FACT SHEET

Applicant:	SOUTHERN DISPOSAL SOLUTIONS, LLC 1061 Cotton Ford Road Center, TX 75935 (936) 591-2260
Project Proposal:	Permit to drill and complete one Class V Stratigraphic Test Well
Type of Facility:	N/A
Well Names:	S2O No. 1
Project Location:	Section 7, Township 10 North, Range 12 West De Soto Parish
Facility Local Address:	N/A
Application No.:	44876
Docket No.:	IMD 2024-01

Project Summary: The following information is prepared according to the requirements of Statewide Order No. 29-N-1, (LAC 43:XVII, Subpart 1) to briefly set forth the principal facts and significant policy questions considered in preparing a draft permit concerning an application by Southern Disposal Solutions, LLC (Southern) to drill one Class V stratigraphic test (injection) well in De Soto Parish, Louisiana.

The application is for the drilling of one proposed Class V stratigraphic test (injection) well. The total depth of the well is at a depth of approximately 5,800 feet below ground level.

The acquisition of geotechnical data is proposed to occur in the drilling of this well. No disposal of waste via injection will occur.

General Information: Southern proposes to collect geotechnical cores, fluid samples, static pressure measurements, and other applicable information.

The base of the lowermost underground source of drinking water (USDW) is approximately 715 feet below ground level. There are eight (8) registered water wells located within a one-mile radius of the proposed well location. The principal regional aquifers in the area comprise of the Carrizo-Wilcox, Upland Terrace, and Red River Alluvial Aquifers.

The complete application consists of the application form (Form UIC-25 Stratigraphic Test); technical attachments describing the geology, hydrology and construction.

The draft permit conditions were based on applicable rules and regulations as set forth in Statewide Order No. 29-N-1 (LAC: 43:XVII, Subpart 1) as amended. Such rules provide for the protection and non-endangerment of USDW regarding the permitting, drilling, completing, operating and maintaining of Classes I (nonhazardous waste), III, IV, and V injection well operations in the State of Louisiana.

Application Locations: An application package is available for inspection at the Louisiana Office of Conservation, Injection and Mining Division, LaSalle Building, 617 North Third Street, Room 817, Baton Rouge, LA 70802 from 8:00 am until 4:30 pm, Monday through Friday. To view, please ask for the Southern Class V Permit Application identified at the beginning of this document. The application package is also available at the Louisiana Department of Natural Resources, Office of Conservation website.

For any information concerning the application, call Patrick Ragan at (225) 342-6486, Monday through Thursday, between the hours of 7:00 a.m. to 5:00 p.m.

Comment Period: The public comment period officially commences March 20, 2024, at 8:00 a.m. and concludes April 26, 2024, at 4:30 p.m. Submit all comments in writing to Patrick Ragan, Louisiana Office of Conservation, Injection and Mining Division, 617 N. 3rd St, Baton Rouge, LA 70802. Comments may also be e-mailed to info@la.gov. Please reference Southern Class V Permit, Application Number 44876.

Public Hearing: The public hearing will be held April 25, 2024, 6:00 pm at Mansfield City Hall, 705 Polk Street, Mansfield, LA 71052.

JEFF LANDRY
GOVERNOR

TYLER PATRICK GRAY
SECRETARY

BENJAMIN C. BIENVENU
COMMISSIONER OF CONSERVATION

State of Louisiana

DEPARTMENT OF ENERGY AND NATURAL RESOURCES
OFFICE OF CONSERVATION

March 14, 2024

Bradley Odom
Southern Disposal Solutions, LLC (S1088)
1061 Cotton Ford Road
Center, TX 75935

* * * APPROVAL TO CONSTRUCT * * *

RE: Stratigraphic Test Well – New Drill
S2O SWD #1
Benson Field
De Soto Parish

Application No. 44876
Serial No. _____
API No. _____

Dear Mr. Odom:

The application by Southern Disposal Solutions, LLC to drill a Class V stratigraphic test well has met the interim requirements for permitting such a well. The issuance of this Permit to Construct constitutes a final permit decision regarding the construction of this well. You are hereby granted approval to perform the work as described in the application. The approved work must be completed by _____ __, 2024.

Southern Disposal Solutions, LLC is to notify the Conservation Enforcement Specialist (CES) for De Soto Parish, Pete Bradford at (318) 518-2677, Monday through Friday, or by calling the Injection and Mining Division at (225) 342-5515 at least 72 hours prior to commencement of work. At least 48 hours before the casing test of the long string, contact the CES to schedule a witnessed casing test.

Within twenty (20) days after completion of the work, submit the documentation requested in the enclosed Reporting Requirements to the Injection and Mining Division. PLEASE READ THE ENCLOSURES CAREFULLY.

Please be reminded that for future work on the well, a work permit approval must be obtained from this office before repairing, stimulating, plugging, or otherwise working on this well.

Yours very truly,

Benjamin C. Bienvenu
Commissioner of Conservation

Stephen H. Lee, Director
Injection and Mining Division

OFFICE OF CONSERVATION

IMD REPORTING REQUIREMENTS >> Class V Stratigraphic Test

Drilling and construction of the well must be completed within one (1) year from the date of the permit approval letter, otherwise, the permit will expire. **Before the expiration of the permit, the operator must notify the Injection and Mining Division (IMD) if a time extension will be requested or if well will not be drilled**.

The approved application describes how the well is to be constructed. Changes in the approved construction, such as well surface location, well depth, or casing setting depths, will require prior written approval from IMD. Failure to obtain prior written approval will be cause for revoking the permit.

At least forty-eight (48) hours prior to commencement of work, the appropriate Conservation Enforcement Specialist (CES) identified below must be contacted. If you are unable to reach the CES, please call the Injection and Mining Division at (225) 342-5515 between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday.

Application No.	**44876**	Serial No.	
CES Name	**Pete Bradford**	CES Phone No.	**318-518-2677**

Within twenty (20) days after completion of the well, the completion documents listed below must be filed with IMD for review and approval in compliance with the regulations. Please place the well's Serial Number on the log headings.

- A Class V Well History and Work Résumé Report (Form UIC-42 STRAT TEST) with an original signature from an authorized representative of the operating company and two photocopies of the form (front and back). The Form UIC-42 can be saved, filled-out, and printed by going to www.dnr.louisiana.gov/consforms >> Injection & Mining Division >> Form UIC-42.
- Two (2) copies of the wellbore schematic depicting the completed well.
- Two (2) copies of the electric log used to identify the USDW.
- Two (2) copies of the cement bond log for each respective casing string.
- An original AFFIDAVIT OF TEST OF CASING IN WELL (Form CSG-T) signed by a company representative and witnessed by a third party for each casing. Provide a copy of the properly labeled pressure chart if the Form CSG-T does not have a witnessed signature. Include the well name, well serial number, casing size, test start time and stop time, date of test, and signature of company representative. The Form CSG-T can be downloaded from www.dnr.louisiana.gov/consforms >> Injection & Mining Division >> Form CSG-T.

Send the above required documentation together in **ONE PACKAGE** to:

Office of Conservation- 9th Floor
Injection & Mining Division
617 North 3rd Street
Baton Rouge, LA 70802

OFFICE OF CONSERVATION

FORM UIC-25 STRAT TEST

CLASS-V WELL PERMIT APPLICATION

MAR 01 2024

INJECTION & MINING DIVISION

1. APPLICATION TYPE: (Check One)	LOUISIANA DEPARTMENT OF NATURAL RESOURCES - OFFICE OF CONSERVATION INJECTION & MINING DIVISION Injection-Mining@la.gov (225) 342-5515
☑ DRILL AND COMPLETE NEW CLASS-V WELL ☐ CONVERT AN EXISTING WELL TO CLASS-V ☐ OTHER (SPECIFY)	

2. IDENTIFY WELL USE
STRATIGRAPHIC TEST

3. IDENTIFY FUTURE WELL USE (i.e. Conversion to Class VI, monitor well, P&A, etc.)
CONVERSION TO CLASS II

4. OWNER/OPERATOR NAME	5. OOC OPERATOR CODE
SOUTHERN DISPOSAL SOLUTIONS, LLC	S1088

6. OWNER/OPERATOR MAILING ADDRESS	7. CITY, STATE, ZIP CODE
1061 COTTON FORD RD.	CENTER, TX 75935

8. TELEPHONE NO.	9. E-MAIL ADDRESS
936-591-2260	bradley@southernfluidtx.com

10. WELL NAME	11. WELL NO.	12. WELL SERIAL NO. (Well Conversions Only)
S2O SWD	1	

13. FIELD NAME	14. FIELD CODE
BENSON	1440

15. PARISH NAME	16. SECTION	17. TOWNSHIP	18. RANGE
DESOTO	7	10N	12W

19. LOUISIANA COORDINATE ZONE (Check One)	For Item Numbers 20 Through 25, Give Coordinates in Louisiana Coordinate System 1927 and 1983
☑ NORTH ZONE ☐ SOUTH ZONE	

20. LATITUDE (NORTH) NAD 1927	21. LONGITUDE (WEST) NAD 1927	22. LOUISIANA LAMBERT (X-Y) COORDINATES (NAD 1927)
31°52'21.91"	93°37'58.78"	X: 1648297.89 Y: 440547.12

23. LATITUDE (NORTH) NAD 1983	24. LONGITUDE (WEST) NAD 1983	25. LOUISIANA LAMBERT (X-Y) COORDINATES (NAD 1983)
31°52'22.51"	93°37'59.43"	X: 2929083.17 Y: 501254.37

26. LIST PERMITS, LICENSES, OR APPROVALS THE APPLICANT HAS RECEIVED OR APPLIED FOR WHICH SPECIFICALLY AFFECT THE APPLICANT'S LEGAL OR TECHNICAL ABILITY TO CARRY OUT THE PROPOSED ACTIVITY. INCLUDE IDENTIFICATION NUMBER OF APPLICATIONS OR, IF ISSUED, THE IDENTIFICATION NUMBER OF THE PERMIT, LICENSE, OR OTHER APPROVALS.

Regulatory Program or Agency	Permits, Licenses, Construction, Project Approval Identification
US ARMY CORPS OF ENGINEERS	JURISDICTIONAL DETERMINATION SUBMITTED.

22. WELL CASING / CEMENT DATA

CASING SIZE (OD-INCHES)	HOLE DIAMETER (INCHES)	CASING WEIGHT (LB/FT)	CASING GRADE	CASING SETTING DEPTHS TOP	CASING SETTING DEPTHS BOTTOM	TOTAL SACKS	SACKS CEMENT (Lead/Tail)	TYPE (Lead/Tail)	YIELD (CU FT/SACK) (Lead/Tail)	CEMENT TOP
9.625	12.25	36	K-55	0	1,000	410	230/180	Class A/Class A	1.98/1.18	SURFACE
7	8.75	26	L-80	0	5,800	930	345/585	Class A/Class H	1.73/1.19	SURFACE

23. BASE OF USDW (FT): 715'

REFERENCE E-LOG (SERIAL NUMBER): 148541

24. ELEVATION OF DATUM (FT): 310' (Estimated)

☐ KB ☑ GL ☐ MSL

25. WELL TOTAL DEPTH (FT):	26. PLUGBACK DEPTH (FT):	27. TUBING SIZE & DEPTH:	28. PACKER SIZE & DEPTH:
5,800'	5,750'	4.5" @ 5,260'	4.5" X 7" @ 5,260'

INJECTIVITY TEST INFORMATION (IF APPLICABLE)

29. INJECTION ZONE DEPTHS

Top: 3,455' Bottom: 5,724'

30. COMPLETION/PERFORATION DEPTHS

Top: 5,310' Bottom: 5,724'

Proposed perfs: 5360'-5375'; 5430'-5490'

31. WELL COMPLETION ☐ OPEN HOLE ☑ PERFORATIONS ☐ SCREEN

32. TEST MATERIAL (e.g. nitrogen, brine, etc):	33. MAXIMUM TEST PRESSURE (psi):	34. TOTAL INJECTION VOLUME (bbls):
N/A ***CO_2 is prohibited as a Class V test material***	N/A	N/A

35. Is the Well Located on Indian Lands or Other Lands Owned by or under the Jurisdiction or Protection of the Federal Government? ☐ YES ☑ NO

36. Is the Well Located on State Water Bottoms or Other Lands Owned by or under the Jurisdiction or Protection of the State of Louisiana? ☐ YES ☑ NO

37. AGENT OR CONTACT AUTHORIZED TO ACT ON BEHALF OF THE APPLICANT DURING THE PROCESSING OF THIS APPLICATION

OFFICE OF CONSERVATION

NAME: Jordy Babineaux

COMPANY: Approach Environmental

MAR 14 2024

MAILING ADDRESS: P.O. Box 7192

TELEPHONE NUMBER: 985-789-0711

E-MAIL ADDRESS: jordypb@approachenv.com

INJECTION & MINING DIVISION

38. CERTIFICATION BY WELL OWNER/OPERATOR

I certify that as the owner/operator of the injection well, the person identified in Item No. 37 above is authorized to act on my behalf during the processing of this application, to submit additional information as requested, and to give oral statements in support of this application. I will grant an authorized agent of the Office of Conservation entry onto the property to inspect the injection well and related appurtenances as per LSA-R.S. 30:4. I agree to operate the well in accordance with Office of Conservation guidelines. I further certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment or both (LSA-R.S. 30:17).

Print Name of Well Owner/Operator	Print Title of Company Official (as applicable)
Bradley Odom	Member and COO

Signature of Well Owner/Operator

Date: 2·23·24

Response to 2/22/24 NOD

I. SUBMIT THE FOLLOWING AS A COMPLETE APPLICATION PACKAGE FOR A CLASS-V WELL:

A. Application Fee: Submit the non-refundable application fee for each well per LAC 43:XIX.Chapter 044876

B. Include the following as applicable:

1. One Form UIC-25 STRAT TEST with original signature;
   a. Should there be no existing field designation, please use the following dependent upon which Office of Conservation district the well is to be located in (click here to see the district outlines):
      - WILDCAT-SO LA LAFAYETTE DIST (9727)
      - WILDACT-NO LA SHREVEPORT DIST (9715)
      - WILDCAT-NO LA MONROE DIST (9709)
2. Two original Form MD-10-R-A for each existing well to be converted (if conversion is proposed);
3. One original Certified Location Plat showing the location of each Class-V well location;
   a. Please be sure to comply with the requirements of the IMD-GS-10 Policy
4. Injection test fluid analysis (if injection is proposed);
5. An annotated copy of an electric well log of the nearest offset well that shows the Underground Source of Drinking Water (USDW);
6. An annotated copy of an electric well log of the nearest offset well that shows the proposed injection zone (if injection is proposed);
7. Work prognosis for drilling, completing, and testing the well;
8. Schematic(s) of the Class-V well showing:
   a. Casing diameter, specifications, material (PVC, steel, etc.), and depth,
   b. Screen type, length, material, slot or opening size,
   c. Injection tubing size inside casing (if any),
   d. Hole diameter (bit size),
   e. Amount and type of cement used and depths to top and bottom of cement,
   f. Wellhead showing all fittings,
   g. Discharge line diameter and connection to wellhead,
   h. Well house (if any).
   Schematics should be stamped and signed by a Louisiana-registered Professional Engineer (PE) as appropriate
9. Financial surety will be required for Class V per LAC.XIX.104.C.5. Bonding costs will be the estimated cost for the actual plugging and abandonment (P&A) of the well.
   a. Please provide a P&A procedure, schematic, and 3rd party cost estimate.
      ** The acceptance of the P&A procedure will not constitute approval to P&A the well to those standards and will strictly be used to verify the 3rd party estimate**

II. REQUIREMENTS OF A PERMIT APPLICATION FOR CLASS-V INJECTION WELL:

A. Operating a Class-V well without a permit is a violation of Statewide Order No. 29-N-1 (LAC 43:XVII, Subpart 1) and may subject the well owner to enforcement action including fines as provided by La R.S. 30. No fines will be imposed on the owner of an existing unpermitted injection well provided the owner submits an application for a permit. However, repairing, stimulating, plugging or performing other work on a Class-V well without a work permit (Form UIC-17) may subject the well owner to a fine.

B. After completing the Class-V well, a permanent, weather-proof sign not less than 1 foot by 2-foot in size must be erected within ten feet of the well, which, at a minimum shows the Well Name and Office of Conservation issued Well Serial Number. If the Class-V well is enclosed within a well house, the sign may be inside the well house, if it is prominently visible upon entering.
After completing the Class-V well, complete and submit the Form UIC-42 STRAT TEST

C. When abandoning, the well must be plugged in accordance with Office of Conservation guidelines in effect at the time of abandonment.

The Injection & Mining Division can be reached by telephone at 225-342-5515 or email Injection-Mining@la.gov

Please submit the completed application form with all required attachments to:

OFFICE OF CONSERVATION

JAN 10 2024

INJECTION & MINING DIVISION

Mailing Address

Office of Conservation Injection & Mining Division
617 North Third Street
Baton Rouge, LA 70802-5428

Street Delivery Address

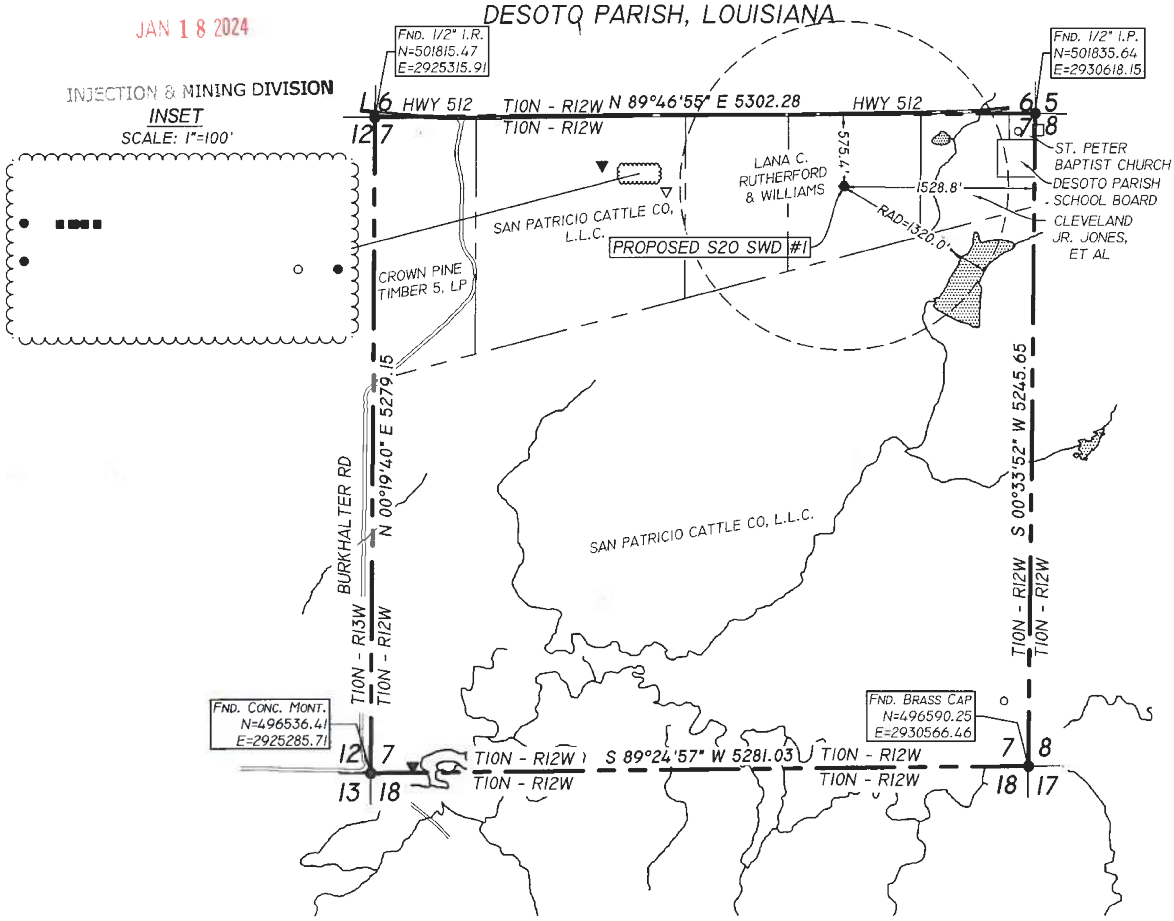
Office of Conservation
Injection & Mining Division
LaSalle Building
617 North Third Street, Suite 817
Baton Rouge, LA 70802-5428

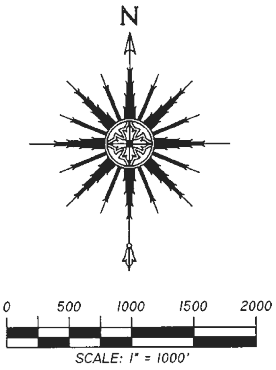
OFFICE OF CONSERVATION

JAN 18 2024

INJECTION & MINING DIVISION

INSET
SCALE: 1"=100'





LEGEND	
OIL & GAS WELLS	
●	ACTIVE - PRODUCING GAS
○	DRY & PLUGGED NO PRODUCT SPECIFIED
■	PERMIT EXPIRED
SALT WATER DISPOSAL WELLS	
▲	DRY & PLUGGED, CLASS II
WATER WELLS	
▼	ACTIVE
▽	PLUGGED & ABANDONED
□	UNREGISTERED
FND.	FOUND
I.P.	IRON PIPE
I.R.	IRON ROD
	BAYOU / CREEK
	WATER BODY

PLAT SHOWING LOCATION S2O SWD #1, SOUTHERN DISPOSAL SOLUTIONS LLC

LOCATED 575 FEET FROM THE NORTH LINE AND 1528 FEET FROM THE EAST LINE OF SECTION 7, TOWNSHIP 10 NORTH, RANGE 12 WEST, DESOTO PARISH, LOUISIANA.

ALL OIL & GAS WELLS AND WATER WELLS ARE BASED ON THE LDNR SONRIS COORDINATES UNLESS OTHERWISE NOTED.

STATE PLANE COORDINATES (LA NORTH)

NAD 1927	NAD 1983
(Y) 440547.128	(Y) 501254.374
(X) 1648297.893	(X) 2929083.171
LATITUDE IS N 31°52'21.91"	LATITUDE IS N 31°52'22.51"
LONGITUDE IS 93°37'58.78" W	LONGITUDE IS 93°37'59.43" W

GROUND ELEVATION AT SOUTHERN DISPOSAL SWD NO. 1 IS 302.76 NAVD 1988.

DATE: FIELD SURVEY OCTOBER 25, 2023

DATE: SCALED DRAWING NOVEMBER 28, 2023

DISTANCE TO SHOULDER OF HWY 512 FROM PROPOSED SWD IS 566'
DISTANCE TO SHOULDER OF INTERSTATE 49 FROM PROPOSED SWD IS 65,020'

NO RESIDENTIAL OR COMMERCIAL STRUCTURES ARE LOCATED WITHIN 500' OF PROPOSED LOCATION.

THE BASIS OF BEARINGS USED FOR THIS MAP IS GRID, ESTABLISHED FROM THE LOUISIANA STATE PLANE COORDINATE SYSTEM, NORTH ZONE, NAD 1983 (2011) POSITION (EPOCH 2010.00) ADJUSTMENT, AS DETERMINED FROM C4GNET RTN.

BOUNDARY BASED ON CASH SALE DEED RECORDED AS INSTRUMENT NO. 793272 OF THE RECORDS OF DESOTO PARISH, LOUISIANA.

I, MATTHEW P. CARAWAY, PROFESSIONAL LAND SURVEYOR, LA LIC. NO. 5322, CERTIFY THAT THE WELL LOCATION DEPICTED AND DESCRIBED ON THIS PLAT WAS LOCATED AND SURVEYED IN THE FIELD BY ME OR UNDER MY DIRECTION WITH ACCURACY AND PRECISION TO THE NEAREST FOOT. I HAVE PROPERLY EXAMINED THIS PLAT AND HAVE DETERMINED THAT IT COMPLIES WITH EXISTING LOCAL LOUISIANA CODES, AND HAS BEEN PROPERLY SITE ADAPTED TO USE IN THIS AREA. THIS IS NOT A PROPERTY BOUNDARY SURVEY AND DOES NOT MEET THE STANDARDS OF PRACTICE FOR A PROPERTY BOUNDARY SURVEY. BASIS OF COORDINATES IS GPS OBSERVATION USING C4GNET.

