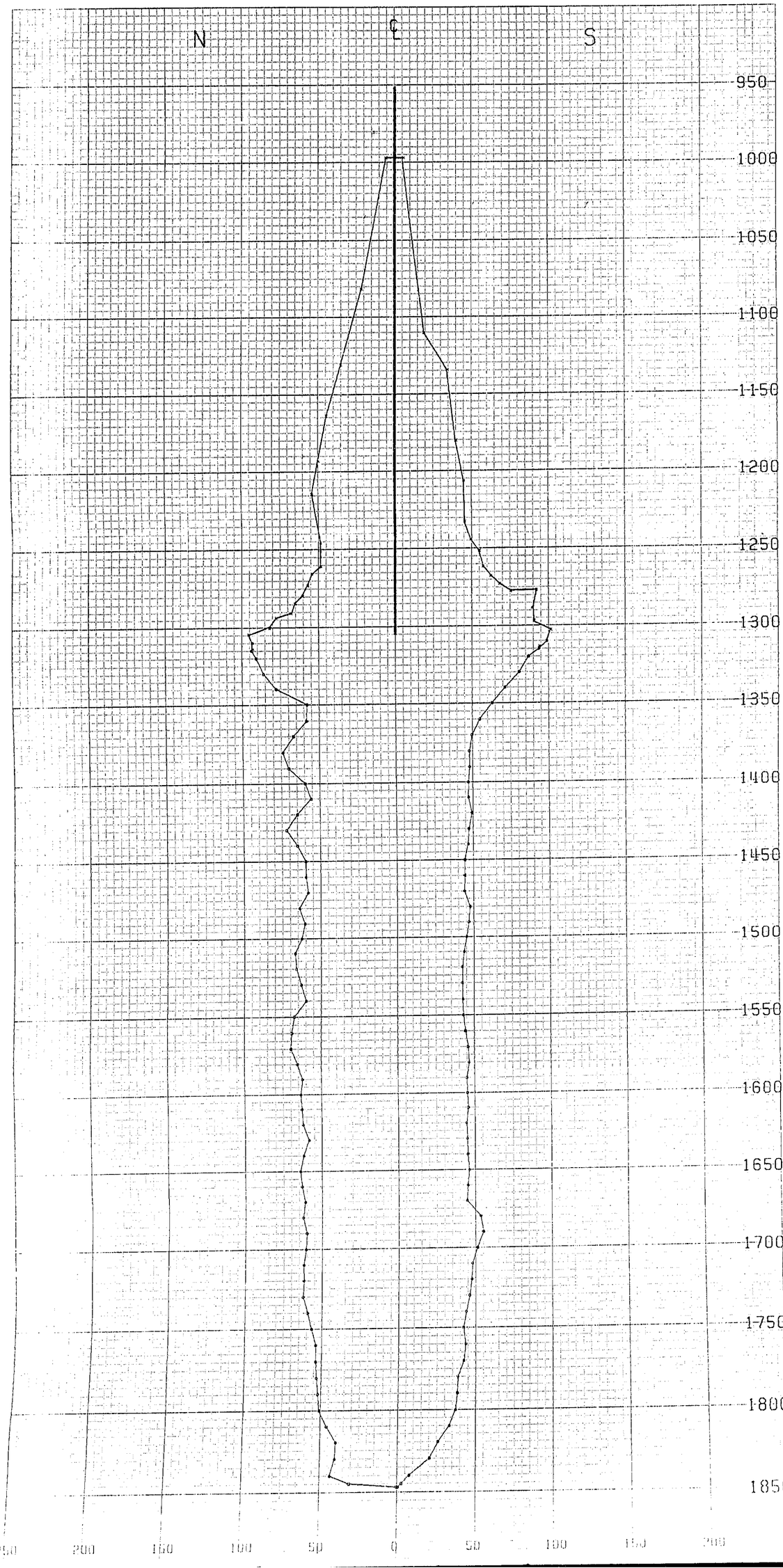
DEPTH- 1330 80 DEGREES

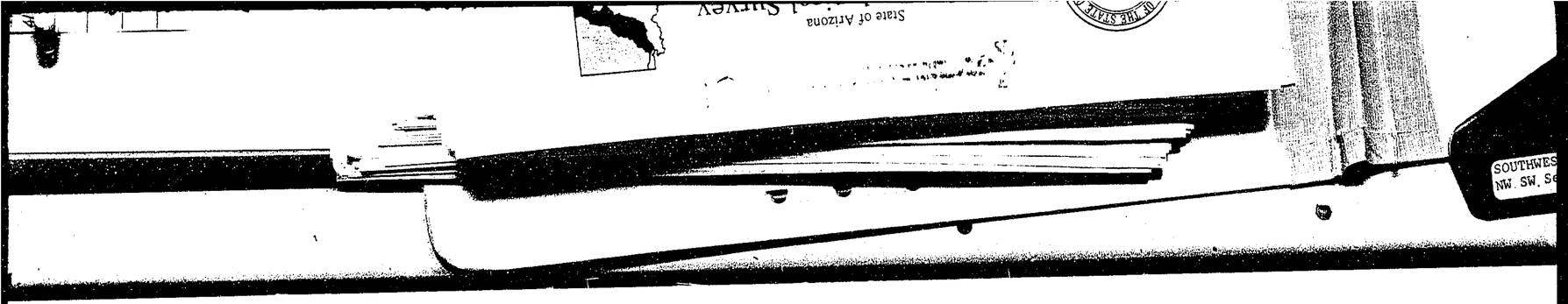
AZ	RADII IN FEET								
0	94.3	93.9	94.2	94.7	95.6	95.3	94.0	93.5	93.5
45	93.9	94.5	93.3	93.9	94.4	94.3	93.6	95.0	98.3
90	99.1	101.4	102.8	102.5	100.5	101.2	101.2	101.0	99.5
135	96.3	91.9	88.2	88.3	91.4	94.3	96.4	97.0	97.2
180	95.7	92.8	92.7	93.5	94.5	94.8	94.2	94.9	96.7
225	97.5	99.3	98.9	97.8	95.6	95.0	94.1	94.4	94.1
270	93.4	93.0	92.7	93.4	93.0	93.1	92.8	92.2	91.7
315	91.7	91.8	91.5	92.8	93.5	94.5	95.6	94.6	94.7

20-APR-85 14:18:07

VERTICAL CROSS SECTION

HORTON SHEY COMPANY
PHOENIX, ARIZONA
ROACH BAKER NO. 2
APRIL 15, 1985
HORZ SCALE: 1 IN. = 50 FEET
VERT SCALE: 1 IN. = 50 FEET




State of Arizona
SOUTHWES
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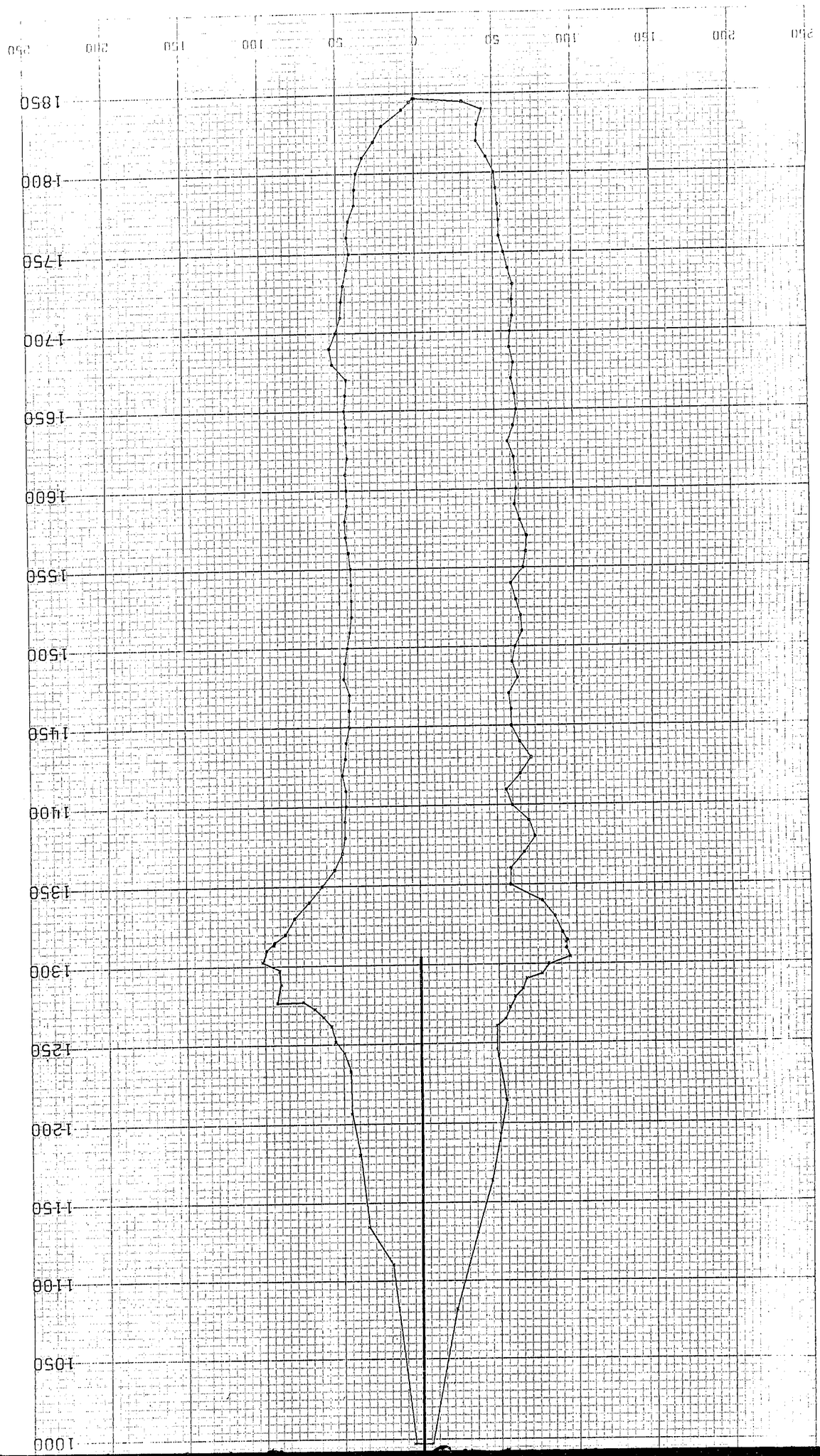
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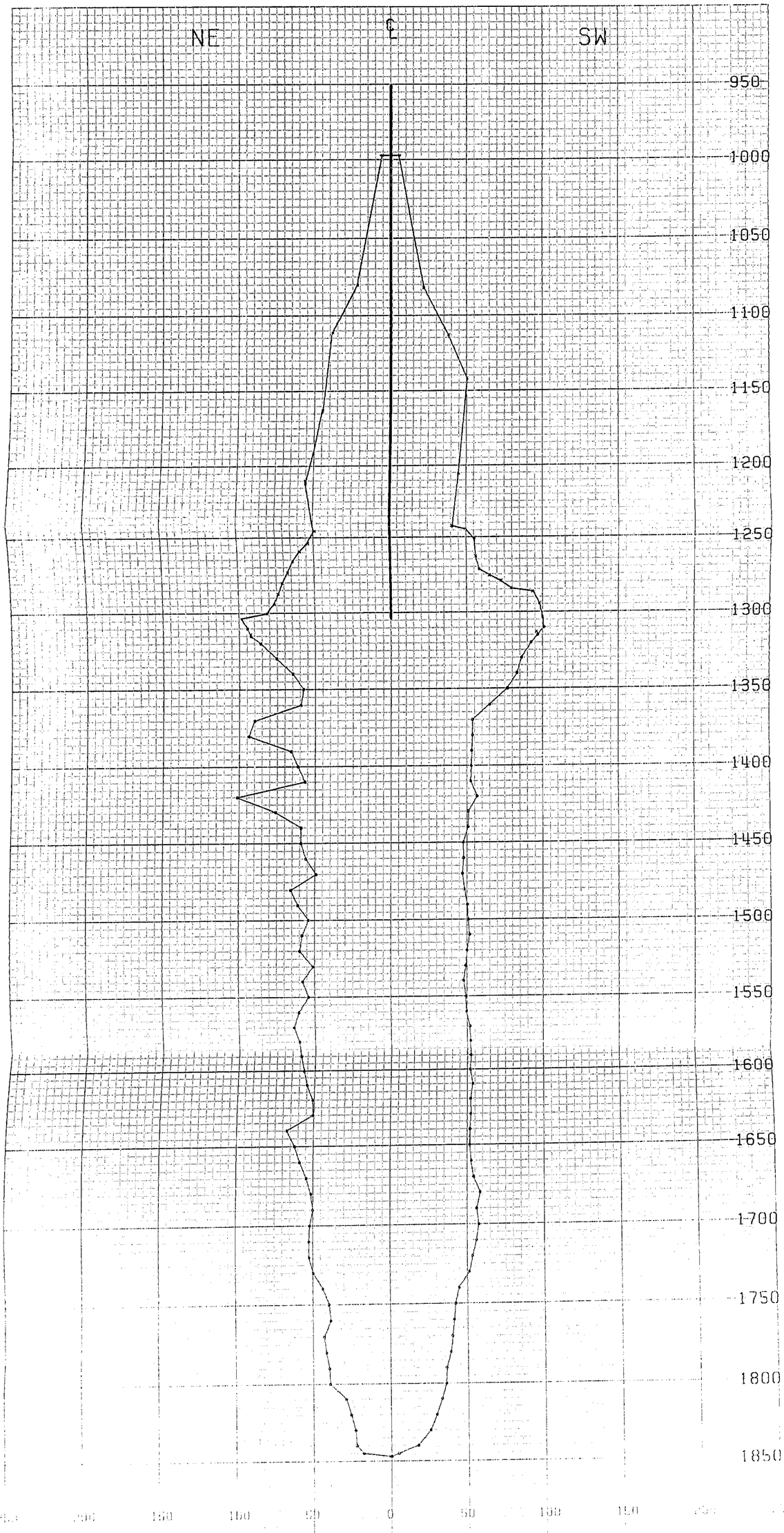
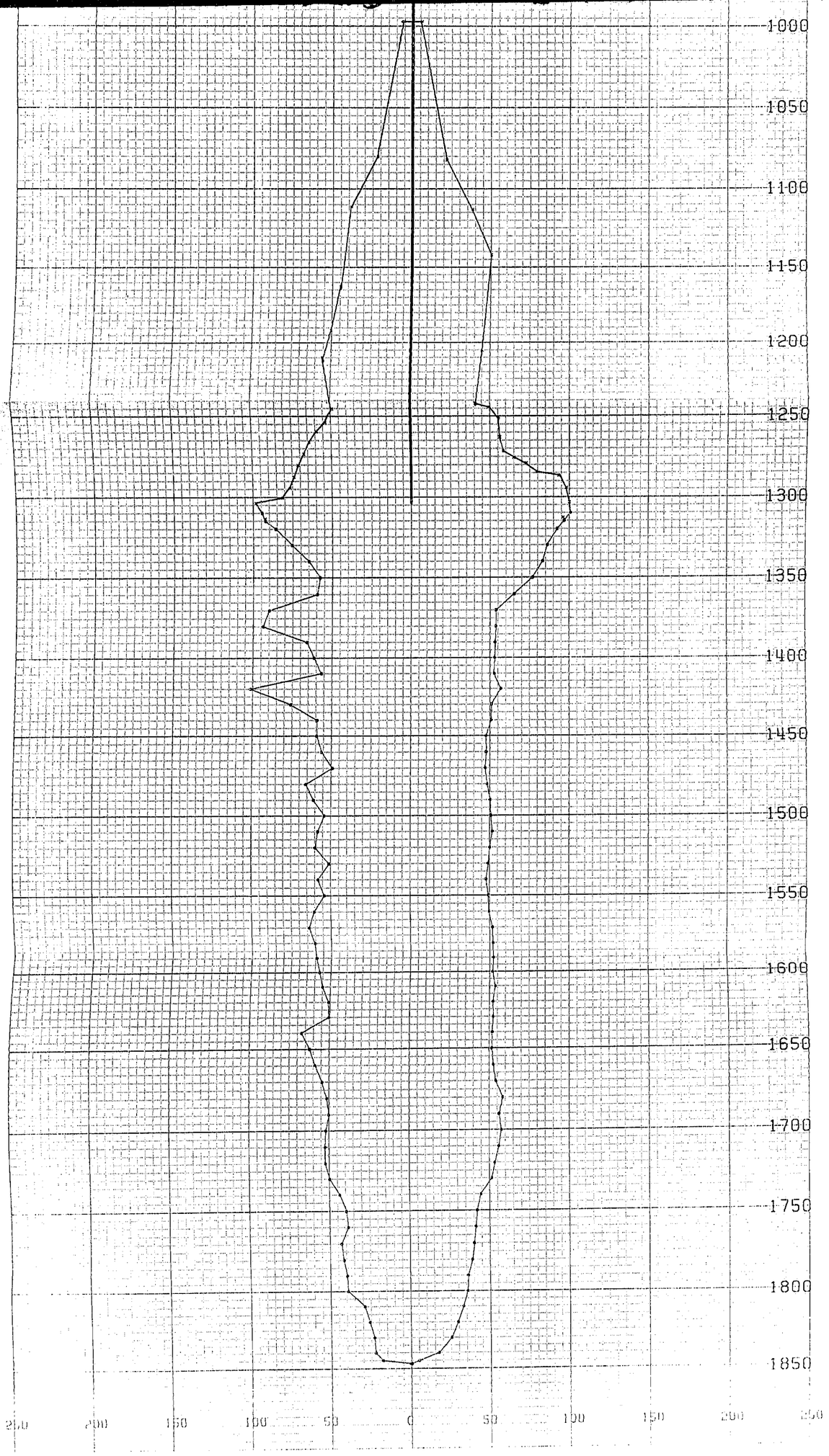
20-APR-85 14:25:25

VERTICAL CRØSS SECTIØN

MORTON SALT COMPANY
PHOENIX, ARIZONA
ROACH BAKER NO. 2
APRIL 15, 1985
HORZ SCALE: 1 IN. = 50 FEET
VERT SCALE: 1 IN. = 50 FEET

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20-APR-85 14:21:55

VERTICAL CROSS SECTION

MORTON SALT COMPANY
PHOENIX, ARIZONA
ROACH BAKER NO. 2
APRIL 15, 1985
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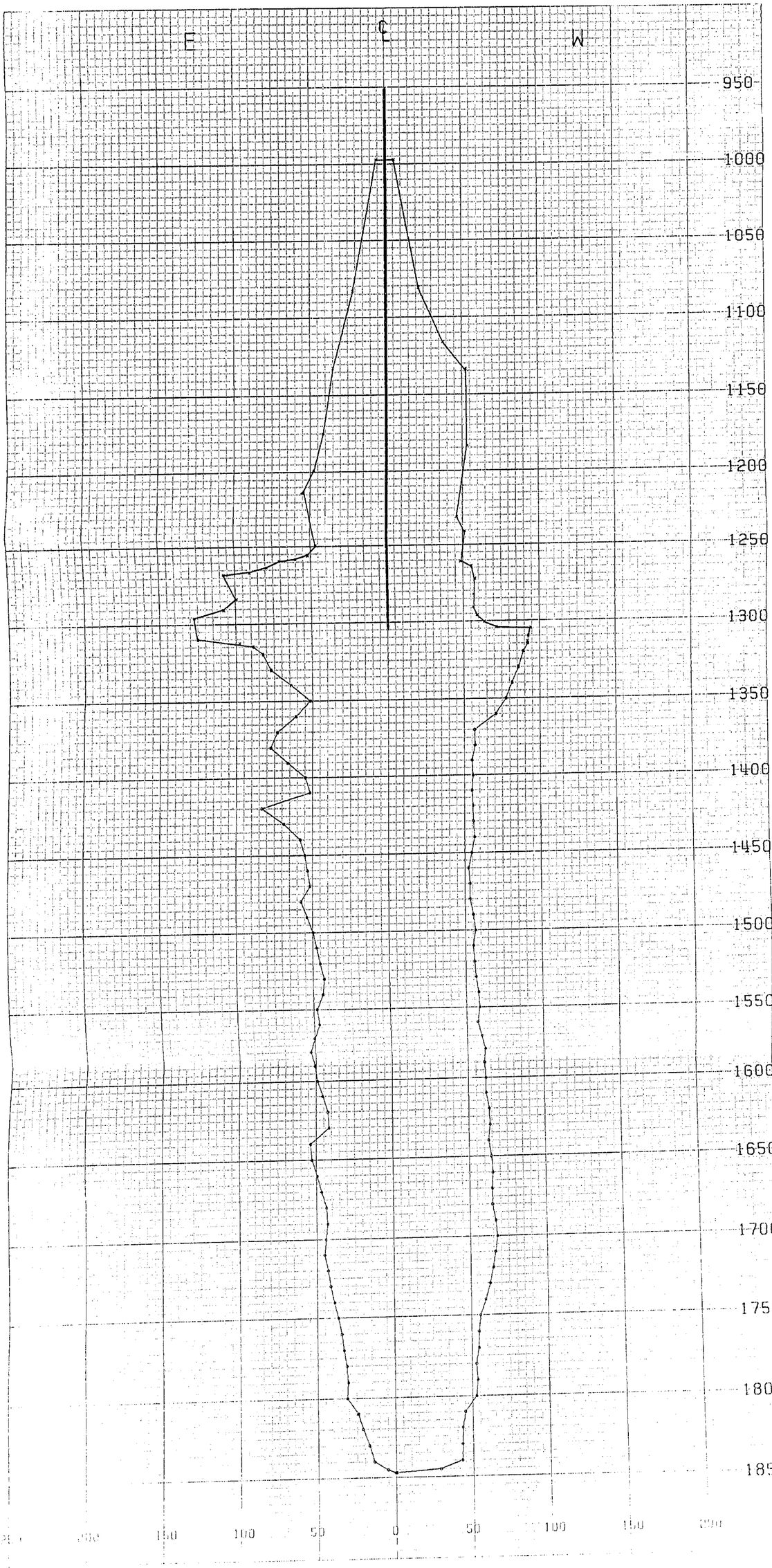

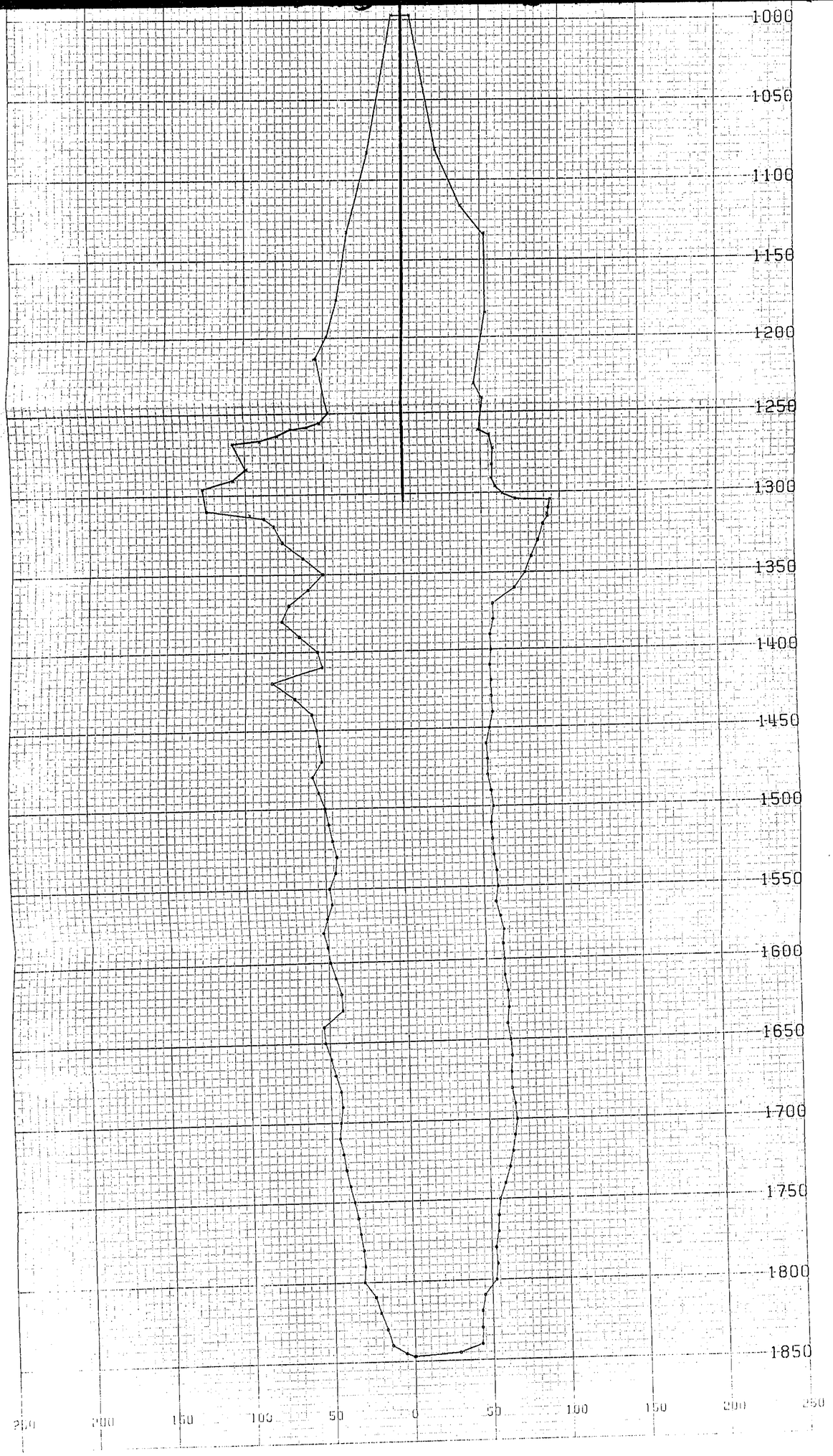
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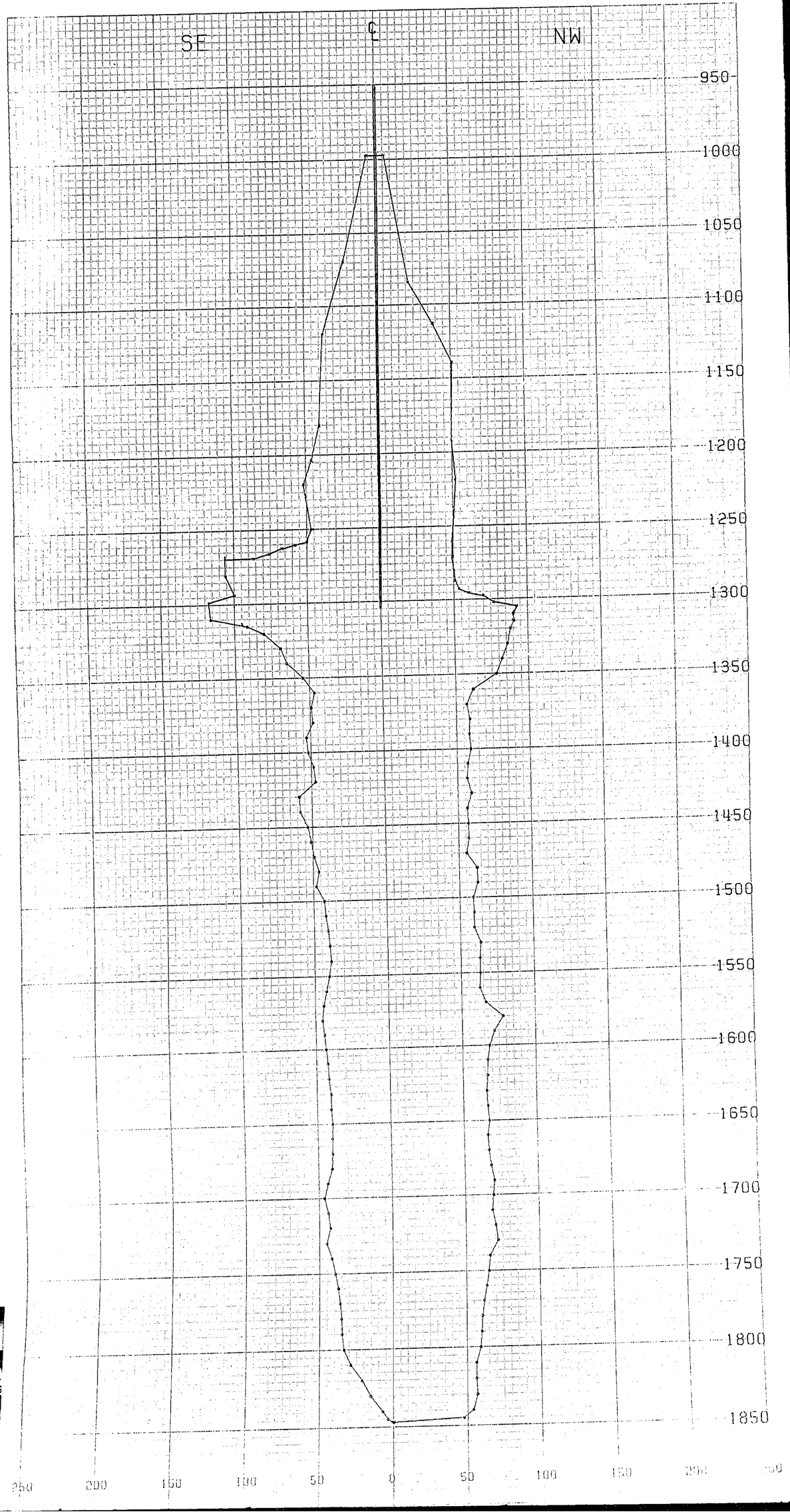
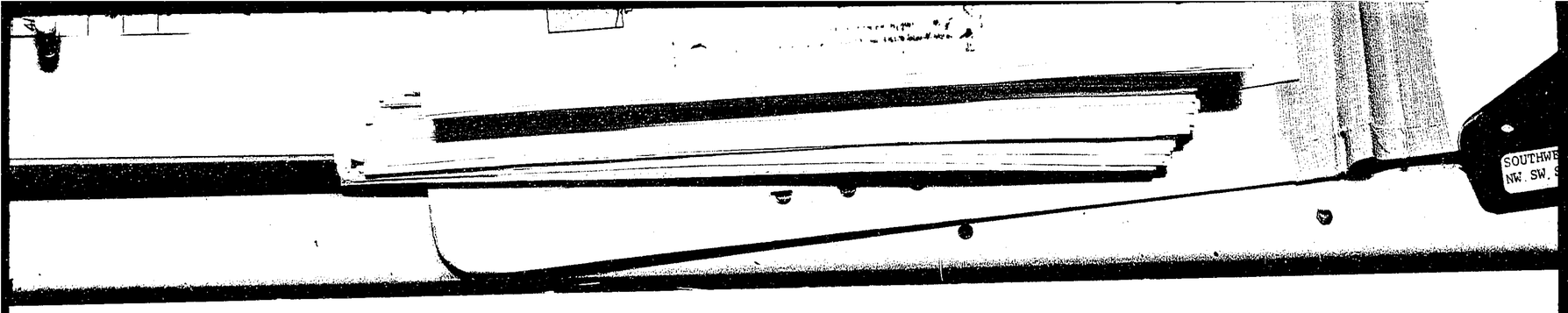
20-APR-85 14:29:09

VERTICAL CROSS SECTION

HORTON SALT COMPANY
PHOENIX, ARIZONA
ROACH BAKER NO. 2
APRIL 15, 1985
HORZ SCALE: 1 IN. = 50 FEET
VERT SCALE: 1 IN. = 50 FEET

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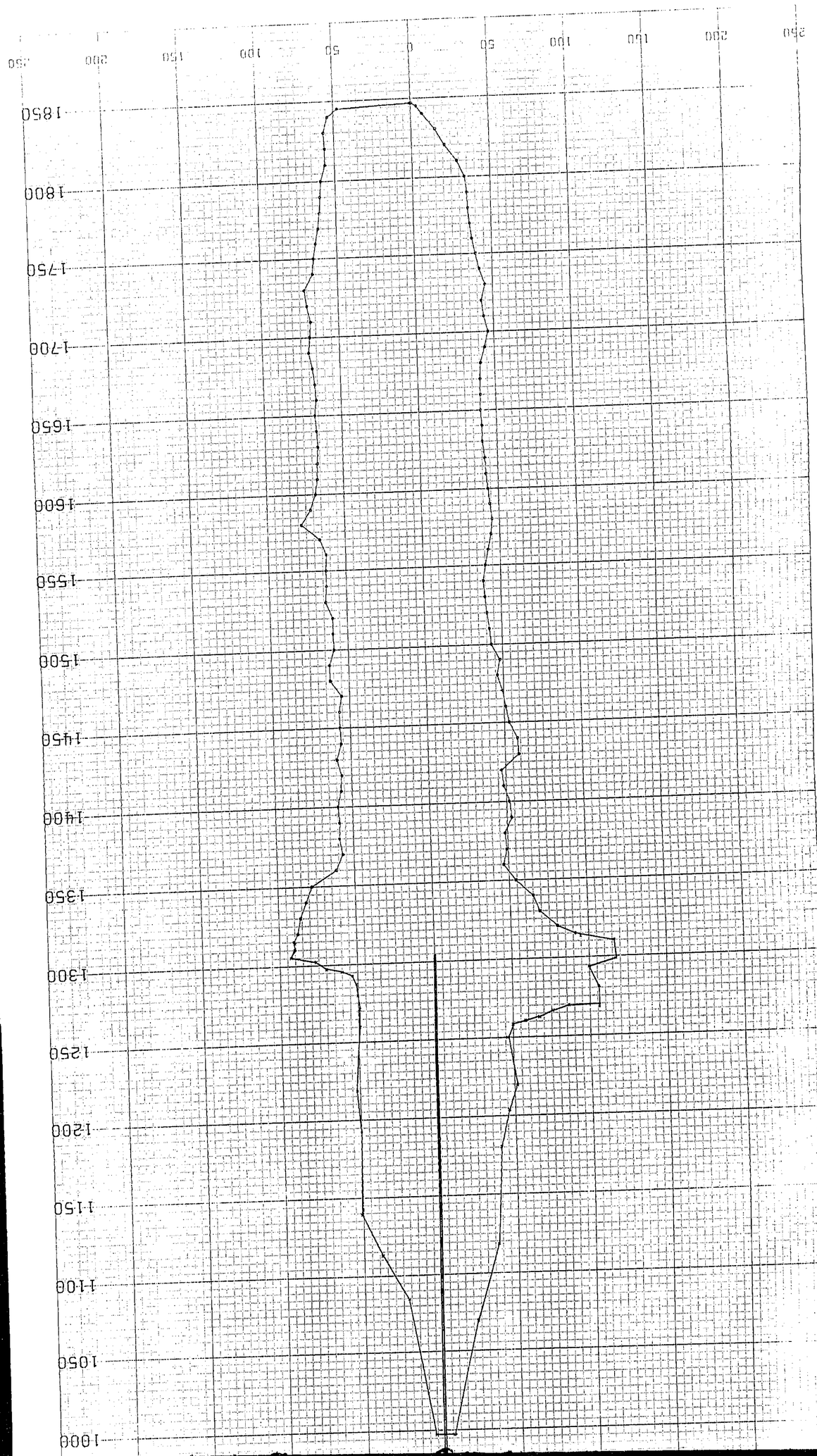
NW. SW. S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MARTON SALT COMPANY
PHOENIX, ARIZONA
ROACH BAKER NO. 2
APRIL 15, 1985

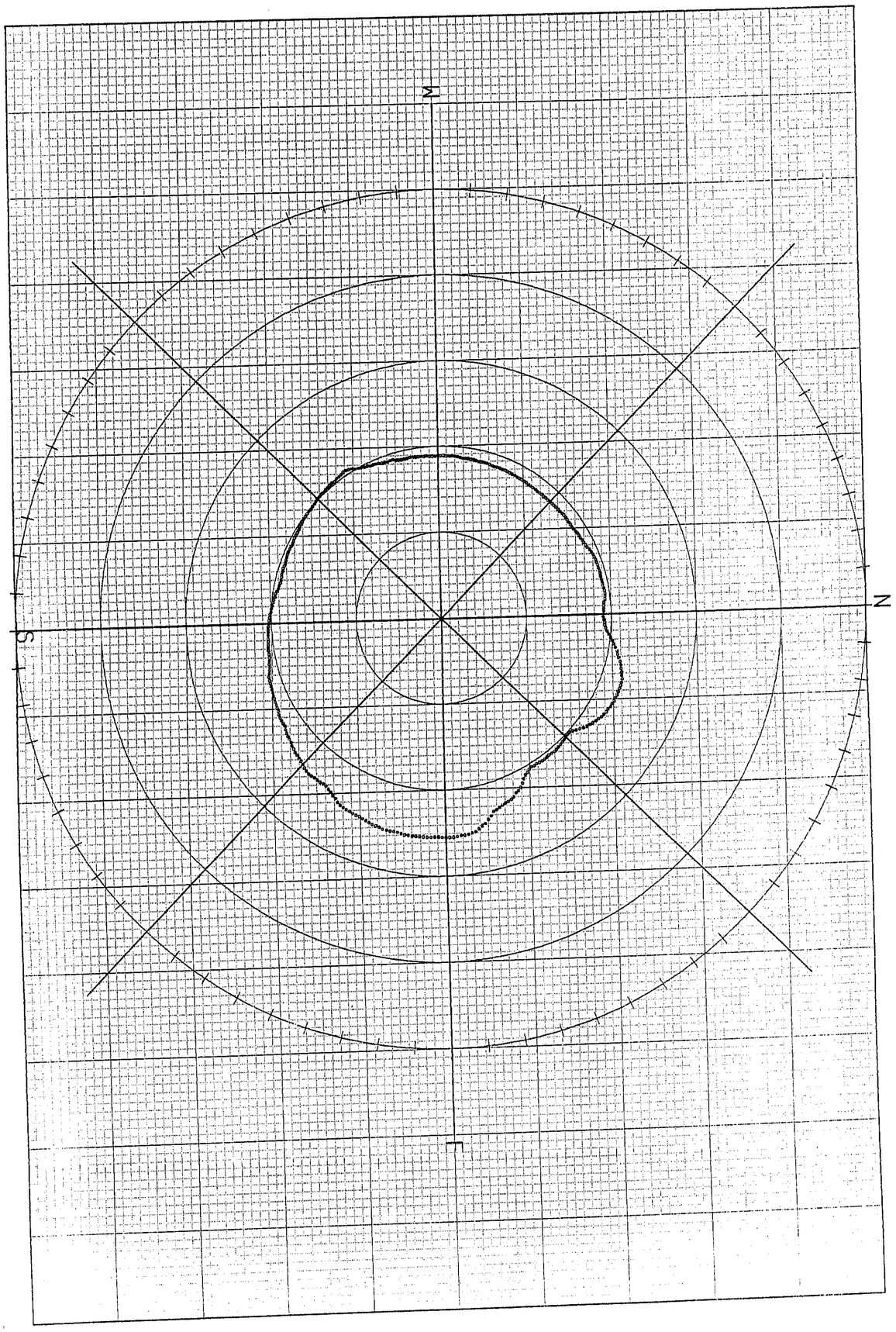
MAX RADII REPORT

20-APR-85 14:10:04
FROM DEPTH- 990
THRU DEPTH- 1850

AZM	RANGE	DEPTH	AZM	RANGE	DEPTH	AZM	RANGE	DEPTH	AZM	RANGE	DEPTH	AZM	RANGE	DEPTH	AZM	RANGE	DEPTH	AZM	RANGE	DEPTH	AZM	RANGE	DEPTH
0	95.5	1304	45	101.2	1420	90	127.2	1295	135	117.3	1298	180	101.5	1302	225	100.7	1310	270	94.2	1304	315	92.7	1305
1	95.3	1304	46	101.6	1420	91	127.1	1295	136	116.6	1298	181	101.2	1302	226	100.6	1310	271	94.2	1304	316	92.7	1305
2	95.8	1304	47	101.8	1420	92	126.8	1296	137	116.3	1310	182	100.8	1302	227	100.8	1302	272	94.4	1304	317	92.7	1305
3	96.1	1304	48	102.2	1420	93	126.9	1295	138	115.7	1310	183	100.6	1303	228	100.7	1303	273	94.1	1304	318	92.9	1305
4	96.3	1304	49	102.5	1420	94	127.2	1295	139	115.6	1310	184	100.1	1303	229	101.0	1302	274	94.1	1304	319	93.0	1305
5	96.9	1304	50	102.6	1420	95	127.2	1295	140	114.8	1310	185	100.0	1303	230	101.0	1302	275	94.3	1304	320	92.9	1305
6	97.8	1303	51	102.8	1420	96	127.2	1295	141	114.4	1310	186	99.5	1303	231	101.4	1302	276	94.2	1304	321	93.2	1305
7	98.8	1303	52	102.6	1420	97	127.2	1295	142	113.6	1310	187	99.2	1303	232	101.5	1302	277	94.1	1304	322	93.3	1304
8	100.3	1303	53	102.3	1420	98	127.2	1310	143	113.1	1310	188	99.1	1303	233	101.1	1302	278	93.8	1304	323	93.2	1305
9	101.5	1302	54	102.6	1420	99	127.3	1310	144	112.8	1310	189	98.4	1303	234	101.8	1302	279	93.5	1304	324	93.2	1305
10	102.6	1302	55	102.7	1420	100	127.2	1310	145	112.1	1310	190	98.4	1303	235	101.8	1302	280	93.6	1304	325	93.1	1305
11	103.7	1302	56	102.7	1420	101	127.3	1310	146	111.6	1310	191	97.8	1303	236	102.1	1302	281	93.8	1304	326	93.1	1305
12	105.3	1301	57	102.6	1420	102	126.9	1295	147	110.6	1310	192	97.3	1303	237	102.6	1302	282	93.6	1304	327	93.1	1305
13	105.9	1301	58	102.2	1420	103	126.6	1296	148	110.6	1310	193	97.1	1303	238	102.4	1302	283	93.7	1304	328	93.2	1305
14	106.9	1301	59	102.4	1420	104	126.5	1296	149	110.5	1310	194	96.7	1304	239	102.1	1302	284	93.5	1304	329	93.5	1304
15	108.2	1301	60	102.1	1420	105	126.8	1296	150	110.4	1310	195	96.7	1304	240	101.4	1302	285	93.2	1305	330	93.9	1304
16	109.1	1300	61	102.7	1302	106	126.6	1296	151	110.1	1310	196	96.8	1304	241	100.5	1303	286	93.4	1304	331	93.8	1304
17	109.8	1300	62	103.6	1302	107	126.9	1295	152	109.3	1310	197	97.1	1303	242	99.8	1310	287	93.5	1304	332	93.9	1304
18	110.6	1300	63	104.3	1302	108	126.2	1296	153	109.1	1310	198	97.2	1303	243	99.3	1310	288	93.4	1304	333	94.3	1304
19	111.4	1300	64	105.7	1301	109	126.1	1296	154	108.6	1310	199	97.4	1303	244	98.6	1310	289	93.3	1304	334	94.3	1304
20	112.2	1299	65	107.6	1301	110	126.0	1296	155	108.5	1310	200	97.2	1303	245	98.4	1310	290	93.0	1305	335	94.8	1304
21	112.5	1299	66	109.2	1300	111	125.6	1296	156	108.1	1310	201	97.1	1303	246	97.8	1310	291	92.8	1305	336	95.0	1304
22	112.6	1299	67	110.4	1300	112	125.2	1296	157	108.0	1310	202	97.3	1303	247	97.7	1310	292	93.1	1305	337	95.7	1304
23	112.7	1299	68	111.0	1300	113	124.8	1310	158	107.5	1310	203	97.5	1303	248	97.5	1310	293	93.2	1305	338	96.1	1304
24	112.8	1299	69	112.6	1299	114	124.3	1310	159	107.3	1310	204	97.8	1303	249	97.1	1310	294	93.1	1305	339	96.5	1304
25	112.8	1299	70	113.4	1299	115	124.4	1310	160	107.1	1310	205	97.9	1303	250	96.5	1310	295	93.3	1304	340	96.6	1304
26	112.6	1299	71	113.8	1299	116	124.2	1310	161	106.9	1310	206	97.8	1303	251	96.5	1310	296	93.0	1305	341	96.9	1304
27	112.7	1299	72	114.1	1299	117	123.9	1310	162	106.8	1310	207	97.7	1303	252	96.1	1310	297	92.9	1305	342	96.8	1304
28	112.4	1299	73	114.7	1299	118	123.8	1310	163	106.6	1310	208	97.6	1303	253	96.3	1310	298	92.9	1305	343	96.9	1304
29	112.4	1299	74	115.3	1299	119	123.6	1310	164	105.7	1310	209	97.8	1303	254	96.4	1310	299	93.0	1305	344	96.7	1304
30	111.7	1300	75	116.1	1298	120	123.3	1310	165	105.2	1310	210	98.1	1303	255	95.5	1310	300	92.7	1305	345	97.0	1304
31	111.7	1300	76	116.6	1298	121	122.5	1310	166	104.5	1310	211	98.0	1303	256	95.1	1310	301	92.7	1305	346	96.9	1304
32	111.2	1300	77	118.6	1298	122	121.3	1310	167	104.5	1310	212	98.2	1303	257	95.0	1304	302	92.9	1305	347	96.6	1304
33	110.8	1300	78	120.2	1297	123	120.6	1310	168	103.9	1302	213	98.4	1303	258	94.9	1304	303	92.7	1305	348	96.8	1304
34	109.8	1300	79	122.1	1297	124	119.7	1310	169	103.4	1302	214	98.7	1303	259	95.0	1304	304	92.8	1305	349	96.9	1304
35	109.2	1300	80	123.1	1297	125	119.0	1310	170	103.4	1302	215	98.9	1303	260	95.0	1304	305	92.5	1305	350	96.9	1304
36	108.5	1300	81	124.3	1296	126	118.2	1310	171	103.3	1302	216	99.0	1303	261	94.9	1304	306	92.5	1305	351	97.0	1304
37	107.4	1301	82	125.6	1296	127	118.1	1298	172	103.3	1302	217	99.4	1303	262	94.7	1304	307	92.4	1305	352	97.4	1303
38	106.7	1301	83	126.1	1296	128	118.6	1298	173	102.9	1302	218	99.4	1303	263	94.6	1304	308	92.7	1305	353	97.4	1303
39	105.6	1301	84	126.5	1296	129	118.6	1298	174	102.6	1302	219	99.5	1303	264	94.7	1304	309	92.3	1305	354	97.2	1303
40	104.3	1302	85	126.7	1296	130	118.6	1298	175	102.5	1302	220	99.7	1303	265	94.4	1304	310	92.4	1305	355	96.9	1304
41	103.2	1302	86	126.7	1296	131	119.0	1298	176	102.4	1302	221	99.5	1303	266	94.6	1304	311	92.5	1305	356	96.1	1304
42	101.9	1302	87	127.0	1295	132	119.0	1298	177	102.3	1302	222	99.8	1303	267	94.2	1304	312	92.2	1305	357	95.8	1304
43	100.9	1302	88	127.3	1295	133	118.6	1298	178	102.1	1302	223	99.9	1303	268	94.1	1304	313	92.6	1305	358	95.6	1304
44	101.0	1420	89	127.3	1295	134	118.1	1298	179	101.8	1302	224	100.3	1310	269	93.9	1304	314	92.4	1305	359	95.6	1304

MAXIMUM RADII

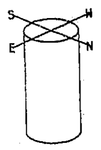
PHOENIX, ARIZONA
ROACH BAKER NO. 2
APRIL 15, 1985
SCALE: 1 IN. = 50 FEET

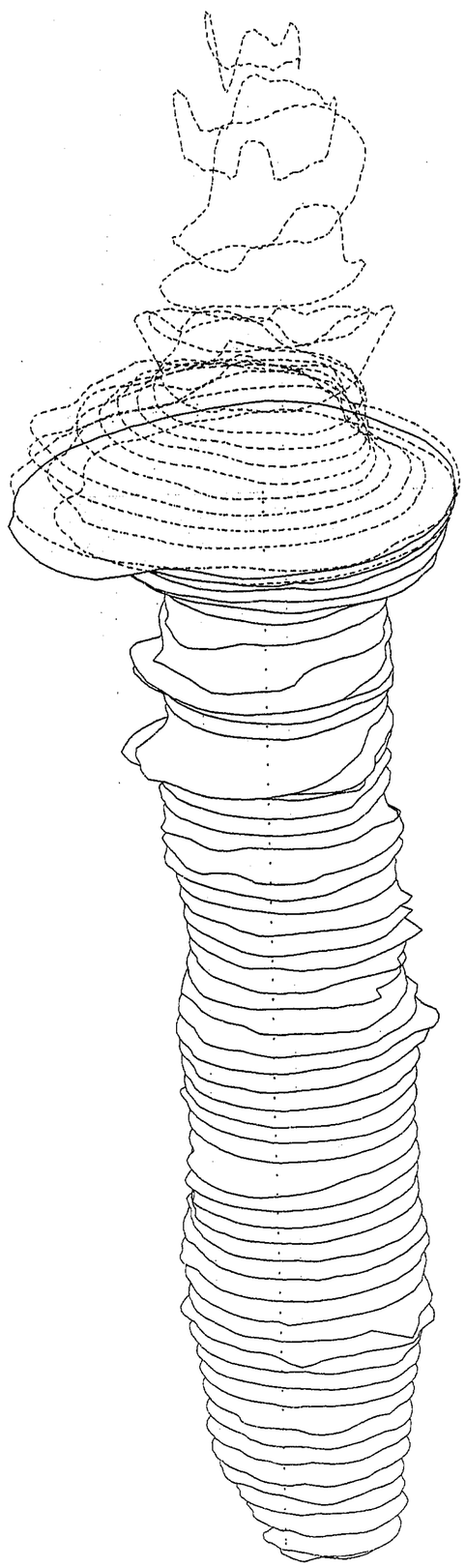


20-APR-85 14:45
FROM DEPTH: 990
THRU DEPTH: 1850
VIEWING AZIMUTH:45
HORZ SCALE: 1 IN.=50 FT.
VERT SCALE: 1 IN.=50 FT.