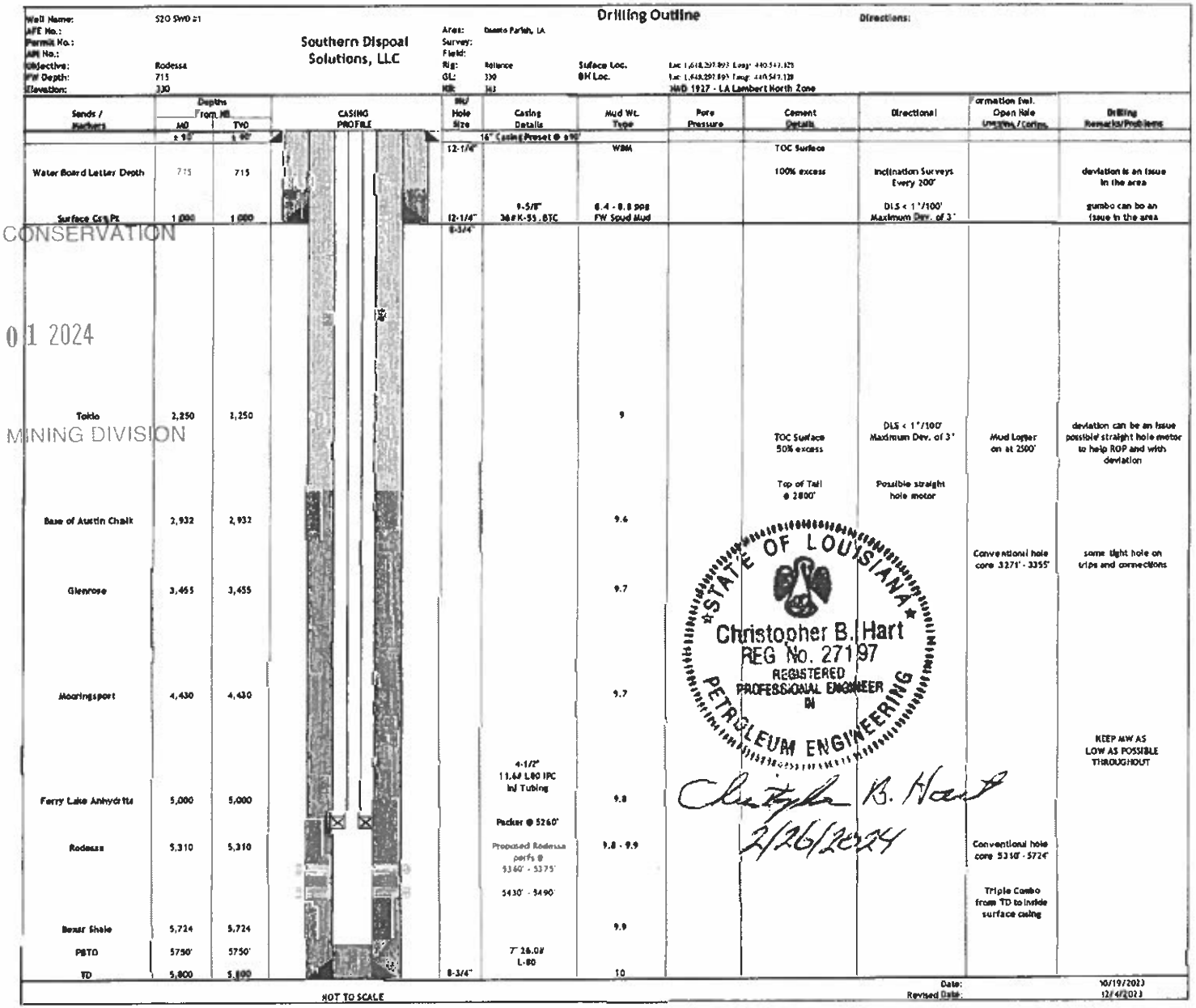
M. P. C. 11/30/23

MATTHEW P. CARAWAY — DATE
REGISTERED PROFESSIONAL LAND SURVEYOR
LOUISIANA LICENSE NO. 5322

MATTHEW P. CARAWAY
License No. 5322
PROFESSIONAL LAND SURVEYOR
STATE OF LOUISIANA

047876

WELLBORE DIAGRAM:

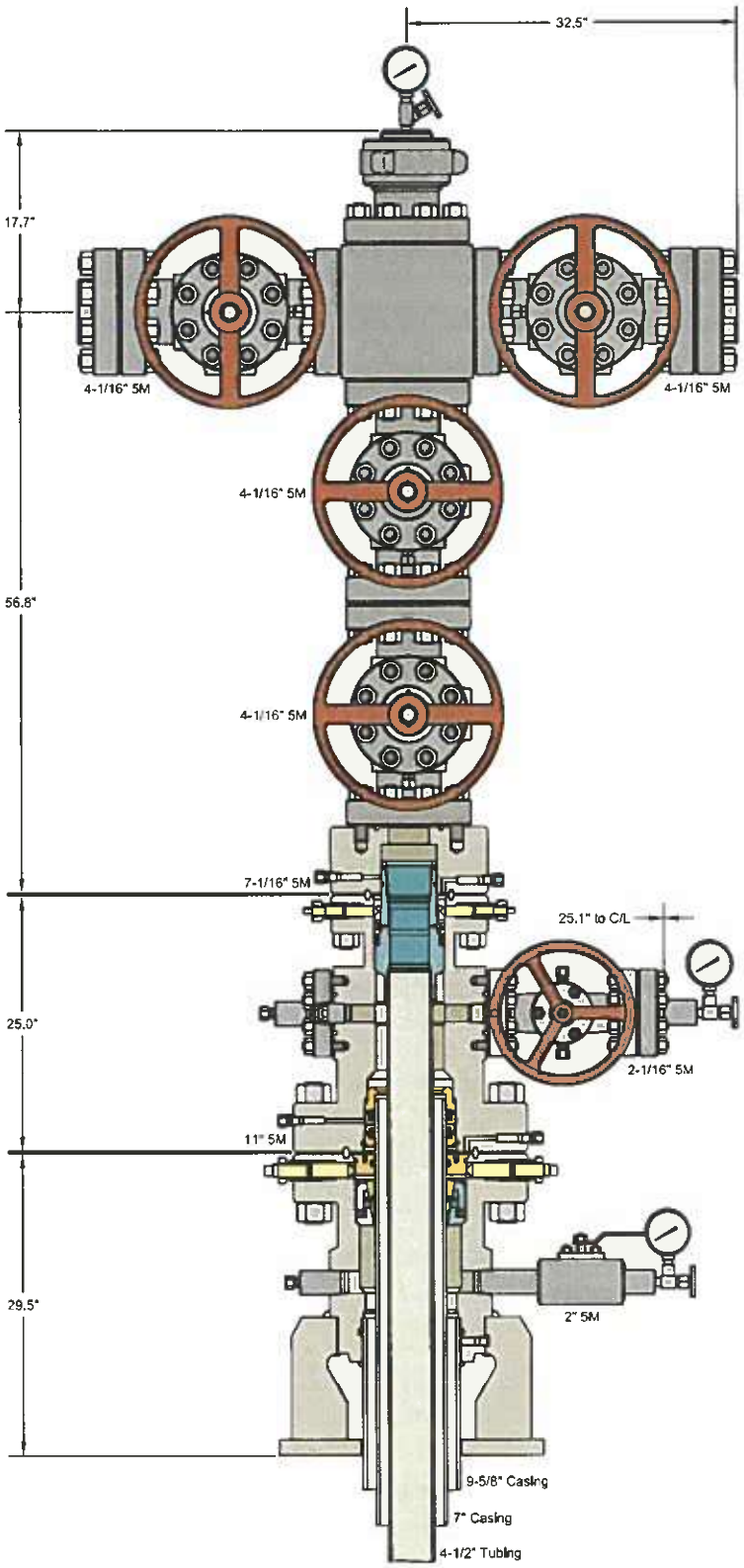


STATE OF LOUISIANA
Christopher B. Hart
REG No. 27197
REGISTERED PROFESSIONAL ENGINEER IN PETROLEUM ENGINEERING

Christopher B. Hart
2/26/2024

Response to 2/22/24 NOD

044876



OFFICE OF CONSERVATION

JAN 18 2024

INJECTION & MINING DIVISION

ALL DIMENSIONS APPROXIMATE

CACTUS WELLHEAD LLC	SOUTHERN DISPOSAL SOLUTIONS EAST TEXAS		
9-5/8" x 7" x 4-1/2" Conventional Wellhead System With 11" 5M x 7-1/16" 5M CTH-HPS-F Tubing Head And 4-1/16" 5M x 4-1/16" 5M Production Tree Assembly	DRAWN	VJK	06OCT23
	APPRV		
	DRAWING NO.	CEE0001842	

Southern Disposal Solutions, LLC.
S2O SWD #1
Desoto Parish, LA

APPROVALS

Drilling Engineer:	Jeremy Martin, Brad Hunsucker
Operations Superintendent:	Dale Nace

WELL INFORMATION

Surface Location:

X = 1,648,297.893 Y = 440,547.128 (NAD 27 Louisiana Lambert North Zone)

Lat: 31° 52' 21.91" N Lon: 93° 37' 58.78" W

Permit BHL:

X = 1,648,297.893 Y = 440,547.128 (NAD 27 Louisiana Lambert North Zone)

Lat: 31° 52' 21.91" N Lon: 93° 37' 58.78" W

GL:	330 ft
KB:	13 ft
RKB:	343 ft
Total Depth:	5800' MD/TVD
Well Type:	SWD

API:

Drilling Permit #:

DIRECTIONS

OBJECTIVE (Landing Point)

Objective	MD / TVD	Coordinates
Rodessa	5310' MD/TVD	Lat: 31° 52' 21.91" N Lon: 93° 37' 58.78" W

The S2O SWD #1 is a proposed vertical well designed to target the Rodessa formation located in Desoto Parish, LA. The Rodessa top is estimated at 5310' MD/TVD.

GENERAL WELL PLAN:

Procedure Outline

1) MIRU Reliance 2. 16" Conductor pre-set at 90'.
2) P/U 12-1/4" bit, and drill surface hole to 1,000' MD/TVD, taking MWD surveys every 200'.
3) Make a wiper trip in preparation for logging.
4) R/U logging unit and log well per Southern Disposal, LLC.
5) After logging is complete, make wiper trip to TD, and POOH laying down drill pipe.
6) At TD Circulate bottoms up and make a wiper trip to surface. Trip out of the hole and run, set, and cement 9-5/8" surface casing at ± 1,000'. RU wireline and run RCBL on the 9 -5/8" surface casing.
7) Perform ID/OD weld on 11" 5M x 9-5/8" SOW surface wellhead and test same.
8) N/U rigs 11", 5M BOPs and test same.
9) PU 8-3/4" bit and BHA. Test casing (1,500 psi), drill out float equipment and 10' formation and perform FIT test on the 9-5/8" casing shoe to a 12.0 ppg equivalent.
10) Drill ahead with BHA to core point at 3,271'. Make sure mud loggers are rigged up and taking samples @ 2,500'. After reaching core point, trip out of the hole and pick up coring assembly.
11) Trip back in the hole and take core at 3,271' - 3,355' as per Baker Hughes coring procedures.
12) After coring is complete, pick up 8-3/4" drill bit and BHA, trip in hole to 3,355'. Drill ahead to second core point @ 5,310'. Be prepared to ream thru first core interval on trip back in hole. POOH, LD BHA, and PU coring assembly.
13) Trip in the hole and take core at 5,310' - 5,724' as per Baker Hughes coring procedures.
14) After coring is complete, pick up 8-3/4" drill bit and BHA. Drill ahead to TD @ 5,800'.
15) After reaching TD, make a wiper trip in preparation for logging.
16) R/U logging unit and log well per Southern Disposal, LLC.
17) After logging is complete, make wiper trip to TD, and POOH laying down drill pipe.
18) Run, set and cement 7" casing to ~5,800'.
19) Install 11" 5M x 7-1/16" 5M wellhead and test same. Install BPV and test same. Turn rig over to completions engineer for completion operations.

CASING PROGRAM

Casing	Size	Wt.	Grade	Burst	Collapse	Tensile (Body)	Conn	Test PSI
Conductor	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Surface	9-5/8"	36.0#	J-55	3520	2020	564	BTC	1500
Production	7"	26.0#	L-80	7240	5410	604	LTC	TBD

WELLHEAD SYSTEM

- 11" 5M x 9-5/8" SOW with 26" Base Plate
- 11" 5M x 7-1/16" 5M

GEOLOGIC INFORMATION

Formation Name	Lithology	TVD Depth	Est. EMW	Descriptions or Potential Drilling Problems
Tokio	Sandstone	2,350	9.0	
Austin Chalk Base	Chalk	2,932	9.6	
Glenrose	Limestone	3,455	9.7	
Mooringsport		4,430	9.7	
Ferry Lake Anhydrite	Anhydrite	4,885	9.8	
Rodessa	Limestone	5,310	9.8 - 9.9	Possible inflow
Bexar Shale	Shale	5,724	9.9	
TD		5,800	10.0	

****Refer to WBD for additional information.**

PLANNED TD

Drilling will cease when the following requirements are met:

1) Planned permit depth (5,800' MD/TVD) has been reached or geologist stops drilling short of permit depth.

WIRELINE LOGGING

- **GR, SP, Resistivity (90' - 1,000')**
- **Conventional hole cores at 3,271' - 3,355' (confining shale) and 5,310' - 5,724' (Rodessa)**
- **Triple combo (1,000' - TD)**

OPERATION NOTES

- All repairs to the rig are to be completed **before** the rig is put on day work.
- **Note on the drilling report each BOP test time and date. Keep a file on location with all appropriate BOP test charts. Interval BOP test pressure requirements will be provided in the procedure detail.**
- **BOP well control drills are to be conducted weekly. Note well control drills on daily reports. Also keep a file of everyone's BOP certification on location. Do not conduct BOP/pit drills while in the open hole!**
- Hold daily safety meetings with all rig personnel each tour and before each change in operation. Share forward plans and contingencies during these sessions.
- Maintain inventory sheets on all tubulars, rental tools, casing, and bits. **Thread protectors required on all tubulars.**
- Complete a Trip Sheet report for each short/wiper trip performed and ensure that the choke manifold is properly aligned to allow for bottoms up gas to be routed through the hydraulic choke and/or pit blooey line in the event that a gas bubble reaches surface.
- Calculate fill-up volumes for each pipe size in the drill string. Ensure that rig personnel record fill up volumes on trips every 5 stands or if the hydrostatic pressure (HSP) is reduced by more than 75 psi. Rig Supervisor should be on the rig floor at all times while pipe is being pulled from the open hole.
- Inspect BHA equipment at the end of each well or every 250 hrs. of use. Monitor operating hours on stabilizers, motors, jars, etc. and inspect to API specifications, replacing/re-cutting when necessary.

- Rig Supervisor should witness all testing and cementing operations. Verify all casing test pressures and cement volumes with Superintendent prior to performing the job.
- Verify any drilling hard lines with geologist and Superintendent prior to spud of the well.
- All casing strings N grade or higher should be cut with casing saws, not torches.
- All casing should be tallied, strapped, and drifted on location prior to running and witnessed by Company man.
- Note on daily report all formation integrity tests and results. Specify LOT or JUG test.
- Record slow pump rates after each crew change, bit trip, and 1,000' of new hole drilled.
- Monitor PU, SO, Rotating String Weight, and Torque off/on bottom throughout the 9-7/8" hole.
- Make sure all wellheads delivered to location match the well head description in the drilling program.

PROCEDURE

A. PRE-SPUD OPERATIONS:

1) 16" Conductor pre-set at 90'.
2) Move in and rig up Reliance #2 on S2O SWD #1 location. Complete a safety inspection of the rig prior to accepting the rig on day rate.
3) Inspect all BHA components and drill pipe prior to spud. Send a copy of the inspection report to Drilling Superintendent.
   - Strap and caliper all BHA before running in the hole.
4) Cross check surface plat with rig GPS prior to spud.
5) Test all surface equipment and lines to 1,500 psi or rig recommendations.

B. SURFACE HOLE DRILLING (0' - 1,000' MD/TVD)

HIGHLIGHTS

- Drill 12-1/4" surface hole to 1,000' MD/TVD. **The waterboard depth is 715'.**
- We will be utilizing the rig totco survey for this hole section. Need to maintain vertical to casing point.
- Control drill to minimize washout throughout this hole section.
- Keep pump rates low until BHA is buried 200' below conductor.
- Be cautious of lost circulation throughout the interval.
- Run GR, SP and Resistivity log from 1,000'- 90'.
- Run and cement 9-5/8", 36.0#, K-55, BTC surface casing.

Mud Weight/Comments

- Spud in with fresh water using available solids control equipment per mud engineer.
- Utilize Soap Sticks and SAPP to treat gumbo and aid in bit balling.
- Pump PHPA sweeps while drilling and prior to running casing.
- Mud weight needs to be 8.6 - 8.8 ppg at casing point.

Recommended Mud Properties

Fluid Properties - Surface							
MD	MW	PV	YP	API	LGS	pH	6 RPM
0' - 1,000'	8.4 - 8.8	<5	<5	NC - 20	<6	<9.0	N/A

Wiper Trips

- Make wiper 30' prior to reaching TD and strap out of the hole.

Directional Requirements

- Take MWD surveys every 200'. Maintain vertical and discuss with engineer if deviates from vertical.

1) PU the following drilling assembly (12-1/4" PDC bit).

						UPPER CONNECITON		LOWER CONNECTION			
COMPONENT DESCRIPTION	NO.	LENGTH	CUM LENGTH	ITEM O.D.	ITEM I.D.	CONN SIZE	PIN/BOX	CONN. SIZE	PIN/BOX	WEIGHT IN AIR	BUOYED WEIGHT
Bit 12-1/4" RPS616	1	1.5	1.5	13.5		6-5/8" REG	PIN				
Bit Sub w/ float	1	4	5.5	6.25	2.25	4-1/2" XH	BOX	6-5/8" REG	BOX	360	309.24
Drill Collar	2	60	65.5	6.25	2.25	4-1/2" XH	BOX	4-1/2" XH	PIN	5400	4638.6
Stabilizer	1	4	69.5	12	2.25	4-1/2" XH	BOX	4-1/2" XH	PIN	360	309.24
Drill Collar	1	30	99.5	6.25	2.25	4-1/2" XH	BOX	4-1/2" XH	PIN	2700	2319.3
Stabilizer	1	4	103.5	12	2.25	4-1/2" XH	BOX	4-1/2" XH	PIN	360	307.8
Drill Collar	15	450	553.5	6.25	2.25	4-1/2" XH	BOX	4-1/2" XH	PIN	40500	34789.5
HWDP	15	450	1010.5	5	3	4-1/2" XH	BOX	4-1/2" XH	PIN	21600	18544.4
Drill Pipe			BALANCE								
								wt below HWDP		49960	43245
								80 % SF			34596

- Jars are NOT required for this hole section.
- Wt below HWDP with 80% safety factor = 34.5 Kips (BF = .8656)
- The above BHA is intended as a general recommendation. Actual components, dimensions, weights, and placement may vary based on field measurements and conditions.
- Utilize 6" Pump Liners for this hole section

Recommended Operating Parameters

Bit Make	Bit Type	WOB	RPM	GPM	Nozzles	TFA	SPP
RPS616	PDC	8 – 12	80 – 120	700	9 – 13's	1.167	1500 - 2200

2) Drill out with fresh water and sweep hole as needed for hole cleaning and seepage losses. Control pump rates as necessary to control washout and backside loading. Keep pump rates at a minimum until BHA below base of the conductor. Be cautious of the potential for lost circulation in this interval if backside MW's get too high.

3) Drill ahead keeping the MW between 8.4 ppg and 8.8 ppg. This interval should take one bit to drill. Take MWD surveys every 200', discuss with engineer if deviates from vertical. Keep deviation below 2°.

4) 30' prior to planned TD at 1,000' MD, make a wiper trip to surface and strap out. Once depth is verified trip back in the hole and drill the necessary footage to fit casing strap.

5) Run GR, SP and Resistivity log from 1,000'- 90'.

6) Circulate and condition mud per Genesis and pull out of the hole to run casing.

SURFACE CASING RUNNING

7) Pre-Job Operations

- Ensure that all proper equipment is on location before RU and running casing (Innovex Float Shoe, Collar and Centralizers).
- Visually inspect, clean, drift, and tally the entire 9-5/8", 36.0#, K-55, BTC **(8.765" DRIFT).**
- Ensure that all wellhead components are inspected, calipered for proper dimensions, AND match the description in the procedure.
- Pre-plan waste management and handling requirements for performing this cement job to avoid disruptions.
- Ensure cellar pump large enough to handle volumes.
- Be sure to have sugar on location in preparation for cement to surface.
- Review running procedures for the surface casing and follow all proper handling practices.
- Hold pre-job safety meetings with rig crews, casing crews and all personnel prior to starting operations.

8) Rig up casing crew. Have a casing circulating swedge with a low torque valve in the open position at all times while running casing. Function test the casing safety valve before running casing.

9) PU and run the 9-5/8" casing to ± 1,000' MD/TVD as follows:

Item	Description	Approximate Length
1	9-5/8", 36.0#, K-55, BTC PDC Drillable Innovex Float Shoe	1.5'
2	1 Jts 9-5/8", 36.0#, K-55,LTC Casing	42'
3	9-5/8", 36.0#, K-55, BTC PDC Drillable Innovex Float Collar	1.5'
4	~22 Jts 9-5/8", 36.0#, K-55, BTC Casing	955'

Centralizer Placement

# Placed	Type	Installation Method	Location/Comments
1	Bow Spring Type	Latch-On with Stop Rings	10' Above the Float Shoe
1	Bow Spring	Latch-On	Over coupling between shoe joints
1	Bow Spring Type	Latch-On with Stop Rings	10' Below the Float Collar
1	Bow Spring Type	Latch-On	Over the first coupling above the float collar
~6	Bow Spring Type	Latch-On	Over Coupling on Every 4 joint to 90'

BTC make up torque: Make up to the triangle stamp and record make up torque. Buttress connections are known for inconsistent makeup torque values because the makeup torque is dependent on the final location of the field end pin with respect to its alignment in the coupling to the "triangle" stamp.

Notes:

- Use caution while running casing to bottom to alleviate the potential for surging the well.
- Monitor returns while running in the hole and when tagging bottom. Slow down running speed if losses occur when running pipe.
- Thread lock the float shoe, shoe jt, and float collar.
- Use proper "API Modified Casing Thread Compound" to dope all connections above the float collar **(LEAD FREE).**
- Visually inspect float equipment prior to running in hole.
- Check floats after running ~3 joints in the hole.
- Calculate all casing capacities and displacements prior to running casing.
- Account for all casing joints tallied after running casing.
- Buoyed weight of casing in 8.8 ppg mud (BF = 0.8656) is 34.5 kips. Do not exceed buoyed weight plus 100 kips of over pull (134.5 kips) of pick-up weight without discussing with Drilling Superintendent/Engineer.

10) When casing is landed, MU DOC cement head.

11) Bring pumps up and gradually increase to maximum circulating rates of 10 - 12 bpm. Circulate and condition mud a minimum of 1.5 times the casing volume and until the shaker screens are clear.

12) Report on the morning report any problems encountered while running casing (i.e., sticking, drag, lost returns, etc.).

SURFACE CASING CEMENTING

13) Load top plug and ensure that the cementing head is operating properly. Verify that the proper plug is loaded. Verify the equalizing channel is clear and that the cementing head will retain the plug when loaded.

14) RU all cement equipment and test lines to 3,000 psi.

15) Prior to beginning to mix cement, the company representative and the cementing service engineer should independently calculate the required cement and displacement volumes needed and compare numbers. Resolve any discrepancies prior to starting job. Check freshwater volume prior to cementing. RU 2 water lines to the cement truck to ensure enough water gets to the cement truck. Record starting water volume prior to cementing. Also verify the amount of bulk cement on location. At the end of the job, record the volume of water used.

16) Mix and pump the spacers and cement as follows.

- Pump 30 bbls of DOC mud flush
- Mix and pump 230 sks of 12.5 ppg lead and 180 sks of 15.6 ppg Tail at 10 bpm

Surface Cement	Lead Slurry Design	Tail Slurry Design
Depth ft	0' – 700'	700' – 1000'
Quantity sks	230	180
Excess Volume %	100	100
Additives	DOC Lite A 6% Total Gel 3% Salt 0.25#/sk Phenoseal	Class A Neat
Weight ppg	12.5	15.6
Yield ft3/sk	1.98	1.18
Cement Volume bbl	80	37

Slurry will be lab tested for actual compressive strength and fluid loss. Field blend testing is required. Do not pump the slurry design above unless it matches the field blend test results. Use the tested recipe.

Notes:

- The above volumes are based on a 12-1/4" open hole with 100% excess for lead and 100% excess for tail.
  - **This excess number may change based on the hole condition and if there appears to be more washout than expected. Check excess volumes with engineer before loading cement.**
- Review cementing volumes, excess volumes, and displacement volumes with the engineer prior to pumping the job.
- Reciprocate casing in 15' to 20' strokes slowly if possible while circulating and cementing. Stop if losses are encountered.

17) Drop Top Wiper Plug, verify departure and displace with **± 74 bbls of mud** at 10 - 12 bpm. Slow pump rates to ± 4 bpm over the last 30 bbl of the displacement.

18) Bump the plug with 500 psi over final pumping pressure. Wait 5 minutes and then release pressure to check that the floats are holding.

- Record all detail about plug type, displacement, full returns, etc. on the morning report.

19) RD cement crew.

20) If cement is not seen at the surface, there is a contingency to perform a top out cement job (see DOC Cement Proposal for specifics). Notifications to the LDNR and approvals need to be obtained prior to pumping top out job. **Contact Drilling Engineer and Drilling Superintendent for procedure if this occurs.**

21) WOC a minimum of 4 hours. **Check with Engineer or Superintendent on wait time for the cement.**

22) ND flowline and make appropriate casing cuts and begin to install wellhead.

WELLHEAD, NIPPLE-UP AND TESTING:

23) Install 11" 5M x 9-5/8" SOW "A" section wellhead with base plate and perform ID/OD weld. Test wellhead to 1,010 psi (50% collapse of the 9-5/8" casing). Do not remove base plate on this job. Space wellhead so that the top of the "A" section is at ground level. **Confirm all measurements and ensure that they are accurate before installing "A" section.**

- Note: Ensure that a Cactus representative is on location during the wellhead installation.

A) Install the rigs 11" 5M BOPs consisting of one annular, one pipe ram, one blind ram (solid double), cross, one pipe ram. Install low pressure rotating head and orbit valve.

B) Test rams / choke manifold to 250 psi low and 5,000 psi high. Test annular to 250 psi low and 3,500 psi high (70% of rating). Test BOPs on 21-day intervals.

- Ensure that copies of all BOP Testing Charts are kept on location.

C) Test 9-5/8" surface casing to 1500 psi for 30 minutes with BOP testers.

- Burst of the 9-5/8", 36.0#, K-55, BTC casing is 3,520 psi (70% = 2,464 psi)
- Ensure that the pressure does not drop ≥ 10% of the original test pressure.

D) Grease the wear bushing thoroughly before installing and record ID of bushing. Install wear bushing using the setting and retrieval tool and do not drop it through the rotary table. Install flowline, turn buckles, and fill up line. Wear bushing should be pulled and inspected on each trip.

24) Complete and file form CSG-T with the Injection and Mining Division of LDENR.

8-3/4" INTERMEDIATE HOLE DRILLING (1,000' - 5800' MD/TVD)

HIGHLIGHTS

- Run RCBL on 9-5/8" surface casing to ensure sufficient cement bond.
- Perform a 12.0 ppg EMW Jug test at 10' below the 9-5/8" casing shoe.
- Mud loggers to be utilized in this hole section.
- Keep the well straight and avoid any walk.
- Watch mud properties closely below the anhydrite; utilize Soda Ash/Desco to treat.
- Manage mud weight as necessary throughout this interval. Expected 10.0 ppg at TD.
- Conventional cores will be taken at 3,271' - 3,355' and 5,310' - 5,724'.
- Wireline logging will be run in this hole section.

Fluid Properties - Production							
MD	MW	PV	YP	API	LGS	pH	6 RPM
1,000' - 3,000'	9.0 - 9.6	<20	>10	20 - 10	<8	<9.0	N/A
3,000' - 5,800'	9.6 - 10.0	<20	>10	<10	<8	9.5	N/A

Mud Weight/Comments

- While drilling out utilize Sodium Bicarbonate and Lignite to treat cement and buffer pH.
- At base of Anhydrite, treat out soluble calcium with Soda Ash. Add Lig and Pac to attain specific fluid loss.
- Maintain ~9.5 pH with Caustic Soda, add gel for viscosity.
- Pump high vis sweeps supplemented with bridging agents to clean hole and seal porosity.
- Control fluid loss with additions of Pac/Lignite. Have LCM on location in the event of losses.

Directional Requirements

- Control the angle and deviation as necessary to avoid walk.

Mud logger

- Rig up mud loggers and be prepared to log from 2,500' - TD. Confirm sample intervals with geologist.

Wireline Logging& Coring

- Conventional cores will be taken at 3271' - 3355' and 5310' - 5724'. Baker Hughes will be used for the coring operations.
- The production hole will be wireline logged per Southern Disposal, LLC. Triple Combo has been requested; please confirm with geologist prior to calling out tools.

1) After a successful BOP test, pick up the following drilling assembly:

						UPPER CONNECITON		LOWER CONNECTION			
COMPONENT DESCRIPTION	NO.	LENGTH	CUM LENGTH	ITEM O.D.	ITEM I.D.	CONN SIZE	PIN/BOX	CONN. SIZE	PIN/BOX	WEIGHT IN AIR	BUOYED WEIGHT
8-3/4" SPL616 Ulterra Bit	1	1.5	1.5	9.875		4-1/2" REG	PIN				
7" 7/8 6.9, 0.25 REV straight motor	1	27	28.5	6.75	2.25	4-1/2" XH	BOX	4-1/2" REG	BOX	5500	
X/O	1	3.0	31.5	9	3.5	4-1/2" XH	BOX	6-5/8" REG	PIN	230	
6.25" DC	1	29.0	60.5	6.25	2.75	4-1/2" XH	BOX	4-1/2" XH	PIN	2800	
Stabilizer	1	8.0	68.5	13.0	3	4-1/2" XH	BOX	4-1/2" XH	PIN	1200	
6.25" DC	1	29.0	97.5	6.25	2.75	4-1/2" XH	BOX	4-1/2" XH	PIN	2800	
Stabilizer	1	8.0	105.5	8.25	3	4-1/2" XH	BOX	4-1/2" XH	PIN	1200	
6.25" DC	18	522.0	627.3	6.25	2.75	4-1/2" XH	BOX	4-1/2" XH	PIN	50400	
HWDP and Drill Pipe			BALANCE								
								wt. below Crossover		64130	54337
								80 % SF			43469

- 0.25 RPG motor - TBD, consult with MS Directional rep to confirm
- Available WOB below the Drill Pipe in 10.0 ppg mud ~43.4 kips (80% SF) (BF = 0.8473)
- Confirm enough BHA weight to drill interval prior to picking up drill pipe
- The above BHA is intended as a general recommendation. Actual components, dimensions, and placement may vary based on field measurements and conditions.
- Control WOB and RPMs in the upper part of the hole to prevent washout around the surface casing shoe and deviation.

2) Drill out float equipment and cement in shoe joint. **If shoe joint is wet, stop drilling immediately and contact Superintendent or Engineer.** If shoe joint is not wet, continue drilling out 10' of new formation. Run and record a Jug Test to 12.0 ppg per the following guidelines:

- Circulate and condition mud stabilizing weight and fluid properties.
- Close the pipe rams on the BOP stack.
- **Pump at ½ bbl per minute until an EMW of 12.0 ppg is achieved.**
- **Hold pressure for 10 minutes. (12 ppg - 9.0 ppg) x 0.052 x 1010' = 158 psi applied at surface.**
- Plot the pressure vs. volume results on a chart and send to the Superintendent and Engineer.
- If the shoe test is not achieved discuss the possibility of a squeeze.

3) Drill ahead following the below recommended parameters back reaming connections to help control deviation.

Recommended Operating Parameters

Bit Make	Bit Type	WOB	RPM	GPM	Nozzles	TFA	SPP
SPL616	PDC	12 – 30	70 – 120	600	9 – 12's	.99	2000 – 2800

- The above drilling parame.ters are recommendations. These may be changed based on formation changes or unforeseen issues. Encourage the driller to adjust drilling parameters to keep maximum ROPs.
- Drill out from 1010' with slower rotary speeds and controlled pump rates until BHA is buried below the surface casing shoe.
- Once BHA is buried, increase pump rate and RPM as necessary to maximize the ROP.
- Confirm with Superintendent or Engineer on bit type changes prior to running.
- Discuss jet size the Superintendent or Engineer.

4) Prior to core point contact all necessary members, Baker Hughes, etc. in preparation for coring. Parties will need a minimum of 24 hrs. prior to picking up assembly. Discuss shuttle dry run, tripping practices, etc. with coring hand prior to picking up the core assembly. Be sure any necessary crossovers, subs, collars, etc., are on location and expected prior to coring personnel arriving on location.

5) Drill ahead to the first core point at 3271', make wiper trip, circulate and condition the mud as per Genesis specs prior to POOH to pick up the core barrel/tools.

6) Pick up Baker Hughes' core barrel and coring bit. Will utilized Baker Hughes' recommended coring BHA. Trip in the hole as per Baker Hughes rep on location and begin coring operations.

7) Core the confining shale from 3271' - 3355'. Pull out of the hole and lay down core barrel. Core Lab will cut, bag, and prepare core samples. Core samples will be sent to Core Lab for analysis.

8) Pick up the previous BHA with new motor (if needed) and new 8-3/4" bit (if needed) and trip in the hole. Drill ahead to the second core point at 5310'. Make wiper trip, circulate and condition the mud as per Genesis specs prior to POOH to pick up the core barrel/tools.

9) Pick up Baker Hughes' core barrel and coring bit. Will utilized Baker Hughes' recommended coring BHA. Trip in the hole as per Baker Hughes rep on location and begin coring operations.

10) Core the Rodessa Formation from 5310' - 5724'. Pull out of the hole and lay down core barrel. Core Lab will cut, bag, and prepare core samples. Core samples will be sent to Core Lab for analysis.

11) Pick up the previous BHA with new motor (if needed) and new 8-3/4" bit (if needed) and trip in the hole. Drill ahead to TD at 5800'.

12) Make a wiper trip, if necessary, based on core point, hole drilled, and hole conditions. Pull out of the hole and rig up wireline to log the well.

13) Log the production hole with Triple Combo and any other logging suites deemed necessary by Southern Disposal, LLC.

14) After logs are successfully run make a conditioning trip in preparation to run 7" production casing.

PRODUCTION CASING RUNNING

15) Pre-Job Operations

- Ensure that all proper equipment is on location before RU and running casing (Innovex Float Shoe, Float Collar, and Centralizers).
- Visually inspect, clean, drift, and tally the entire **7", 26.0#, L-80, LTC (Drift 6.151")** casing when it arrives on location.
- Torque turn to be utilized on this casing run.
- Have a thread rep on location during running of the casing.
- Have thread rep supply the proper pipe dope.
- Ensure that all wellhead components are inspected, calipered for proper dimensions, AND match the description in the procedure.
- Pre-plan waste management and handling requirements for performing this cement job to avoid disruptions.
- Review running procedures for the production casing and follow all proper handling practices.
- Hold pre-job safety meetings with rig crews, casing crews and all personnel prior to starting operations.
- We will be utilizing 3rd party CRT tool & Torque Turn reps

16) Rig up casing crew. Have casing circulating swedge with a low torque valve in the open position at all times while running casing for the 7". Function test the casing safety valve before running casing.

17) PU and run the 7" casing to PBTD as follows:

Item	Description	Approximate Length
1	7", 26#, LTC, PDC Drillable Innovex Float Shoe	1.5'
2	2 Jts 7", 26#, LTC Casing	84'
3	7", 26#, LTC PDC Drillable Innovex Float Collar	1.5'
4	136 Jts 7", 26#, LTC Casing	~5713'

CENTRALIZER PLACEMENT

# Placed	Type	Installation Method	Location/Comments
1	Bow Spring Type	Latch-On with Stop Rings	10' Above the Float Shoe
1	Bow Spring	Latch-On	Over coupling between shoe joints
1	Bow Spring Type	Latch-On with Stop Rings	10' Below the Float Collar
1	Bow Spring Type	Latch-On	Over the first coupling above the float collar
~17	Bow Spring Type	Latch-On	Over Coupling on Every 4 joint to 3000'
~8	Bow Spring Type	Latch-On	Over Coupling on Every 10 joint to 100'

Notes:

- Use caution while running casing to bottom to alleviate the potential for surging the well.
- Monitor returns while running in the hole and when tagging bottom. Slow down running speed if losses occur when running pipe.
- Fill pipe every 30 joints, or as necessary.
- Thread lock the float shoe, 2 shoe joints, and float collar.
- Use "API Modified Casing Thread Compound" to dope all connections above the float collar **(LEAD FREE)**.
- Visually inspect float equipment prior to running in hole.
- Check floats after running ~ 3 joints in the hole.

18) Once on bottom, bring pumps up and gradually increase to maximum circulating rates of 6 - 8 bpm. Circulate and condition mud a minimum of 1.5 times the casing volume and until the shaker screens are clear.

19) Report on the morning report any problems encountered while running casing (i.e., sticking, drag, lost returns, etc.).

PRODUCTION CASING CEMENTING

20) Pre-Job Operations

- Re-calculate cement volumes based on actuals (TD, hole size change, shoe track, etc.).
- Run pilot and field blend test on cement prior to cementing casing. Discuss planned job with Superintendent and Engineer.
- Obtain 2 samples of wet and dry cement, mix water and all liquid additives for lab testing prior to cementing.
- Run both a bottom and top wiper plug.

21) Load bottom plug and ensure that the cementing head is operating properly. Verify that the proper plug is loaded. Verify the equalizing channel is clear and that the cementing head will retain the plug when loaded.

22) RU all cement equipment and test lines to 5,000 psi.

23) Prior to beginning to mix cement, the company representative and the cementing service engineer should independently calculate the required cement and displacement volumes needed and compare numbers. Resolve any discrepancies prior to starting job. Check freshwater volumes prior to cementing. RU 2 water lines to the cement truck to ensure enough water gets to the cement truck. Record starting water volume prior to cementing. Also verify the amount of bulk cement on location. At the end of the job, record the volume of water used and that all the cement has been mixed.

24) Mix and pump the cement job as follows:

- Pump 30 bbls of DOC Flush at 6-8 bpm
- Mix and pump 345 sacks of 13.0 ppg Lead and 585 sacks of 14.5 ppg Tail at 6 - 8 bpm

Production	Lead Slurry Design	Tail Slurry Design
Depth ft	0' – 2,800'	2,800' – 5,800'
Quantity sks	345	585
Excess Volume %	50	50
Additives	DOC Lite A (60/40) 6% Total Gel 0.25% DOC 15 0.25% DOC 41P 0.1% DOC 34 0.3% DOC 180 3% KCL 1.0#/sk Phenoseal	50/50 POZ Premium H 2% Total Gel 0.5% DOC 15 0.1% DOC 17 0.05% DOC FWCA 3% KCL 1.0#/sk Phenoseal
Weight ppg	13.0	14.5
Yield ft3/sk	1.73	1.19
Cement Volume bbl	106	124

Slurry will be lab tested for actual compressive strength and fluid loss. Field blend testing is required. Do not pump the slurry design above unless it matches the field blend test results. Use the tested recipe.

Notes:

- The above volumes are based on an 8-3/4" open hole with 50%. After logging cement volumes will be adjusted to 15% above caliper.
- Review cementing, excess and displacement volumes with the engineer prior to pumping the job.

25) Drop top plug, verify departure, and displace cement with **± 218 bbls** of 11.2 ppg water based mud at 6 - 8 bpm. Slow pump rates to ± 4 bpm over the last 30 bbl of the displacement.

26) Bump the plug with 500 psi over final pumping pressure. Wait 5 minutes and then release pressure to check that the floats are holding.

- Record all detail about plug type, displacement, full returns, etc. on the morning report.
- Note if any cement or spacer was seen at the surface.

27) RD cement crew & WOC for 8 hours. **Check with Engineer or Superintendent on wait time for the cement.**

28) PU BOPs and set casing slips in neutral with the **"as cemented weight"** or post cemented casing weight minus the hook and block. Work the slips in place and ensure this weight is on the wellhead and centered. Ensure that weight set slips and manually energized slips are available in the event we do not have enough casing weight to set the slips.

29) Make rough cut on casing and lay down same.

WELLHEAD

30) Make final cut on the 7" casing.
31) Install BPV in 7" Casing Hanger for additional barrier.
32) Install 11" 5M x 7-1/16" 5M tubing head and test void to 4500 psi (limit based on previous casing head).
33) Test 7" production casing to 1000 psi for 30 minutes.
34) Complete and file form CSG-T with Injection and Mining Division of LDENR.

- Note: Ensure that a Cactus wellhead representative is on location during the wellhead installation.

Turn Reliance #2 over to completions engineer to perform completion operations

Southern Disposal Solutions LLC

Well	S2O SWD #1	AFE	
Field			
County	Desoto Parish		
State	Louisiana		
Objective	Complete Well for Injection		

Prepared by	Tom Bailey
Title	SDS Petroleum Consultants
Phone	903-571-3771
Date	11/27/2023

Step	Description of Activity
	Well is loaded with Freshwater
	Complete well with Drilling Rig
	Order out and unload and Strap 4.5" Tubing
	Wait 24 Hours on Cement prior to any Completion Activity
	RD Bop's and Install Cactus B-Section and Test. 7-1/16" 5K Flange looking up.
	Install Cactus Test Plug
	Install 5K Master valve and torque up.
	Test to 5K and Remove Test Cap
	Remove Test Plug
	RU Cased Hole with 5K Lubricator, (Will not need Grease to run GR/JB or RCBL)
	GIH with a 6"OD, GR/JB to PBTD. POOH
	GIH with RCBL and Pull Log back to 200' above Top of Cement. POOH
	Evaluate Cement and Correlate RCBL to Open Hole Log to pick perf intervals.
	RU Pump Truck, Tie into B-Section and Test Casing to 4000 psi. Chart for 10 minutes. Bleedoff and leave pump truck hooked up.
	24 Hour Notice: Call LDNR and let them know when and where we are going to set Packer
	GIH with 1st set of guns. Get tied in to zone. Pressure casing to 3000 psi and fire bottom gun. Monitor for break. Perf rest of guns. POOH
	Shoot remaining zones. Proposed perf intervals are 5360'-5375' and 5430'-5490'. These will be refined using well log on current well.
	Shut in well and monitor pressure until stable. Use shut in pressure to calculate bottom hole pressure.
	RU Packer with Pump Out Plug and set packer (via wireline) 40' above top zone that was perfd. (+ or - 5310') POOH
	Bleedoff pressure and check for any flow.
	RD Cased Hole, Prepare to run Tubing with Seal Assembly
	RU Casing Crew and Torque Turn.
	Make up Seal Assembly and GIH with Tubing. Torque Turn as per Tubing Specs.
	Run to top of Packer. Tag Packer and calculate space outfor 15,000 lbs compression
	Install Tubing Hanger and slackoff. Backoff lift sub and strip off 7-1/16" Master Valve
	Install Tree and Test
	RD Casing Crew
	Open Valves on Tree andTest Casing side to 1000 psi and chart for 30 minutes
	Tie into flow line on tree and apply set pressure to pump out plug
	RD Drlg Rig
	Revisions to Procedure will be made when actual well is drilled.

Marked Log - 1466' Away

#148541

Schlumberger

INDUCTION-ELECTRICAL LOG

COMPANY W. C. NABORS

Sec. # 148541

WELL FINCHER ESTATE NO. 1

FIELD WILDCAT

COUNTY DE SOTO STATE LOUISIANA

COUNTY DE SOTO, LA.
FIELD or LOCATION WILDCAT
WELL FINCHER ESTATE NO. 1
COMPANY W. C. NABORS

LOCATION: API Serial No. NA
EAST OF CONVERSE FIELD
Sec. 7 Twp. 10N Rge. 12W

Other Services:
FDC/GR

Permanent Datum: SURF. PIPE COLLAR ; Elev.: NA
Log Measured From RKB , 12 Ft. Above Perm. Datum
Drilling Measured From RKB

Elev.: K.B. NA
D.F. NA
G.L. NA

Date	5-15-75			
Run No.	ONE			
Depth—Driller	4347			
Depth—Logger	4350			
Btm. Log Interval	4349			
Top Log Interval	419			
Casing—Driller	8 5/8 @ 412	@	@	@
Casing—Logger	419			
Bit Size	7 7/8			
Type Fluid in Hole	GEL			
Dens. / Visc.	10.4 / 48	/	/	/
pH / Fluid Loss	NA / NA ml	ml	ml	ml
Source of Sample	FLOWLINE			
R_m @ Meas. Temp.	2.20 @ 110 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	1.80 @ 110 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	2.00 @ 110 °F	@ °F	@ °F	@ °F
Source: R_{mf} / R_{mc}	C / C			
R_m @ BHT	1.65 @ 140 °F	@ °F	@ °F	@ °F
TIME Circulation Stopped	5-15 0600			
TIME Logger on Bottom	5-15 0800			
Max. Rec. Temp.	140 °F	°F	°F	°F
Equip. / Location	5643 / SHV	/	/	/
Recorded By	KIRBY			
Witnessed By	BROWN-JOHNSON			

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

SCALE CHANGES

	Type Log	Depth	Scale Up Hole	Scale Down Hole

Run No.	ONE
Service Order No.	27351
Fluid Level	FULL

EQUIPMENT DATA

Panel	F-213
Mem. Panel	B-169
TTR	NA
DPI	B-727
Cartridge	F-237
Sonde	M-1024
Cent. Device	NONE
Stand Off - Inches	NA
G.R. Panel	NA
G.R. Cartridge	NA

LSN6552160000148541

REMARKS:
REPEAT SECTION LOGGED 3 1/2"
SHALLOW.

OFFICE OF CONSERVATION

MAR 01 2024

INJECTION & MINING DIVISION

CALIBRATION DATA

INDUCTION S.B.R.	ONE
INDUCTION SONDE ERROR (At surface, enter "surface" Down hole, enter depth)	SURFACE
INDUCTION Corrected For Hole Size	
INDUCTION Corrected For Rm	
Speed - F.P.M.	100
GR BKG. CPS	NA
GR Source CPS	NA
GR Tc Sec	NA

16
148541
6552

SPONTANEOUS-POTENTIAL

− 15 + MILLIVOLTS

DEPTH

6FF40 INDUCTION CONDUCTIVITY MILLIMHOS/M = $\frac{1000}{\text{OHMS. M}^2\text{/M}}$