ISOMETRIC VIEW

MORTON SALT COMPANY
PHOENIX, ARIZONA
ROACH BAKER NO. 2
APRIL 15, 1985





20-APR-85 15:26
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VIEWING AZIMUTH: 225
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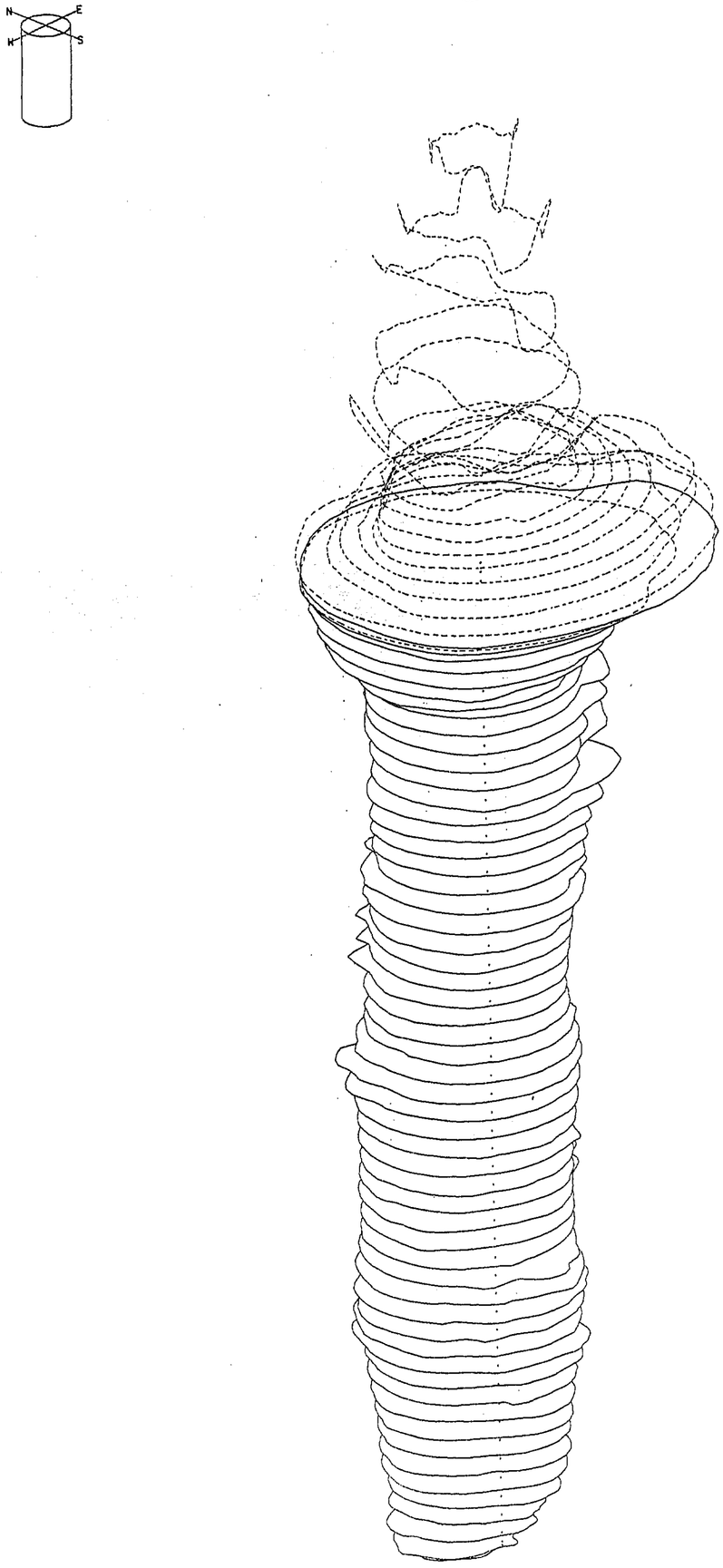
VERT SCALE: 1 IN.=50 FT.

ISOMETRIC VIEW

MORTON SALT COMPANY
PHOENIX, ARIZONA
ROACH BAKER NO. 2
APRIL 15, 1985



20-APR-85 15:32
FROM DEPTH: 990
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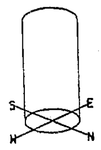
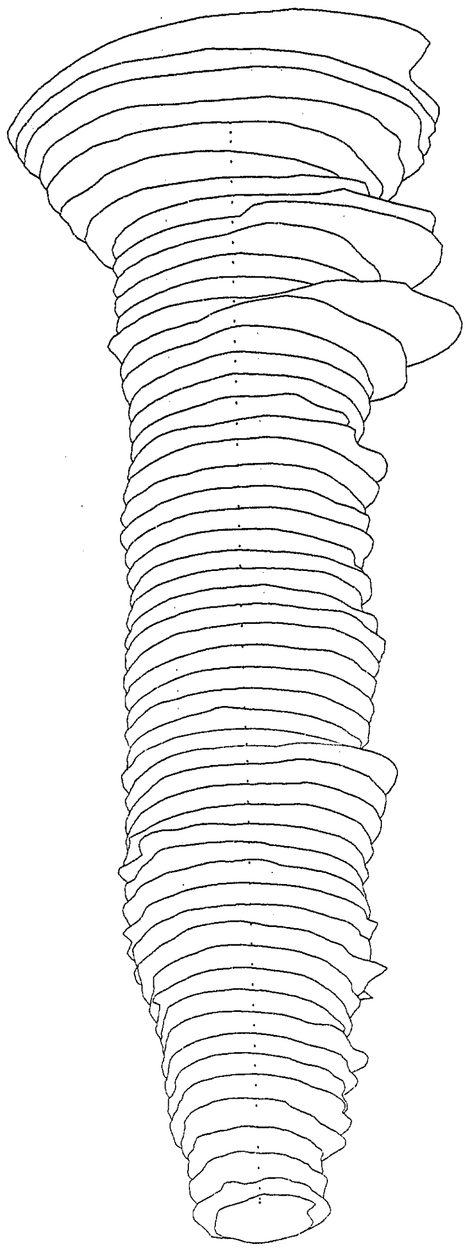
VIEWING AZIMUTH: 135
HORZ SCALE: 1 IN.=50 FT.
VERT SCALE: 1 IN.=50 FT.

ISOMETRIC VIEW

MORTON SALT COMPANY
PHOENIX, ARIZONA
ROACH BAKER NO. 2
APRIL 15, 1985

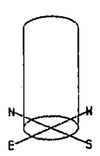


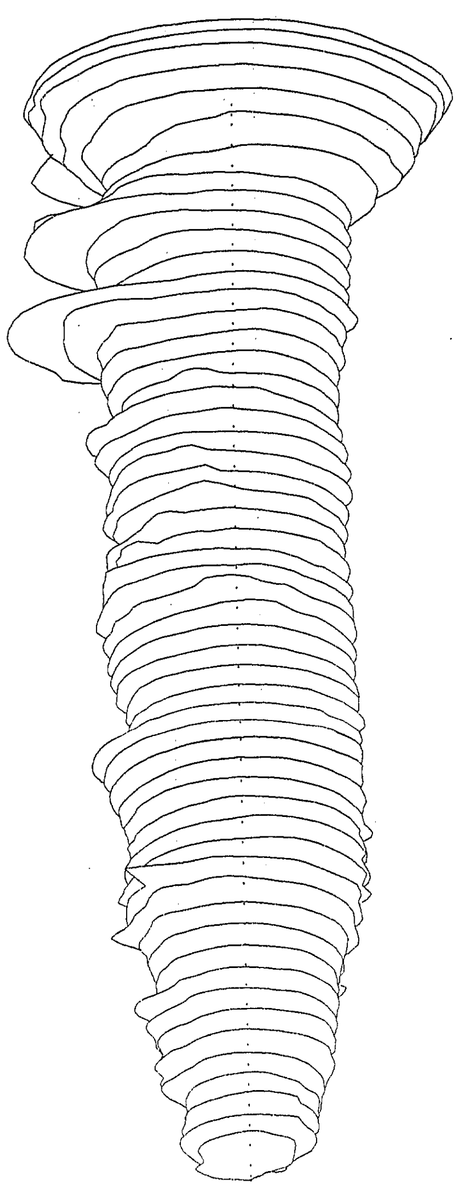


20-APR-85 15:37
FROM DEPTH: 990
THRU DEPTH: 1850
VIEWING AZIMUTH: 315
HORZ SCALE: 1 IN.=50 FT.
VERT SCALE: 1 IN.=50 FT.

ISOMETRIC VIEW

MORTON SALT COMPANY
PHOENIX, ARIZONA
ROACH BAKER NO. 2
APRIL 15, 1985





State of Arizona
Arizona Geological Survey
845 North Park Avenue, #100
Tucson, Arizona 85719
(602) 882-4795

Fife Symington
Governor

Larry D. Fellows
Director and State Geologist

July 3, 1995

file 548

Ms. Elizabeth Coffman
Dwight's EnergyData, Inc.
4350 Will Rogers Parkway, Suite 101
Oklahoma City, OK 73108

Dear Ms. Coffman:

I have enclosed the information in our well-file numbers 10-18, 10-19, 12-2, 13, 46, 347, and 548 in response to your recent letter. The information in these early well files is very meager, including only a cover sheet as in 10-18 and 10-19. The information in 13, 46, 347, and 548 is a little better, and was made from the best available data (such as onion-skin paper, etc.). As a result, give me a call if some of the information is difficult to read and I will try to help you from the original material.

Let me know if I may be of further assistance.

Sincerely,

Steven L. Rauzi
Oil & Gas Program Administrator

Enclosures

Oil and Gas Conservation Commission
STATE OF ARIZONA
5150 N. 16th STREET, SUITE B-141
PHOENIX, ARIZONA 85016
PHONE: (602) 255-5161

August 27, 1990

Ms. Betty Johns
Manager of Insurance Accounting
Morton International, Inc.
110 North Wacker Drive
Chicago, IL 60606-1560

RE: Southwest Salt Company
Performance Bonds 8306106 and 8418292

Dear Ms. Johns:

In reply to your letter of August 20, this letter represents this Commission's approval to release the referenced performance bonds 8306106 and 8418292.

Our records show that the wells drilled under the referenced bonds, namely Roach-Baker 1, permit 527, and Roach-Baker 2, permit 548, have been plugged and abandoned to the satisfaction of this Commission.

Sincerely,

Steven L. Rauzi

Steven L. Rauzi
Oil & Gas Specialist

Morton *International*

August 20, 1990

Dr. Daniel Brennan
Executive Director
State of Arizona
Oil & Gas Conservation Commission
5150 N. 16th St., Suite B-141
Phoenix, AZ 85016

RE: Southwest Salt Company
Bond No. 8306106 and 8418292

Subject: Request to terminate bonds

Dear Dr. Brennan:

I have been requested to ask that the above captioned bonds be terminated with the Commission's approval. Please see attached memo from our Southwest Salt Company, (a wholly-owned subsidiary of Morton International, Inc.), and copies of bonds.

Please advise if this action is appropriate at this time. If further information is required, please let me know.

Sincerely,

Betty Johns,
Manager of Insurance Accounting

BJ/cm
Enclosures

cc: Gary McFarlin
Jeff Sandburg

AUG 20 1990

Morton *International*

Morton Salt

Interoffice Memo

August 13, 1990

To: Betty Johns
Corporate Insurance
From: G. L. McFarlin
Glendale
Subject: Performance Bonds - Oil and Gas Conservation Commission

Please find attached copies of bonds serial numbers 83-06-106 and 84-18-292. These bonds were posted with the Arizona Oil and Gas Conservation Commission to insure proper abandonment of Roach Baker wells #1 and #2. Both of these wells were properly abandoned in June 1990. The bonds are no longer required and should be released.

Please let me know if you require anything else. I would appreciate copies of any correspondence relating to this matter.

Sincerely,

G. L. McFarlin

GLM:jp

cc: File 030-1
File 030-2

Oil and Gas Conservation Commission
STATE OF ARIZONA
5150 N. 16th STREET, SUITE B-141
PHOENIX, ARIZONA 85016
PHONE: (602) 255-5161

548

July 30, 1990

Mr. Gary L. McFarlin
Facility Manager
Morton Salt
13000 West Glendale Avenue
Glendale, AZ 85307-2408

Dear Gary:

Enclosed are copies of the surety bonds for the wells Roach-Baker 1 and Roach-Baker 2.

Let me know if I can be of further assistance.

Sincerely,

Steve

Steven L. Rauzi
Oil & Gas Specialist

Oil and Gas Conservation Commission
STATE OF ARIZONA
5150 N. 16th STREET, SUITE B-141
PHOENIX, ARIZONA 85016
PHONE: (602) 255-5161

July 6, 1990

Mr. J. H. Huizingh
Morton International Inc.
110 North Wacker Drive
Chicago, IL 60606-1555

Dear Mr. Huizingh:

I hereby acknowledge receipt of the plugging records dated July 3, 1990, for Roach-Baker 1 (P/N 527) and Roach-Baker 2 (P/N 548). This Commission is satisfied with your plugging and abandonment of these wells.

Sincerely,

Steven L. Rauzi

Steven L. Rauzi
Oil & Gas Specialist

Morton *International*

Morton Salt

July 3, 1990

Certified Mail

Mr. Steven L. Rauzi
Oil and Gas Conservation Commission
State of Arizona
5150 North 16 Street, Suite B141
Phoenix, AZ 85016

Mr. James Walker
U.S. EPA Region VIII
Drinking Water Branch (8WM-DW)
999 18th Street, Suite 500
Denver, CO 80202-2405

Dear Messrs. Rauzi and Walker:

In accordance with Arizona Administrative Code R12-7-127.C, the plugging records (Form No. 10) are attached for both Roach-Baker No. 1 (Permit No. 527) and Roach-Baker No. 2 (Permit No. 548). The plugging began for each well according to the final plans dated January 16, 1990, and approved by the AOGC in a letter dated January 22, 1990, and the U.S. EPA Region IX in a letter dated February 16, 1990 (Refer to W-6-2). The plans were revised on site when necessary with the concurrence of the AOGC and EPA representatives. The attached documents present the as plugged condition of each well.

Should you have any questions concerning the reports, please feel free to contact me at (312) 807-2594.

It is requested that the Arizona Oil and Gas Conservation Commission and U.S. EPA Region 9 advise in writing that the pluggings and abandonment of these two wells are satisfactory.

Thank you both for your assistance in successfully plugging these two wells.

Yours very truly,

Jim Huizingh

J. H. Huizingh
Manager, Solar Salt Technology

kkg

cc: J. J. Harkins
G. L. McFarlin - Glendale
M. E. Stover

P & A WITNESS RECORD

MORTON (SOUTHWEST) SALT NOS. 1 & 2, PERMIT NOS. 527 & 548

5/30/90: Run CBL logs on both the 1 & 2 wells.
Discuss P & A plans. (finish 6:30pm)

5/31/90: View the downhole video of wells and note depths of csg damage.
Run Thermal Decay Time (TDT) log on 2 (no diesel located).
Determine perfs for squeeze on 1 & 2.
Decide to perf top of cavern for diesel on 2. (finish at 6:00pm)

6/01/90: Tag plug in 1 and perf 778' up to 716'.
Cement 1 from plug up to 700', WOC overnight.
Perf 2 and let stand overnight to allow diesel to surface.

6/02/90: (Saturday, 7:30am to 6:20pm)
Bail fluid on 2 with dump bailer for 2 hrs with no diesel recovery.
Retrieve pkr in 2, set plug at 970', spot 10' cmt with bailer, WOC.
Tag TOC in 1 at 672', spud with tbg to 676' (hard cement).
In conference call with JW-EPA, agree to eliminate pkr at 640'.
Perf 1 from 650' up to 100' and lift cement up to 400'.

6/03/90: (Sunday, 7:00am to 3:30pm)
Tag TOC in 1 at 406', circulate cement to surface, no drop.
Perf 2 at 928'-32', lift cmt to 650', set pkr, squeeze at 56 psi.

6/04/90: (start at 6:30am) Perf 2 from 638' to 100'.
Pump 223 sacks of cement through tbg, WOC 8 hrs, reload cmt truck.
Tag TOC at 342', pump 240 sacks, WOC overnight. (finish at 8:00pm)

6/05/90: (start at 7:00am) Tag TOC at 165', circ cmt to surface, no drop.

6/06/90: Weld plates on both 1 & 2 per R12-7-127.7.

S. L. Rauzi

S. L. Rauzi, 6/06/90

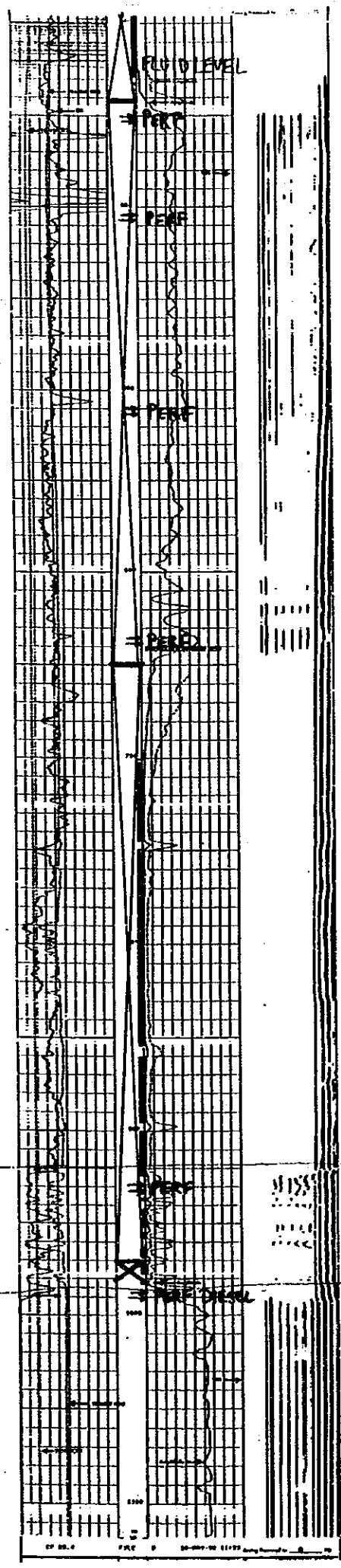
Morton Salt #2
(548)

TOP 2nd PLUG
223 sks 342'

TOP 4th PLUG
Surf

TOP 3rd PLUG
240 sks 165'

TOP 1st PLUG
650'



TOP Anhydrite

TOP Halite

Morton Salt #2
PIN 548

Schlumberger

SCHLUMBERGER WELL SERVICES
5000 GULF FREEWAY, P.O. BOX 2175
HOUSTON, TEXAS 77001, (713) 928-4000

PN #527,548

PLEASE REPLY TO

Schlumberger Well Services
Wireline & Testing
#17 County Rd. 5911
Farmington ,NM 87401

May 29, 1990

Jim Huizingh
Morton Salt
13000 W. Glendale Ave.
Glendale, AZ 85307

TO WHOM IT MAY CONCERN,

Bill Kelt is qualified as a Schlumberger Specialist in the interpretation of CBL's and TDT's. Bill has 9 years experience with Schlumberger and has been tested on CBL and TDT interpretation, and given promotions based on those tests. All logs and interpretations are checked by me, (David L. Fairhurst), I have 8 years experience with both CBL and TDT interpretation.

If there are any questions, please call me at (505) 325-5006.

Sincerely,

David L. Fairhurst

David L. Fairhurst
District Manager

DLF/ts

Morton *International*

Morton Salt

May 1, 1990

Mr. Daniel Brennan
Executive Director
Arizona Oil and Gas Commission
5150 North 16 Street
Suite B 141
Phoenix, AR 85016

Mr. Harry Seraydarian
Director, Water Management Division
U.S. EPA Region 9
215 Fremont Street
San Francisco, CA 94105

Dear Messrs. Brennan and Seraydarian:

This is a follow-up to my letter to you dated April 12, 1990, concerning plugging Roach-Baker Wells No. 1 and No. 2 at Southwest Salt Company, Glendale, Arizona. The drilling rig is scheduled to arrive on Tuesday, May 1. The plugging of Well No. 2 will be done first.

As agreed to by phone on Friday, April 27, I will contact the AOG representative (Dan Brennan) and the EPA representative (George Robin) when the well is clear and a cement bond log can be scheduled.

I anticipate that further communication will be made by phone or on site with the agency representatives.

Sincerely yours,

J. H. Huizingh

J. H. Huizingh
Manager, Solar Salt Technology

kkg

Morton *International*

Morton Salt

548

April 12, 1990

Mr. Daniel Brennan
Executive Director
Arizona Oil and Gas Commission
5150 North 16th Street
Suite B 141
Phoenix, Arizona 85016

Mr. Harry Seraydarian
Director, Water Management Division
U.S. EPA Region 9
215 Fremont Street
San Francisco, California 94105

Dear Messrs. Brennan and Seraydarian:

Morton Salt intends to commence plugging the No. 1 and No. 2 wells at Southwest Salt Company, Glendale, Arizona during the week of April 23, 1990. This letter fulfills the requirement for notifying the Arizona Oil and Gas Commission and the U.S. EPA one week in advance of the start of the work, as stated in the plugging plans dated January 16, 1990, and approved by the AOG ir a letter dated January 22, 1990 and the U.S. EPA Region 9 in a letter dated February 16, 1990 (refer to W-6-2). When the specific date for starting during the week of April 23 is chosen, notification will be made by telephone with a follow-up letter of confirmation.

Yours very truly,

Pronounced
Jim Huizingh High Zing

J. H. Huizingh
Manager, Solar Salt Technology

JHH/cm
041290

(312) 807-2594

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, CA 94105

cc:

February 16, 1990

H. W. Diamond
Director of Engineering
Morton International Inc.
110 North Wacker Drive
Chicago, IL 60060-1555

In reply
refer to W-6-2

PW 527 PW 548

RE: Southwest Salt Roach-Baker No. 1 and No. 2
Plugging and Abandonment Plans

Dear Mr. Diamond:

We have reviewed the proposed minor modifications to the plugging and abandonment procedures for the subject wells, described in your letter and Plugging Plans dated January 16, 1990.