3000 2000 1000

1000 0

RESISTIVITY OHMS. M²/M

AMP. SHORT NORMAL

0 4

SHORT NORMAL A-16"-M

0 20

0 200

6 FF40 INDUCTION

0 20

0 200

400

Casing

500

600

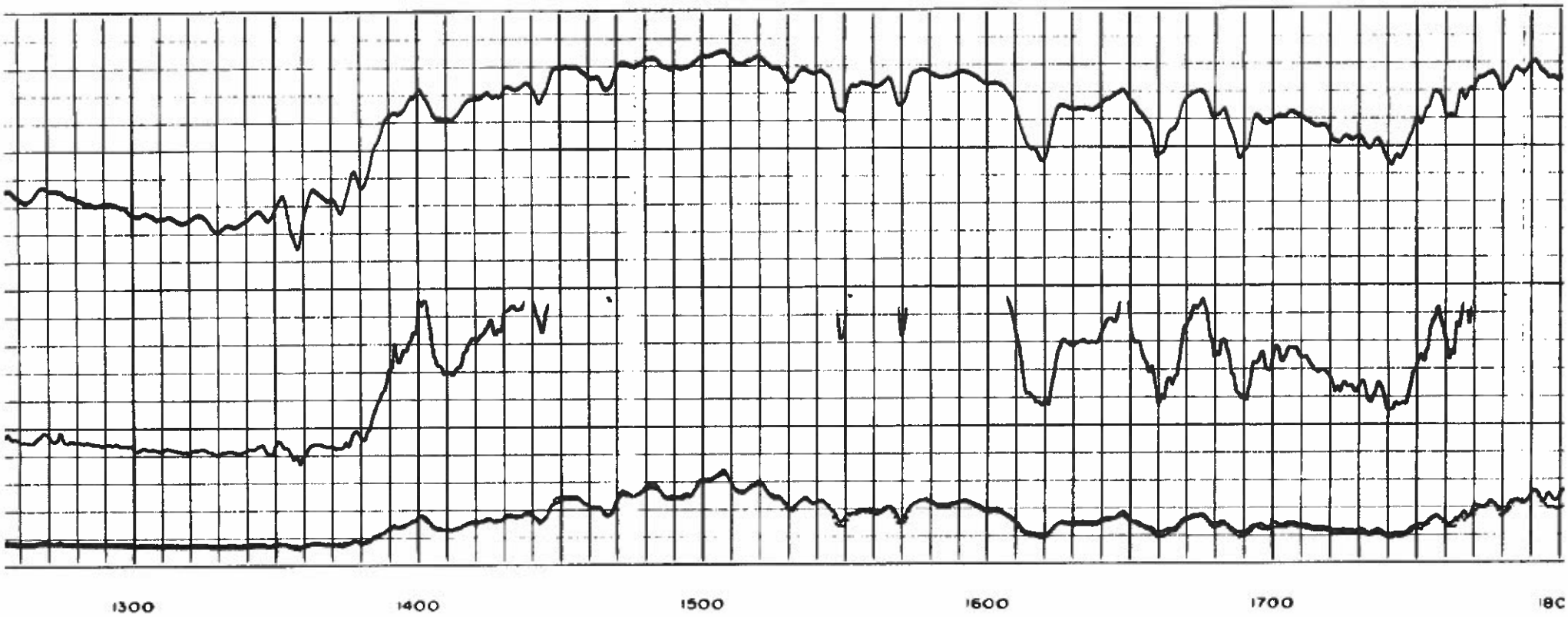
700

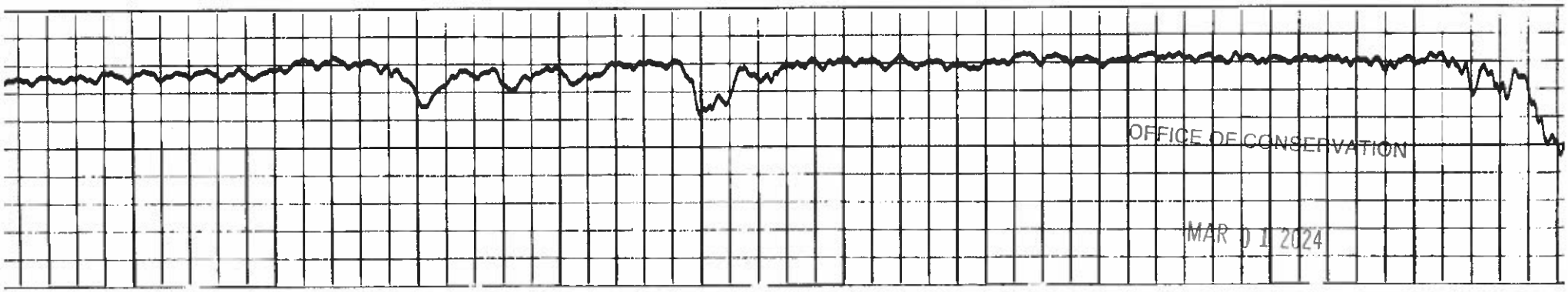
OFFICE OF CONSERVATION

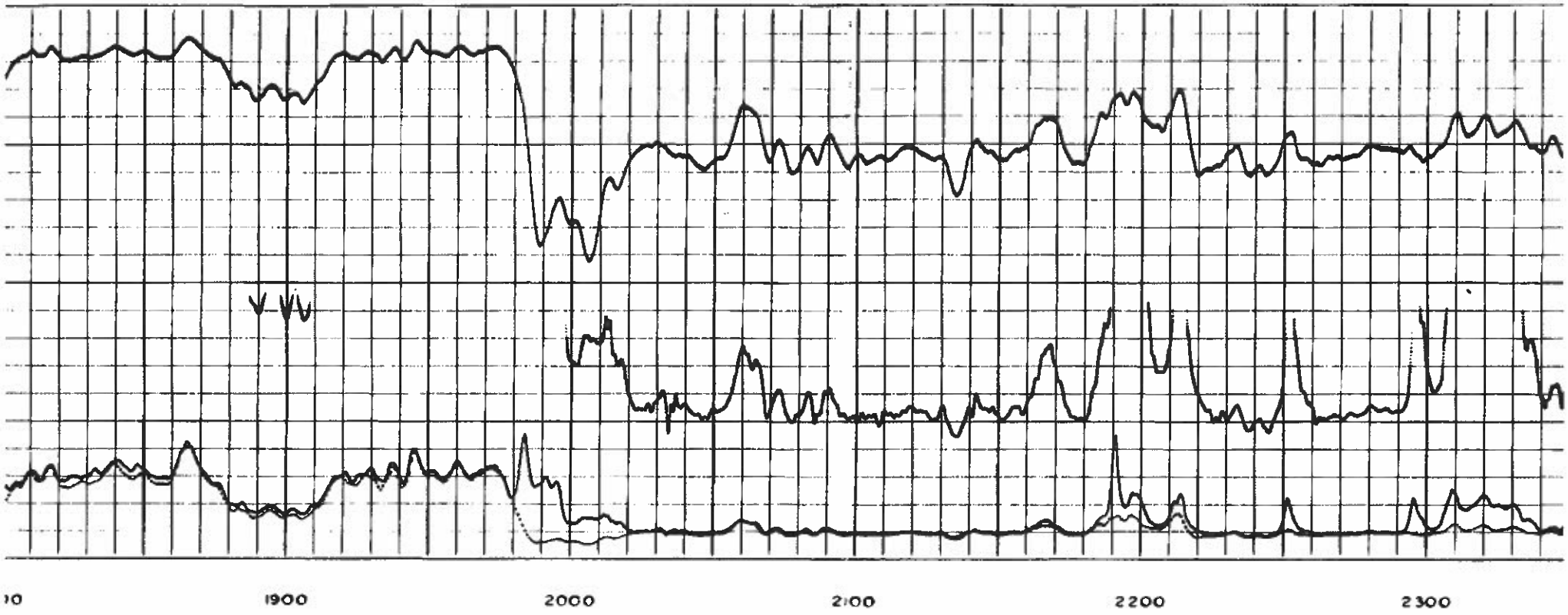
MAR 01 2024

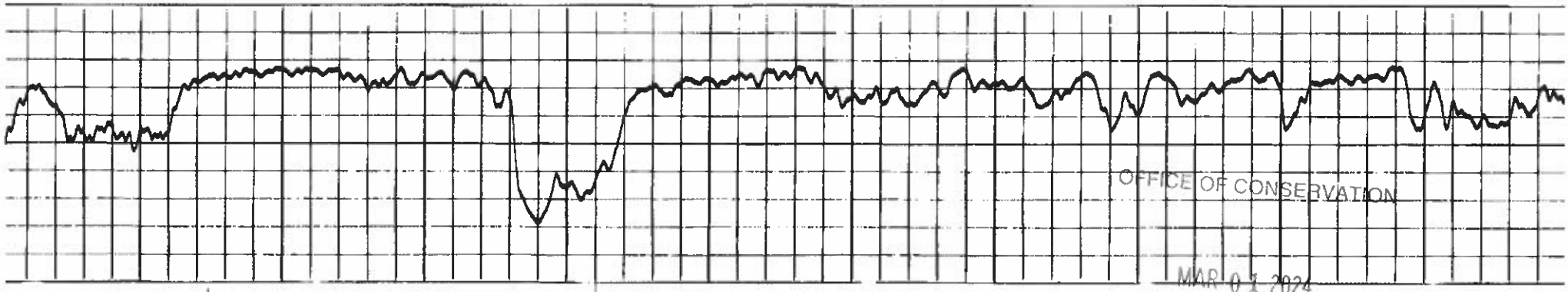
INJECTION & MINING DIVISION

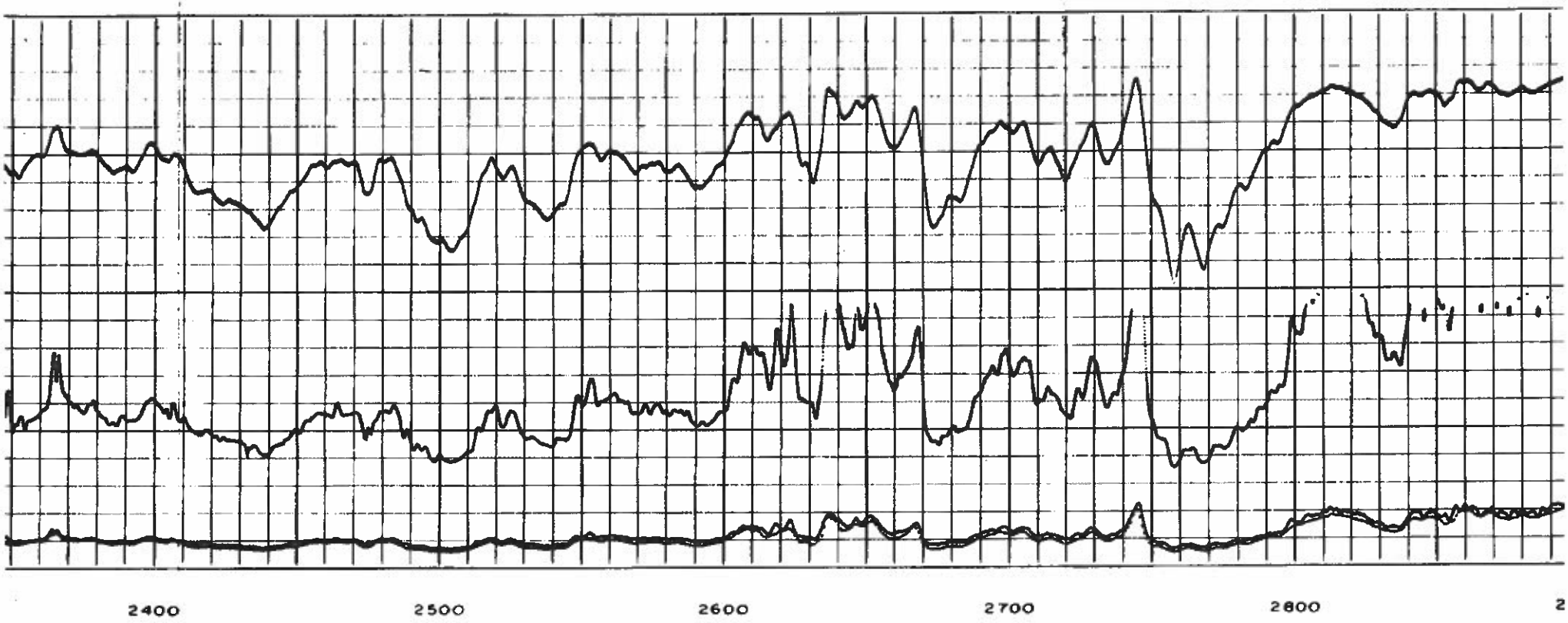
Response to 2/22/24 NOD

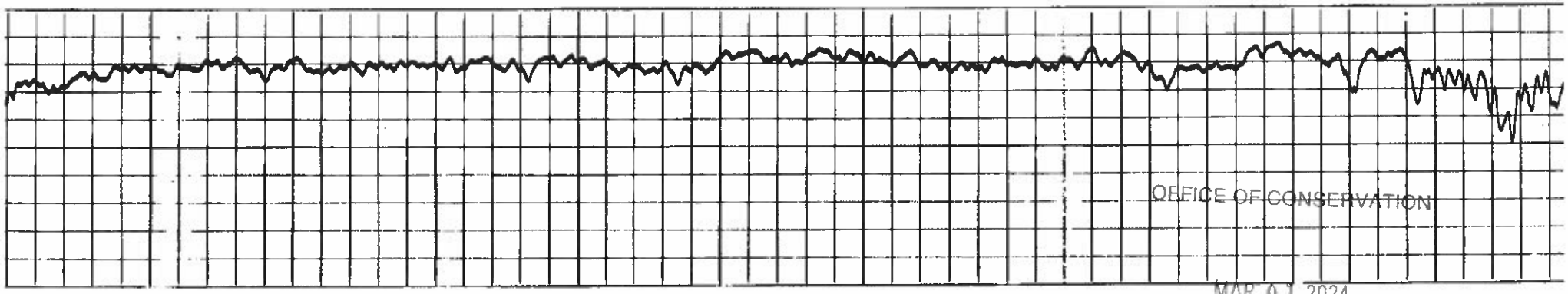


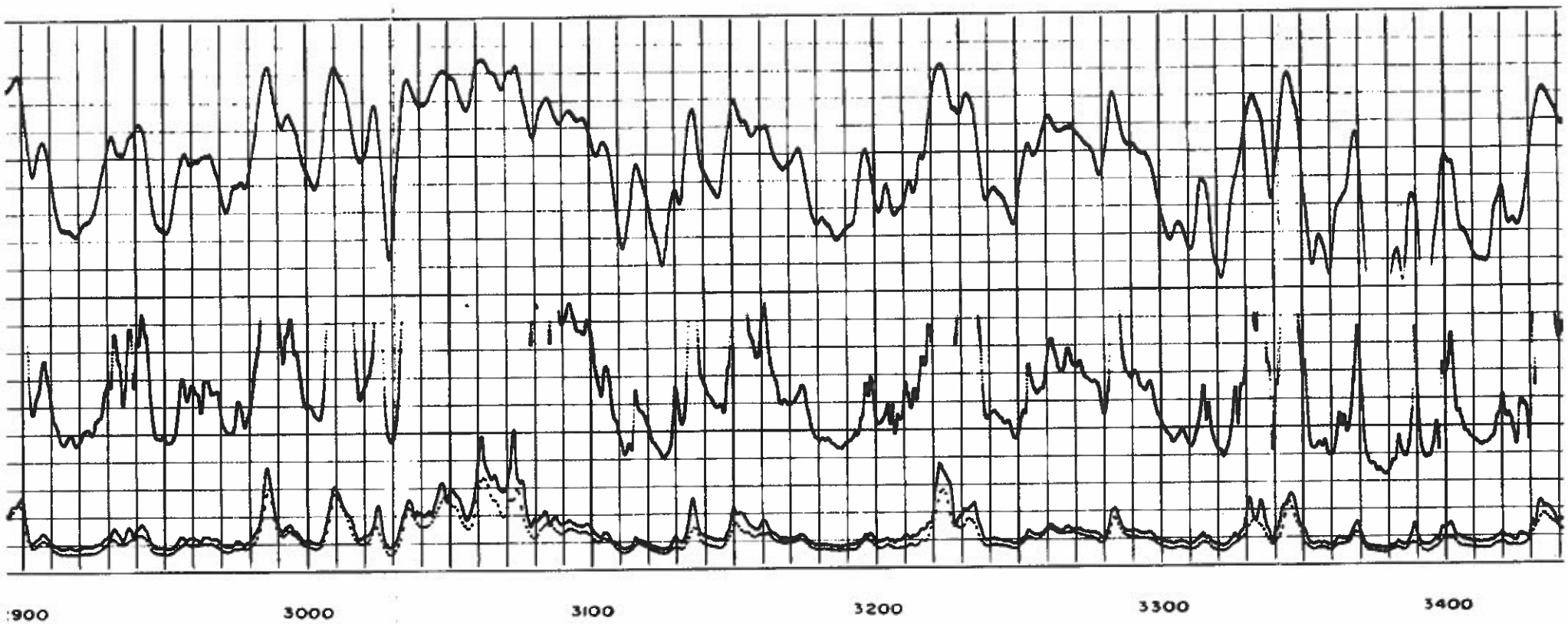


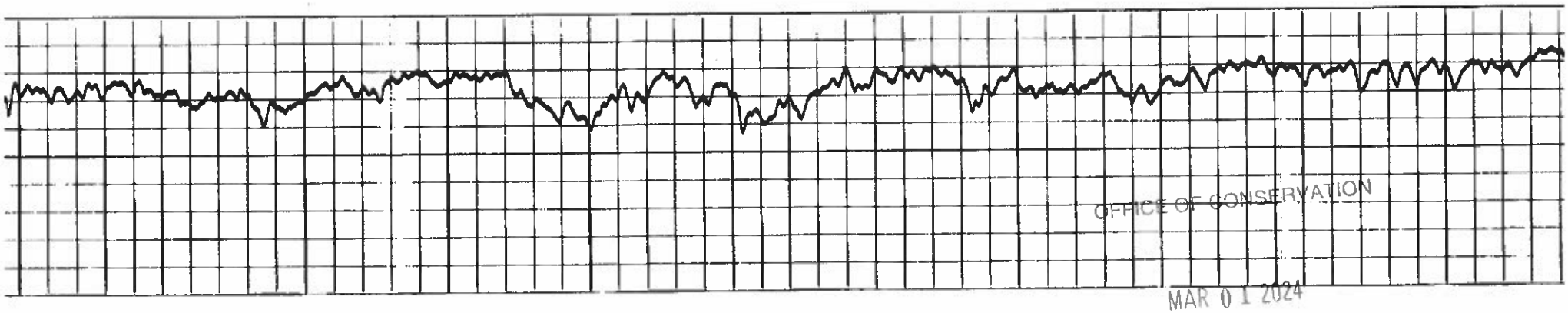


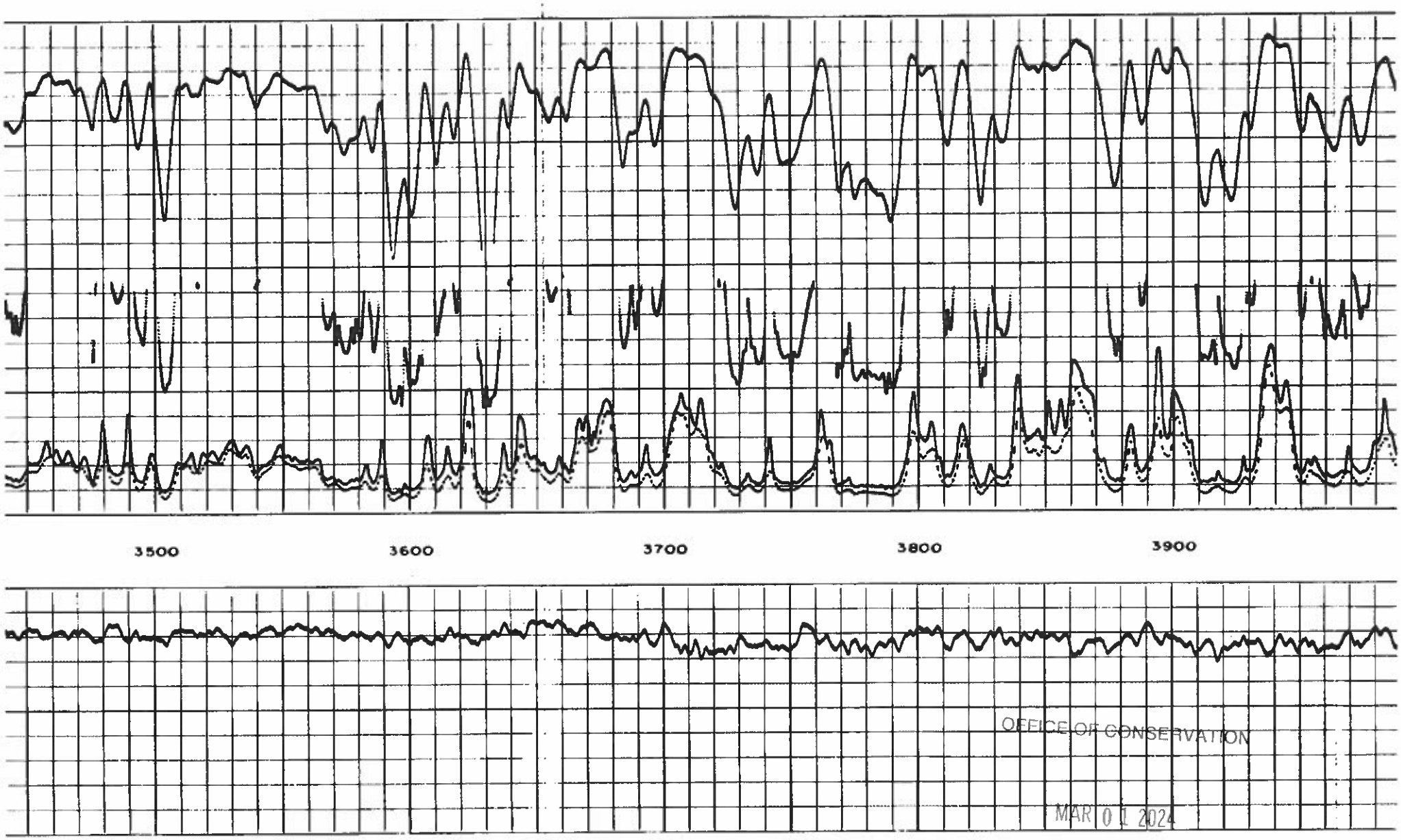


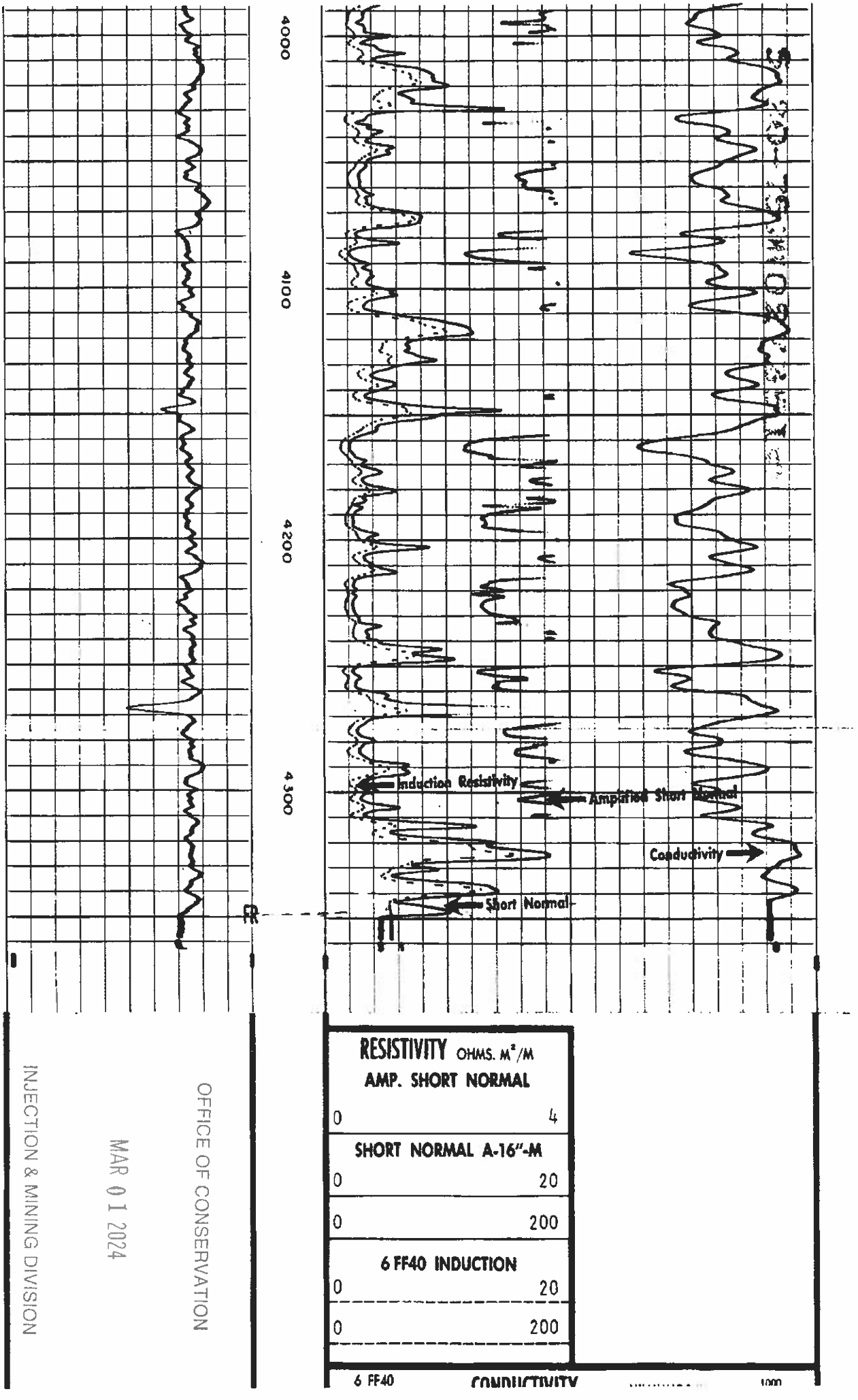


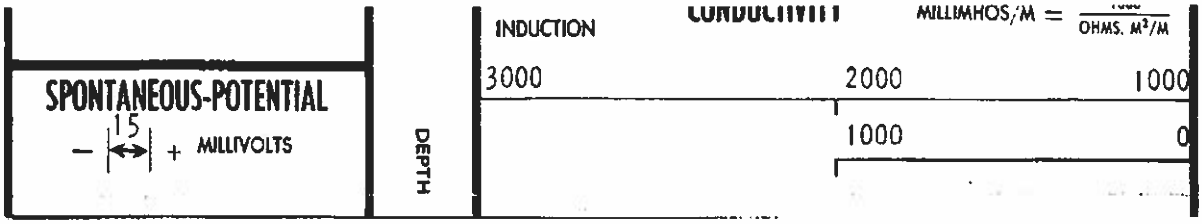












Schlumberger BlueView :

WELL NAME: HA RA SUB San Patricio 7H #002
SERIAL# 240440
FIELD: Benson
S/T/R: 507 | T10N | R12W
PARISH: DeSoto

Schlumberger

Well: San Patricio 7H #2
Field: Benson
Parish: DeSoto
State: Louisiana

See letter mandelay

Platform Express
Array Induction
Neutron / Density 240440

RECEIVED
FEB 15 2010
OFFICE OF CONSERVATION
SHREVEPORT, LA

OFFICE OF CONSERVATION
MAR 01 2024
INJECTION & MINING DIVISION

Company: Encana Oil and Gas
Well: San Patricio 7H #2
Location: 500' FNL & 2240 FEL
Field: Benson
Parish: DeSoto

LOCATION
500' FNL & 2240 FEL
of Section 7
LA Serial Number 240440

		Run 1	Run 2
Elev.:	K.B.	359.00 ft	
	G.L.	333.00 ft	
	D.F.	359.00 ft	

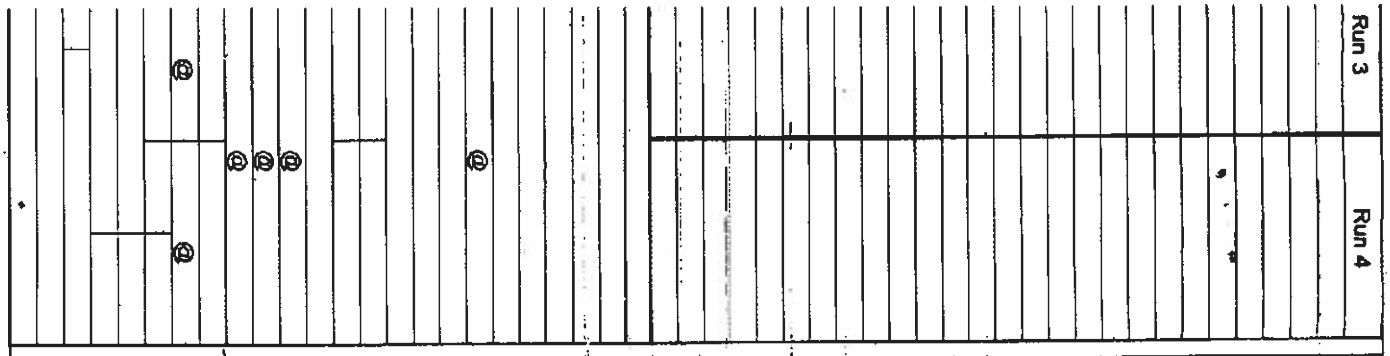
Permanent Datum: Ground Level — Elev.: 333.00 ft
Log Measured From: Kelly Bushing — 26.00 ft above Perm. Datum
Drilling Measured From: Kelly Bushing

API Serial No.	Section	Township	Range
17-031-24954	7	10N	12W

Logging Date			5-Dec-2009				
Run Number			1				
Depth Driller			11081 ft				
Schlumberger Depth			11100 ft				
Bottom Log Interval			11092 ft				
Top Log Interval							
Casing Driller Size @ Depth			10.750 in @ 2450 ft		@		
Casing Schlumberger			2455 ft				
Bit Size			9.875 in				
Type Fluid In Hole			Water Based Mud				
MUD Density	Viscosity		11.5 lbm/gal	38 s			
MUD Fluid Loss	PH		7.2 cm3	10			
MUD Source Of Sample			Circulation Tank				
RM @ Measured Temperature			0.940 ohm.m @ 65 degF		@		@
RMF @ Measured Temperature			0.799 ohm.m @ 65 degF		@		@
RMC @ Measured Temperature			1.316 ohm.m @ 65 degF		@		@
Source RMF	RMC		Calculated	Calculated			
RM @ MRT	RMF @ MRT		0.245 @ 269	0.208 @ 269	@	@	@
Maximum Recorded Temperatures			269 degF				
Circulation Stopped		Time	4-Dec-2009	9:30			
Logger On Bottom		Time	5-Dec-2009	6:15			
Unit Number	Location		2359	Shreveport, LA			
Recorded By			A. Knapek & J. Wheeler				
Witnessed By			Kenneth Daniel				

OFFICE OF CONSERVATION
RECEIVED
FEB 26 2010
GEOLOGICAL DIVISION

			Run 1	Run 2
Logging Date				
Run Number				
Depth Driller				
Schlumberger Depth				
Bottom Log Interval				
Top Log Interval				
Casing Driller Size @ Depth			@	
Casing Schlumberger				
Bit Size				
Type Fluid In Hole				
MUD Density	Viscosity			
MUD Fluid Loss	PH			
MUD Source Of Sample				
RM @ Measured Temperature			@	
RMF @ Measured Temperature			@	
RMC @ Measured Temperature			@	
Source RMF	RMC			
RM @ MRT	RMF @ MRT		@	@
Maximum Recorded Temperatures				
Circulation Stopped		Time		
Logger On Bottom		Time		
Unit Number	Location			
Recorded By				
Witnessed By				



DEPTH SUMMARY LISTING

Date Created: 3-DEC-2009 17:41:24

Depth System Equipment

Depth Measuring Device		Tension Device		Logging Cable	
Type:	IDW-B	Type:	CMTD-B/A	Type:	7-46A XS
Serial Number:	6626	Serial Number:	2564	Serial Number:	2359
Calibration Date:	5-Nov-2009	Calibration Date:	21-Nov-2009	Length:	17000 FT
Calibrator Serial Number:	33	Calibrator Serial Number:	78801	Conveyance Method:	Wireline
Calibration Cable Type:	7-46A XS	Number of Calibration Points:	10	Rig Type:	LAND
Wheel Correction 1:	-5	Calibration RMS:	26		
Wheel Correction 2:	-3	Calibration Peak Error:	55		

Depth Control Parameters

Log Sequence:	First Log In the Well
Rig Up Length At Surface:	264.00 FT
Rig Up Length At Bottom:	261.20 FT
Rig Up Length Correction:	2.80 FT
Stretch Correction:	6.00 FT
Tool Zero Check At Surface:	0.70 FT

Depth Control Remarks

1. Full Schlumberger depth procedure from 18-Feb-2008 followed
2. IDW used as primary depth control
3. Z-Chart used as secondary depth control
4.
5.
6.

OTHER SERVICES1	OTHER SERVICES2
OS1: BHC	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
Log Objective: Well Evaluation	
Toolstring run as per toolsketch	
Holevolume computed using HCAL data channel	
Cement volume calculated with a FCD of 7.625"	

RWA computed using DPHZ data channel	
Logged on a limestone matrux, MDEN = 2.71g/cc	
Maximum recorded temperature taken from HTEM as 269degF	
Caliper check in casing reading 10.05". 10.75" & 40.5# casing has ID =	10.05"
Repeat done over anhydrite and at bottom per client request	
Schlumberger full radiation SOP followed. NSR-F 160 and GSR-Z 5089	
Rig: Trinidad 54	
Crew: B. Smith, J. Duty	
Thank you for choosing Schlumberger	

RUN 1		RUN 2	
SERVICE ORDER #:	B3O2-00019	SERVICE ORDER #:	
PROGRAM VERSION:	17C0-154	PROGRAM VERSION:	
FLUID LEVEL:	0 ft	FLUID LEVEL:	

LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1

SURFACE EQUIPMENT

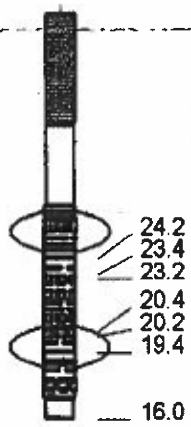
GSR-U/Y
NCT-B
CNB-AB
NCS-VB
WITM (DTS)-A

DOWNHOLE EQUIPMENT

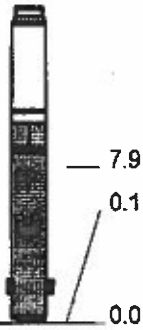
LEH-PT LEH-PT 1093			76.1
AH-233	CTEM HGNS HTEM	70.9	73.0
DTC-H ECH-KC 10390 DTCH0-A	HMCA TelStatus ToolStatu	68.8 68.8	71.8
HILTH-FTB HGNSD-H 3905 HMCA-H HGNH 2905 NLS-KL NSR-F 160 HACCZ-H 3298 HCNT-H HGR HRCC-H 3869 HRMS-H 3962 HRGD-H 3967 GLS-VJ 5089 MCFL Device-H HILT Nucl. LS-H 28808 HILT Nucl. SS-H 27849 HILT Nucl. BS-H 26816 BOW-SPR NPV-N	HGNS Gamm HGNS Neut HGNS Neut HGNS sens HRCC cart MCFL HILT call HRDD-LS HRDD-SS HRDD-BS	68.1 62.2 61.7 59.4 55.4 50.0 49.5 49.1	68.8
AH-184 AH-184 4880			47.1
AH-184 AH-184 1908			45.1
PPC1-B PPC1-B 8263 PPC_CAL_STD	Calipers PPC_Cartr	42.0 36.6	43.1

RUN 2

DSLT-FTB 36.6
DSLC-B
ECH-KH 8264
SLS-W 639



AIT-M 16.0
AMIS-A 1384
AMRM-A



1.0 IN Standoff

MAXIMUM STRING DIAMETER 5.88 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN FEET

Schlumberger

2 Inch Main Pass
2" per 100'

MAXIS Field Log

Input DLIS Files

DEFAULT	AIT_SONIC_CAL_TLD_013LUP	FN:12	PRODUCER 03-Dec-2009 17:19	11100.0 FT	2202.0 FT

Output DLIS Files

DEFAULT	AIT_SONIC_CAL_TLD_034PUP	FN:31	PRODUCER 03-Dec-2009 17:15	11106.0 FT	2208.0 FT

Integrated Hole/Cement Volume Summary

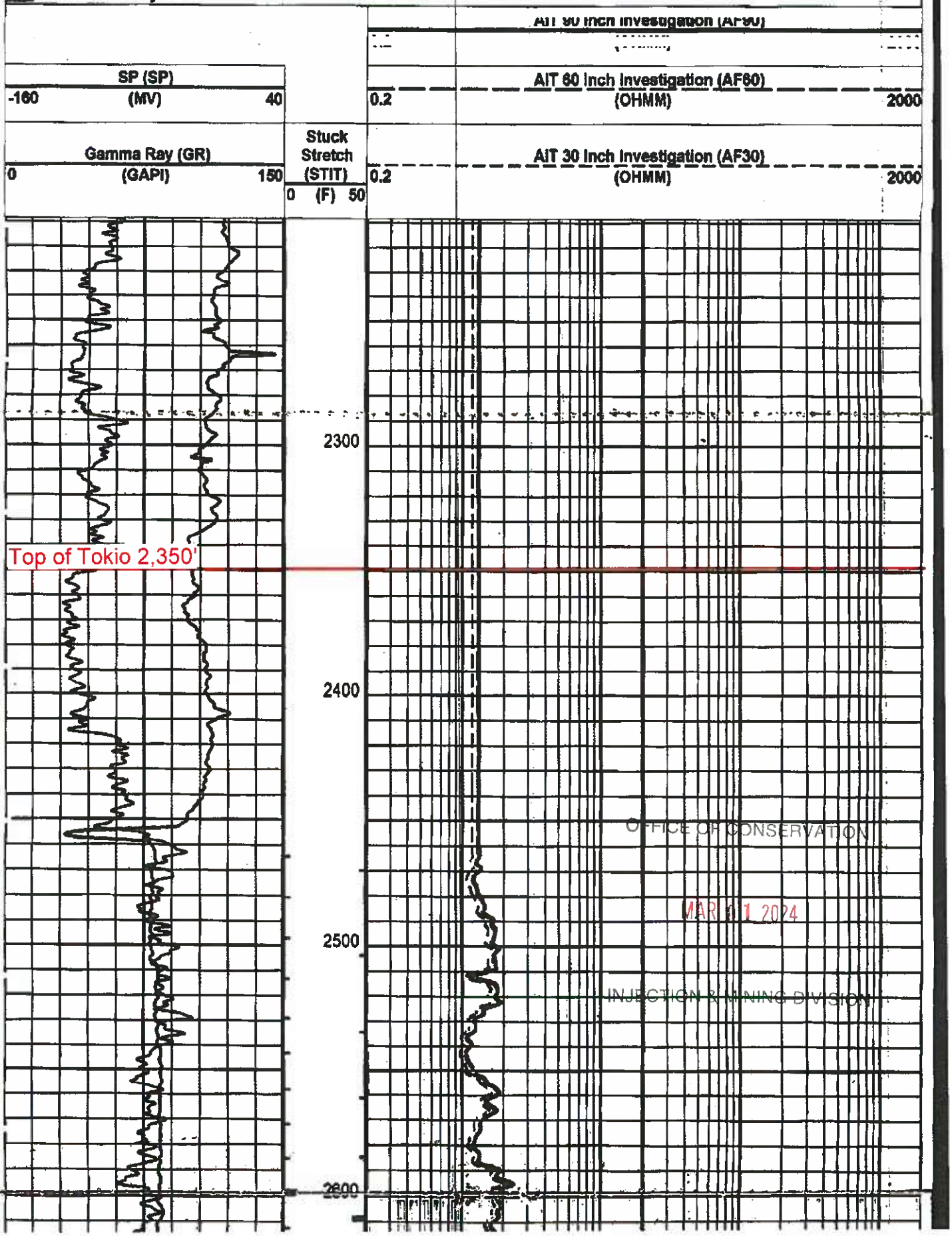
Hole Volume = 5095.97 F3
Cement Volume = 2354.56 F3 (assuming 7.63 IN casing O.D.)
Computed from 11100.0 FT to 2455.0 FT using data channel(s) HCAL