The proposed revisions, in Steps 7 and 8 for well No. 1 and Steps 9 and 10 for well No. 2, add detail and clarification but do not represent a substantial change to the procedures. The EPA therefore finds these revisions acceptable.

The revised Plugging Plans for the referenced wells, dated January 16, 1990, are hereby approved.

Upon completion of the plugging and abandonment operations, submit a full report to this office describing the work performed and the results of any testing or logging that was done, in accordance with 40 CFR Part 144.28(k).

If you have any further questions concerning these matters, please call James Walker at (303) 293-1429 or Lester Kaufman, Chief, Underground Injection Control Section, at (415) 744-2250.

Sincerely,

Harry Seraydarian, Director
Water Management Division

cc: Daniel Brennan, Executive Director,
Arizona Oil & Gas Commission

Oil and Gas Conservation Commission
STATE OF ARIZONA
5150 N. 16th STREET, SUITE B-141
PHONEIX, ARIZONA 85016
PHONE: (602) 255-5161

January 22, 1990

H. W. Diamond
Director of Engineering
Morton Salt Company
110 North Wacker Drive
Chicago, IL 60606-1555

RE: Plugging Plan, Roach-Baker No. 1 (State Permit #527)
Plugging Plan, Roach-Baker No. 2 (State Permit #548)

Dear Mr. Diamond:

We are in receipt of your revised Plugging Plans dated 16 January 1990 for the above referenced wells. This letter constitutes our approval of the proposed steps as presented in those plans.

Sincerely,

Steven L. Rauzi

Steven L. Rauzi
Oil & Gas Specialist

AZ OIL & GAS
CONSERVATION COMMISSION

JAN 19 1990

Morton *International*

Morton Salt

January 16, 1990

Mr. Daniel Brennan
Executive Director
Arizona Oil and Gas Commission
5150 North 16th Street
Suite B 141
Phoenix, Arizona 85016

Mr. James Walker
U.S. EPA Region 9
c/o U.S. EPA Region VII
One Denver Place
999 18th Street
Denver, Colorado 80202

RE: Arizona Oil and Gas Commission Conservation Commission Response of December 7, 1989 and U.S. EPA Region 9 Response of December 22, 1989 to Morton Salt letter of November 30, 1989 on Plugging Southwest Salt Company's Roach-Baker No. 1 and No. 2 Wells

= 5%

Dear Mr. Brennan and Mr. Walker:

U.S. EPA Region 9 has responded to the November 30, 1989 plugging plans in its letter of December 22, 1989, a copy of which is enclosed; the plans were approved as submitted.

The Arizona Oil and Gas Conservation Commission has responded to the November 30, 1989 plugging plans in its letter of December 7, 1989, a copy of which is enclosed. Basically it pointed out that, 1) if the cement falls back, it must be re-filled and, 2) when there is a two step procedure, the top of the cement must be tagged before the second step is undertaken. The Commission advised that the plans will be approved with the inclusion of minor modifications to address these concerns.

In order to incorporate these items, Morton Salt proposes the following:

1. Add the following sentence to step 7 for Well No. 1 and to step 9 for Well No. 2: "Wait at least eight hours for the cement to harden. Tag the top of the cement; if it has fallen back, refill to 400'. Repeat the filling, waiting, tagging, sequence until the casing is cemented to 400'."

2. Add the following sentence to step 8 for Well No. 1 and step 10 for Well No. 2: "Wait at least eight hours for the cement to harden. If it has fallen back, refill to the surface. Repeat the filling and waiting sequence until the casing is cemented to the surface."

The plugging plans for the wells have been revised to incorporate these changes and are enclosed.

The revisions provide more detail to the procedures and are not a change. It is requested that the Arizona Oil and Gas Conservation Commission and U.S. EPA Region 9 advise in writing whether the January 3, 1990 plans are acceptable.

As stated previously, as soon as final approval is received a funding request will be submitted to Morton Salt Management and immediately after it is approved, the work will begin. We wish to again express our appreciation to both of you in developing this plan.

Yours very truly,

H.W. Diamond

H. W. Diamond
Director of Engineering

HWD/cm
122689

Enclosure

cc: Mr. Lester Kaufman- UIC Section Chief
U.S. EPA - Region 9
215 Fremont Street
San Francisco, California 94105

J. E. Goodbrake
G. L. McFarlin-Glendale
M. E. Stover

1/16/90

Plugging Plan for Roach-Baker #2
Revised by Morton Salt
January 16, 1990

For all cementing: cement will be Class A or B or Type 2. Cement may be purchased locally and mixed and pumped with rig equipment. It will be neat cement mixed with water and no other additions. Wait-on-cement time will be at least eight hours. After each stage of cementing, the top of the cement will be tagged. If the cement is hard, proceed to the next step; if top of cement is not found, repeat procedures as necessary until a hard cement plug is established.

Notification: The Arizona Oil and Gas Commission and the U.S. EPA will be notified one week in advance of the start of the work.

1. Remove 5" and 7" tubing at least to 1,050'. If it will not come free by conventional means, may run a freepoint and cut where tubing is free. May need to pull in sections.

2. Remove 8-5/8" liner. May need to cut in sections and remove as above. Well will now be clear to at least 1,050'.

3. Run cement bond log deep enough to pick up the top of the cavity and high enough to pick up the top of the fluid level. If the tubing is only cleared to 1,050', and the log shows that the top of the cavity is below that, an attempt will be made to clear the tubing and find the top of the cavity. If the cement bond log does not clearly indicate the top of the cavern, another log type, as determined by Morton Salt, will be run.

4. Run a density TDT interface type log from below top of the cavity to the surface. This type of log will pick up any pockets of oil as a lower density fluid. Exact specifications of log will depend on which logging contractor is selected. Logging contractor will be qualified to interpret all logs that are run. Evidence of qualification will be provided once the logging contractor is selected.

5. If oil is found, perforate the 10-3/4" casing with at least 40 holes or 10' with 4 jets per foot and attempt to remove all of the oil. If no oil is found perforate at

1/16/90

the top of cavity as that is where any oil trapped in the cavity would collect. If there is any oil in the cavity it will flow to the top of the fluid level as the lower density oil makes its way into the casing.

After a waiting period of eight hours, begin bailing the casing; continue bailing until there is a two hour period in which no oil is recovered. Any oil that is found will be directed into a reserve pit and disposed of properly.

6. Set a regular cast-iron bridge plug 20' above the perforations completed in step No. 5. If the casing conditions and size are unknown, set an inflatable bridge plug. Using tubing, break circulation and clean hole. Place 10' to 20' of Class A or B or Type 2 cement on plug. Cement may be purchased locally and mixed and pumped with rig equipment. It will be neat cement, mixed with water and no other additions. Wait-on-cement time will be at least eight hours.

   Tag top of cement. If cement is hard, proceed to next step. If top of cement is not found, repeat procedures as necessary until a hard cement plug is established in the hole.

7. Perforate 10-3/4" casing with eight shots per foot over a four foot section. This will be done at approximately 960' above the plug and as low as possible in the anhydrite confining zone above the salt. Eight shots per foot will probably be accomplished by two runs at four shots per foot.

8. Set packer at 800' and attempt to squeeze from 960' to just below 800'. If formation will not take squeeze fluid, fill with cement to just below 800'.

9. If the cement bond log shows uncemented volumes behind the 10-3/4" casing at approximately 800', consult the Commission Representative on-site on the number and location of perforations to fill this void and perforate accordingly. Also, consult the Commission and U.S. EPA Representatives for any perforations that are appropriate between 800' and 400', and perforate accordingly. Fill with cement to 400'. Wait at least eight hours for the cement to harden. Tag the top of the cement; if it has fallen back, refill to 400'. Repeat the filling, waiting, tagging, sequence until the casing is cemented to 400'.

1/16/90

10. If the cement bond log shows uncemented volumes behind the 10-3/4" casing above 400', consult the Commission and U.S. EPA Representatives on-site on the number and location of perforations to fill this void. The section above the fluid level will be perforated a couple of times just in case there are uncemented sections above this point. Fill with cement to surface. Wait at least eight hours for the cement to harden. If it has fallen back, refill to the surface. Repeat the filling and waiting sequence until the casing is cemented to the surface.

11. Cut off casing and install plugged well marker in accord with R12-7-127.

In the event of unexpected complications, the program will be revised as directed by the Commission and U.S. EPA Representatives on-site.

1/16/90

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, CA 94105

DEC 22 1989

In Reply
Refer to w-6-2

H. W. Diamond
Director of Engineering
Morton International, Inc.
110 North Wacker Drive
Chicago, IL 60060-1555

RE: Southwest Salt Roach-Baker #1
Plugging and Abandonment Plan

Southwest Salt Roach-Baker #2 #542
Plugging and Abandonment Plan

Dear Mr. Diamond:

We have reviewed the revised plugging and abandonment plans for the subject wells that were attached to your letter of October 9, 1989 as attachments #1 and #2. We found them to be acceptable with the exception of the cementing procedure proposed for the lowermost set of perforations in each well. The EPA position was presented by James Walker, EPA Environmental Engineer, in telephone conversations with you on November 14 and 15:

> **The bottom squeeze operation should be performed separately through a packer or retainer set above the perforations to ensure that an adequate cement volume is placed in the annular space behind the production casing between the salt formation and the USDW.**

We have reviewed your last P & A revision (dated November 27), which includes a separate squeeze operation for the lowermost perforations and setting cement plugs in two or more stages in each well. The plans are approved as presented in these documents.

Upon completion of the plugging and abandonment operations, submit a full report to this office describing the work conducted and the results of any testing or logging that was done per 40 CFR §144.28(k).

If you have any further questions concerning these matters, please call James Walker at (303) 293-1431 or Lester Kaufman, Chief, Underground Injection Control Section, at (415) 654-9275.

Sincerely,

Harry Seraydarian, Director
Water Management Division

cc: Daniel Brennan - Arizona Oil and Gas Commission

Oil and Gas Conservation Commission
STATE OF ARIZONA
5150 N. 16th STREET, SUITE B-141
PHOENIX, ARIZONA 85016
PHONE: (602) 255-5161

December 7, 1989

Mr. H. W. Diamond
Director of Engineering
Morton International, Inc.
110 N. Wacker Drive
Chicago, IL 60606-1555

Dear Mr. Diamond:

In response to your letter of November 30, 1989 we have the following comments on the Plugging Plan for Roach-Baker #1.

1. It is unclear whether you intend a period of waiting for cement to harden between step 7 and step 8. Is this intended to be a continuous procedure? Is this a stage as mentioned in the introductory paragraph?

2. You have eliminated the required waiting period in the cementing to the surface procedure (Step 8). You are required to check for "fall back" after cementing and to refill the hole if it does not remain full.

With regard to the Plugging Plan for Roach-Baker #2 we note that the same comments apply, in this case at steps 9 and 10. #547

Please modify your plans to clarify whether cementing above 700 feet (#1) or above 800 feet (#2) is to be a two-step or a one-step procedure. (Either a one-step or a two-step procedure will be approved by the Commission.) If it is to be a two-step procedure the top of the cement must be tagged before the second step is undertaken.

You must wait at least 8 hours after cementing to the surface to check for fall-back. If the cement level has gone down, repeat the cementing process until cement remains at the surface after eight hours of waiting time. This was included in your earlier plan.

The Commission will approve the present plan (dated November 20, 1989) with the inclusion of these minor modifications.

Very truly yours,

Daniel J. Brennan
Executive Director

Morton *International*

Morton Salt

November 30, 1989

Mr. Daniel Brennan
Executive Director
Arizona Oil and Gas Commission
5150 North 16th Street
Suite B 141
Phoenix, Arizona 85016

Mr. James Walker
U.S. EPA Region IX
c/o U.S. EPA Region VII
One Denver Place
999 18th Street
Denver, Colorado 80202

RE: Southwest Salt Company, Plugging Roach-Baker
No. 1 and No. 2 Wells
#547

Dear Mr. Brennan and Mr. Walker:

Morton Salt's letter of October 9, 1989 to Mr. Harry Seraydarian (U.S. EPA Region IX) with a copy to Mr. Brennan, proposed an alternative method for plugging the No. 1 and No. 2 wells at Southwest Salt Company - Glendale, Arizona. As a result of the October 9 letter, further discussions were held between Mr. Walker and Morton Salt.

Enclosed are revised plans dated November 20, 1989 for plugging these two wells. It is believed that they will be acceptable to the Arizona Oil and Gas Commission and Mr. Walker has indicated preliminary approval by U.S. EPA Region IX.

It is requested that both the Arizona Oil and Gas Commission and the U.S. EPA Region IX advise in writing whether the November 20, 1989 plans are acceptable. As soon as approval is received, a funding request will be submitted to

Morton Salt management and immediately thereafter, the work will begin.

We wish to express our appreciation to both of you for your assistance in developing this plan.

Yours very truly,

H. W. Diamond

H. W. Diamond
Director of Engineering

HWD/cm
112289

Enclosure

cc: Mr. Lester Kaufman- UIC Section Chief
U.S. EPA - Region IX
215 Fremont Street
San Francisco, California 94105

J. F. Goodbrake
M. E. Stover
G. L. McFarlin-Glendale

Plugging Plan for Roach-Baker #2
Revised by Morton Salt
November 27, 1989

For all cementing: cement will be Class A or B or Type 2. Cement may be purchased locally and mixed and pumped with rig equipment. It will be neat cement mixed with water and no other additions. Wait-on-cement time will be at least eight hours. After each stage of cementing, the top of the cement will be tagged. If the cement is hard, proceed to the next step; if top of cement is not found, repeat procedures as necessary until a hard cement plug is established.

Notification: The Arizona Oil and Gas Commission and the U.S. EPA will be notified one week in advance of the start of the work.

1. Remove 5" and 7" tubing at least to 1,050 feet. If it will not come free by conventional means, may run a freepoint and cut where tubing is free. May need to pull in sections.

2. Remove 8-5/8" liner. May need to cut in sections and remove as above. Well will now be clear to at least 1,050 feet.

3. Run cement bond log deep enough to pick up the top of the cavity and high enough to pick up the top of the fluid level. If the tubing is only cleared to 1,050 feet, and the log shows that the top of the cavity is below that, an attempt will be made to clear the tubing and find the top of the cavity. If the cement bond log does not clearly indicate the top of the cavern, another log type, as determined by Morton Salt, will be run.

4. Run a density interface type log from below top of the cavity to the surface. This type of log will pick up any pockets of oil as a lower density fluid. Exact specifications of log will depend on which logging contractor is selected. Logging contractor will be qualified to interpret all logs that are run. Evidence of qualification will be provided once the logging contractor is selected.

5. If oil is found, perforate the 10-3/4" casing with at least 40 holes or 10 feet with 4 jets per foot and attempt to remove all of the oil. If no oil is found perforate at the top of cavity as that is where any oil trapped in the cavity would collect. If there is any oil in the cavity it will flow to the top of the fluid level as the lower density oil makes its way into the casing.

   After a waiting period of eight hours, begin bailing the casing; continue bailing until there is a two hour period in which no oil is recovered. Any oil that is found will be directed into a reserve pit and disposed of properly.

6. Set a regular cast-iron bridge plug 20 feet above the perforations completed in Step No. 5. If the casing conditions and size are unknown, set an inflatable bridge plug. Using tubing, break circulation and clean hole. Place 10 to 20 feet of Class A or B or Type 2 cement on plug. Cement may be purchased locally and mixed and pumped with rig equipment. It will be neat cement, mixed with water and no other additions. Wait-on-cement time will be at least eight hours.

   Tag top of cement. If cement is hard, proceed to next step. If top of cement is not found, repeat procedures as necessary until a hard cement plug is established in the hole.

7. Perforate 10-3/4" casing with eight shots per foot over a four foot section. This will be done at approximately 960 feet, above the plug and as low as possible in the anhydrite confining zone above the salt. Eight shots per foot will probably be accomplished by two runs at four shots per foot.

8. Set packer at 800 feet and attempt to squeeze from 960 feet to just below 800 feet. If formation will not take squeeze fluid, fill with cement to just below 800 feet.

9. If the cement bond log shows uncemented volumes behind the 10-3/4" casing at approximately 800 feet, consult the Commission representative on-site on the number and location of perforations to fill this void and perforate accordingly. Also, consult the Commission and U.S. EPA representatives for any perforations that are appropriate between 800 feet and 400 feet, and perforate accordingly. Fill with cement to 400 feet.

10. If the cement bond log shows uncemented volumes behind the 10-3/4" casing above 400 feet, consult the Commission and U.S. EPA representatives on-site on the number and location of perforations to fill this void. The section above the fluid level will be perforated a couple of times just in case there are uncemented sections above this point. Fill with cement to surface.

11. Cut off casing and install plugged well marker in accord with R12-7-127.

In the event of unexpected complications, the program will be revised as directed by the Commission and U.S. EPA representatives on-site.

111589

Morton *International*

Morton Salt

October 9, 1989

Mr. Harry Seraydarian
Director, Water Management Division
U. S. EPA - Region IX
215 Fremont Street
San Francisco, California 94105

RE: Southwest Salt Roach-Baker #2 (#548)
Plugging and Abandonment Plan
(U. S. EPA Reference W-6-2 of
June 19, 1989)

Southwest Salt Roach-Baker #1
Plugging and Abandonment Plan
(U. S. EPA Reference W-6-2 of
July 17, 1989)

Dear Mr. Seraydarian:

On March 14, 1989 Morton Salt submitted plugging and abandonment plans that had been approved by the Arizona Oil and Gas Commission for wells Roach-Baker #1 and Roach-Baker #2, both in Glendale Arizona. Your letter of June 19, 1989 approved a plugging and abandonment plan for Roach-Baker #2 provided certain conditions or changes were incorporated. Your letter of July 17, 1989 advised that the plan for Roach-Baker #1 was approved but recommended incorporation of certain changes.

Morton Salt has reviewed the requested conditions and changes and requests clarification on some and reconsideration of others.

As a starting point, here is Morton Salt's understanding of the program requested by U. S. EPA Region 9 for Roach-Baker #2.

1. Remove 5" and 7" tubing at least to 1050 ft. If it will not come free by conventional means, may run a

freepoint and cut where tubing is free. May need to pull in sections.

2. Remove 8-5/8" liner. May need to cut in sections and remove as above. Well will now be clear to at least 1050 ft.

3. Run cement bond log deep enough to pick up the top of the cavity and high enough to pick up the top of the fluid level. If the tubing is only cleared to 1050 ft. and the log shows that the top of the cavity is below that, an attempt will be made to clear the tubing and find the top of the cavity. If the cement bond log does not clearly indicate the top of the cavern, a sonar survey will be run.

   Note: Morton Salt requests that it be allowed to determine the type of log to use if the cement bond log does not clearly indicate the top of the cavern.

4. Run a density interface type log from below top of the cavity to the surface. This type of log will pick up any pockets of oil as a lower density fluid. Exact specifications of log will depend on which logging contractor is selected. Logging contractor will be qualified to interpret whatever logs are run; evidence of qualification will be provided once the logging contractor is selected.

5. If oil is found, perforate the 10-3/4" casing with at least 40 holes or 10 feet with 4 jets per foot and attempt to remove all of the oil. If no oil is found perforate at the top of cavity as that is where any oil trapped in the cavity would collect. If there is any oil in the cavity it will flow to the top of the fluid level as the lower density oil makes its way into the casing.

   After a waiting period of eight hours, begin bailing the casing; continue bailing until there is a two hour period in which no oil is recovered. Any oil that is found will be directed into a reserve pit and disposed of properly.

6A. Set a regular cast-iron bridge plug 20 feet above the perforations completed in Step No. 5. If the casing conditions and size are unknown, set an inflatable bridge plug. Using tubing, break circulation and clean hole. Place 10 to 20 ft. of Class A or B or Type 2

cement on plug. Cement may be purchased locally and mixed and pumped with rig equipment. It will be neat cement, mixed with water and no other additions. Wait on cement time will be at least eight hours.

Tag top of cement. If cement is hard, proceed to next step. If top of cement is not found, repeat procedures as necessary until a hard cement plug is established in the hole.

6B. Conduct a pressure test of the 10-3/4" casing to prove mechanical integrity of the casing. If the casing leaks, determine the location of the leak or leaks and repair by cementing prior to proceeding with the plugging procedure.

7A. Perforate the 10-3/4" casing with eight shots per foot over a four foot section at approximately 960 feet above the plug, and as low as possible in the anhydrite confining zone above the salt. Eight shots per foot will probably be accomplished by two runs at four shots per foot.

7B. Cement off the perforations at 960± feet to ensure this interval is plugged off.

7C. Set a retainer or packer immediately below the proposed perforations as stated in Step No. 8. This will leave a column of cement from the next proposed perforation to 960 feet.

Note: Step 7C was requested by the U.S. EPA. Morton Salt does not understand it and requests clarification.

8A. If bonding is questionable at the base of the USDW (800 feet), the interval will be perforated and squeezed.

Note: From data collected by Morton at other wells it believes that the base of the USDW is shallower than 800 feet. Morton Salt only notes this for the record; if bonding is questionable, the casing will be perforated at 800' and squeezed.

8B. If the cement bond log shows uncemented volumes behind the 10-3/4" casing, the Commission representative on site will be consulted on the number and location of perforations to fill this void. The area above the fluid level will be perforated a couple of times just in case there are uncemented sections above this point.

9. Delete.

Note: This step has been incorporated into Step 6A.

10. Delete.

Note: This step has been incorporated into Step 6A.

11A. Using Class A or B or Type 2 cement, pump cement through the tubing to fill the well to approximately 400'. Wait at least eight hours and tag the top of cement. Repeat Step 11A until the top of the cement is at approximately 400'.

11B. Pump cement through the tubing to fill the well to the surface.

12. Wait at least eight hours and tag top of cement. Refill with cement any volume that has been squeezed off. Repeat until cement remains at surface after eight hours of waiting time.

13. Cut off casing and install plugged-well marker in accord with R12-7-127.

It is believed that the Arizona Oil and Gas Commission, the U. S. EPA and Morton Salt are all in agreement for Steps 1 through 6A (except for Morton Salt's request under Step 3 that it be allowed to determine the type of log if the cement bond doesn't clearly indicate the top of the cavern); however, Morton Salt is concerned about Steps 6B through 11 and asks that they be reconsidered.

The procedure described above calls for a step-by-step process consisting of:

(1) squeeze the leak believed to be behind the 8-5/8 inch liner set to 840 feet.
(2) test for leaks and if any are found, squeeze.
(3) perforate at 960 feet and squeeze.
(4) if bonding is questionable at 800 feet, perforate and squeeze.
(5) if the cement bond log shows uncemented volumes behind the 10-3/4 inch casing, consult the Commission representative on site and perforate as instructed (note that the procedure does not call for separate squeezing of these perforations).

Each separate squeeze requires the following steps: (1) locate the leak if not a result of a perforation at a known depth, (2) set a plug below the leak, (3) set a packer above the leak, (4) squeeze the leak, (5) remove the packer, (6) drill out the squeeze and the plug. Doing each squeeze separately is very time consuming and therefore costly.

The following is Morton Salt's analysis of the potential problems and a proposed alternative procedure. Once Step 6A is completed, two concerns remain:

1) Is there an open channel behind part of the casing, and
2) When the entire well is filled with cement at Step 11, could the cement leak out at some point leaving a void in the casing?

To address these concerns, Morton Salt proposes the following in place of Steps 6B through 11:

7. Perforate at 960 ft., if the bonding is questionable perforate at 800 ft. and perforate as directed by the Arizona Oil and Gas Commission representative if the cement bond log shows uncemented volumes behind the 10-3/4 " casing.

8. Using Class A or B or Type 2 cement, pump cement through tubing to fill the well to the surface. Wait at least eight hours and tag the top of the cement. Refill with cement any volume that may have been squeezed off. Repeat until cement remains at surface after eights hours of waiting time.