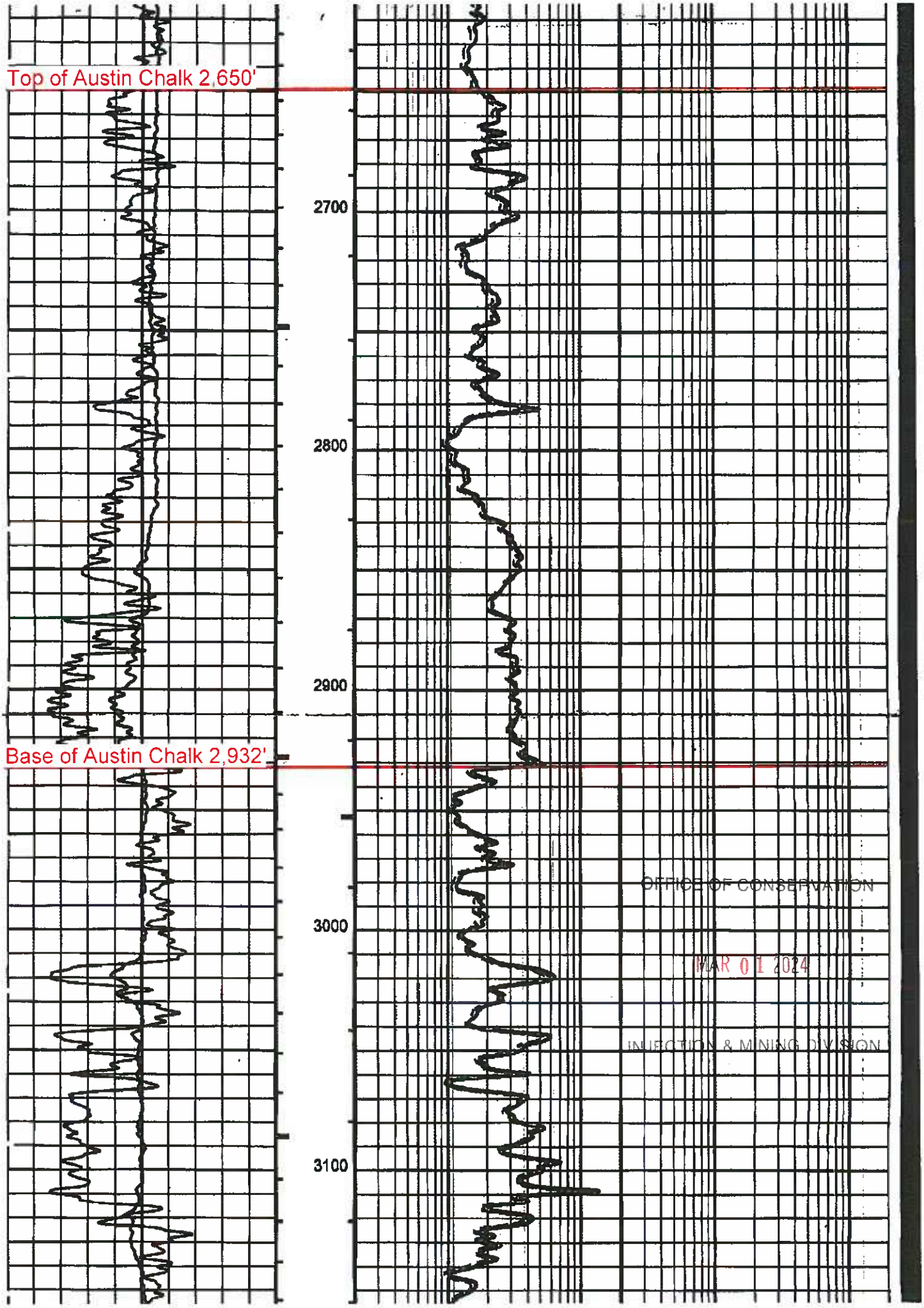
OP System Version: 17C0-154

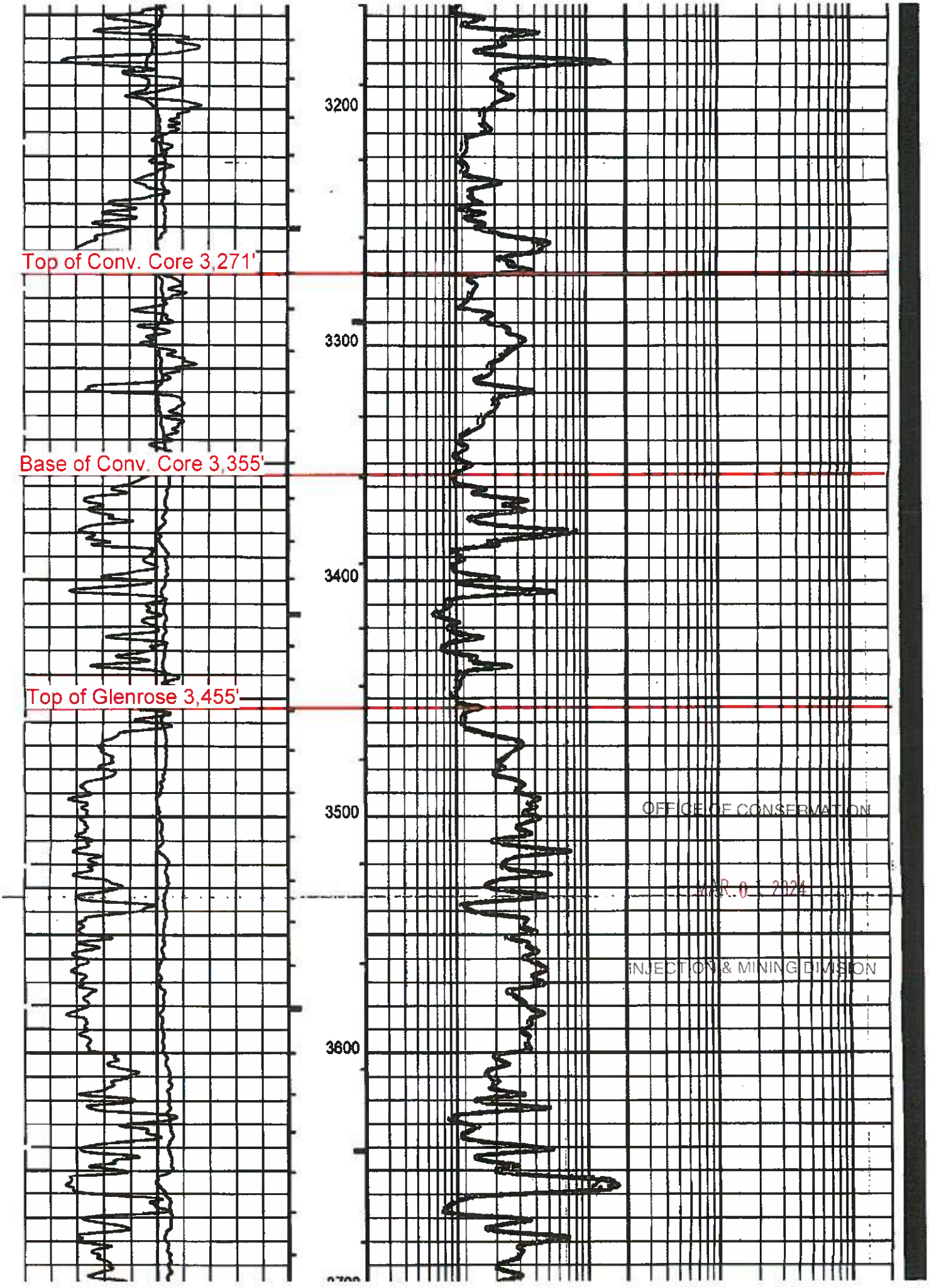
AIT-M	17C0-154	DSLT-FTB	17C0-154
PPC1-B	17C0-154	HILTH-FTB	17C0-154
DTC-H	17C0-154		

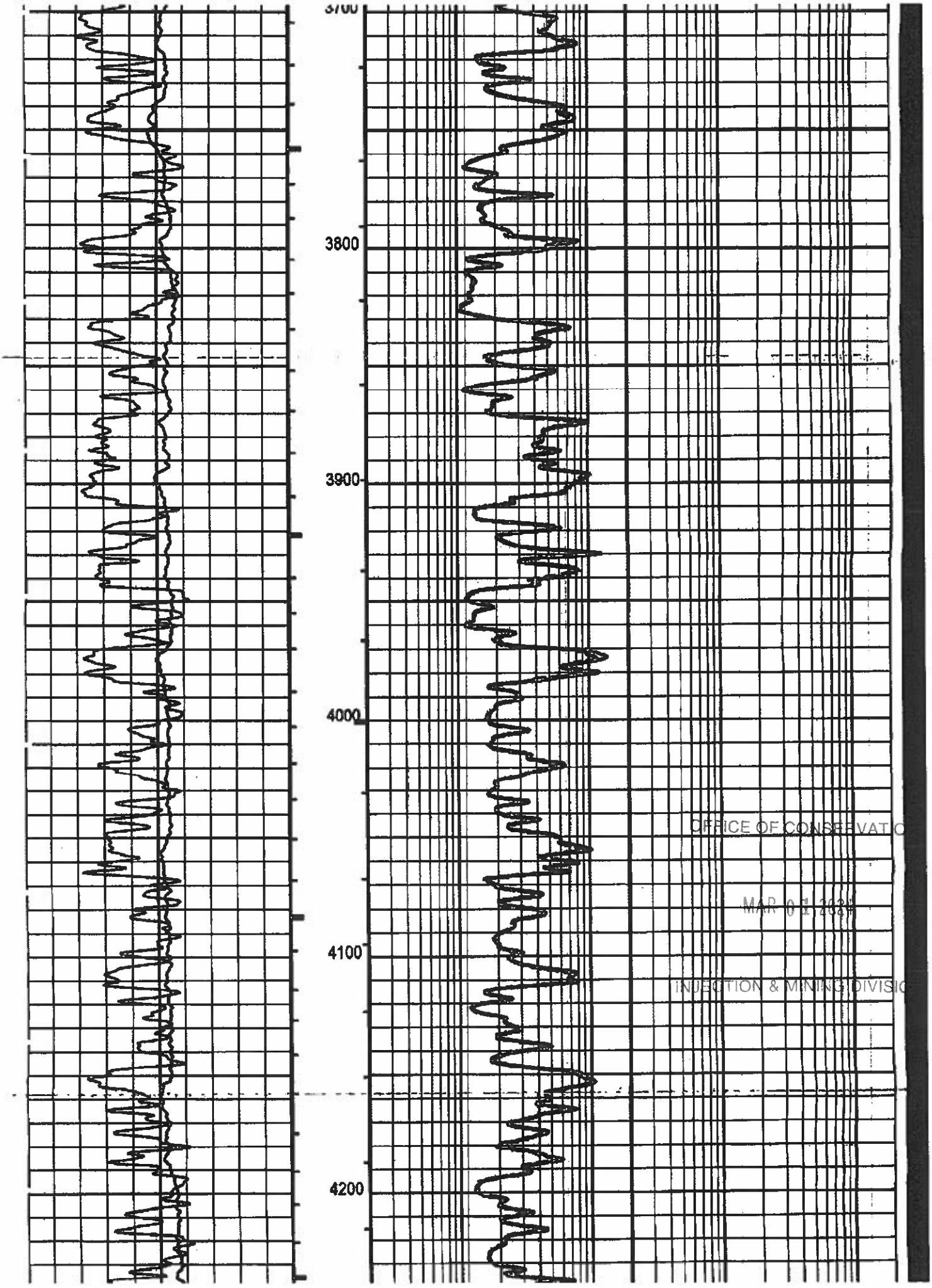
PIP SUMMARY

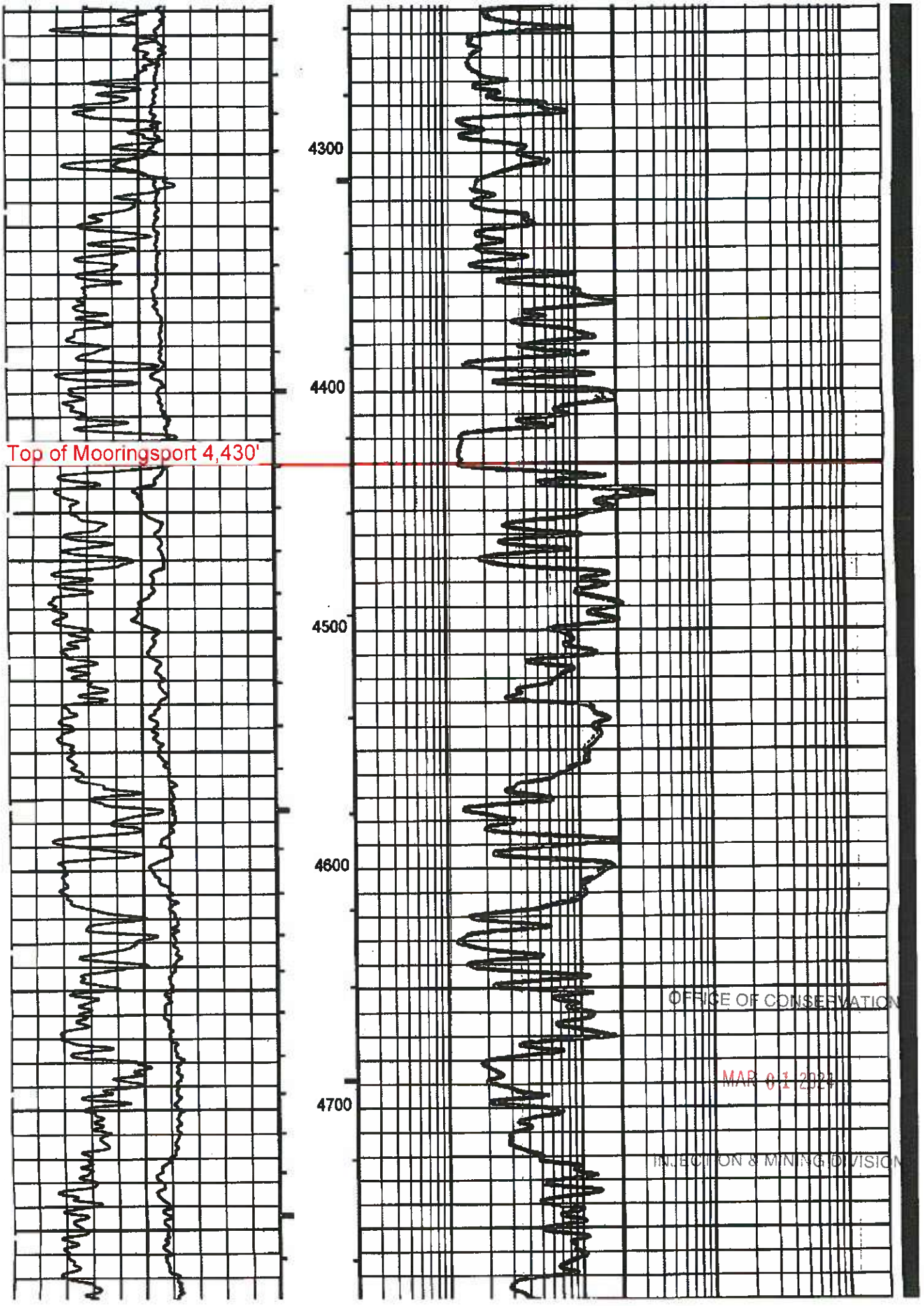
Integrated Hole Volume Minor Pip Every 10 F3
Integrated Hole Volume Major Pip Every 100 F3
Integrated Cement Volume Minor Pip Every 10 F3
Integrated Cement Volume Major Pip Every 100 F3
Time Mark Every 60 S