   Note: Class A and B and Type 2 cement has a density of 117 lbs. per cubic foot which is a pressure gradient of 0.81 psi/foot (from $\frac{117\ lbs/ft^3}{144\ in^2/ft^2}$).

   In order to ensure that the formation is not fractured, standard practice is to limit injection pressure to 0.80 to 0.85 psi/ft. Thus, the pressure exerted by the column of cement is the maximum that would be used in a conventional squeeze between a plug and a packer.

9. Drill out the cement plug with approximately a 4" bit down to the top of the plug set in Step 6A.

   a. If one or more voids are found, refill the casing with cement as in Step 6 and drill. Repeat the re-cementing and re-drilling until no voids are found when drilling.

b. When no voids are found, refill the casing with cement as in Step 8.

Morton Salt believes that this will accomplish the same results as the plan in U. S. EPA's letter of June 19. The squeeze pressure will be the same as if each squeeze was done separately. A check will be made to determine whether the cement has gone out of the casing leaving a void; the procedure will be repeated until it is confirmed that the cement has not gone out and left a void.

For Roach-Baker #1, Morton Salt proposes essentially the same program as for Roach-Baker #2 but without checking for and removing oil, as no oil was injected into Roach-Baker #1. Attachments #1 and #2 are the revised proposed plugging plans for Roach-Baker #1 and Roach-Baker #2, respectively.

Morton Salt requests that U. S. EPA Region 9 respond with one of the following:

1) Approve Morton Salt's proposal in this letter; Morton Salt will immediately make arrangement to plug the wells.

2) Advise that a meeting would be appropriate between U. S. EPA Region 9 and Morton Salt. Hopefully a representative of the Arizona Oil and Gas Commission would also attend. Morton Salt requests such a meeting to be scheduled for October 31 at the latest. Immediately thereafter, Morton Salt will make arrangements to plug the wells.

If you wish to discuss this further, my phone is (312) 807-2561. While Morton Salt hopes that its plan in attachments #1 and #2 will be approved, it is more important that this matter be resolved promptly. I'm looking forward to hearing from you.

Yours very truly,

H. W. Diamond

H. W. Diamond
Director of Engineering

cm/091189

cc: Daniel Brennan, Arizona Oil and Gas Commission
(w/attachments)
G. L. McFarlin-Glendale
M. E. Stover
J. E. Goodbrake

D. Brennan

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

In Reply
Refer to: W-6-2

June 19, 1989

John E. Goodbrake
Director of Manufacturing
Morton Thiokol, Inc.
Morton Salt Division
110 North Wacker Drive
Chicago, Illinois, 60606-1555

RE: Southwest Salt Roach Baker #2 #542
Plugging and Abandonment Plan

Dear Mr. Goodbrake:

We have reviewed the attached plugging and abandonment plan for Roach-Baker #2 submitted on March 14, 1989 by Martha Stover of your office (Attachment 1). The plan is approved provided the following conditions or changes are incorporated (see below and also Attachment 2):

Step No. 3

If the Cement Bond Log does not clearly indicate the top of the cavern, then run a Sonar Survey.

Step No. 5

Perforate at least **40 holes or 10 feet with 4 jets per foot.**

Step No. 6

A regular cast-iron bridge plug should be set 20 feet above the perforations completed in Step No. 5. Dump 10 feet of cement on the plug. If the casing conditions and size are unknown, set an inflatable bridge plug.

NOTE: At this point, a pressure test of the 10 3/4 inch casing should be performed to prove mechanical integrity of the casing. If the casing leaks, determine the location of the leak and repair by cementing prior to proceeding with the plugging procedure.

Step No. 7

The perforations at 960± feet should be cemented at this time to ensure that this interval is plugged off. A retainer or packer should be set immediately below the proposed perforations as stated in Step No. 8. This will leave a full column of cement from the next proposed perforation to 960 feet.

Step No. 8

If bonding is questionable at the base of the USDW (800 feet), it is recommended that the interval be perforated and squeezed.

Step No. 9

Delete.

Step No. 11

The bottom squeeze should be performed separately to ensure that all of the cement in this step does not go out at 400± feet and leave a void in the casing.

If you have any questions concerning these requirements please call Lester Kaufman, Chief, Underground Injection Control Section, at (415) 974-0893.

Sincerely,

Keith Takata

for Harry Seraydarian
Director
Water Management Division

Attachments

cc: Martha Stover - Morton Thiokol (w/Attachments)
Daniel Brennan - Arizona Oil & Gas Commission (w/Attachments)

6/19/89

Attachment 1

Plugging Plan Submitted by Morton Thiokol
Morton Salt - Roach Baker #2 #5-1

1. Remove 5" and 7" tubing at least to 1050 ft. If it will not come free by conventional means, may run a freepoint and cut where tubing is free. May need to pull in sections.

2. Remove 8-5/8" liner. May need to cut in sections and remove as above. Well will now be clear to at least 1050 ft.

3. Run Cement Bond Log deep enough to pick up the top of the cavity and high enough to pick up the top of the fluid level. If the tubing is only cleared to 1050 ft., and the log shows that the top of the cavity is below that, an attempt will be made to clear the tubing and find the top of the cavity.

4. Run a density interface type log from below top of the cavity to the surface. This type of log will pick up any pockets of oil as a lower density fluid. Exact specifications of log will depend on which logging contractor is selected. Logging contractor will be qualified to interpret both cement bond and density interface log. Evidence of qualification will be provided once the logging contractor is selected.

5. If oil is found, perforate the 10-3/4" casing and attempt to remove all of the oil. If no oil is found perforate at the top of cavity as that is where any oil trapped in the cavity would collect. If there is any oil in the cavity it will flow to the top of the fluid level as the lower density oil makes its way into the casing.

   After a waiting period of eight hours begin bailing the casing. Continue bailing until there is a two hour period in which no oil is recovered. Any oil that is found will be directed into a reserve pit and disposed of properly.

6. Set a plug in the 10-3/4" casing as close to the top of the cavern as possible. A petal basket type plug will probably be used as we do not know the condition and clearance in the casing. 5-10 ft. of gravel and sand will be dropped in the casing to seal off petal basket. If casing clearances seem favorable a conventional bridge plug may be used. If so, no gravel will be dropped to seal the plug.

7. Perforate 10-3/4" casing with eight shots per foot over a four foot section. This will be done at approximately 960 feet, above the plug and as low as possible in the anhydrite confining zone above the salt. Eight shots per foot will probably be accomplished by two runs at four shots per foot.

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8. If the cement bond log shows uncemented volumes behind the 10-3/4" casing, the Commission representative on site will be consulted on the number and location of perforations to fill this void. The area above the fluid level will be perforated a couple of times just in case there are uncemented sections above this point.

9. Using tubing, break circulation and clean hole. Place 10-20 feet of Class A or B or Type 2 cement on plug. Cement will be purchased locally and mixed and pumped with rig equipment. It will be neat cement, mixed with water with no other additions. Wait on cement time will be at least eight hours.

10. Tag top of cement. If cement is hard, proceed to next step. If top of cement is not found repeat procedures as necessary until a hard cement plug is established in the hole.

11. Using cement mix as above, pump cement through the tubing to fill the well to surface (approximately 450 sacks). by filling the well to surface the weight of the cement will put 770 psi pressure on the perforations at 960 feet. This will accomplish any squeeze job required.

12. Wait at least eight hours and tag top of cement. Refill with cement any volume that has been squeezed off into either set of perforations. Repeat until cement remains at surface after eight hours of waiting time.

13. Cut off casing and install plugged well marker in accord with R12-7-127.

6/19/85

Attachment 2

Plugging Plan Revised by US EPA Region 9
Morton Salt - Roach Baker #2

1. Remove 5" and 7" tubing at least to 1050 ft. If it will not come free by conventional means, may run a freepoint and cut where tubing is free. May need to pull in sections.

2. Remove 8-5/8" liner. May need to cut in sections and remove as above. Well will now be clear to at least 1050 ft.

3. Run Cement Bond Log deep enough to pick up the top of the cavity and high enough to pick up the top of the fluid level. If the tubing is only cleared to 1050 ft., and the log shows that the top of the cavity is below that, an attempt will be made to clear the tubing and find the top of the cavity. **If the Cement Bond Log does not clearly indicate the top of the cavern, then run a Sonar Survey.**

4. Run a density interface type log from below top of the cavity to the surface. This type of log will pick up any pockets of oil as a lower density fluid. Exact specifications of log will depend on which logging contractor is selected. Logging contractor will be qualified to interpret both cement bond and density interface log. Evidence of qualification will be provided once the logging contractor is selected.

5. If oil is found, perforate the 10-3/4" casing with **at least 40 holes or 10 feet with 4 jets per foot** and attempt to remove all of the oil. If no oil is found perforate at the top of cavity as that is where any oil trapped in the cavity would collect. If there is any oil in the cavity it will flow to the top of the fluid level as the lower density oil makes its way into the casing.

   After a waiting period of eight hours begin bailing the casing. Continue bailing until there is a two hour period in which no oil is recovered. Any oil that is found will be directed into a reserve pit and disposed of properly.

6. ~~Set a plug in the 10-3/4" casing as close to the top of the cavern as possible. A petal basket type plug will probably be used as we do not know the condition and clearance in the casing. 5-10 ft. of gravel and sand will be dropped in the casing to seal off petal basket. If casing clearances seem favorable a conventional bridge plug may be used. If so, no gravel will be dropped to seal the plug.~~

   A regular cast-iron bridge plug should be set 20 feet above the perforations completed in Step No. 5. Dump 10 feet of cement on the plug. If the casing conditions and size are unknown, set an inflatable bridge plug.

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NOTE: At this point, a pressure test of the 10 3/4 inch casing should be performed to prove mechanical integrity of the casing. If the casing leaks, determine the location of the leak and repair by cementing prior to proceeding with the plugging procedure.

7. Perforate 10-3/4" casing with eight shots per foot over a four foot section. This will be done at approximately 960 feet, above the plug and as low as possible in the anhydrite confining zone above the salt. Eight shots per foot will probably be accomplished by two runs at four shots per foot. **The perforations at 960± feet should be cemented at this time to ensure that this interval is plugged off. A retainer or packer should be set immediately below the proposed perforations as stated in Step No. 8. This will leave a full column of cement from the next proposed perforation to 960 feet.**

8. If the cement bond log shows uncemented volumes behind the 10-3/4" casing, the Commission representative on site will be consulted on the number and location of perforations to fill this void. The area above the fluid level will be perforated a couple of times just in case there are uncemented sections above this point. **If bonding is questionable at the base of the USDW (800 feet), it is recommended that the interval be perforated and squeezed.**

9. **Delete.**

~~Using tubing, break circulation and clean hole. Place 10-20 feet of Class A or B or Type 2 cement on plug. Cement will be purchased locally and mixed and pumped with rig equipment. It will be neat cement, mixed with water with no other additions. Wait on cement time will be at least eight hours.~~

10. **Delete.**

~~Tag top of cement. If cement is hard, proceed to next step. If top of cement is not found repeat procedures as necessary until a hard cement plug is established in the hole.~~

11. ~~Using cement mix as above,~~ Using Class A or B or Type 2 cement, pump cement through the tubing to fill the well to surface (approximately 450 sacks). By filling the well to surface the weight of the cement will put 770 psi pressure on the perforations at 960 feet. This will accomplish any squeeze job required. **The bottom squeeze should be performed separately to ensure that all of the cement in this step does not go out at 400± feet and leave a void in the casing.**

6/14/84

12. Wait at least eight hours and tag top of cement. Refill with cement any volume that has been squeezed off into either set of perforations. Repeat until cement remains at surface after eight hours of waiting time.

13. Cut off casing and install plugged well marker in accord with R12-7-127.

6/19/84

Oil and Gas Conservation Commission
STATE OF ARIZONA
3110 N. 19th AVENUE, SUITE 190
PHOENIX, ARIZONA 85015
PHONE: (602) 255-5161

March 20, 1989

Mr. E. M. Willse
Senior Project Engineer
Morton Thiokol, Inc.
110 North Walker Drive
Chicago, IL 60606-1555

Re: Southwest Salt Company
Plugging Plans for #1 and #2 Wells
State Permits #527 and #548 respectively

Dear Mr. Willse:

We are in receipt of, and approve, your revised plugging plans dated March 14, 1989.

You will need to complete two copies of our Form No. 9 for each well. Your plugging plans of March 14, 1989, can be attached in response to item #2. After plugging is finished, you will need to complete one copy of our Form No. 10 for each well. The actual work performed should be reported on our Form No. 25. I have enclosed copies of these forms for your use.

It is important that this office be notified 24 hours prior to commencement of operations at the wells.

Should you have any questions or if we can be of further assistance, please advise.

Sincerely,

Steven L. Rauzi
Oil & Gas Specialist

SLR:lr
Encl.

MORTON THIOKOL, INC.

Morton Salt Division

file 548

March 14, 1989

Mr. Daniel Brennan
Executive Director
Arizona Oil and Gas Commission
3110 North 19th Avenue
Suite 190
Phoenix, Arizona 85015

RE: Southwest Salt Company
Plugging #1 and #2 Wells

#546

Dear Mr. Brennan:

Enclosed is our second revision to the plugging plan for Roach-Baker #1 and #2. It incorporates all the changes you requested in your letter of February 15, 1989 and that we discussed in our telephone conversation of March 7, 1989. The changes to the plan that was submitted February 2, 1989 are as follows:

Well #1, Step 3 - Has been changed to "If the top of cavity is higher than 870 ft. the Oil and Gas Commission will be notified."

Well #1, Step 4 - Has been changed to allow the setting of either a petal basket or a bridge plug.

Well #2, Step 3 - Has been changed to run the cement bond log up to the top of the fluid level.

Well #2, Step 4 - Has been changed to "Evidence of qualification will be provided."

Well #2, Step 5 - Has been changed to reflect the current plan for determining the presence of oil in the cavern. After perforating, we will wait at least eight hours and then bail until there is a two hour period in which no oil is recovered.

Well #2, Step 8 - Has been changed to add perforating above the top of the fluid level (where the cement bond log cannot

be run) just in case there are uncemented sections there. It has also been changed to consult with the Commission representative on the number and location of perforations to fill any uncemented void.

Well #2, Step 9 - Has been changed to remove the alternative of using a dump boiler to place 10-20 ft. of cement on top of the plug.

If I can be of any assistance during your review don't hesitate to call me. My telephone number is 312/807-2500. We will be waiting for your written approval before we proceed with the project.

Sincerely,

E. M. Willse
Senior Project Engineer

cep/020189

Encl.

cc: D. R. Border
J. E. Goodbrake
M. E. Stover

3/14/84

Plugging Plan
Morton Salt - Roach-Baker #2 P/N 548

1. Remove 5" and 7" tubing at least to 1,050 ft. If it will not come free by conventional means, may run a freepoint and cut where tubing is free. May need to pull in sections.

2. Remove 8-5/8" liner. May need to cut in sections and remove as above. Well will now be clear to at least 1,050 ft.

3. Run Cement Bond Log deep enough to pick up the top of the cavity and high enough to pick up the top of the fluid level. If the tubing is only cleared to 1,050 ft., and the log shows that the top of the cavity is below that, an attempt will be made to clear the tubing and find the top of the cavity.

4. Run a density interface type log from below top of the cavity to the surface. This type of log will pick up any pockets of oil as a lower density fluid. Exact specifications of log will depend on which logging contractor is selected. Logging contractor will be qualified to interpret both cement bond and density interface log. Evidence of qualification will be provided once the logging contractor is selected.

5. If oil is found, perforate the 10-3/4" casing and attempt to remove all of the oil. If no oil is found perforate at the top of cavity as that is where any oil trapped in the cavity would collect. If there is any oil in the cavity it will flow to the top of the fluid level as the lower density oil makes its way into the casing.

   After a waiting period of eight hours begin bailing the casing. Continue bailing until there is a two hour period in which no oil is recovered. Any oil that is found will be directed into a reserve pit and disposed of properly.

6. Set a plug in the 10-3/4" casing as close to the top of the cavern as possible. A petal basket type plug will probably be used as we do not know the condition and clearance in the casing. 5-10 ft. of gravel and sand will be dropped in the casing to seal off petal basket. If casing clearances seem favorable a conventional bridge plug may be used. If so, no gravel will be dropped to seal the plug.

7. Perforate 10-3/4" casing with eight shots per ft. over a four ft. section. This will be done at approximately

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960 ft., above the plug and as low as possible in the anhydrite confining zone above the salt. Eight shots per foot will probably be accomplished by two runs at four shots per foot.

8. If the cement bond log shows uncemented volumes behind the 10-3/4" casing, the Commission representative on site will be consulted on the number and location of perforations to fill this void. The area above the fluid level will be perforated a couple of times just in case there are uncemented sections above this point.

9. Using tubing, break circulation and clean hole. Place 10-20 ft. of Class A or B or Type 2 cement on plug. Cement will be purchased locally and mixed and pumped with rig equipment. It will be neat cement, mixed with water with no other additions. Wait on cement time will be at least eight hours.

10. Tag top of cement. If cement is hard, proceed to next step. If top of cement is not found repeat procedures as necessary until a hard cement plug is established in the hole.

11. Using cement mix as above, pump cement through the tubing to fill the well to surface (approximately 450 sacks). By filling the well to surface the weight of the cement will put 770 psi pressure on the perforations at 960 ft. This will accomplish any squeeze job required.

12. Wait at least eight hours and tag top of cement. Refill with cement any volume that has been squeezed off into either set of perforations. Repeat until cement remains at surface after eight hours of waiting time.

13. Cut off casing and install plugged well marker in accord with R12-7-127.

020189

3/14/84

Oil and Gas Conservation Commission
STATE OF ARIZONA
3110 N. 19th AVENUE, SUITE 190
PHOENIX, ARIZONA 85015
PHONE: (602) 255-5161

February 15, 1989

Mr. E. M. Willse
Senior Project Engineer
Morton Thiokol, Inc.
110 North Wacker Drive
Chicago, IL 60606-1555

Dear Mr. Willse:

We approve the plugging plan for Morton Salt Roach-Baker No. 1 well with the following exceptions:

1. Step 3, if the top of the cavern is found higher than 880 feet the Commission should be notified prior to any further activity in the well.

You may be interested to see the enclosed sample log of the Roach-Baker No. 1 well. It shows that the top of anhydrite was found in the 790 - 800 foot sample. This is confirmed by the density log. You have shown top of the anhydrite at 670'. This is not important unless the top of the cavern is higher than you predict.

We approve the plan for plugging the Morton Salt Roach-Baker No. 2 with the following changes:

Step 3 Run Cement Bond log all the way to the surface.

Step 4 ...Evidence of qualification shall be provided to the Commission prior to running the log.

Step 5 Make sure well is filled to the surface prior to perforating. If flow occurs after perforating, no further operations will take place until flow ceases. Any oil reaching the surface will be directed to a reserve pit and disposed of properly.

Step 8 Perforate after consultation with the Commission representative on site.

Step 9 We do not approve placing cement with a dump bailer.

If you accept these changes, please sign the enclosed copy and return it to us.

Very truly yours,

Daniel J. Brennan
Executive Director

Enclosure

2/15/89

080-90	same, darker brn color
690-700	dark red-black-grn mottled grains of "70-80" predominant, in rounded frags from crse gr to v crse grn size
700-710	same, drk grns 80%
10-20	same, drk grns 95%
20-30	same, drk grns 55%
30-40	same
40-50	large grains (small pebble) of drk mat and qtzite 50-50
50-60	same
60-70	same, drk grains 70%
70-80	same, 55% drk grns
80-90	same
790-800	anhydrite
800-10	anhydrite 30-40% drk grns
10-20	same, drk grns 10%
30-40	all anhydrite, massive, sugary text
40-50	same
50-60	same
70-80	same
880-90	same /log shows salt (halite) top at 80; caliper shows salt dissolving in drilling fluid from 880 to around 1150 where apparently mud became saturated/
890-900	sample of combined material from up hole - no salt because salt dissolved
900-10	cavings and possibly remnant material from dissolved salt from here to T.D.
910-T.D. 4478'	salt (halite)

527

MORTON THIOKOL, INC.
Morton Salt Division

February 2, 1989

Mr. Daniel Brennan
Executive Director
Arizona Oil and Gas Commission
3110 North 19th Avenue
Suite 190
Phoenix, Arizona 85015

RE: Southwest Salt Company
Plugging #1 and #2 Wells
#543

Dear Mr. Brennan:

Enclosed is our revised plugging plan for Roach-Baker #1 and #2. Don't hesitate to call if I can assist you in your review. My phone number is 312/807-2500.

Please advise in writing when the plugging plans have been approved.

Sincerely,

E. M. Willse
Senior Project Engineer

cep/020189

Encl.

cc: D. R. Border
J. E. Goodbrake
M. E. Stover

110 North Wacker Drive, Chicago, Illinois 60606-1555 (312) 807-2000

Plugging Plan
Morton Salt - Roach-Baker #2 (548)

1. Remove 5" and 7" tubing at least to 1,050 ft. If it will not come free by conventional means, may run a freepoint and cut where tubing is free. May need to pull in sections.

2. Remove 8-5/8" liner. May need to cut in sections and remove as above. Well will now be clear to at least 1,050 ft.

(cleared to 1050

3. Run Cement Bond Log deep enough to pick up the top of the cavity and high enough to pick up possible top of cement if it is somewhere short of surface. If the tubing is only cleared to 1,050 ft., and the log shows that the top of the cavity is below that, an attempt will be made to clear the tubing and find the top of the cavity.

(all the way to surface

4. Run a density interface type log from below top of the cavity to the surface. This type of log will pick up pockets of oil as a lower density fluid. Exact specifications of log will depend on which logging contractor is selected. Logging contractor will be qualified to interpret both cement bond and density interface log. Evidence of qualification ~~may~~ be provided, ~~upon request~~, once logging contractor is selected.

shall

5. If oil is found, perforate the 10-3/4" casing and attempt to remove all of the oil. If no oil is found perforate at the top of cavity as that is where any oil trapped in the cavity would collect. If there is any oil in the cavity it will flow to surface as the lower density oil makes its way into the casing and essentially lowers the downhole pressure on the cavity.

Wait how long?

If there is no flow from the well, confirmation of the lack of oil in the cavern will be made by sampling the fluid in the casing. This will either be a small (1-2 gallon) logging tool sample made right at the point of perforation or a longer (50-100 gallon) bailer sample taken at the top of the fluid level in the well.

?

6. Set a plug in the 10-3/4" casing as close to the top of the cavern as possible. A petal basket type plug will probably be used as we do not know the condition and clearance in the casing. 5-10 ft. of gravel and sand will be dropped in the casing to seal off petal basket. If casing clearances seem favorable a conventional bridge plug may be used. If so, no gravel will be dropped to seal the plug.

2/2/89

7. Perforate 10-3/4" casing with eight shots per ft. over a four ft. section. This will be done at approximately 960 ft., above the plug and as low as possible in the anhydrite confining zone above the salt. Eight shots per foot will probably be accomplished by two runs at four shots per foot.

8. If cement bond log shows uncemented volumes behind the 10-3/4" casing, perforate at two or three places (depending on length of uncemented section) to fill this uncemented annulus. Alternate cementation w/ cement.

9. Using tubing, break circulation and clean hole. Place 10-20 ft. of Class A or B or Type 2 cement on plug. Cement will be purchased locally and mixed and pumped with rig equipment. It will be neat cement, mixed with water with no other additions. Wait on cement time will be at least eight hours. ~~As an alternate cement may be placed with a dump bailer.~~

10. Tag top of cement. If cement is hard, proceed to next step. If top of cement is not found repeat procedures as necessary until a hard cement plug is established in the hole.

11. Using cement mix as above, pump cement through the tubing to fill the well to surface (approximately 450 sacks). By filling the well to surface the weight of the cement will put 770 psi pressure on the perforations at 960 ft. This will accomplish any squeeze job required.

pressure at 100'? 500'?

12. Wait at least eight hours and tag top of cement. Refill with cement any volume that has been squeezed off into either set of perforations. Repeat until cement remains at surface after eight hours of waiting time.

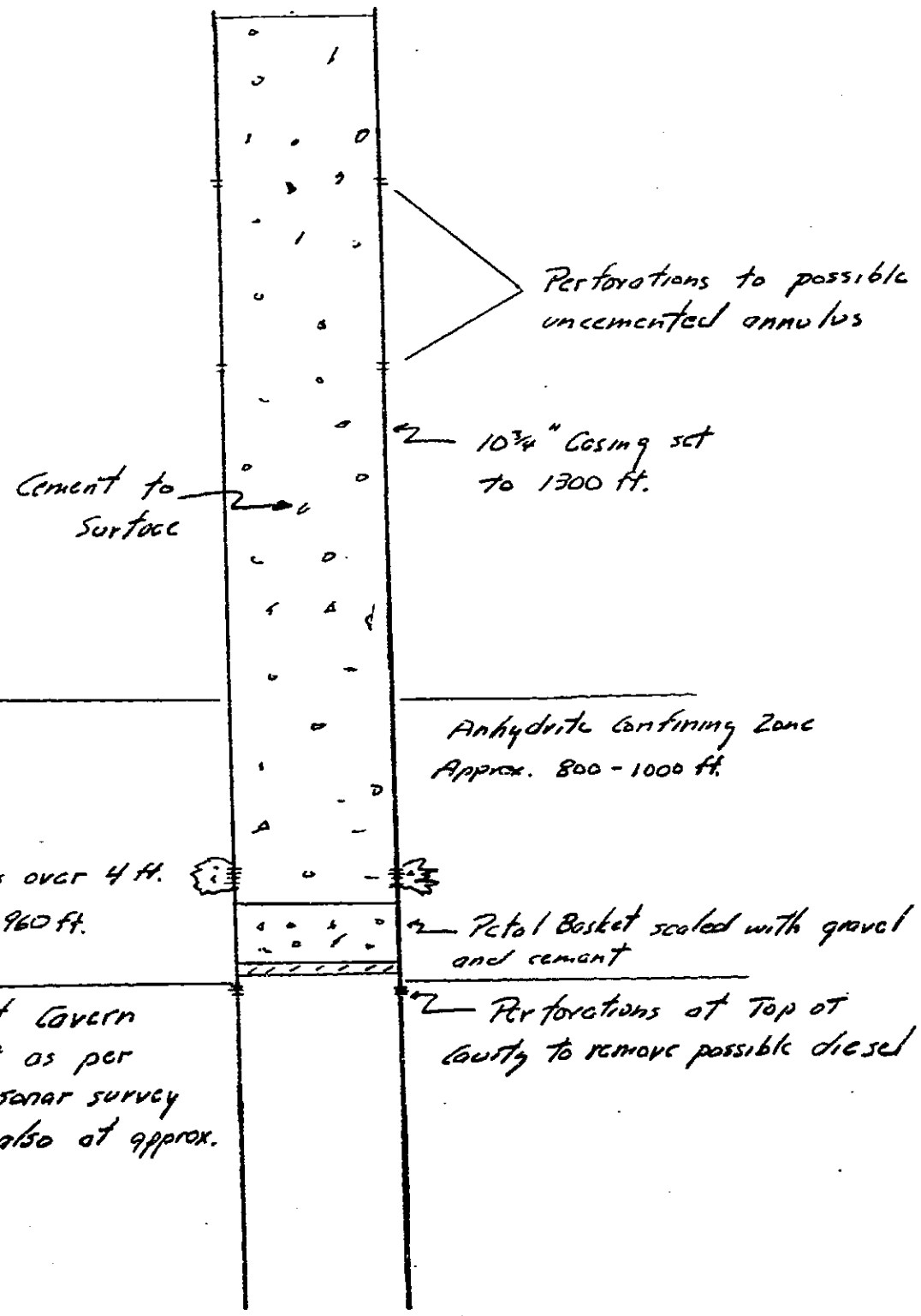
13. Cut off casing and install plugged well marker in accord with R12-7-127.

020189

2/2/89

Morton Salt - Rock Baker 2

Completed Plug Job



2/2/89

(548)

Oil and Gas Conservation Commission
STATE OF ARIZONA
3110 N. 19th AVENUE, SUITE 190
PHOENIX, ARIZONA 85015
PHONE: (602) 255-5161

December 27, 1988

S. A. Medley
Morton Thiokol, Inc.
110 North Wacker Drive
Chicago, IL 60606-1555

Dear Mr. Medley:

We have reviewed your plans to plug and abandon the two wells in Glendale. We feel that the plans are too sketchy to approve (or to disapprove) as presented.

Using your submittal as a take-off point, we have added some of the detail we consider appropriate for a proposed plan of work. Enclosed is a copy of what we have done. We feel it is important to specify materials, mixing rates, and so on, to provide a specific guide to people in the field. At decision points, such as whether to set a packer or a petal basket, it is useful to set out the conditions under which one or the other should be set.

Don't consider that what we have done is exactly what we require; rather that it indicates the kind of detail that should be included. Diagrams are very useful and should be included in your plan.

While operators often have their in-house staff prepare such plans, we do accept plans prepared by industry consultants who specialize in such work. The plan used at the recent plugging of a bore hole at the Cal Gas facility adjacent to your operation was prepared by a consulting company and supervised by one of their people on the well site.

Thank you for your cooperation in the effort to get these wells plugged as quckly and effectively as possible.

Very truly yours,

D. J. Brennan/sac

Daniel J. Brennan
Executive Director

Enclosure

PLUGGING PLAN

Morton Salt - Roach Baker #2

1. Remove 5" and 7" tubing down to 1,000 ft. If it will not come free by conventional means, run a freepoint and cut where tubing is free. May need to pull in sections.

2. Remove 8-5/8" liner. May need to cut in sections and remove as above.

3. Clean out 10 3/4" casing to 1050 feet.

4. Run Cement Bond Log from 1,000 feet to surface to determine where pipe is cemented.

5. Run a density interface log. Have log interpreted by a person qualified to analyze this type of log. Provide evidence of qualification of analyst.

6. If top of cavity is not found in density interface log, clean out 10 3/4" to TD and re-run density interface log.

7. If oil is found, perforate the 10 3/4" casing and remove all the oil. If no oil is found perforate at top of cavern and bail, swab or pump at least 20 barrels of fluid to demonstrate absence of oil. Refill cavern with brine.

8. Set a plug in 10 3/4" casing 3 feet above top of cavern. Use a standard bridge plug or petal basket type plug depending on which will best retain a cement plug in the casing. If casing is in good condition the bridge plug may suffice, otherwise the petal basket type plug may be necessary.

9. Using tubing, circulate to clean hole. Place 10' of class A or B or Type 2 cement on plug. If casing is in bad condition, use a salt cement, either a dry salt - dry cement mixture or mix cement with brine. Wait on cement 8 hours for non-salt cement, at least 24 hours for salt cement.

10. Tag top of cement. If cement is hard, proceed to next step. If top of cement is not found, clean out hole to bridge plug, tag plug, and repeat procedures as necessary until a cement plug is established in the hole.

11. Underream casing, or perforate with 8 shots per foot above top of cement plug.

12. Using a salt cement as described above, through tubing, squeeze perforations using between 500 pounds and 750 pounds pressure. Wait on cement 24 hours. Tag top of cement in casing, above top perforation. If cement is not found above perforations, repeat this step until it is found above perforations.

13. If logs indicate uncemented volumes behind 10 3/4" casing, perforated at indicated depths.

14. Fill casing through tubing, in stages with Class A or B or Type 2 cement to surface, allowing sufficient volumes to fill the void areas behind the pipe. Wait on cement 8 hours. Tag top of cement. If cement top has fallen, repeat this step until casing remains full to top after 8 hours hardening time.

15. Cut off casing and install plugged well marker in accord with R12-7-127.

MORTON THIOKOL, INC.
Morton Salt Division

December 14, 1988

Certified Mail

Mr. Daniel Brennan
Executive Director
Arizona Oil and Gas Commission
3110 North 19th Avenue
Suite 190
Phoenix, Arizona 85015

RE: Southwest Salt Company
Plugging No. 1 and 2 Wells

Dear Mr. Brennan:

This letter is a follow-up to your telephone conversation with John Goodbrake, Dan Border and Ed Willse regarding plugging of wells R.B. nos. 1 and 2. Enclosed are plugging plans for the two wells. The plans include the procedures discussed and ensure the wells are properly plugged.

Please advise in writing when the plugging plans have been approved. We will proceed with the program once we receive the Oil and Gas Commission's approval.

Sincerely,

S. A. Medley
Manager of Environmental Affairs

cep/121288

Encl.

cc: D. R. Border
J. E. Goodbrake
E. M. Willse
M. E. Stover

Plugging Plan - Glendale No. 2

1. Remove 5" and 7" tubing down to 1,000 ft. If it will not come free by conventional means, run a freepoint and cut where tubing is free. May need to pull in sections.

2. Remove 8-5/8" liner. May need to cut in sections and remove as above.

3. Run a cement bond log to determine if the top section (surface to 500 ft.) was cemented.

4. Run a density interface log in an attempt to find the old diesel oil blanket.

5. If oil is found, perforate the 10-3/4" casing and remove as much of the oil as possible. Even if no oil is found, perforate at the top of the cavity to be sure no oil is trapped in that space.

6. Set a plug in the 10-3/4" casing at the top of cavity (approximately 1,000 ft.). The plug will either be a standard bridge plug or a petal basket type plug depending on well conditions.

7. If an uncemented section is found, the 10-3/4" casing will be perforated at the bottom of that section and two or three other places up the casing. This will allow cement to flow into the uncemented section when the well is cemented.

8. Run tubing and fill the well with cement from plug to surface.

U.S. ENVIRONMENTAL PROTECTION AGENCY

UNDERGROUND INJECTION CONTROL PERMIT: CLASS III

Permit Number AZS000000003

EPA ID Number AZD020681839

Pursuant to the Underground Injection Control regulations of the U.S. Environmental Protection Agency codified at Title 40 of the Code of Federal Regulations, Parts 124, 144, 146, and 147

Southwest Salt Co.
P. O. Box 1237
Litchfield Park, Arizona 85340

is hereby authorized to operate a Class III injection well identified as

Roach-Baker #2

located at

T2N, R1W, SW 1/4 Sec. 2
Glendale
Maricopa County, Arizona

into Luke Salt Body, upon the express conditions that the permittee meet the restrictions set forth herein. Injection is authorized by rule pursuant to 40 CFR 144.21 until the effective date of this permit.

All references to Title 40 of the Code of Federal Regulations are to all regulations that are in effect on the date that this permit is effective. The following attachments are incorporated into this permit: Attachment H (Operating Data); Attachment O (Contingency Plan for Well Failure); Attachment Q (Plugging and Abandonment Plan); Attachment R (Financial Responsibility).

This permit shall become effective on 30 OCT 1985

This permit and the authorization to inject shall continue for the operating lifetime of the well, unless terminated, or until primary enforcement responsibility is delegated to the State of Arizona, unless that State chooses to adopt this permit as a State permit.

The Director shall review this permit at least once every five years from the date of issuance to determine whether it should be modified, revoked, reissued, terminated, or a minor modification made as provided in 40 CFR 144.39, 144.40, and 144.41.

Signed on 30 SEP 1985

Frank M. Covington

Frank M. Covington, Director
Water Management Division
EPA Region 9

PART I

GENERAL PERMIT COMPLIANCE

A. EFFECT OF PERMIT

The permittee is allowed to engage in underground injection in accordance with the conditions of this permit. The permittee, authorized by this permit, shall not construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR Part 142 or may otherwise adversely affect the health of persons. Any underground injection activity not specifically authorized in this permit is prohibited. Compliance with this permit does not constitute a defense to any action brought under the SDWA, or any other common or statutory law or regulation. Issuance of this permit does not convey property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of State or local law or regulations. Nothing in this permit shall be construed to relieve the permittee of any duties under applicable regulations.

B. PERMIT ACTIONS

1. Modification, Revocation, Reissuance and Termination.

The Director may, for cause or upon request from the permittee, modify, revoke and reissue, or terminate this permit in accordance with 40 CFR 144.12, 144.39, and 144.40. Also, the permit is subject to minor modifications for cause as specified in 40 CFR 144.41. The filing of a request for a permit modification, revocation and reissuance, or termination, or the notification of planned changes, or anticipated noncompliance on the part of the permittee does not stay the applicability or enforceability of any permit condition. The Director may also modify, revoke and reissue, or terminate this permit in accordance with any amendments to the SDWA if the amendments have applicability to the conditions in this permit.

2. Transfer of Permits.

This permit is not transferrable to any person except in accordance with 40 CFR 144.38.

C. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

D. CONFIDENTIALITY

In accordance with 40 CFR Part 2 and 144.5, any information submitted to EPA pursuant to this permit may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice. If a claim is asserted, the validity of the claim will be assessed in accordance with the procedures in 40 CFR Part 2 (Public Information). Claims of confidentiality for the following information will be denied:

1) The name and address of the permittee:

2) Information which deals with the existence, absence or level of contaminants in drinking water.

E. DUTIES AND REQUIREMENTS

1. Duty to Comply.

The permittee shall comply with all applicable UIC Program regulations and conditions of this permit, except to the extent and for the duration such noncompliance is authorized by an emergency permit issued in accordance with 40 CFR 144.34. Any permit noncompliance constitutes a violation of the SDWA and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or for denial of a permit renewal application. Such non-compliance may also be grounds for enforcement action under RCRA.

2. Penalties for Violations of Permit Conditions.

Any person who violates a permit requirement is subject to civil penalties, fines, and other enforcement action under the SDWA and may be subject to the such actions pursuant to RCRA. Any person who willfully violates permit conditions may be subject to criminal prosecution.

3. State Continuation.

An EPA permit issued for the operating lifetime of the injection well may continue in force at the time a State is authorized to

assume primary enforcement authority, providing that the State has the authority to do so under State law, and that the State chooses to adopt and enforce the permit. Otherwise, the injection activity is operating without a Federal UIC permit from the time that the State assumes primacy until the effective date of the State-issued new permit.

4. Need to Halt or Reduce Activity not a Defense.

It shall not be a defense, for permittee in an enforcement action, that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

5. Duty to Mitigate.

The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.

6. Proper Operation and Maintenance.

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this permit.

7. Duty to Provide Information.

The permittee shall furnish to the Director, within a time specified, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

8. Inspection and Entry.

The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law to:

(a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this permit;

(b) Have access to and copy, at reasonable times, any records that are kept under the conditions of this permit;

(c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

(d) Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by SDWA, any substances or parameters at any location.

9. Records.

(a) The permittee shall retain records and all monitoring information, including all calibration and maintenance records and all original instrumented recordings for continuous monitoring and copies of all reports required by this permit for a period of at least five years from the date of the sample, measurement or report.

(b) The permittee shall maintain records of all data required to complete the permit application form for this permit and any supplemental information submitted under 40 CFR 144.31 for a period of at least five years from the date the application was signed. These periods may be extended by request of the Director at any time.

(c) The permittee shall retain records concerning the nature and composition of all injected fluids until three years after the completion of plugging and abandonment which has been carried out in accordance with the attached plugging and abandonment plan, and is consistent with 40 CFR 146.10.

(d) The permittee shall continue to retain the records after the retention period specified by paragraphs (a) to (c) above, unless he delivers the records to the Director or obtains written approval from the Director to discard the records.

(e) Records of monitoring information shall include:

(1) The date, exact place, and time of sampling or measurements;

(2) The individual(s) who performed the sampling or measurements;

(3) A precise description of both sampling methodology and the handling (custody) of samples;

(4) The date(s) analyses were performed;

(5) The names of individual(s) who performed the analyses;

(6) The analytical techniques or methods used; and

(7) The results of such analyses.

10. Monitoring.

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. Monitoring results shall be reported at the intervals specified in Part II, Paragraphs C and D, of this permit.

(a) Monitoring of the nature of injected fluids shall comply with applicable analytical methods cited and described in Table I of 40 CFR 136.3 or in Appendix III of 40 CFR Part 261 or in certain circumstances by other methods that have been approved by the Administrator.

(b) The permittee shall submit, to the Director, all reports as required in Part II, Sections C and D of this permit. The permittee shall prepare a report describing the intended procedures that will be used for sample collection, handling, and analysis. This report must be submitted for approval by EPA a minimum of 30 days prior to collecting samples for the first Quarterly Report and any time the sampling procedures are changed or modified for subsequent reporting periods.

11. Signatory Requirements.

All reports or other information, required to be submitted by this permit or requested by the Director, shall be signed and certified in accordance with 40 CFR 144.32.

12. Reporting Requirements.

(a) Planned Changes. The permittee shall give written notice to the Director, as soon as possible, of any planned physical alterations or additions to the permitted facility.

(b) Anticipated Noncompliance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

(c) Compliance Schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 30 days following each schedule date.

(d) Twenty-four Hour Reporting.

(1) The permittee shall report to the Director any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the

time the permittee becomes aware of the circumstances. The following shall be included as information which must be reported orally within 24 hours:

(i) Any monitoring or other information which indicates that any contaminant may cause an endangerment to an underground source of drinking water.

(ii) Any noncompliance with a permit condition, or malfunction of the injection system, which may cause fluid migration into or between underground sources of drinking water.

(2) A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

(e) Other Noncompliance. The permittee shall report all other instances of noncompliance not otherwise reported at the time monitoring reports are submitted. The reports shall contain the information listed in Permit Condition 12(d)(2) above.

(f) Other Information. When the permittee becomes aware that he failed to submit any relevant facts in the permit application or submitted incorrect information in a permit application or in any report to the Director, the permittee shall submit such facts or information within 10 days.

(g) Report on Permit Review. Within thirty (30) days of receipt of this permit, the permittee shall report to the Director that he has read and is personally familiar with all terms and conditions of this permit.

F. PLUGGING AND ABANDONMENT

1. Notice of Plugging and Abandonment.

The permittee shall notify the Director no later than 45 days before conversion or abandonment of the well.

2. Plugging and Abandonment.

Pursuant to 40 CFR §146.10, the Director shall prescribe aquifer cleanup and monitoring prior to plugging and abandonment where he deems it necessary and feasible to insure adequate protection of USDWs.

The permittee shall plug and abandon the well consistent with 40 CFR 146.10, as provided for in the attached plugging and abandon-

ment plan (which is hereby incorporated as a part of this permit). Within 60 days after plugging a well, or at the time of the next quarterly report (whichever is shorter), the permittee shall submit a report to the Director. The report shall be certified as accurate by the person who performed the plugging operation, and shall consist of either:

(a) A statement that the well was plugged in accordance with the plan previously submitted to the Director; or

(b) If the actual plugging differed from the approved plan, a statement defining the actual plugging and why the Director should approve such deviation. Any deviation from an previously approved plan may be cause for the Director to require the operator to replug the well.

3. Inactive Wells.

After a cessation of injection for two years the permittee shall plug and abandon the well in accordance with the plan unless he:

(a) Provides notice to the Director; and

(b) Describes actions or procedures, which are deemed satisfactory by the Director, that the permittee will take to ensure that the well will not endanger USDWs during the period of temporary abandonment. These actions and procedures shall include compliance with the technical requirements applicable to active injection wells unless waived, in writing, by the Director.

G. MECHANICAL INTEGRITY

1. Standards.

All injection well(s) must have and maintain mechanical integrity consistent with 40 CFR 146.8.

2. Mechanical Integrity Request from Director.

The Director may, by written notice, require the permittee to demonstrate mechanical integrity at any time.

3. Subsequent Mechanical Integrity Demonstrations.

A demonstration of mechanical integrity in accordance with 40 CFR 146.8 and 146.33(b)(3) shall be made no later than five years from the date of the last approved demonstration. Mechanical integrity shall also be demonstrated any time the tubing is removed from the well, the packer is reset, or a loss of mechanical integrity becomes evident during operation. The permittee shall notify the Director of his intent to demonstrate mechanical integrity at least 30 days prior to such demonstration. The permittee shall report the results of a mechanical integrity demonstration within 90 days after completion.

4. Loss Of Mechanical Integrity.

If the permittee or the Director finds that the well fails to demonstrate mechanical integrity during a test, or a loss of mechanical integrity as defined by 40 CFR 146.8 becomes evident during operation, the operation shall be halted immediately and shall not be resumed until the Director gives approval to recommence injection.

H. FINANCIAL RESPONSIBILITY

1. Financial Responsibility.

The permittee is required to maintain financial responsibility and resources to close, plug, and abandon the underground injection operation in a manner consistent with the underground injection control regulations and Attachment Q (Plugging and Abandonment Plan). The financial responsibility mechanism shall be updated periodically, upon request of the Director.

2. Insolvency.

In the event of:

(a) the bankruptcy of the trustee or issuing institution of the financial mechanism, or

(b) suspension or revocation of the authority of the trustee institution to act as trustee, or

(c) the institution issuing the financial mechanism loses its authority to issue such an instrument, the permittee must notify the Director, within ten (10) business days. The owner or operator must establish other financial assurance or liability coverage acceptable to the Director, within 60 days after such an event.

An owner or operator must also notify the Director by certified mail of the commencement of voluntary or involuntary proceedings under Title 11 (Bankruptcy), U.S. Code naming the owner or operator as debtor, within 10 business days after the commencement of the proceeding. A guarantor of a corporate guarantee must make such a notification if he is named as debtor, as required under the terms of the guarantee.

PART II

WELL SPECIFIC CONDITIONS FOR UIC PERMITS

A. CONSTRUCTION

1. Casing and Cementing [40 CFR 146.32(a)].

Notwithstanding any other provisions of this permit, the permittee shall case and cement the well to prevent the movement of fluids into or between underground sources of drinking water.

2. Construction Specification Requirement.

The permittee shall submit to the Director, within ninety (90) days of the effective date of the permit, complete well construction details including, but not limited to, type, thickness, diameter, nominal weight, collapse strength, internal yield strength and lengths of all casing and tubing, API cement classification, and accurate schematic diagrams of well completion.

B. OPERATIONS

1. Injection Formation.

Injection shall be limited to the Luke Salt Body in the interval between 880 ft. and 4503 ft. below land surface. In no event shall the roof of the solution cavern be developed in such a manner that dissolution of the overlying anhydrite beds takes place or that injection brines or seal fluids are allowed to migrate into any overlying formation.

2. Injection Pressure Limitation [40 CFR 146.33(a)].

Except during well stimulation injection pressure at the wellhead shall be calculated so as to assure that the pressure in the injection zone during injection does not initiate new fractures or propagate existing fractures in the injection zone. In no case shall injection pressure initiate fractures in the confining zone or cause the movement of injection or formation fluids into an underground source of drinking water.

3. Operational Plan Requirement.

In addition to the injection pressure limitation of Part II, Section B(2) of this permit, the permittee, shall submit to the Director for approval, within ninety (90) days of the effective date of this permit, a detailed operational plan. This plan shall include, but not be limited to, such information as chemical characterization of injected fluids, injection pressure and rate, production pumping rate, and volume of injectate to be processed.

The composition and volume of seal fluid being used as a blanket, as well as detailed operational procedure for the use of the seal fluid, shall also be provided in the above operational plan.

4. Additional Injection Limitation.

Injection between the outermost casing protecting underground sources of drinking water and the well bore is prohibited.

5. Additional Mechanical Integrity Testing.

A mechanical integrity test shall be conducted on the injection well within ninety (90) days after the effective date of this permit to demonstrate that fluids are not moving between or into Underground Sources of Drinking Water (USDWs) pursuant to 40 CFR 146.8. The method used to demonstrate the mechanical integrity of the well shall be submitted to the Director for approval thirty (30) days prior to the test. The Director reserves the right to witness the test. The results of the test shall be submitted to the Director in writing within thirty (30) days from the date of the test's completion.

6. Demonstration of Financial Assurance.

The permittee shall, within ninety (90) days from the effective date of this permit, provide to the Director a demonstration of financial responsibility and resources to close, plug, and abandon the injection well known as Roach-Baker #2. This financial responsibility mechanism shall demonstrate available resources to close, plug, and abandon Roach-Baker #2 in a manner consistent with 40 CFR 146.10.