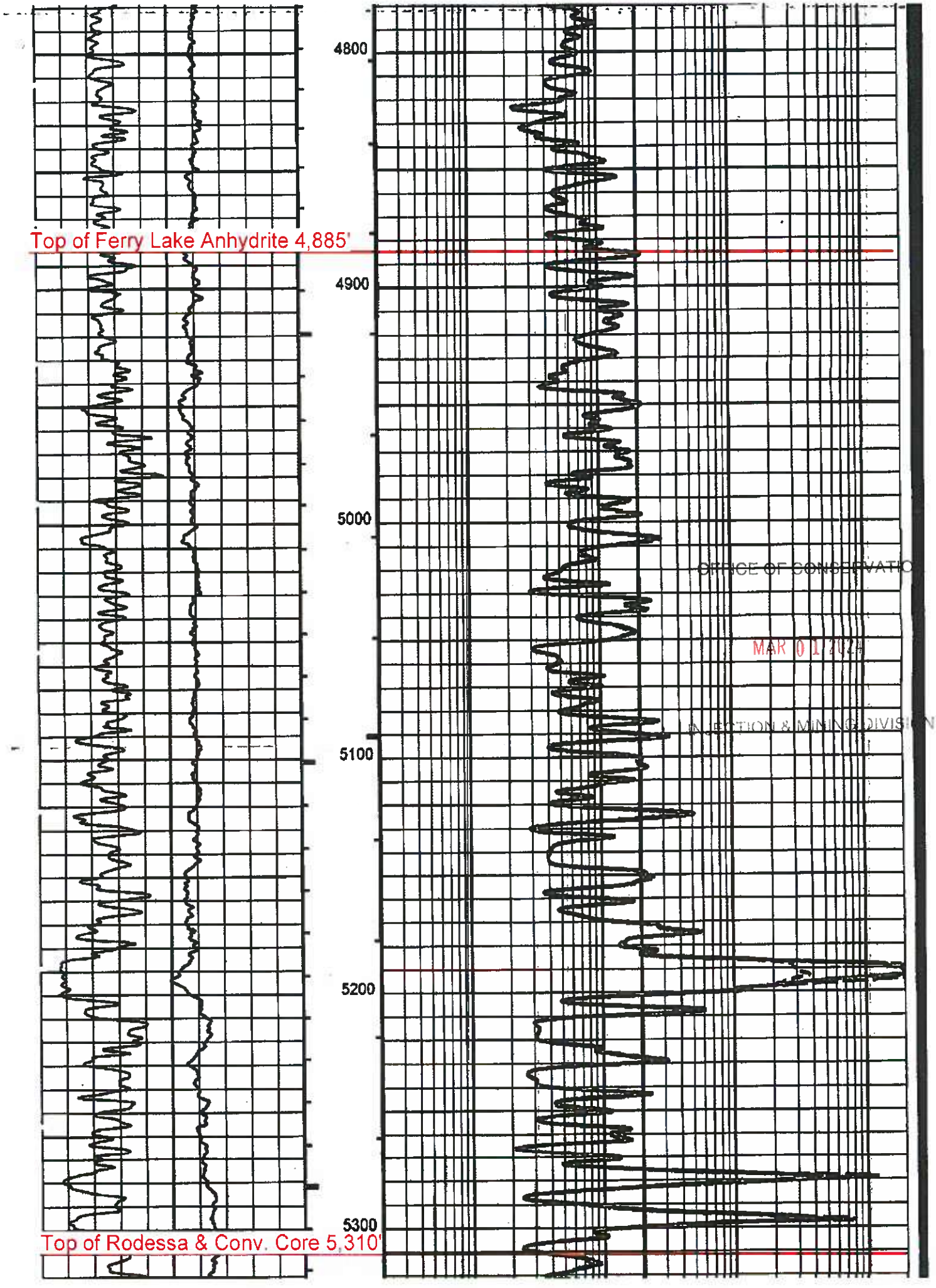


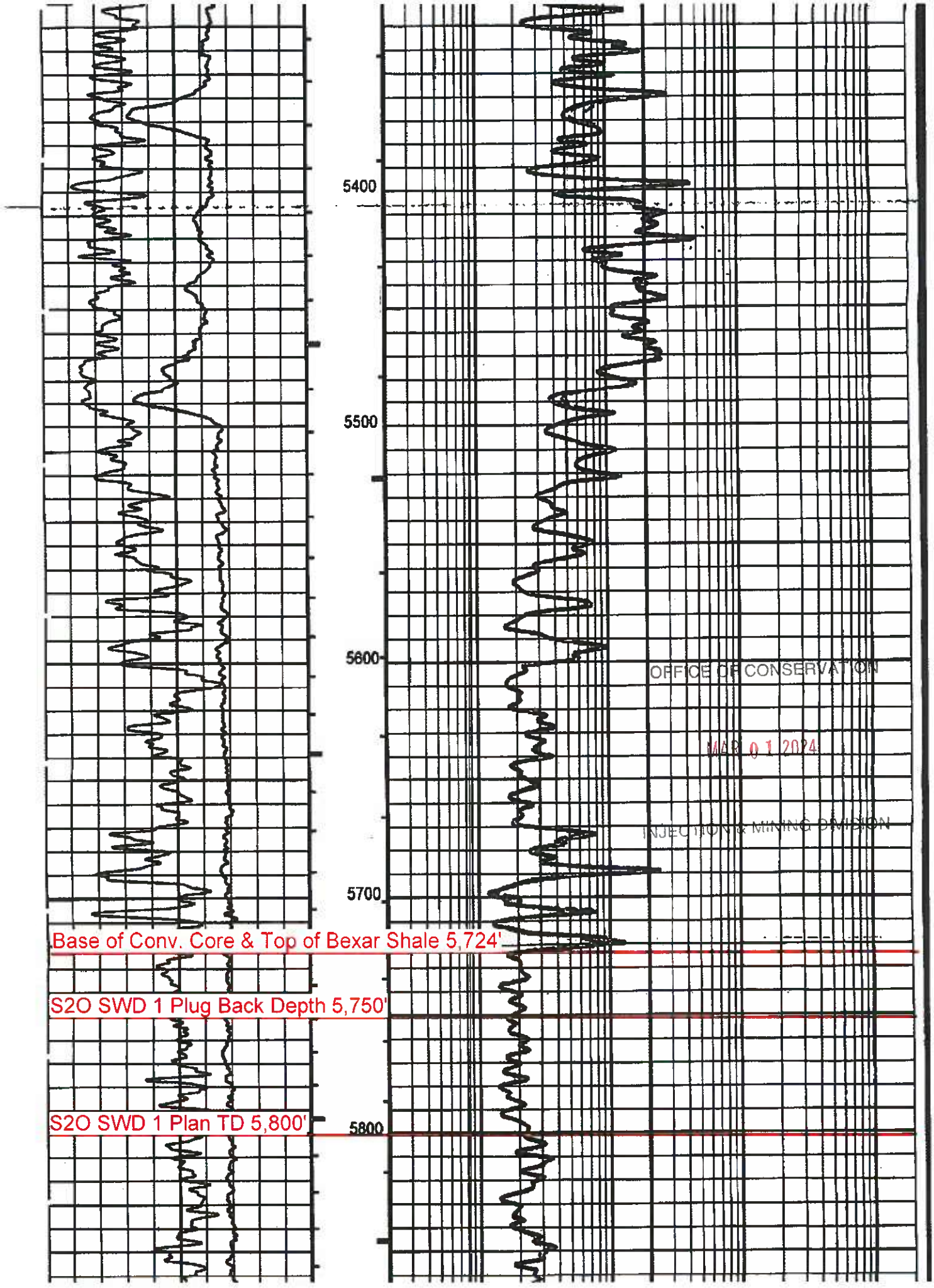


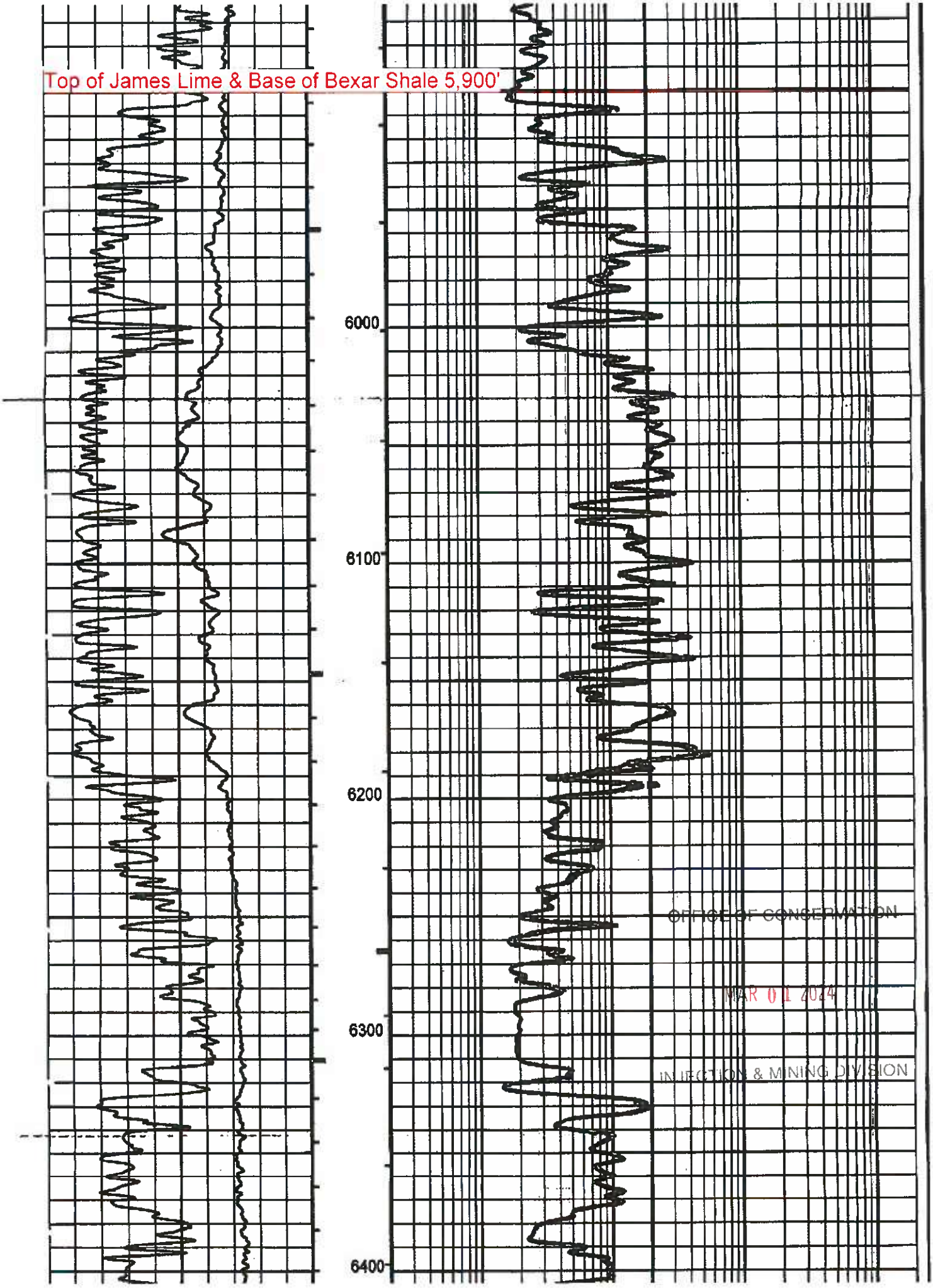


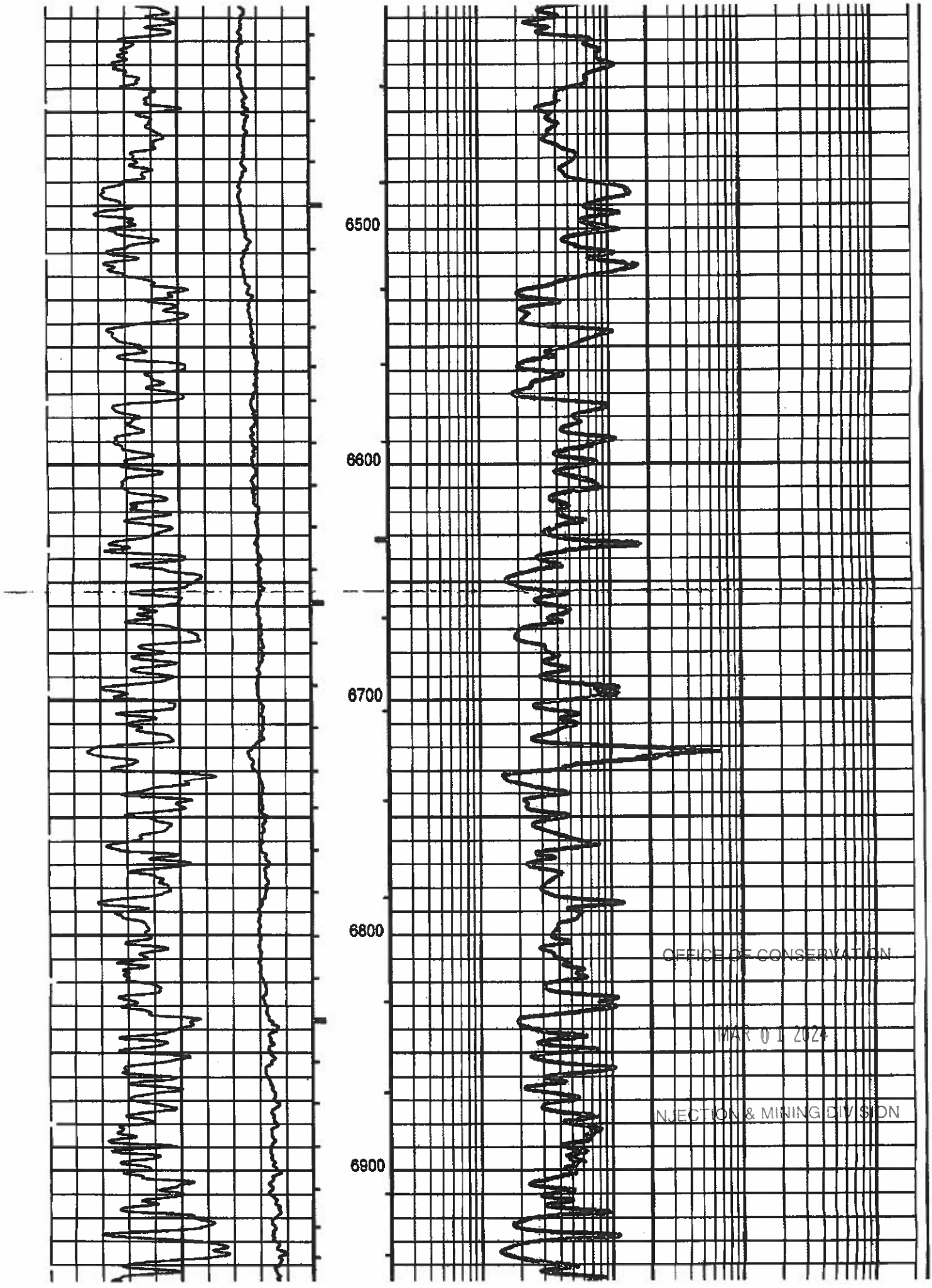


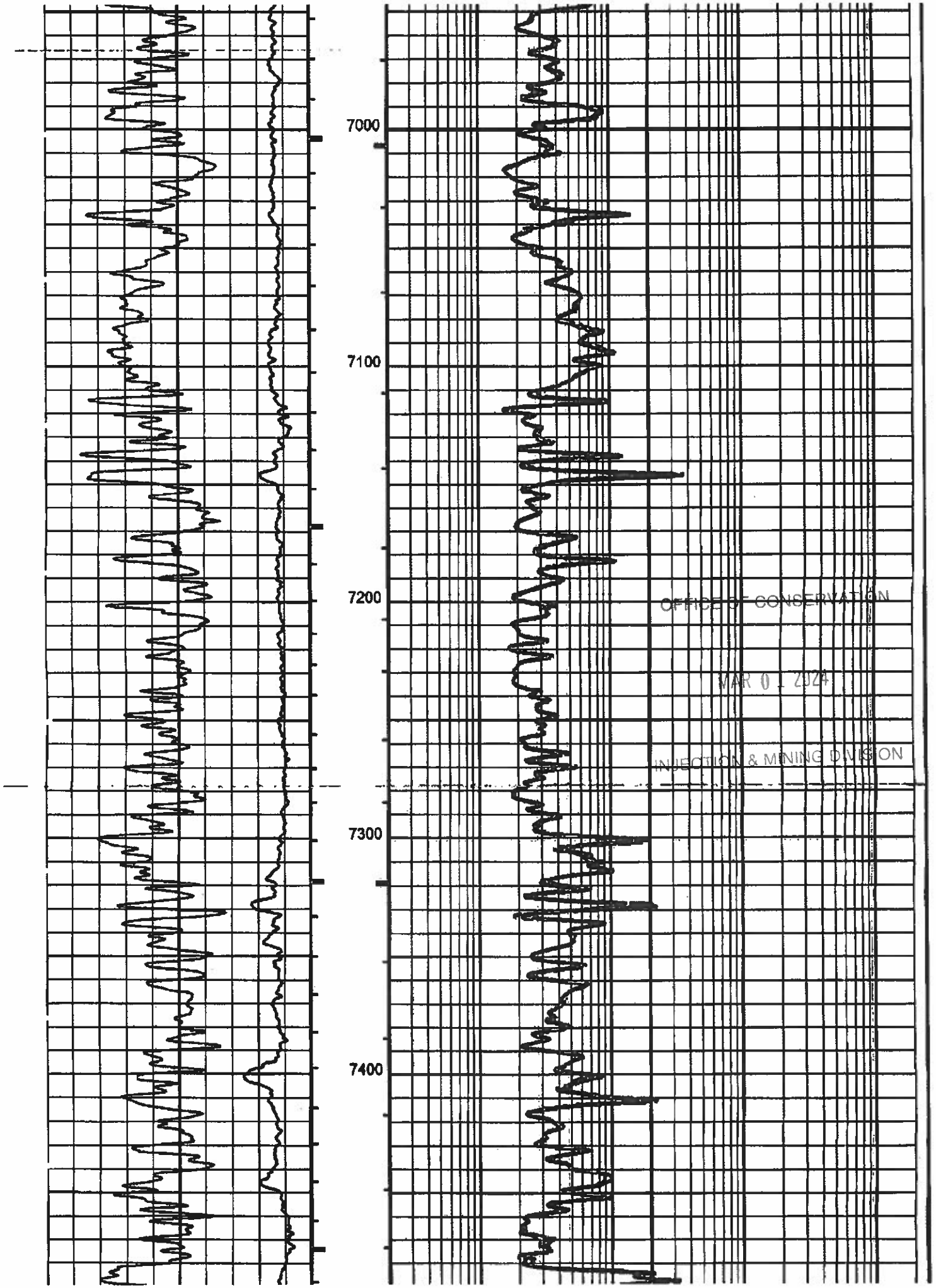


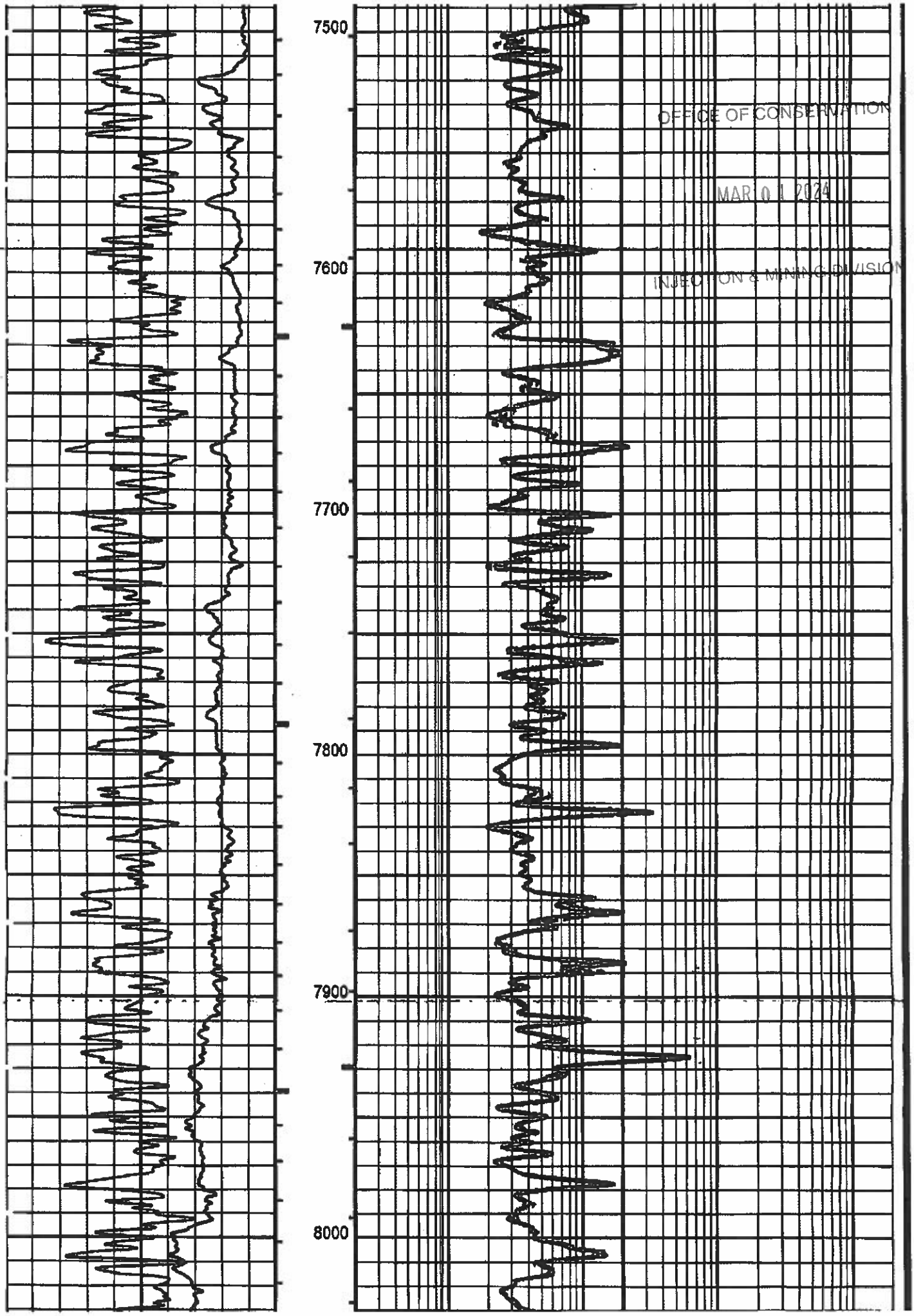


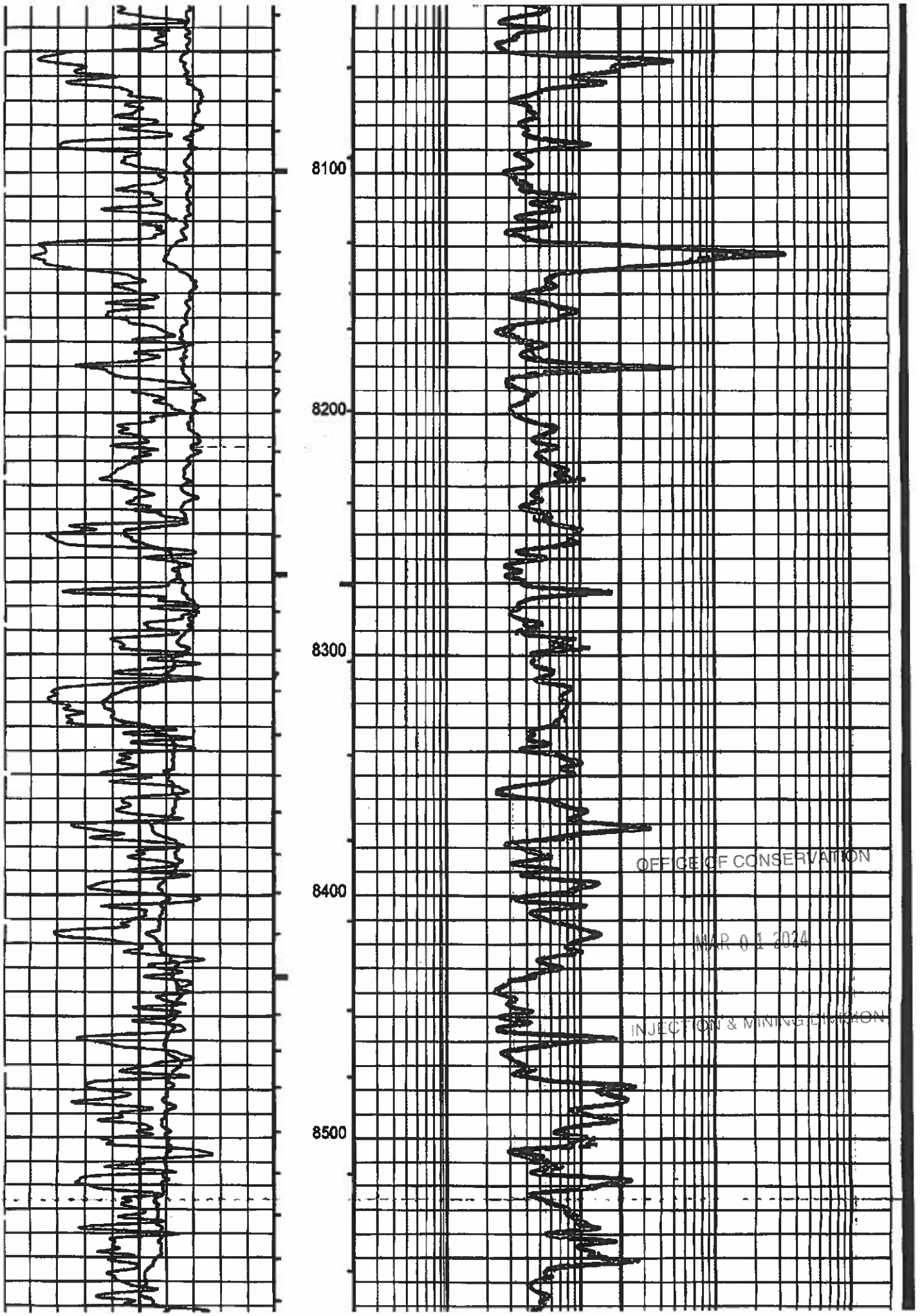


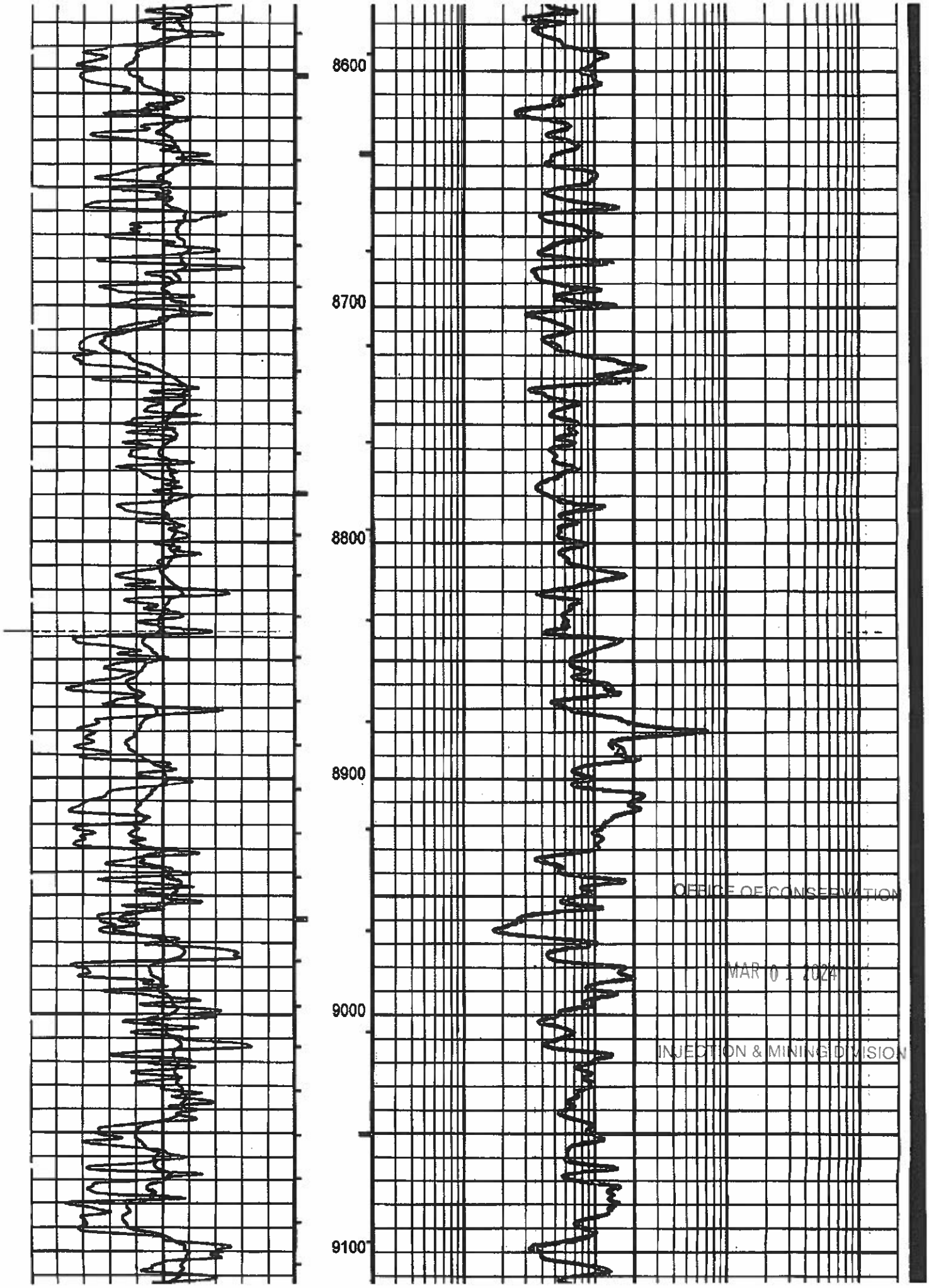


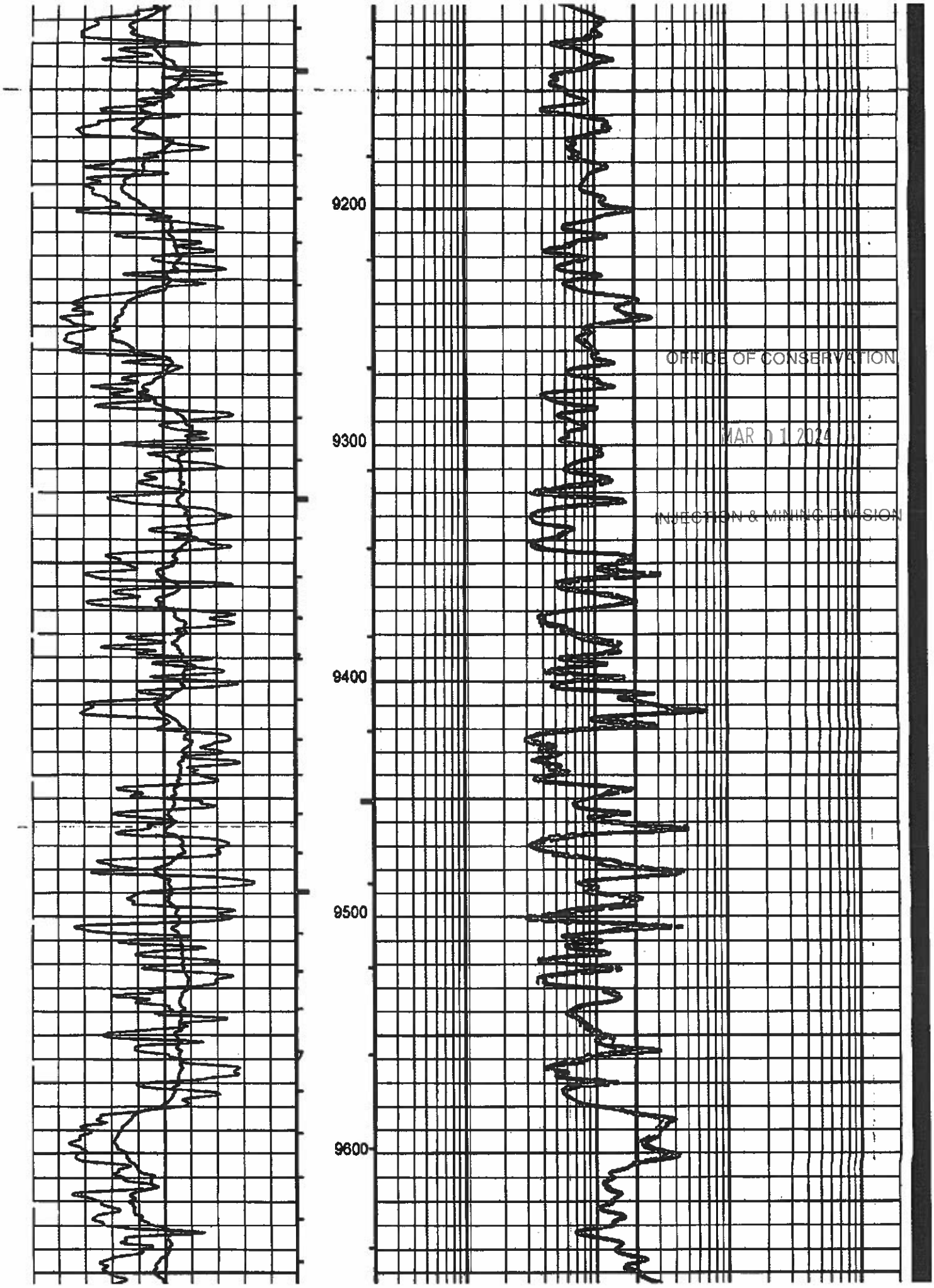


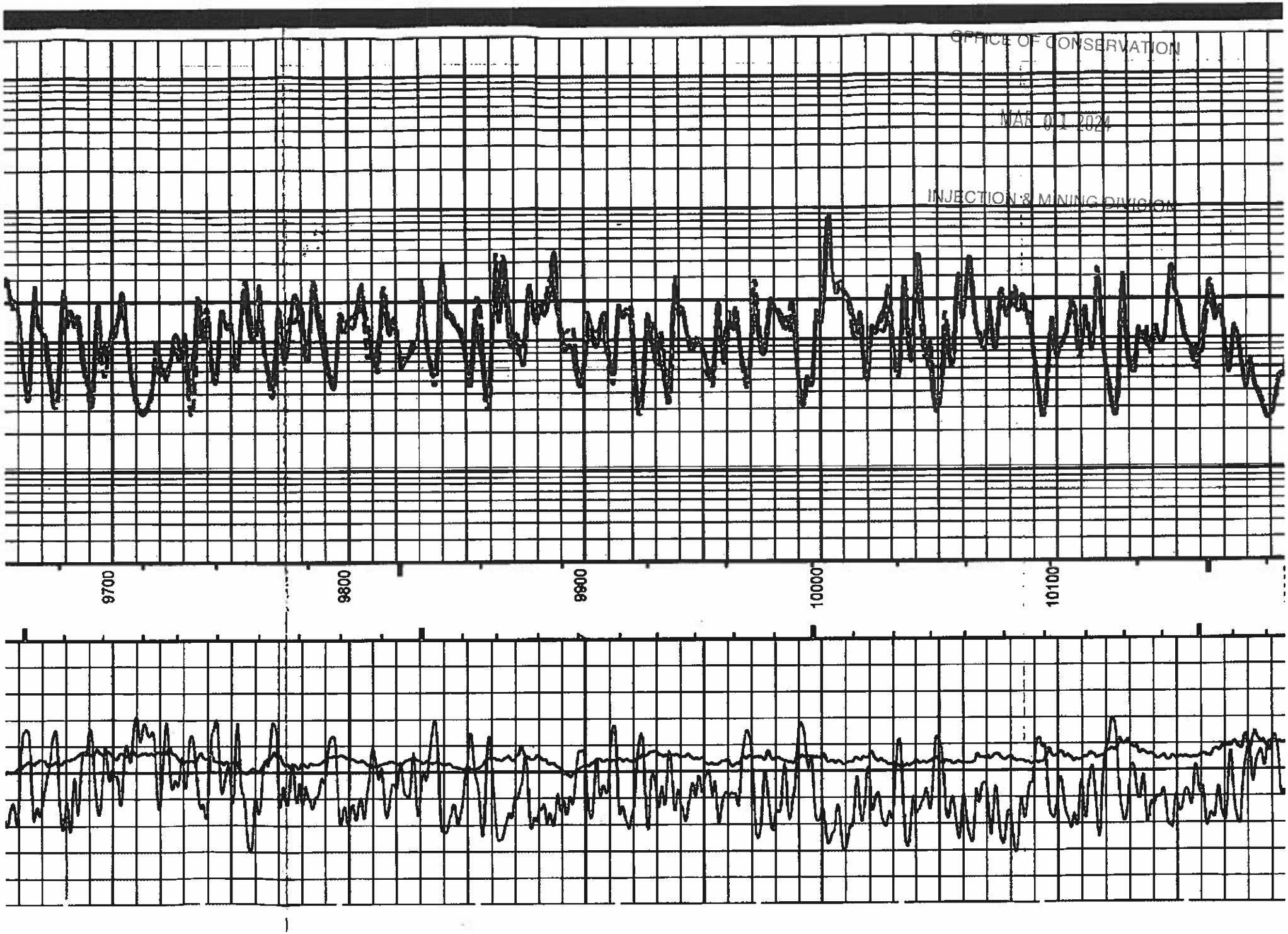


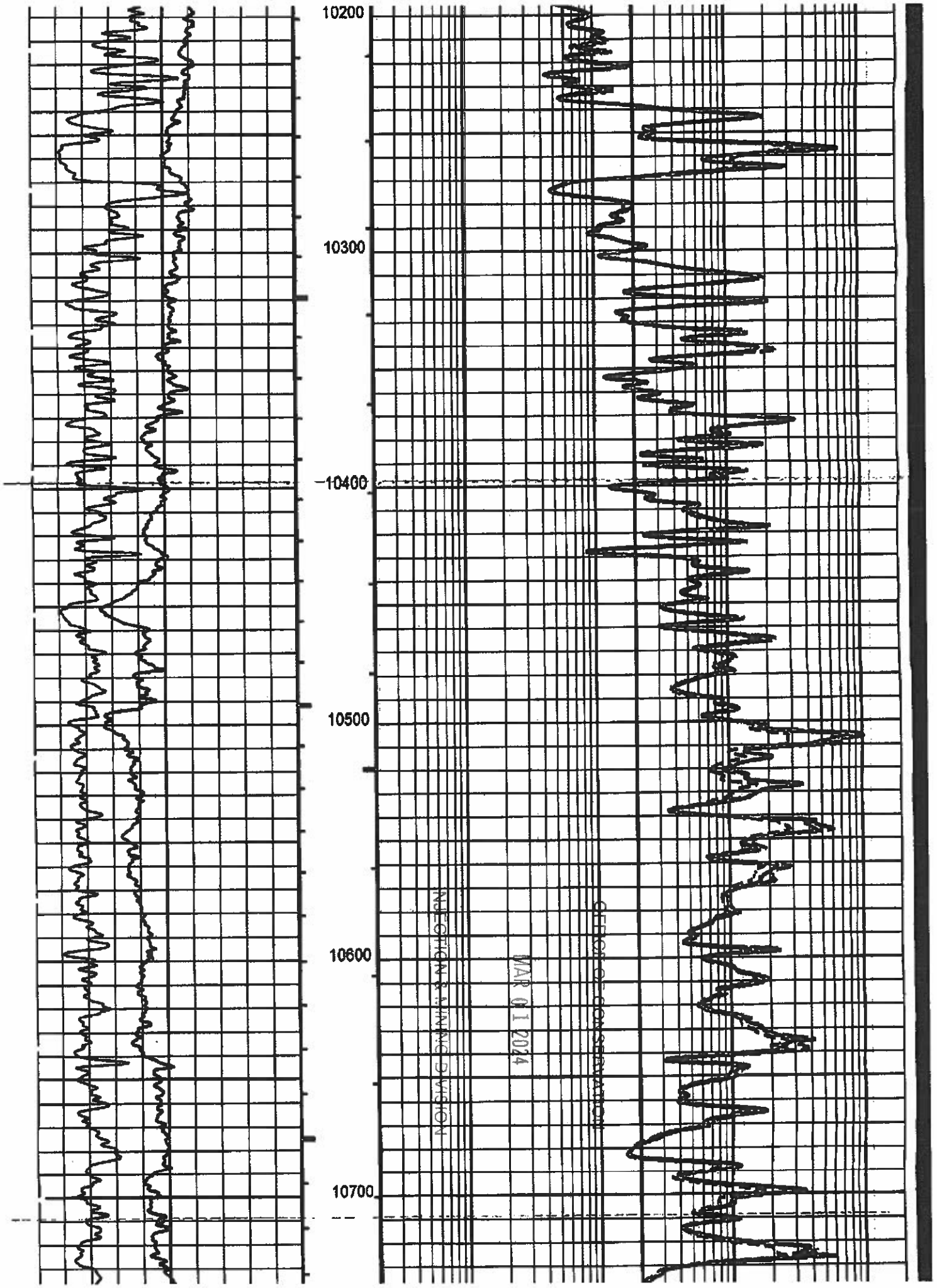


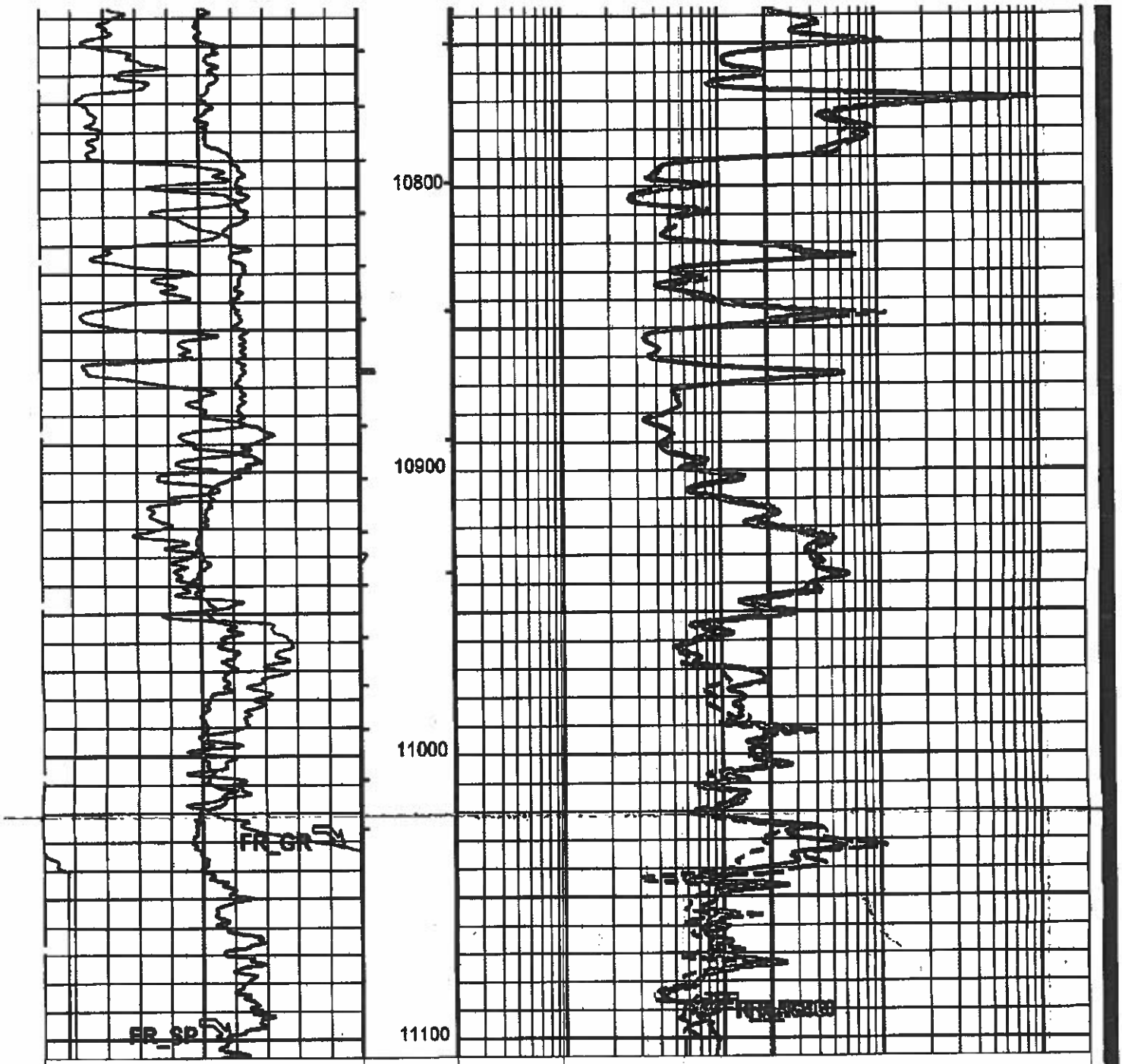









10200
10300
10400
10500
10600
10700
RECEIVED
MAR 01 2024
OIL & GAS CONSERVATION
INJECTION & MONITORING DIVISION



Gamma Ray (GR)	Stuck Stretch	AIT 30 Inch Investigation (AF30)
0 (GAPI) 150	(STIT) 0 (F) 50	0.2 (OHMM) 2000
SP (SP)		AIT 60 Inch Investigation (AF60)
-160 (MV) 40		0.2 (OHMM) 2000
		AIT 90 Inch Investigation (AF90)

PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

AITM Answer Product Processing Summary. Data taken with sonde # 1384

***** Bhole Correction *****

Effective Tool Standoff computed. Borehole diameter and mud res. taken as input (see GCSE and GRSE parameters)

Tool is run in ECCENTERED mode with a tool stand-off of 1.00 IN. Bit size is 8.88 IN.