C. MONITORING

1. Monitoring Requirements [40 CFR 144.51(j)(1) and 144.52(a)(5)].

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The methods used to obtain a representative sample of the fluid to be analyzed and the procedures for analysis of the sample are as follows:

- Grab samples shall be collected at the sampling valve at the wellhead and used for laboratory analysis for physical and chemical characteristics.

- Temperature, annulus pressure, and injection pressure shall be measured at the wellhead.

- The permittee shall identify the types of tests and methods used to generate the monitoring data as specified by 40 CFR 136.3 or Appendix III of 40 CFR 261. When the analytical method for a particular parameter is not specified in either 40 CFR 136.3 or Appendix III of 40 CFR 261, the

permittee must obtain EPA approval of the types of tests and methods used to generate the monitoring data.

2. Injection fluid analysis [§144.28(g)(3)(i)]

The permittee shall provide to the Director a qualitative analysis and ranges in concentrations of all constituents of injected fluids at least once within the first year of authorization and thereafter whenever the injection fluids are modified to the extent that the initial data are incorrect or incomplete. The owner or operator may request Federal confidentiality as specified in 40 CFR Part 2. If the information is proprietary the owner or operator may in lieu of the ranges in concentrations choose to submit maximum concentrations which shall not be exceeded. In such a case the owner or operator shall retain records of the undisclosed concentrations and provide them upon request to the Regional Administrator as part of any enforcement investigation.

3. Demonstration of Mechanical Integrity [§146.33(b)(3)]

A demonstration of mechanical integrity pursuant to 40 CFR 146.8 shall be conducted at least once every five years during the life of the well.

4. Modification of Injection Fluid [§146.33(b)(1)].

Whenever the injection fluid is modified to the extent that the analysis required by §146.34(a)(7)(iii) is incorrect or incomplete, a new analysis as required by §146.34(a)(7)(iii) shall be provided to the Director.

5. Monitoring Frequency [§146.33(b)(2) and (4)].

Monitoring shall be conducted no less frequently than indicated for the parameters listed below:

Parameter	Monitoring Frequency	Sample Type
injection rate, vol/time	continuous	Recorder
injection total volume, gallons	continuous	Totalizer
injection pressure, psig	continuous	Recorder
produced fluid total volume, gallons	continuous	Totalizer
seal fluid level,feet below land surface	continuous	Recorder
injection fluid temperature, °F	continuous	Recorder
produced fluid temperature, °F	continuous	Recorder
seal fluid, temperature, °F	continuous	Recorder

Parameter	Monitoring Frequency	Sample Type
fluid level, injection zone, feet below land surface	semi-monthly	Measured

6. Continuous monitoring devices.

Continuous recording devices shall be installed at the wellhead and used to monitor temperature of injection fluid and produced fluid and seal fluid, injection rate, injection pressure, volume of injected and produced fluids, and seal fluid level.

D. REPORTING REQUIREMENTS [40 CFR 146.33(c)(1)]

1. Quarterly reports

The permittee shall submit accurate quarterly reports to the Director containing the following information:

(a) Results of the injection fluid analyses specified in Part II, Section C, item 2.

(b) Monthly average, maximum and minimum values for injection fluid temperature, produced fluid temperature, seal fluid temperature, injection pressure, injection rate, and total injection volume and production volume.

2. Reports on Well Tests and Workovers [§146.13(c)(2)].

In the first quarterly report after the activity the permittee shall report to the Director the results of the following:

(a) Mechanical integrity tests;

(b) Other tests required by this permit;

(c) Any well workover.

3. Reporting of Monitoring Results

All pH values shall be reported to the nearest 0.1 pH unit. Observation and recording of parameters specified to be monitored periodically shall be done over equal time intervals over a 24 hour period. When computing a daily or monthly average value, as defined in the section of Definitions, for those parameters monitored continuously, the continuous recording charts shall be read once every 2 hours during periods of injection. The reporting of daily average, daily maximum, and daily minimum values shall be in a format acceptable to the Director.

Monitoring results obtained during each calendar month shall be summarized for each month and reported on EPA Form 7520-8. Forms shall be submitted for the reporting periods by the respective due dates as listed below:

Reporting Period	Report Due
July, Aug, Sept	Oct 28
Oct, Nov, Dec	Jan 28
Jan, Feb, Mar	Apr 28
Apr, May, June	Jul 28

The report shall also include the following information:

1. date and time of sample collection;

2. name of individual(s) who performed the sampling;

3. type of containers used and how samples were treated and preserved prior to transporting to the lab;

4. method of transportation to the lab;

5. name and location of the lab analyzing the samples;

6. the procedures used by the lab for analysis; (Note: If the procedures were different from the information submitted as required in Part I, Section E, item 10(b) of this permit, indicate these differences.) and

7. reference to established, published criteria should be made wherever possible.

Copies of the monitoring results required by Section C of Part I and all other reports required by Section B of Part II shall be submitted to the Director at the following address:

U.S. Environmental Protection Agency
Region 9
Water Management Division
Underground Injection Control Section (W-6-2)
215 Fremont Street
San Francisco, California 94105

Attachment H

Operating Plan

The permittee shall submit, within ninety (90) days of the effective date of the permit, a detailed plan of operation for review and approval by the Director.

This plan shall include, but not be limited to, proposed general operating procedures, maximum injection pressures, maximum annulus pressures, maximum volumes of injectate and product withdrawn, and maximum flow rate of injectate.

Attachment O

Contingency Plan for Well Failure

The permittee has submitted the following contingency plans for implementation when any well failures that may cause the migration of fluids into any USDW are identified by testing, or are indicated by operations data:

1. Stop injection to identified well.

2. Investigate well failure.

3. Report as required.

4. Take corrective action to repair or plug well and protect USDW.

Attachment Q

Plugging and Abandonment Plan

The permittee has submitted the following data base for plugging costs in addition to EPA Form 7520-14, which is attached.

Data Base for Plugging Costs

Halliburton Pumping Unit

Mileage from El Centro (230 miles one way)

$2.10/mi Pump Truck (one way)
$0.80/mi Tool Truck (one way)
$2.90/mi x 230 mi = $667.00

Equipment and Crews

$1,000/Day Pump Truck, etc.
$ 160/Day Per Diem - Crew
$ 80/Day Tool Man
$1,240/Day

Cement

$0.95/sack mix & pump customer
$7.00/sack delivered to well

Use ASTM TYPE 2 (API Type B) cement plus 1 bag calcium chloride per 100 sacks of cement.

One sack cement has a volume of 1.18 ft^3

Slurry Volume - Use 5-10% extra in pipes.

Workover Rig

Run tubing string for cementing.

$1,000 move-in plus $75/hour = $1,600/well

Time for Plugging

8 hours maximum

Attachment R

Financial Responsibility

The permittee is being required, within ninety (90) days from the effective date of this permit, to provide to the Director a demonstration of financial responsibility and resources to close, plug, and abandon the injection well in a manner consistent with 40 CFR 146.10.

Definitions

1. BPD

BPD means barrels per day.

2. Daily Average of Parameters Monitored Continuously

Daily Average of Parameters Monitored Continuously means the sum of values observed and recorded periodically as specified in Part II, Section C of this permit, divided by the total number of values observed and recorded during the day.

3. Daily Average of Parameters Not Monitored Continuously

Daily Average of Parameters Not Monitored Continuously means the sum of all daily observed and recorded values divided by the total number of values observed and recorded during that day.

4. Daily or Monthly Maximum Value

Maximum Value means the highest value recorded during the day or month, respectively. For continuously monitored parameters the highest value recorded is the highest instantaneous value for the continuous monitoring record.

5. Daily or Monthly Minimum Value

Minimum Value means the lowest value recorded during the day or month, respectively. For continuously monitored parameters the lowest value recorded is the lowest instantaneous value from the continuous monitoring record.

6. GPM

GPM means gallons per minute.

7. Grab Sample

Grab Sample means a single portion which is not a composite sample. The sample(s) shall be collected at the period(s) most representative of the monitored activity.

8. Injection Tubing or Tubing

Injection Tubing means a system of pipes, of appropriate material, inserted into the well through the casing to convey the injection fluid to the injection zone and to prevent casing degradation.

9. Monthly Average of Parameters Monitored Continuously

Monthly Average of Parameters Monitored Continuously means the sum of values observed and recorded periodically as specified in Part II, Section C, item 1, divided by the total number of values observed and recorded during that month.

10. Monthly Average of Parameters Monitored Daily

Monthly Average of Parameters monitored Daily means the sum of all daily observed and recorded values divided by the total number of values observed and recorded during that month.

11. PSIG

PSIG means pounds per square inch gauge.

February 10, 1977

Memo: Southwest Salt Company Roach Baker #2, Permit 548

From: William E. Allen, Director, Enforcement Section

Bill Aaberg of California Liquid Gas Corporation called this date regarding the subject well. Aaberg is of the opinion that this well is being circulated through a hole in the pipe "hung" at 1710'. A density log which was run March 22, 1974 and which came into my possession in a confidential manner, indicates this hole in the pipe at 1710'. It also indicates the possibility of gas trapped behind the 10" casing at 310' to 328'.

Subsequent logs that have been run, according to Aaberg, indicate that this gas trap is continuing to deepen or widen. This would indicate the possibility that Southwest Salt may be circulating brine from 1710' around the 10" casing that was originally cemented in the hole up through the fresh water table.

If this is true, the 10" that was cemented in the hole at 1310' with 350 sacks has been washed out and this casing is just hanging with the cement sheath around the pipe.

I have talked with Ron Miller with the Water Quality Control Division of the State Health Department concerning this situation. Ron informed me that he would talk with his people and get back to me, probably today. He also acknowledged that it is necessary that they begin to involve themselves in Southwest Salt's mining operation.

ARIZONA DEPARTMENT OF HEALTH SERVICES

Division of Environmental Health Services

RAUL H. CASTRO, Governor
SUZANNE DANDOY, M.D., M.P.H., Director

June 9, 1976

RECEIVED
JUN 11 1976
O & G CONS. COMM.

Ira L. Kimes, Jr., Colonel, USAF
Commander
Department of the Air Force
Headquarters 58th Combat Support Group (TAC)
Luke Air Force Base, Arizona 85309

Dear Colonel Kimes:

This is to acknowledge receipt of your letter of May 24 and Lt. Col. Ferrell's letter of June 3, 1976 regarding salt mining operations in the vicinity of Glendale and Dysart Avenues near Luke Air Force Base.

On June 3rd, Mr. Ed Garthe of this office discussed this subject with a number of Base officials gathered together in your office.

Southwest Salt Company continues to conduct their mining operation at the northeast corner of the intersection mentioned above. Furthermore, the Arizona Oil and Gas Conservation Commission informs us that a similar operation has begun due north of and nearly contiguous to the aforementioned operation. The California Gas Company is conducting this second mining activity.

The first operation (Southwest Salt Co.) involves production of salt as its primary goal. The activity of the California Gas Company reportedly is for the purpose of creating storage capacity for propane gas. Apparently the salt solution from this operation is delivered to the Southwest Salt Company for processing.

Whether either cavity extends beneath military family housing at Luke Air Force Base has not been verified. The mining operations are licensed by the Arizona Oil and Gas Conservation Commission.

Concerning whether adequate safeguards and precautions are being taken regarding ground faults and subsidence and dangers of gas leakage or explosion, as Mr. Garthe stated on June 3rd, our Department has no authority in this area. Since the facilities are licensed by the Arizona Oil and Gas Conservation Commission, you may wish to pursue this matter directly with them.

Possible pollution of the groundwater supply is an area of responsibility of the Department of Health Services, and it is exercised by our Bureau of Water Quality Control. Dr. Ron Miller, Chief of the Bureau of Water Quality Control, informs me that surveillance of the salt mining will be

included in a groundwater monitoring program now under development. In the meantime, the Bureau of Water Quality Control will review Southwest Salt Company records and evaluate the mass balance for water and salt.

Sincerely,

R. Bruce Scott, P.E.
Assistant Director

cc: Arizona Oil and Gas Conservation Commission
Dr. Ron Miller
Mr. Ed Garthe

Copy – Arizona Department of Health Services; State Health Building; Phoenix, Arizona 85007

June 20, 1975

RECEIVED

JUN 25 1975

O & G CONS. COMM.

Mr. G. J. Grott, President
Southwest Salt Company
P.O. Box 1237
Litchfield Park, Arizona 85340

Dear Mr. Grott:

This is to acknowledge your letter dated June 13, 1975.

This Department would like to visit your new well site to observe progress.

A representative will be in contact with you within the next week to arrange for a visit.

Sincerely,

L. Von Roberts, B.S.Ch.E.
Bureau of Water Quality Control

LVR:rl

cc: Arizona Oil and Gas Commission ✓

548

CAL GAS

A Dillingham Company

May 23, 1975

Mr. John Bannister
State of Arizona
Oil & Gas Conservation Commission
8686 N. Central Avenue
Phoenix, Arizona 85020

Dear John:

Thank you very much for the use of your attached copy of the Soil Investigation at the Southwest Salt Company plant.

I appreciate the time you and Bill Allen gave me last Tuesday. Your comments and suggestions will be helpful in the further development of our Luke Salt Storage Project.

My kindest regards.

Sincerely,

Glenn W. Sorensen
Vice President, Engineering & Construction

GWS/ys

Enclosure

548

California Liquid Gas Corporation
P.O. Box 28397 Sacramento, CA 95828 (916) 428-7010
Telex: 37-7322

ARIZONA DEPARTMENT OF HEALTH SERVICES

Division of Environmental Health Services

RAUL H. CASTRO, Governor
J. L. SCHAMADAN, M.D., Director

MAY 12 1975

Mr. John Bannister
Executive Secretary
Oil and Gas Conservation Commission
8686 N. Central Ave., Suite 106
Phoenix, Arizona 85020

Re: Southwest Salt Company

Dear Mr. Bannister:

Mr. S. Von Roberts of this Department reviewed the operations and current status of the subject company on May 2, 1975 with Mr. G. J. Grott, owner, and Mr. Bill Allen of your agency.

The resultant review, engineering and geological discussion satisfied this Department that the possibility of any transmission of brine leakage into fresh water aquifers is very remote and would most certainly be first noticed at the site of the mining operation before any such occurrence.

This Department is aware of the potential hazard therein, however, and will maintain periodic surveillance over the operation to detect the occurrence of any fresh water aquifer contamination.

Sincerely,

James D. Goff, P.E.
Assistant Director

cc: Maricopa County Health Dept.
Mr. G. J. Grott, Southwest Salt Co.
C.R.C. - Maricopa County (misc.)

RECEIVED
MAY 13 1975
O & G CONS. COMM.

(See memo on other side)

527 & 548

State Health Building 1740 West Adams Street Phoenix, Arizona 85007

May 2, 1975

Memo from W. E. Allen

Re: Southwest Salt Company #1 Strat
SW/SW Sec 2-T2N-R1W
Maricopa County, Permit #527

Southwest Salt Company #2 Roach-Baker
NW/SW Sec 2-T2N-R1W
Maricopa County, Permit #548

This is in response to a letter sent to Ed Garthe, Environmental Health Services, from John Bannister. Von Roberts with the Health Services and Jerry Grott of Southwest Salt contacted me by telephone May 1, 1975. Roberts was going to meet with Grott on May 2 and Grott requested that I join them, which I did at 2 p.m. on May 2, 1975.

Our concern and the reason that John wrote Garthe was because of the prevalence of salt that had accumulated over a large section of the surface area of Southwest's operations.

Jerry told us that recent excavations on his premises disclosed a very dry deposit of sand some 15 feet below the surface of the ground. This is below a layer of caliche and clay that lies immediately above the surface. (All pits that are used have been treated to prevent seepage). If Grott's assertion that this deeper sand is extremely dry and powdery is correct, it would appear that no salt water is seeping downward to possibly contaminate the fresh water aquifer.

I brought up the possibility that the salt water could penetrate down to one of the fairly impermeable layers of caliche or clay and spread out laterally until it reached one of the many small fractures that lace this general area. Grott and Roberts were of the opinion that this was highly improbable. They also expressed the opinion that these were only surface fractures and did not reach a depth great enough to intersect the water bearing formation.

Roberts insisted that a program to monitor any intrusion of salt water into a fresh water strata would be time consuming and expensive. He was reminded that we had caused to be drilled and cased a number of holes around the perimeter of the ponds in order to monitor any migration of salt water into a deeper strata. Roberts showed no interest in this procedure except to say that he had no funds to investigate the possible pollution of fresh water caused by brine encroachment. He expressed the opinion that they would require a definite complaint from someone whose water was becoming

salty before they could or possibly would complete an extensive investigation. I told him it would be too late at this point to prevent polluting the fresh water aquifer. He and Jerry both agreed to this statement.

At this point I was convinced that the Health Services had no real interest in monitoring Southwest Salt Company's operations and I made ready to leave. Roberts joined me and the meeting was terminated at 3:20 p.m.

WEA/rlb

OFFICE OF

Oil and Gas Conservation Commission

STATE OF ARIZONA

4515 NORTH 7TH AVE.
PHOENIX, ARIZONA 85013
PHONE: (602) 271-5161

February 25, 1975

Mr. Ed Garthe
Environmental Health Services
Health Department
1740 West Adams
Phoenix, Arizona 85007

Re: Southwest Salt Company's Operation, Glendale Avenue and Dysart Road

Dear Ed:

As you are aware, surveillance of the Southwest Salt Company's operations has been turned over to your department. Again, as you are aware, an operation to create storage caverns for propane is under way in this area. This storage project is under the jurisdiction of this Commission.

We recently inspected the storage project and noticed that the Southwest Salt Company has created additional evaporation areas to the west of the old ponds. I feel this condition should be called to your attention.

Should you have any questions, we will be glad to discuss this with you.

Sincerely,

John Bannister
Executive Secretary

JB/vb

548

OFFICE OF

Oil and Gas Conservation Commission

STATE OF ARIZONA

4515 NORTH 7TH AVE.
PHOENIX, ARIZONA 85013
PHONE: (602) 271-5161

March 20, 1972

Mr. Chuck Sheffing
Shell Oil Company
P. O. Box 1200
Farmington, New Mexico 87401

Dear Chuck:

Attached is miscellaneous information on the Southwest Salt Company wells and the Kerr-McGee Red Lakes Potash Test.

The logs on these wells have been delivered to Acme Blueprint for copying. They will send your copies directly to you. They are being reproduced on a scale of 1 inch = 100 feet.

If we can be of further assistance, please advise.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

Encs.

548

548

Dr. J. J. Wright
Department of Geology
University of Arizona
Tucson, Arizona 85721

Mr. E. L. Marcum, Col. USAF
Vice Commander
Luke Air Force Base
Litchfield, Arizona 85301

Sent memos to the following people on 3-9-72

Mr. Lewis F. Scott
Engineering Testing Lab.Inc.
2525 East Indian School
Phoenix, Arizona 85016

Major Fred Hancher
Luke Air Force Base
Litchfield, Arizona 85301

Mr. Lloyd E. Myers
U. S. Water Conserv. Lab
4331 East Broadway
Phoenix, Arizona 85040

Mr. L. R. Kister
U. S. Geological Survey
2555 East 1
Tucson, Arizona 85716

Mr. Samuel F. Turner
Samuel F. Turner & Assoc.
350 East Camelback Road
Phoenix, Arizona 85012

Mr. Herbert H. Schumann
U. S. Geological Survey
Room 5017 Federal Building
Phoenix, Arizona 85025

The Honorable Jack Williams
Governor
State of Arizona
Phoenix, Arizona 85007

Dr. Hasan Qashu
Hydrology & Water Res. Dept.
University of Arizona
Tucson, Arizona 85721

Mr. Michael Pantano
2836 West Orchid Lane
Phoenix, Arizona 85021

Mr. John Savoy
Hill & Savoy
512 Arizona Bank Building
Phoenix, Arizona 85003

Mr. F. S. Nakayama
4331 East Broadway
Phoenix, Arizona 85040

Dr. West Peirce
Arizona Bureau of Mines
University of Arizona
Tucson, Arizona 85721

Mr. Joseph E. Obr
Water Pollution Control
4019 North 33rd Avenue
Phoenix, Arizona 85017

Mr. Robert H. Follett
State Department of Health
3rd Floor
1624 West Adams Street
Phoenix, Arizona 85007

Mr. Fritz Ryan
State Land Department
1624 West Adams, Room 407
Phoenix, Arizona 85007

#548

Mr. Jim V. Rouse
U.S. Department of Interior
FWPCA, Pacific SW Region
Colorado River-Bonneville Basins Office
Room 415, Building 22
Denver Federal Center
Denver, Colorado 80225

Mr. Glenn Hebert
Civilian Engineer
Luke Air Force Base
Litchfield Park, Arizona
85301

Mr. G. Parkman
C/O Goodyear Farms
Litchfield Park, Az. 85301

Mr. G. W. Bressey
C/O Goodyear Farms
Litchfield Park, Az. 85301

Mr. Forrest L. Stroup
6727 North 23 Drive
Phoenix, Arizona 85015

Mr. Bill King
P. O. Box 1950
Phoenix, Arizona 85001

Mr. Bert Thoressex
U.S.G.S.
230 North 1 Avenue
Phoenix, Arizona 85004

OFFICE OF

Oil and Gas Conservation Commission

STATE OF ARIZONA

4515 NORTH 7TH AVE.
PHOENIX, ARIZONA 85013
PHONE: (602) 271-5161

March 6, 1972

Mr. Edmund C. Garth
Assistant Commissioner for
Environmental Health Services
4019 North 33rd Avenue
Phoenix, Arizona 85017

Dear Mr. Garth:

The Oil and Gas Conservation Commission has been informed by a Directive from the Governor's Office dated, March 1, 1972, that the responsibility of monitoring and surveillance of the Salt Mining Operation, located at Glendale Avenue and Dysart Road, has been placed with your Department.

With the transfer of this responsibility from the Oil and Gas Commission to your Agency, an actuality, we are submitting our files on this operation containing in part the following:

1. Soil Investigation Reports Conducted by Engineers Testing Laboratories, Inc.
2. Suggested Program for Safeguarding Against Soil Pollution by Samuel F. Tunner, Consulting Geologist and Engineer.
3. Monthly Production Reports Submitted by Southwest Salt Company.
4. Miscellaneous Correspondence.
5. Photographs of the Salt Ponds and Surrounding Area.
6. Reports of Meeting With Interstate Parties After the Commission Had Been Assigned the Responsibility of Supervising the Subject Operation.
7. Copies of Well Records.
8. Water Analyses of Nearby Water Wells.
9. Master Thesis by Omar Izzat Touqan.

As was discussed during recent meetings in order to keep the two existing wells under bond, the Oil and Gas Commission will retain the responsibility of these wells.

If this office can be of any assistance, please give us a call.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

Enc.

RECEIVED FILES ON SOUTHWEST SALT COMPANY Mar 6 1972
(date)

Edmund C Garth
(signature)

548

OFFICE OF

Oil and Gas Conservation Commission

STATE OF ARIZONA

4515 NORTH 7TH AVE.
PHOENIX, ARIZONA 85013
PHONE: (602) 271-5161

March 6, 1972

Fidelity and Deposit Company of Maryland
234 North Central
Security Building 85004

Re: Bond #83-06-106

Southwest Salt #1 Strat
SW/SW Section 2-T2N-R1W
Maricopa County
Permit # 527

Southwest Salt #2 Roach-Baker Strat
NW/SW Section 2-T2N-R1W
Maricopa County
Permit #548

Gentlemen:

Enclosed for your information are copies of letters addressed to Southwest Salt Company, advising this Company that in the future the surveillance of their surface operations would be the responsibility of the Environmental Health Services, of the Health Department of the State of Arizona.

These letters also advised the Southwest Salt Company that the Oil and Gas Conservation Commission will retain responsibility for supervising these wells and that the bonds covering these wells will remain in full force and effect.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA/rlb

Enc.

#548

March 3, 1972

Memo: To All Participants

Re: Southwest Salt Company Operation at Glendale Avenue and Dysart Road, Maricopa County, Arizona.

Pursuant to directions received from the Governor dated March 1, 1972, monitoring operations of the captioned project will now be supervised by the Environmental Health Section of the Health Department. The water wells currently in existence will continue to be supervised by the Oil and Gas Conservation Commission.

For your information a copy of our letter to Southwest Salt Company is enclosed.

I would like to take this opportunity to thank each of you for your splendid cooperation with this Commission.

548

RECEIVED
MAR 6 19[illegible]
O & G CONS. [illegible].

JACK WILLIAMS
GOVERNOR

OFFICE OF THE GOVERNOR
STATE HOUSE
PHOENIX. ARIZONA 85007

March 3, 1972

Mr. William E. Allen
Oil and Gas Commission
4515 N. 7th Avenue
Phoenix, Arizona 85013

Dear Mr. Allen:

As a result of the conference with Mr. Garthe on February 3, 1972, I believe the time has come to transfer the monitoring of the salt pooling project, along with the associated funds, to the Health Department as agreed.

The effective date of transfer will be March 1, 1972. Attached is a proposed agreement between the two agencies which should be modified if necessary, and approved by the Attorney General.

Sincerely,

Laurence M. Bloom

Laurence M. Bloom
Administrative Aide

LMB:jh
Enc.

cc: Mr. Edmund C. Garthe

548

AGREEMENT TO TRANSFER MONITORING
OPERATION FROM THE OIL AND GAS
COMMISSION TO THE HEALTH DEPARTMENT

As of March 1, 1972 the Health Department will be the responsible agency to carry out the monitoring of the salt pooling operation near Luke Air Force Base. The Oil and Gas Commission will transfer to the Health Department all records, accounts, and funds relating to the monitoring.

John Bannister
John Bannister
Oil and Gas Commission

Edmund Garthe
Edmund Garthe
Health Department

548

August 11, 1971

Mr. John Savoy
Hill & Savoy
512 Arizona Bank Building
Phoenix, Arizona 85003

RE: Southwest Salt #2 Roach-Baker Strat
NW/4 SW/4 Sec. 2-T2N-R1W
Maricopa County
Our File #548

Dear Mr. Savoy:

As you are aware, we have repeatedly requested samples from the above referenced well. This morning we contacted Bill Garrett with the United States Geologists Survey in Tucson regarding the samples. Mr. Garrett advised us that they were delivering the samples from this well to the Arizona Bureau of Mines in Tucson, and he had made no provision to furnish this office with the required samples.

If you will please refer to Rule #119, paragrach C of the Oil and Gas Conservation Commission of the State of Arizona, and also to our designated D-170, copies of which are enclosed, you will see the responsibility is upon the operator of the well to furnish this Commission with all well samples.

Please take the necessary steps to secure the samples requested for this Commission and arrange to have them sent to our office as quickly as possible. Projects that our Geology Department is presently involved in makes the receiving of these samples a matter of urgency.

Very truly yours,

W. E. Allen
Director, Enforcement Section

WEA/rlb
Enclosures

July 21, 1971

Mr. John Savoy
Hill & Savoy
512 Arizona Bank Building
Phoenix, Arizona 85003

Re: Southwest Salt #2 Roach-Baker Strat
NW/4 SW/4 Sec. 2-T2N-R1W
Maripopa County
Our File #548

Dear Mr. Savoy:

We still have not received the samples on the above referenced well. It would be appreciated if you would prod the U. S. Geological Survey into sending our samples at the earliest possible moment.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA:jd

June 7, 1971

Mr. John Savoy
Hill & Savoy
512 Arizona Bank Building
Phoenix, Arizona 85003

Re: Southwest Salt #2 Koach-Baker Strat
NW/4 SW/4 Sec. 2-T2N-R1W
Maricopa County
Our File #548

Dear Mr. Savoy:

Thank you for submitting the Well Completion Report and Well Log on the above referenced well. You note on the Completion Report that the samples are in possession of the U.S.G.S. If you will refer to our letter to you dated May 3, 1971, you will note that we stated that it was the responsibility of the operator to furnish samples to the Oil and Gas Conservation Commission. Please arrange to have the required samples delivered as indicated in the enclosed Directive D-1-70. Thank you for your cooperation.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA:jd
Enc.

May 20, 1971

Mr. John Savoy
Hill & Savoy
512 Arizona Bank Building
Phoenix, Arizona 85003

Re: Southwest Salt #2 Roach-Baker Strat
NW/4 SW/4 Sec. 2-T2N-R1W
Maricopa County
Our File #548

Dear Mr. Savoy:

On May 3, 1971 we returned the Form 4, Well Completion or Recompletion Report and Well Log, that you had submitted to be further completed by you. As of this date we have not received the completed form. Please have this Form 4 completed and returned to this office as quickly as possible.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA:jd
cc: Mr. Gerald Grott

May 3, 1971

Mr. John Savoy
Hill & Savoy
512 Arizona Bank Building
Phoenix, Arizona 85003

Re: Southwest Salt #2 Roach-Baker Strat
NW/4 SW/4 Sec. 2-T2N-R1W
Maricopa County
Our File #548

Dear Mr. Savoy:

We are returning the Form 4, Well Completion or Recompletion Report and Well Log, that was submitted by you on your #2 Roach-Baker well. Please complete this report by completing the reverse side and return same to us.

Please refer to Rule 19, Paragraph C of the Rules and Regulations of the Oil and Gas Conservation Commission and also to Directive D 1-70 concerning samples. A copy of the above is enclosed. You will note that it is the responsibility of the operator to deliver samples and/or cores to the Commission. Your early cooperation is appreciated.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA:jd
Enc.

LAW OFFICES
HILL & SAVOY
512 ARIZONA BANK BUILDING
PHOENIX, ARIZONA 85003
TELEPHONE 258-7523

GEORGE M. HILL
JOHN E. SAVOY
KENNETH I. TODD
JOHN P. OTTO

April 28, 1971

Mr. W. E. Allen, Director
Enforcement Section
Oil and Gas Conservation Commission
4515 North 7th Avenue
Phoenix, Arizona 85013

Re: SOUTHWEST SALT CO., Well #2 (Roach & Baker Strat)
Your File No. 548

Dear Mr. Allen:

Enclosed please find our completed report, form #4, Well Completion Report. There was no log run, and all of our samples are with USGS. If you need them, they can be obtained from them.

Very truly yours,

For HILL & SAVOY

John E. Savoy/ch
Enclosure

April 9, 197$

Mr. G. J. Grott
Southwest Salt Company
P. O. Box 1237
Litchfield Park, Arizona 85340

Re: Southwest Salt #2 Roach-Baker Strat
NW/4 SW/4 Section 2-T2N-R2W
Maricopa County
Our File #548

Dear Mr. Grott:

Please furnish this office with Form 4, Well Completion Report, on your #2 well. We will also need copies of any logs that may have been run, complete samples, and chips from any cores that may have been cut. We will appreciate this information as quickly as posaible.

Very truly yours,

W. E. Allen, Director
Enforcement Section

WEA:jd
Enc.

E. V. "Gene" Skelley
Registered Land Surveyor No. 1681

WA

Mineral Surveys
Res. 265-8991

ARIZONA SURVEYING SERVICE

5704 NORTH 27th AVENUE
PHOENIX, ARIZONA 85017
PHONE 277-3904

February 10, 1971

Mr. J.T. Grott
Southwest Salt Co.
P.O. Box 1237
Litchfield Park, Ariz.

Dear Sir:
You will find enclosed 3 copies of the Report of Survey of your new well, together with the invoice.

Also, as per your instructions, a copy of this plat has been transmitted directly, by mail, to Mr. Allen, Director, Enforcement Section, Oil and Gas Conservation Commission, State of Arizona.
May I thank you at this time for this opportunity to serve you.

Sincerely,
Eugene V. Skelley

CC: Mr. Allen

RECEIVED
FEB 11 1971
O & G CONS. COMM.

548

SOUTHWEST SALT COMPANY

GLENDALE AVENUE at DYSART ROAD

POSTOFFICE BOX 1237
LITCHFIELD PARK, ARIZONA 85340

Telephone 935-5289

January 8, 1971

Mr. W. E. Allen
Director, Enforcement Section
Oil and Gas Conservation Commission
State of Arizona
4515 North 7th Avenue
Phoenix, Arizona 85013

Dear Mr. Allen:

Attached are copies of observation reports for December and January. Now that we have simplified the procedure it will be easier to report.

Regarding your request for my most recent findings regarding the fissure where it crosses Northern Avenue, I have gone back several times to that area. Once I inspected it at the same time as one of the Maricopa County Highway Engineers. Additional Polaroid shots were taken for Mr. Herb Schumann's file on this area.

In reporting my findings, first let me comment that I seriously question the propriety of the use of the term "faulting conditions" in regard to this activity. I do not find any indication of anything other than simple erosion. It is most enlightening that the action occurs when we have rainfall in the area and occurs most where there is a significant drainage.

Right now there are two new small holes opened up in the south shoulder. Each opening is at the bottom of a drainage and there is no question as to how these were made. These will erode and will quite probably undermine the blacktop necessitating another repair.

There was a further rumor that the crack had opened across the concrete flood control ditch necessitating extensive repairs. This turned out to be entirely rumor. One edge of a road paralleling the ditch had badly eroded, but the ditch was not damaged and the erosion was not anywhere near the fissure.

548

In the way of addenda, we recently had occasion to extensive use of down-the-hole photography and used the same operator who does the wells for Luke Field. I prodded him for all the information we could get that would apply to preventing any damage to our well.

He has found the casing failures to be a vertical collapse without lateral movement. His feeling is that earth subsidence puts a heavy load on the pipe particularly in churn drill holes where the casing has been driven and/or in wells which have been gravel packed.

His recommendation is to drill oversize and not gravel pack so that friction between the casing and the hole is at a minimum.

While we had other reasons for doing as we did, our hole is over-sized and filled with a heavy mud cake and gel above about 650 feet. It was necessary to cement in at the top to provide support for the tubing.

My findings at this time are that subsidence continues to be a problem and that old fissures can become drainage channels, but there are no indications of recent movement in old fissures or the starting of new ones.

Very truly yours,

G. J. Grott,
for SOUTHWEST SALT CO.

GJG/hw

548

OFFICE OF
Oil and Gas Conservation Commission
STATE OF ARIZONA
[redacted] 4515 NORTH 7th AVE.
PHOENIX, AZ. 85013
Phoenix, Arizona 85007
PHONE: 271-5161

December 9, 1970

Mr. Gerald J. Grott
Southwest Salt Company
P. O. Box 1237
Litchfield Park, Arizona 85340

Re: Southwest Salt #1 Strat
SW/4 SW/4 Sec. 2-T2N-R1W
Maricopa County
Our File #527

Southwest Salt #2 Roach-Baker Strat
NW/4 SW/4 Sec. 2-T2N-R1W
Maricopa County
Our File #548

Dear Mr. Grott:

On November 25, 1970, we wrote you requesting a report for the month of October on the condition of the fault northeast of your operations. The report for the month of November is presently due also.

On November 23, 1970, we wrote Mr. John Savoy a letter with a copy to you requesting the certified plat on your #2 well.

Some two weeks ago when John Bannister and I visited your location both John Bannister and myself verbally requested you to submit the above mentioned reports and plat. As of this date we have received neither. We would appreciate receiving these items immediately.

Very truly yours,

W. E. Allen
Director, Enforcement Section

WEA:jd
cc: Mr. John Savoy

November 23, 1970

Certified No. 231794

Mr. John Savoy
34 West Monroe
Phoenix, Arizona

Re: Southwest Salt Company #2 Roach-Baker Strat
NW/4 SW/4 Section 2-T2N-R1W
Maricopa County
Our File #548

Dear Mr. Savoy:

As of this date we have not received the certified plat on the above referenced well. At the time Mr. Bannister issued permission to drill this well prior to receiving the certified plat of same, he was promised that the plat would be submitted to this office at an early date.

Will you please take the necessary measures to submit the plat of this well to this Commission immediately.

Very truly yours,

W. E. Allen
Director, Enforcement Section

WEA:jd
cc: Mr. Jerry Groth
Certified No. 231795

[redacted]

INSTRUCTIONS TO DELIVERING EMPLOYEE

☐ Show to whom, date, and address where delivered ☐ Deliver ONLY to addressee

(Additional charges required for these services)

RECEIPT

Received the numbered article described below.

ERED NO.

IFIED NO.
31795
RED NO.

1. SIGNATURE OR NAME OF ADDRESSEE (*Must always be filled in*)
Gerald J. Gratt
2. SIGNATURE OF ADDRESSEE'S AGENT, IF ANY

DELIVERED
1/15/70

3. SHOW WHERE DELIVERED (*only if requested*)

c55—16—71543-10 GPO

File 548

INSTRUCTIONS TO DELIVERING EMPLOYEE

☐ Show to whom, date, and address where delivered ☐ Deliver ONLY to addressee

(Additional charges required for these services)

RECEIPT

Received the numbered article described below.

O.

94

1. SIGNATURE OR NAME OF ADDRESSEE (*Must always be filled in*)
John Sevay
2. SIGNATURE OF ADDRESSEE'S AGENT, IF ANY
Kay Wade

20

3. SHOW WHERE DELIVERED (*only if requested*)

c55—16—71543-10 GPO

POST OFFICE DEPARTMENT
OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE TO AVOID PAYMENT OF POSTAGE, $300

RECEIVED

NOV 27 1970

POSTMARK OF DELIVERING OFFICE

INSTRUCTIONS: Show name and address below and complete instructions on other side, where applicable. Moisten gummed ends, attach and hold firmly to back of article. Print on front of article *RETURN RECEIPT REQUESTED.*

RETURN TO

NAME OF SENDER

OIL & GAS CONSERVATION COMMISSION
STATE OF ARIZONA
4515 N. 7th AVE.
TELEPHONE: 271-5161
PHOENIX, ARIZONA 85013

STREET AND NO. OR P.O. BOX

POST OFFICE, STATE, AND ZIP CODE

POD Form 3811 Apr. 1967 068—16—71568-10

U.S. PHOENIX AZ
NOV 28 1970
AM

POST OFFICE DEPARTMENT
OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE TO AVOID PAYMENT OF POSTAGE, $300

RECEIVED

DEC 16 1970

POSTMARK OF DELIVERING OFFICE

INSTRUCTIONS: Show name and address below and complete instructions on other side, where applicable. Moisten gummed ends, attach and hold firmly to back of article. Print on front of article *RETURN RECEIPT REQUESTED.*

RETURN TO

NAME OF SENDER

OIL & GAS CONSERVATION COMMISSION
STATE OF ARIZONA
4515 N. 7th AVE.
TELEPHONE: 271-5161
PHOENIX, ARIZONA 85013

STREET AND NO. OR P.O. BOX

POST OFFICE, STATE, AND ZIP CODE

POD Form 3811 Apr. 1967 068—16—71568-10

October 29, 1970

Southwest Salt Company
P. O. Box 1237
Litchfield Park, Arizona

Attention: Mr. Johy Savoy

Re: Southwest Salt Company #2 Roach-Baker Strat
NW/4 SW/4 Section 2-T2N-R1W
Maricopa County
Our File #548

Gentlemen:

Enclosed please find your approved Application for Permit to Drill, Receipt No. 2882, a copy of the approved bond, and our Permit To Drill No. 548.

You have been furnished instruction sheets concerning samples and reports required by this office in previous correspondence. If there is any other way we may be of service, please advise.

Very truly yours,

W. E. Allen
Director, Enforcement Section

jd
Enc.

P.S. We would also appreciate receiving the certified plat showing the exact location of the above well as quickly as possible.

Oil and Gas Conservation Commission
STATE OF ARIZONA
5150 N. 16th STREET, SUITE B-141
PHOENIX, ARIZONA 85016
PHONE: (602) 255-5161

August 27, 1990

Ms. Betty Johns
Manager of Insurance Accounting
Morton International, Inc.
110 North Wacker Drive
Chicago, IL 60606-1560

RE: Southwest Salt Company
Performance Bonds 8306106 and 8418292

Dear Ms. Johns:

In reply to your letter of August 20, this letter represents this Commission's approval to release the referenced performance bonds 8306106 and 8418292.

Our records show that the wells drilled under the referenced bonds, namely Roach-Baker 1, permit 527, and Roach-Baker 2, permit 548, have been plugged and abandoned to the satisfaction of this Commission.

Sincerely,

Steven L. Rauzi

Steven L. Rauzi
Oil & Gas Specialist

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS

Bond Serial No. 84 18 292

That we: SOUTHWEST SALT COMPANY, an Arizona corporation

of the County of Maricopa in the State of Arizona

as principal, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND

of Baltimore, Maryland

AUTHORIZED TO DO BUSINESS WITHIN the State of Arizona.

as surety, are held and firmly bound unto the State of Arizona and the Oil and Gas Conservation Commission, hereinafter referred to as the "Commission", in the penal sum of FIVE THOUSAND AND NO/100 ($5,000.00) Dollars, lawful money of the United States, for which payment, well and truly to be made, we bind ourselves, and each of us, and each of our heirs, executors, administrators or successors, and assigns jointly and severally, firmly by these presents.

The conditions of this obligation are that, whereas the above bounden principal proposes to drill a well or wells for oil, gas or stratigraphic purposes in and upon the following described land situated within the State, to-wit:

Northwest quarter of the southwest quarter Section 11, Township 2 North, Range 1 West, Maricopa County, Well No. 2.

(May be used as blanket bond or for single well)

NOW, THEREFORE, if the above bounden principal shall comply with all the provisions of the Laws of this State and the rules, regulations and orders of the Commission, especially with reference to the requirements of A.R.S. § 27-516, providing for the proper drilling, casing and plugging of said well or wells, and filing with the Oil and Gas Conservation Commission all notices and records required by said Commission, then in the event said well or wells do not produce ~~oil or gas~~ salt in commercial quantities, or cease to produce ~~oil or gas~~ salt in commercial quantites, this obligation is void; otherwise it shall remain in full force and effect.

Whenever the principal shall be, and declared by the Oil and Gas Conservation Commission in violation of the Laws of this State and the rules, regulations and orders of the Commission, the surety shall promptly:

1. Remedy the violation by its own efforts, or
2. Obtain a bid or bids for submission to the Commission to remedy the violation, and upon determination by the Commission and the Surety of the lowest responsible bidder, arrange for a contract between such bidder and the Commission, and make available as work progresses sufficient funds to pay the cost of remedying the violation; but not exceeding, including other costs and damages for which the surety may be liable hereunder, the amount set forth in the first paragraph hereof.

Liability under this bond may not be terminated without written permission of this Commission.

CANCELLED
DATE 8-22-90

WITNESS our hands and seals, this 7th day of October, 19 70

SOUTHWEST SALT COMPANY

Principal

WITNESS our hands and seals this 7th day of October, 19 70

FIDELITY AND DEPOSIT COMPANY OF MARYLAND

A. Grant Kasson, Jr. Surety Attorney-In-Fact

Surety, Resident Arizona Agent
If issued in a state other than Arizona)

(If the principal is a corporation, the bond should be executed by its duly authorized officers, with the seal of the corporation affixed. When principal or surety executes this bond by agent, power of attorney or other evidence of authority must accompany the bond.)

Approved Date 10-22-70

STATE OF ARIZONA
OIL & GAS CONSERVATION COMMISSION

By: John Bannister

Permit No. 548

STATE OF ARIZONA
OIL & GAS CONSERVATION COMMISSION

Bond

File Two Copies

Form No. 2

RECEIVED
OCT 20 1970
STATE O & G
CONS. COMM.

Power of Attorney

FIDELITY AND DEPOSIT COMPANY OF MARYLAND

HOME OFFICE: BALTIMORE, MD.

KNOW ALL MEN BY THESE PRESENTS: That the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, a corporation of the State of Maryland, by WM. H. C. GRIFFITH, Vice-President, and M. A. KELLY, Assistant Secretary, in pursuance of authority granted by Article VI, Section 2, of the By-Laws of said Company, which reads as follows:

"The President, or any one of the Executive Vice-Presidents, or any one of the additional Vice-Presidents specially authorized so to do by the Board of Directors or by the Executive Committee, shall have power, by and with the concurrence of the Secretary or any one of the Assistant Secretaries, to appoint Resident Vice-Presidents, Resident Assistant Secretaries and Attorneys-in-Fact as the business of the Company may require, or to authorize any person or persons to execute on behalf of the Company any bonds, undertakings, recognizances, stipulations, policies, contracts, agreements, deeds, and releases and assignments of judgments, decrees, mortgages and instruments in the nature of mortgages, and also all other instruments and documents which the business of the Company may require, and to affix the seal of the Company thereto."

does hereby nominate, constitute and appoint A. Grant Kasson, Jr. of Phoenix, Arizona.....

its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: any and all bonds and undertakings.....

And the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Company, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the Company at its office in Baltimore, Md., in their own proper persons.

The said Assistant Secretary does hereby certify that the aforegoing is a true copy of Article VI, Section 2, of the By-Laws of said Company, and is now in force.

IN WITNESS WHEREOF, the said Vice-President and Assistant Secretary have hereunto subscribed their names and affixed the Corporate Seal of the said FIDELITY AND DEPOSIT COMPANY OF MARYLAND, this 15th day of September, A.D. 19 65

ATTEST: **FIDELITY AND DEPOSIT COMPANY OF MARYLAND**

(SIGNED) M. A. KELLY *Assistant Secretary* By WM. H. C. GRIFFITH *Vice-President*

(SEAL)

STATE OF MARYLAND
CITY OF BALTIMORE } SS:

On this 15th day of September, A.D. 19 65, before the subscriber, a Notary Public of the State of Maryland, in and for the City of Baltimore, duly commissioned and qualified, came the above-named Vice-President and Assistant Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and they each acknowledged the execution of the same, and being by me duly sworn, severally and each for himself deposeth and saith, that they are the said officers of the Company aforesaid, and that the seal affixed to the preceding instrument is the Corporate Seal of said Company, and that the said Corporate Seal and their signatures as such officers were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporation.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal, at the City of Baltimore, the day and year first above written.

(SIGNED) FRANK G. MEURER

(SEAL) Notary Public Commission Expires July 1, 1967

8-27-90

CERTIFICATE

I, the undersigned, Assistant Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the original Power of Attorney of which the foregoing is a full, true and correct copy, is in full force and effect on the date of this certificate; and I do further certify that the Vice-President who executed the said Power of Attorney was one of the additional Vice-Presidents specially authorized by the Board of Directors to appoint any Attorney-in-Fact as provided in Article VI, Section 2 of the By-Laws of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND.

This Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 19th day of October, 1966.

RESOLVED: "That the facsimile or mechanically reproduced signature of any Assistant Secretary of the Company, whether heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed."

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the said Company, this 7th day of October, 19 70

J. J. Moore
Assistant Secretary

L1419—Ctf.

October 23, 1970

Fidelity & Deposit Company of Maryland
Security Building
Phoenix, Arizona

Attention: A. Grant Kasson, Jr.

Re: Southwest Salt Company #2 Roach Baker-Strat
NW/4 SW/4 Section 2-T2N-R1W
Maricopa County
Our File #548

Bond No. 84-18-292
Fidelity & Deposit Company of Maryland

Gentlemen:

We are returning the performance bond issued to Southwest Salt Company for correction. Your description of the well site locates this well in the SW/4 SW/4 Section 2, Township 2 North, Range 1 West, Maricopa County. According to the information we have on file from Southwest Salt Company, this well is situated in the NW/4 SW/4 Section 2, Township 2 North, Range 1 West, Maricopa County. Will you please make the necessary correction and return the corrected copies to this office at your earliest convenience.

Very truly yours,

W. E. Allen
Director, Enforcement Section

WEA:jd
Enc.
cc: John Savoy

548

October 23, 1970

Fidelity & Deposit Company of Maryland
Security Building
Phoenix, Arizona

Attention: A. Grant Kasson, Jr.

Re: Southwest Salt Company #2 Roach Baker-Strat
NW/4 SW/4 Section 2-T2N-R1W
Maricopa County
Our File #548

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Very truly yours,

W. E. Allen
Director, Enforcement Section

WEA:jd
Enc.
cc: John Savoy

548