***** Input Selections to AITM Answer Product processing *****

Caliper (GCSE): HCAL Mud Resistivity (GRSE): AMF Temperature (GTSE): HTEM Porosity (FPHI): DPHZ

***** Other parameters used by AITM Answer Product processing *****

Form Factor Exponent (FEXP)	2.000	Form Factor Numerator (FNUM)	1.000
Mud Filtrate Sample Resistivity (RMFS)	0.799 OHMM	Mud Filtrate Sample Temperature (MFST)	65.000 DEGF
Resitivity Connate Water (RW)	1.000 OHMM		

***** AITM Answer Product processing control parameters *****

Playback Mode: RECOMPUTE

(AEBC): Yes (AEBL): Yes (AERP): Yes

(ABHM): 2_ComputeStandoff (ABLM): 6_One_Two_and_Four (ARPM): 6_One_Two_and_Four

Format: AIT_2in Vertical Scale: 2" per 100' Graphics File Created: 03-Dec-2009 17:16

OP System Version: 17C0-154

AIT-M	17C0-154	DSLT-FTB	17C0-154
PPC1-B	17C0-154	HILTH-FTB	17C0-154
DTC-H	17C0-154		

Input DLIS Files

DEFAULT	AIT_SONIC_CAL_TLD_013LUP	FN:12	PRODUCER	03-Dec-2009 17:19	11100.0 FT 2202.0 FT

Output DLIS Files

DEFAULT	AIT_SONIC_CAL_TLD_034PUP	FN:31	PRODUCER	03-Dec-2009 17:15

WELL NAME: HA RA SUB San Patricio 7H #002
SERIAL# 240440
FIELD: Benson
S/T/R: 507 | T10N | R12W
PARISH: DeSoto

Schlumberger

Well: San Patricio 7H #2
Field: Benson
Parish: DeSoto State: Louisiana

See letter we delete

Platform Express
Array Induction
Neutron / Density 240440

RECEIVED
FEB 15 2010
OFFICE OF CONSERVATION
SHREVEPORT, LA

Parish: DeSoto
Field: Benson
Location: 500' FNL & 2240 FEL
Well: San Patricio 7H #2
Company: Encana Oil and Gas (USA)

LOCATION
500' FNL & 2240 FEL
of Section 7
LA Serial Number 240440

Elev.: K.B. 359.00 ft
G.L. 333.00 ft
D.F. 359.00 ft

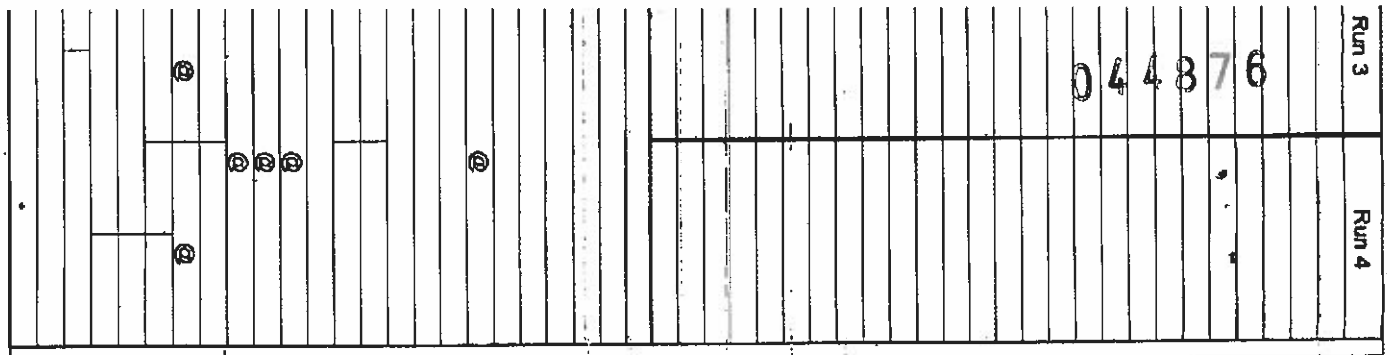
Permanent Datum: Ground Level Elev.: 333.00 ft
Log Measured From: Kelly Bushing 26.00 ft above Perm. Datum
Drilling Measured From: Kelly Bushing

API Serial No.	Section	Township	Range
17-031-24954	7	10N	12W

	Run 1	Run 2
Logging Date	5-Dec-2009	
Run Number	1	
Depth Driller	11081 ft	
Schlumberger Depth	11100 ft	
Bottom Log Interval	11092 ft	
Top Log Interval		
Casing Driller Size @ Depth	10.750 in @ 2450 ft	@
Casing Schlumberger	2455 ft	
Bit Size	9.875 in	
Type Fluid In Hole	Water Based Mud	
MUD Density	11.5 lbm/gal	
MUD Viscosity	38 s	
MUD Fluid Loss	7.2 cm3	
MUD PH	10	
MUD Source Of Sample	Circulation Tank	
RM @ Measured Temperature	0.940 ohm.m @ 65 degF	@
RMF @ Measured Temperature	0.799 ohm.m @ 65 degF	@
RMC @ Measured Temperature	1.316 ohm.m @ 65 degF	@
Source RMF / RMC	Calculated / Calculated	
RM @ MRT / RMF @ MRT	0.245 @ 269 / 0.208 @ 269	@ / @
Maximum Recorded Temperatures	269 degF	
Circulation Stopped / Time	4-Dec-2009 / 9:30	
Logger On Bottom / Time	5-Dec-2009 / 6:15	
Unit Number / Location	2359 / Shreveport, LA	
Recorded By	A. Knapek & J. Wheeler	
Witnessed By	Kenneth Daniel	

OFFICE OF CONSERVATION RECEIVED FEB 25 2010 GEOLOGICAL DIVISION

OFFICE OF CONSERVATION RECEIVED JAN 18 2024 INJECTION & MINING DIVISION



DEPTH SUMMARY LISTING

Date Created: 3-DEC-2009 17:41:24

Depth System Equipment

Depth Measuring Device		Tension Device		Logging Cable	
Type:	IDW-B	Type:	CMTD-B/A	Type:	7-46A XS
Serial Number:	6626	Serial Number:	2564	Serial Number:	2359
Calibration Date:	5-Nov-2009	Calibration Date:	21-Nov-2009	Length:	17000 FT
Calibrator Serial Number:	33	Calibrator Serial Number:	78801	Conveyance Method:	Wireline
Calibration Cable Type:	7-46A XS	Number of Calibration Points:	10	Rig Type:	LAND
Wheel Correction 1:	-5	Calibration RMS:	26		
Wheel Correction 2:	-3	Calibration Peak Error:	55		

Depth Control Parameters

Log Sequence:	First Log In the Well
Rig Up Length At Surface:	264.00 FT
Rig Up Length At Bottom:	261.20 FT
Rig Up Length Correction:	2.80 FT
Stretch Correction:	6.00 FT
Tool Zero Check At Surface:	0.70 FT

Depth Control Remarks

1. Full Schlumberger depth procedure from 18-Feb-2008 followed
2. IDW used as primary depth control
3. Z-Chart used as secondary depth control
4.
5.
6.

OTHER SERVICES1	OTHER SERVICES2
OS1: BHC	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
Log Objective: Well Evaluation	
Toolstring run as per toolsketch	
Holevolume computed using HCAL data channel	
Cement volume calculated with a FCD of 7.625"	

RWA computed using DPHZ data channel	
Logged on a limestone matrux, MDEN = 2.71g/cc	
Maximum recorded temperature taken from HTEM as 269degF	044876
Caliper check in casing reading 10.05". 10.75" & 40.5# casing has ID =	10.05"
Repeat done over anhydrite and at bottom per client request	
Schlumberger full radiation SOP followed. NSR-F 160 and GSR-Z 5089	
Rig: Trinidad 54	
Crew: B. Smith, J. Duty	
Thank you for choosing Schlumberger	

RUN 1		RUN 2	
SERVICE ORDER #:	B3O2-00019	SERVICE ORDER #:	
PROGRAM VERSION:	17C0-154	PROGRAM VERSION:	
FLUID LEVEL:	0 ft	FLUID LEVEL:	

LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1 RUN 2

SURFACE EQUIPMENT

GSR-U/Y
NCT-B
CNB-AB
NCS-VB
WITM (DTS)-A

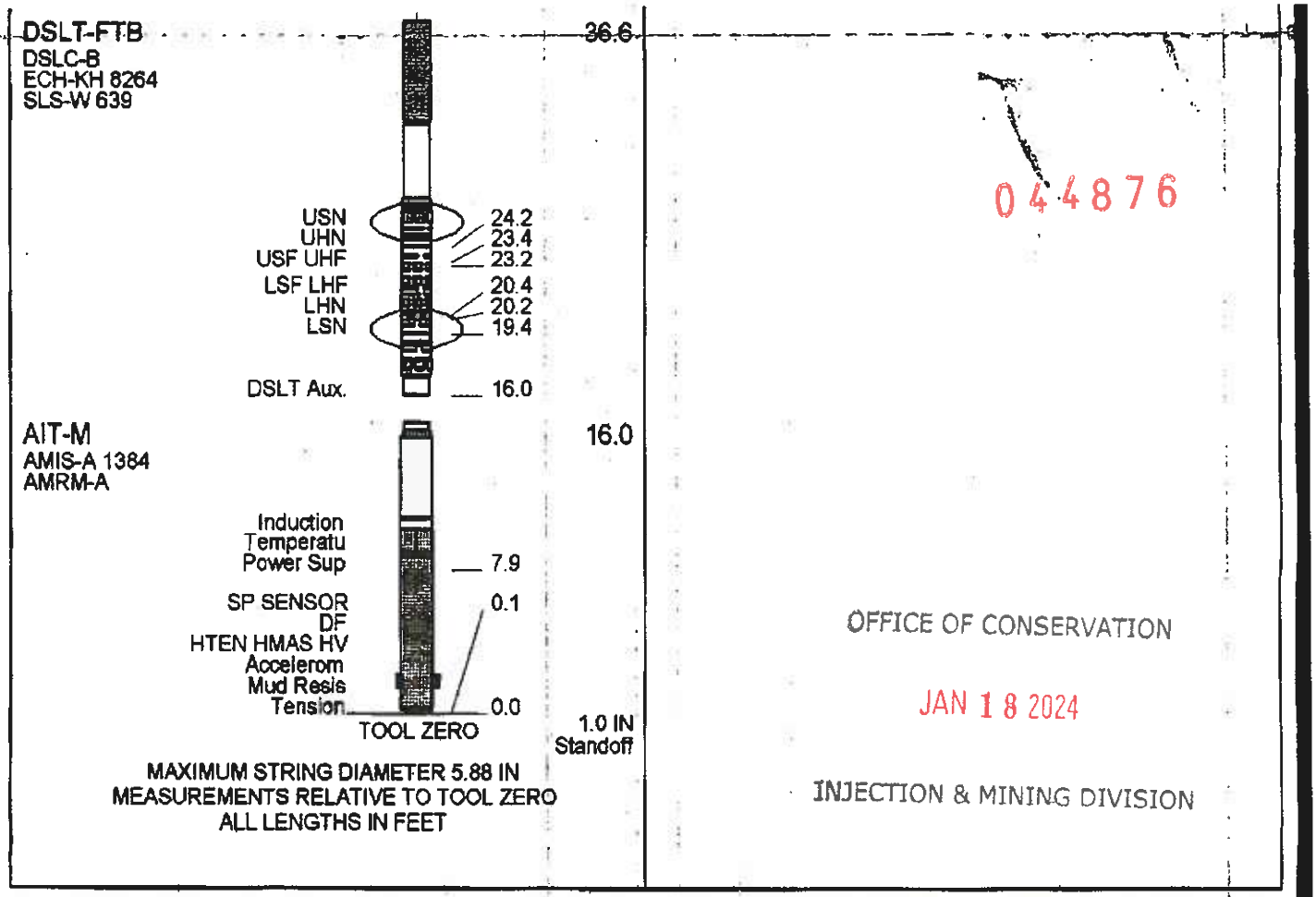
DOWNHOLE EQUIPMENT

LEH-PT LEH-PT 1093			76.1
AH-233	CTEM HGNS HTEM	70.9	73.0
DTC-H ECH-KC 10390 DTCH0-A	HMCA TelStatus ToolStatu	68.8 68.8	71.8
HILTH-FTB HGNSD-H 3905 HMCA-H HGNH 2905 NLS-KL NSR-F 160 HACCZ-H 3298 HCNT-H HGR HRCC-H 3869 HRMS-H 3962 HRGD-H 3967 GLS-VJ 5089 MCFL Device-H HILT Nucl. LS-H 26808 HILT Nucl. SS-H 27849 HILT Nucl. BS-H 26816 BOW-SPR NPV-N	HGNS Gamm HGNS Neut HGNS Neut HGNS sens HRCC cart MCFL HILT call HRDD-LS HRDD-SS HRDD-BS	68.1 62.2 61.7 59.4 55.4 50.0 49.5 49.1	68.8
AH-184 AH-184 4880			47.1
AH-184 AH-184 1908			45.1
PPC1-B PPC1-B 8263 PPC_CAL_STD	Calipers	42.0	43.1
	PPC_Cartr	36.6	

OFFICE OF CONSERVATION

JAN 18 2024

INJECTION & MINING DIVISION



044876

OFFICE OF CONSERVATION

JAN 18 2024

INJECTION & MINING DIVISION

Schlumberger

2 Inch Main Pass
2" per 100'

MAXIS Field Log

Input DLIS Files

DEFAULT	AIT_SONIC_CAL_TLD_013LUP	FN:12	PRODUCER	03-Dec-2009 17:19	11100.0 FT 2202.0 FT

Output DLIS Files

DEFAULT	AIT_SONIC_CAL_TLD_034PUP	FN:31	PRODUCER	03-Dec-2009 17:15	11106.0 FT 2208.0 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 5095.97 F3
Cement Volume = 2354.56 F3 (assuming 7.63 IN casing O.D.)
Computed from 11100.0 FT to 2455.0 FT using data channel(s) HCAL

OP System Version: 17C0-154

AIT-M	17C0-154	DSLT-FTB	17C0-154
PPC1-B	17C0-154	HILTH-FTB	17C0-154
DTC-H	17C0-154		

PIP SUMMARY

Integrated Hole Volume Minor Pip Every 10 F3
Integrated Hole Volume Major Pip Every 100 F3
Integrated Cement Volume Minor Pip Every 10 F3
Integrated Cement Volume Major Pip Every 100 F3
Time Mark Every 60 S

044876

AIT 90 Inch Investigation (AF90)

SP (SP)
-160 (MV) 40

AIT 60 Inch Investigation (AF60)
0.2 (OHMM) 2000

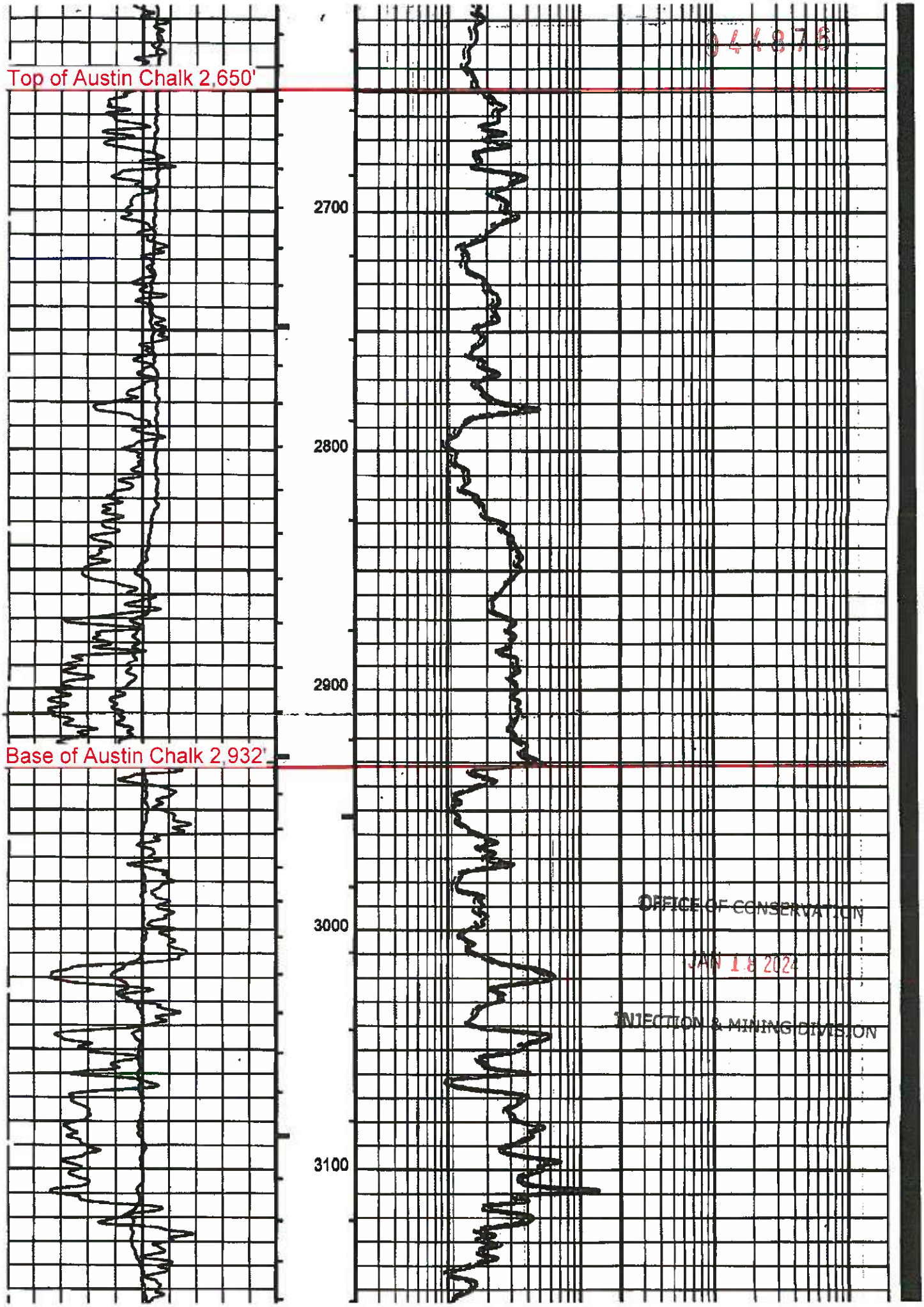
Gamma Ray (GR)
0 (GAPI) 150

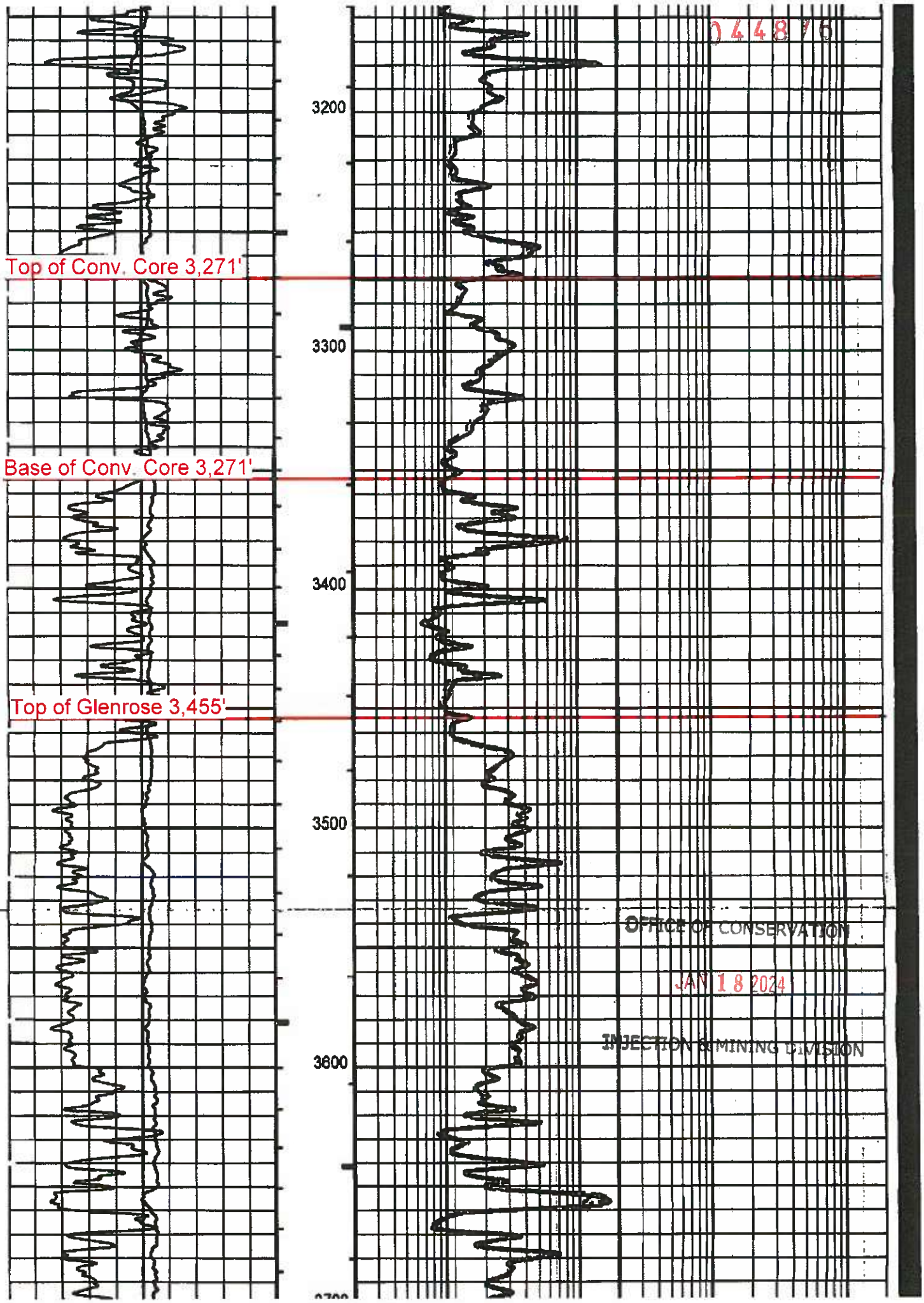
Stuck Stretch (STIT)
0 (F) 50

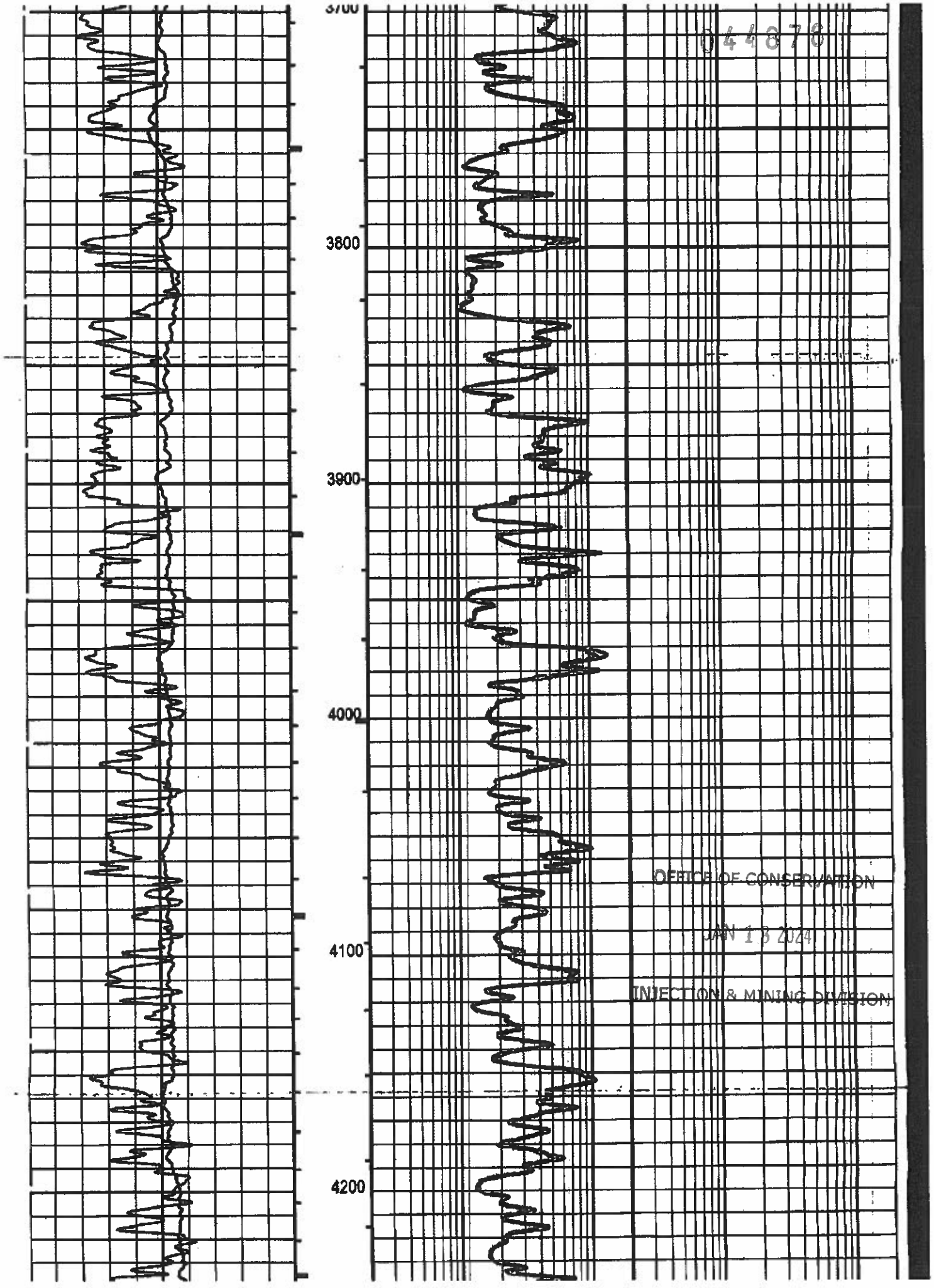
AIT 30 Inch Investigation (AF30)
0.2 (OHMM) 2000

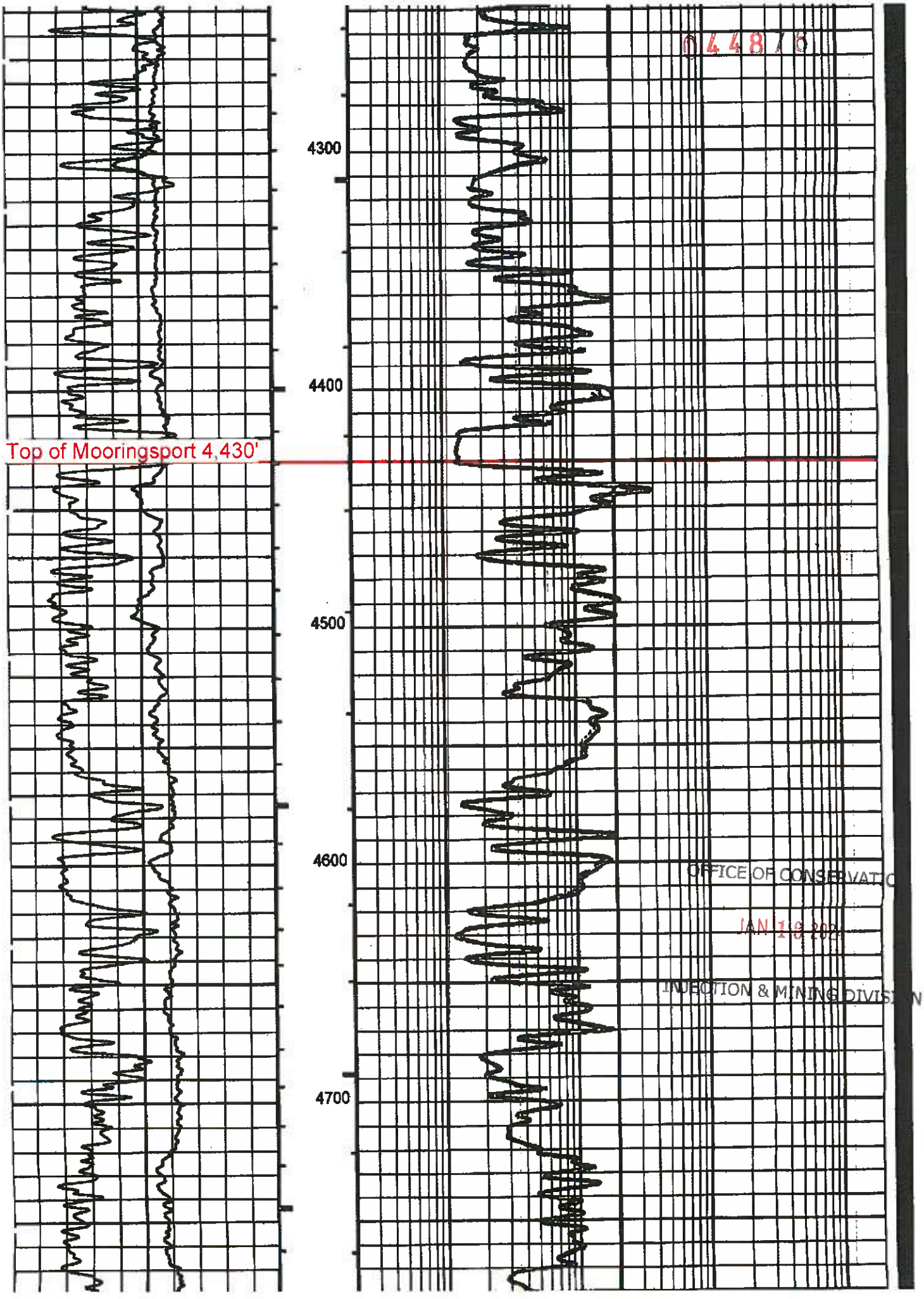
2300
2400
2500
2600

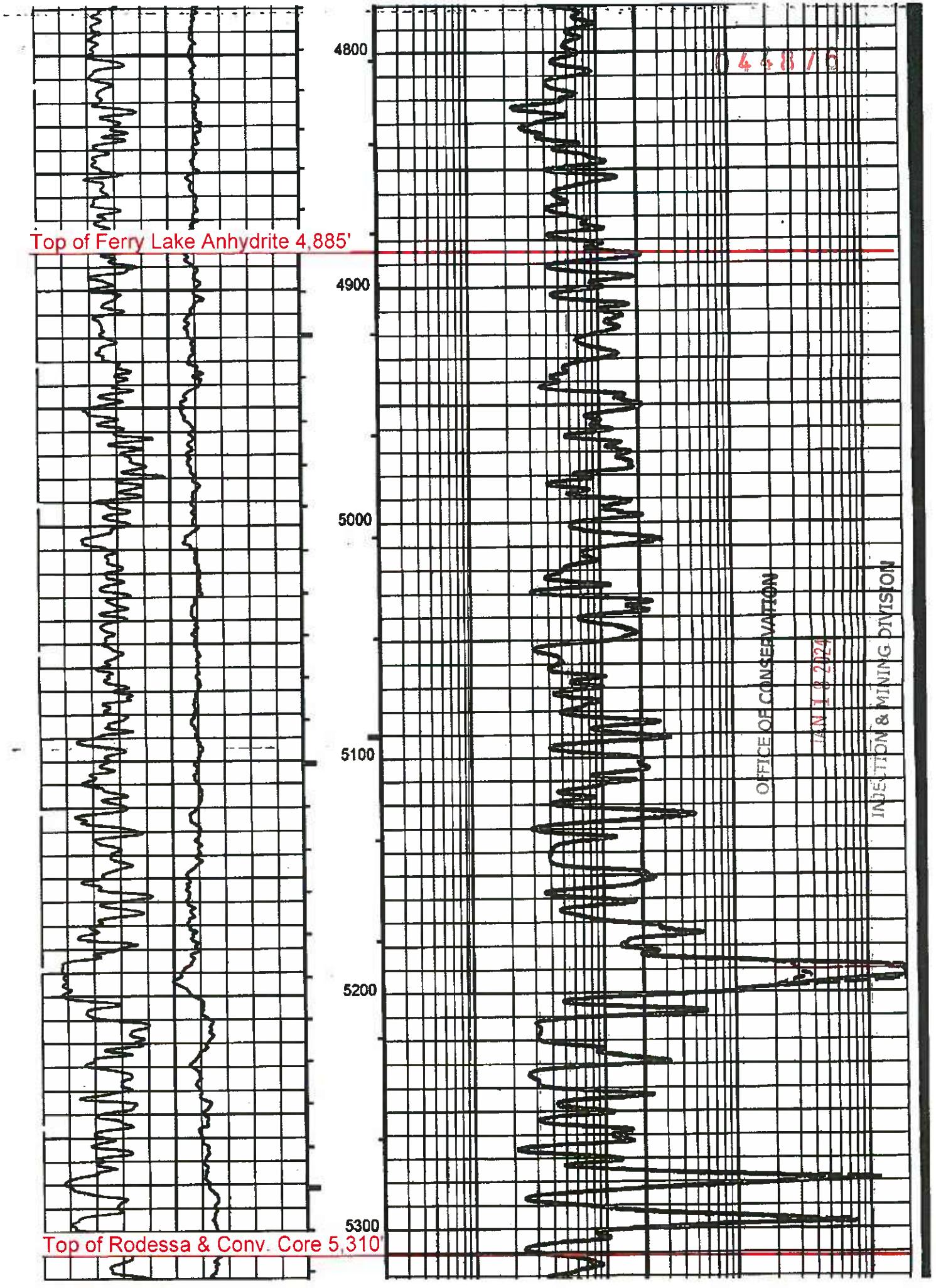
Top of Tokio 2,350'

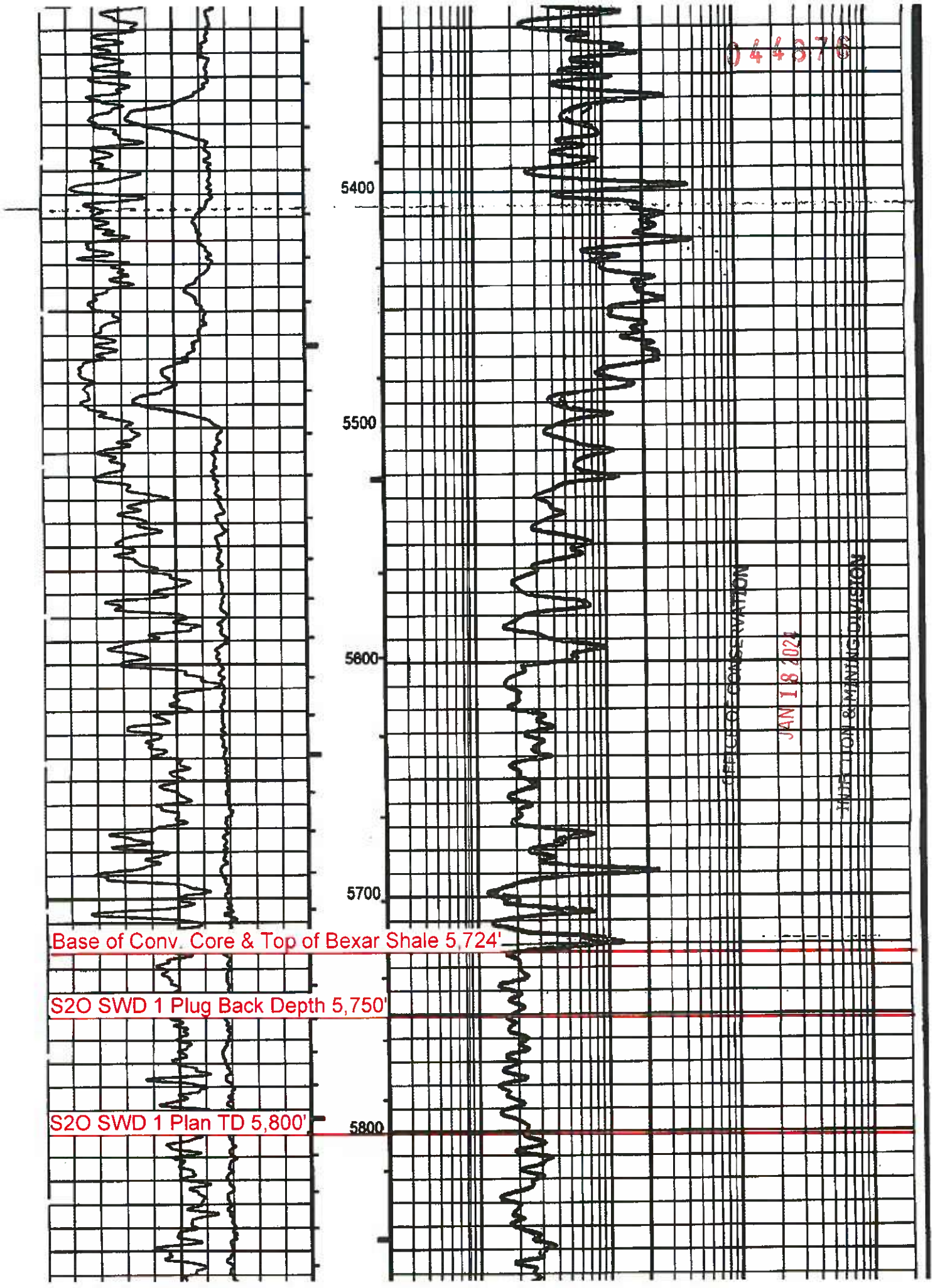

Top of Austin Chalk 2,650'
Base of Austin Chalk 2,932'
2700
2800
2900
3000
3100
244078
OFFICE OF CONSERVATION
JAN 18 2024
INJECTION & MINING DIVISION

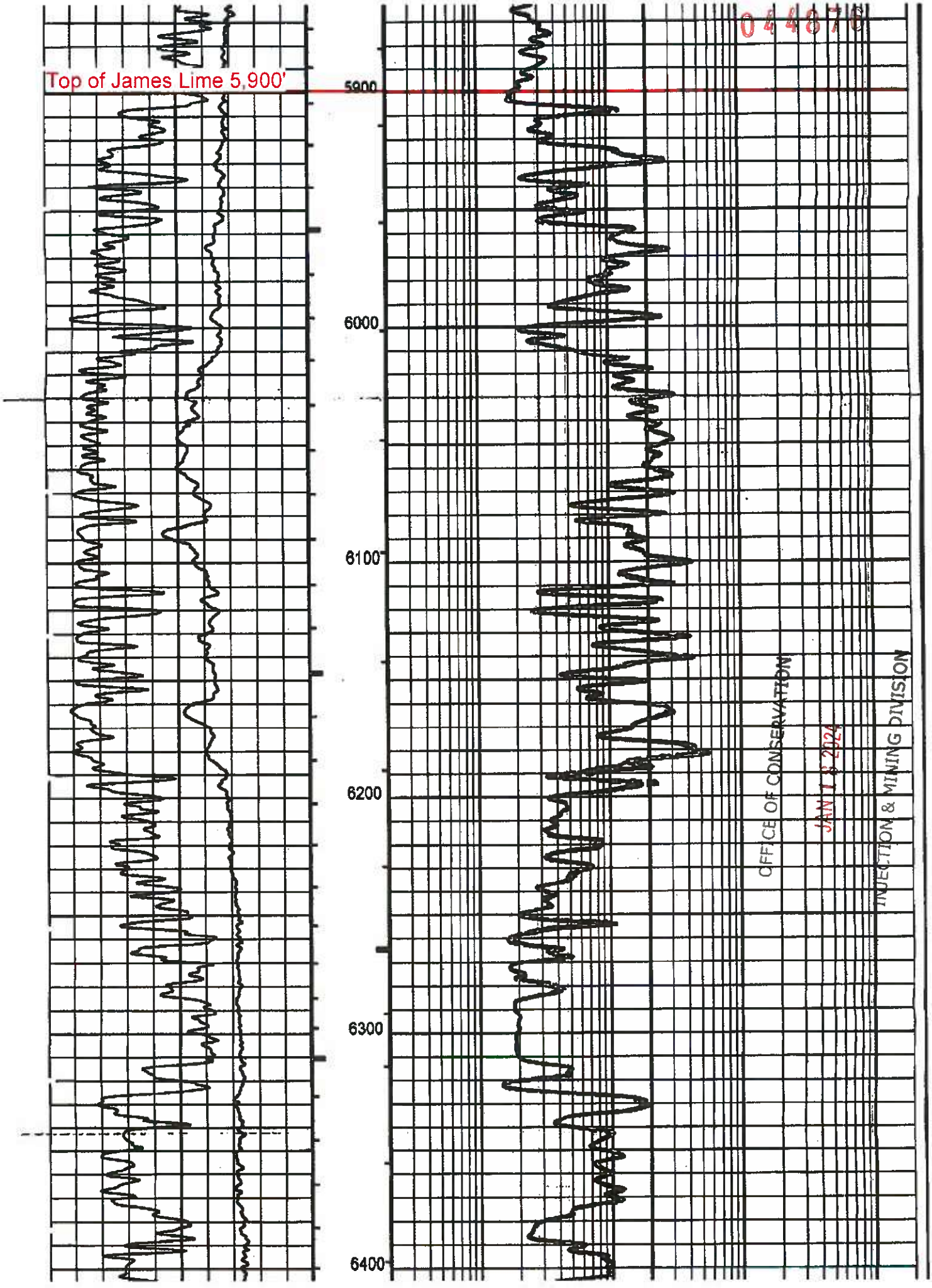


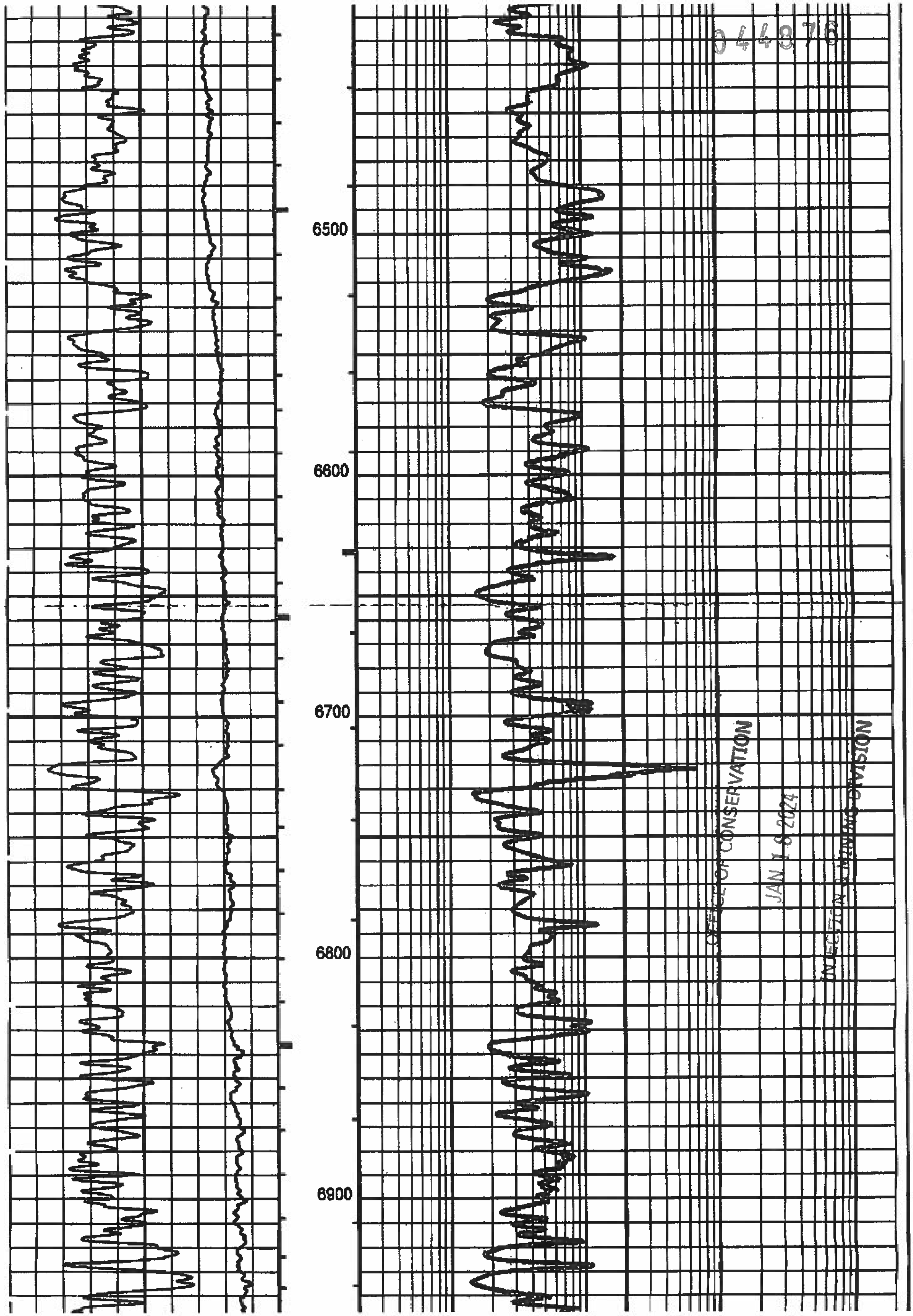

3700
3800
3900
4000
4100
4200
044876
OFFICE OF CONSERVATION
JAN 18 2024
INJECTION & MINING DIVISION

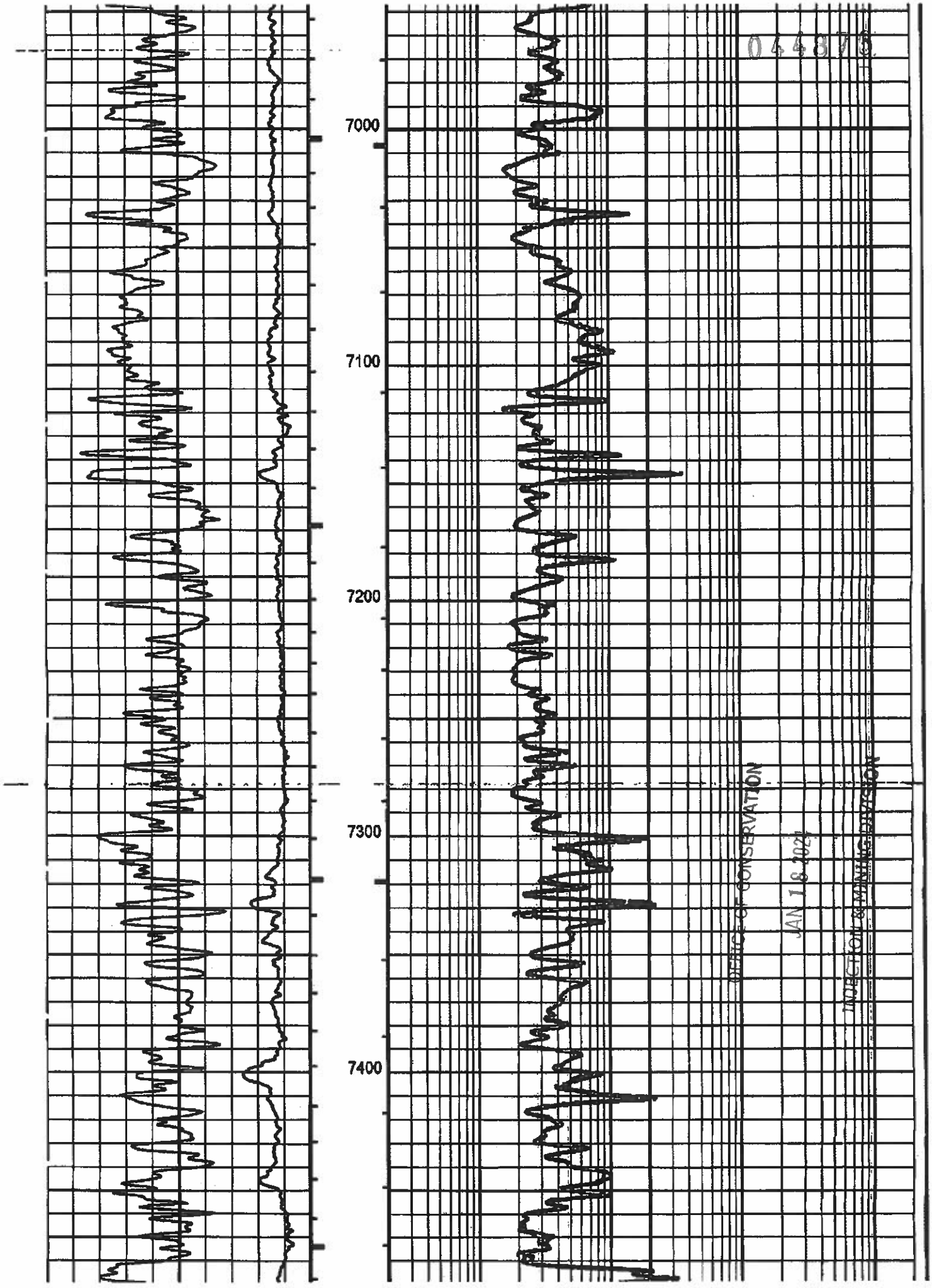


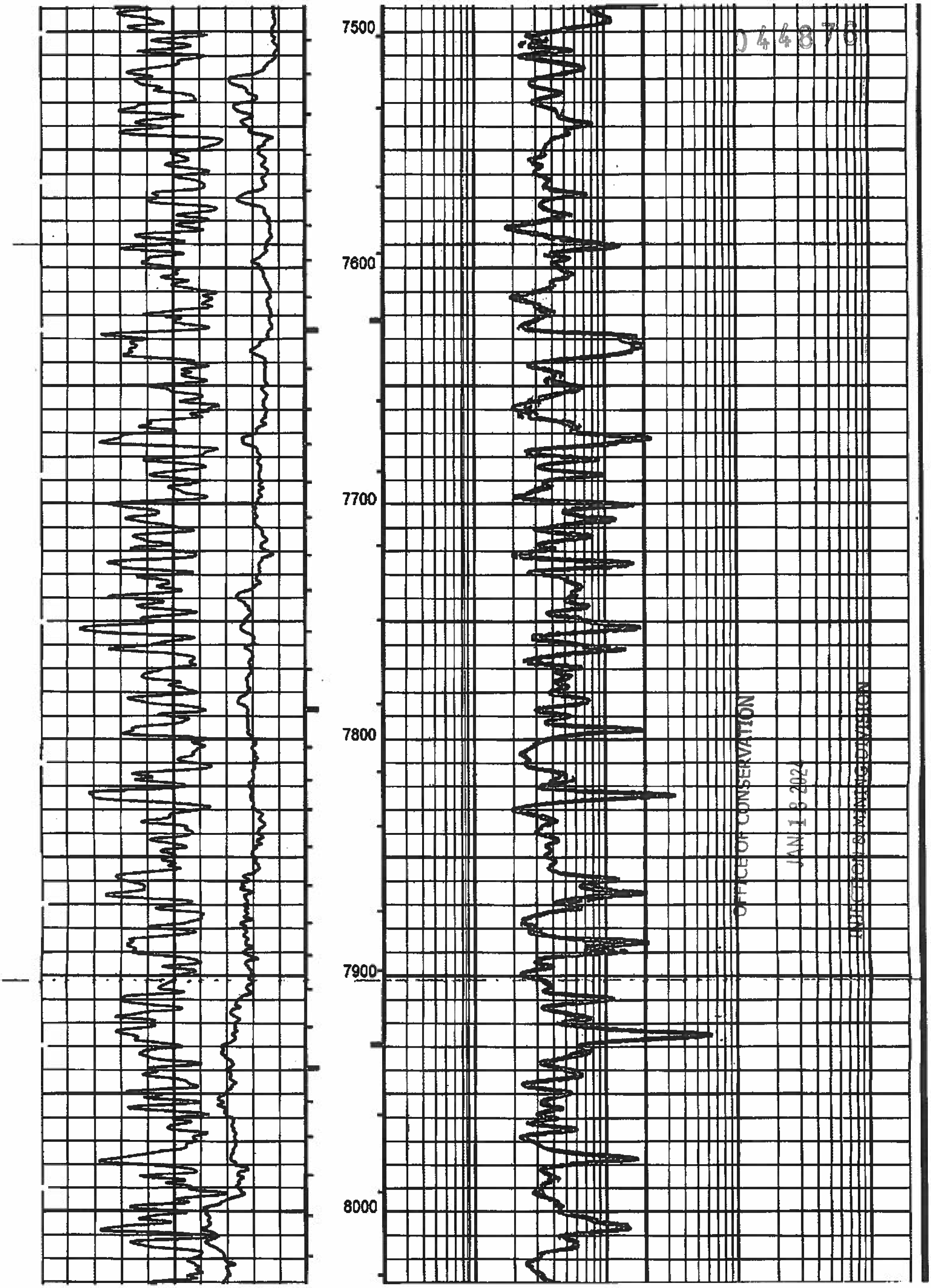

4800
4900
5000
5100
5200
5300
Top of Ferry Lake Anhydrite 4,885'
Top of Rodessa & Conv. Core 5,310'
044816
OFFICE OF CONSERVATION
JAN 18 2024
INJECTION & MINING DIVISION

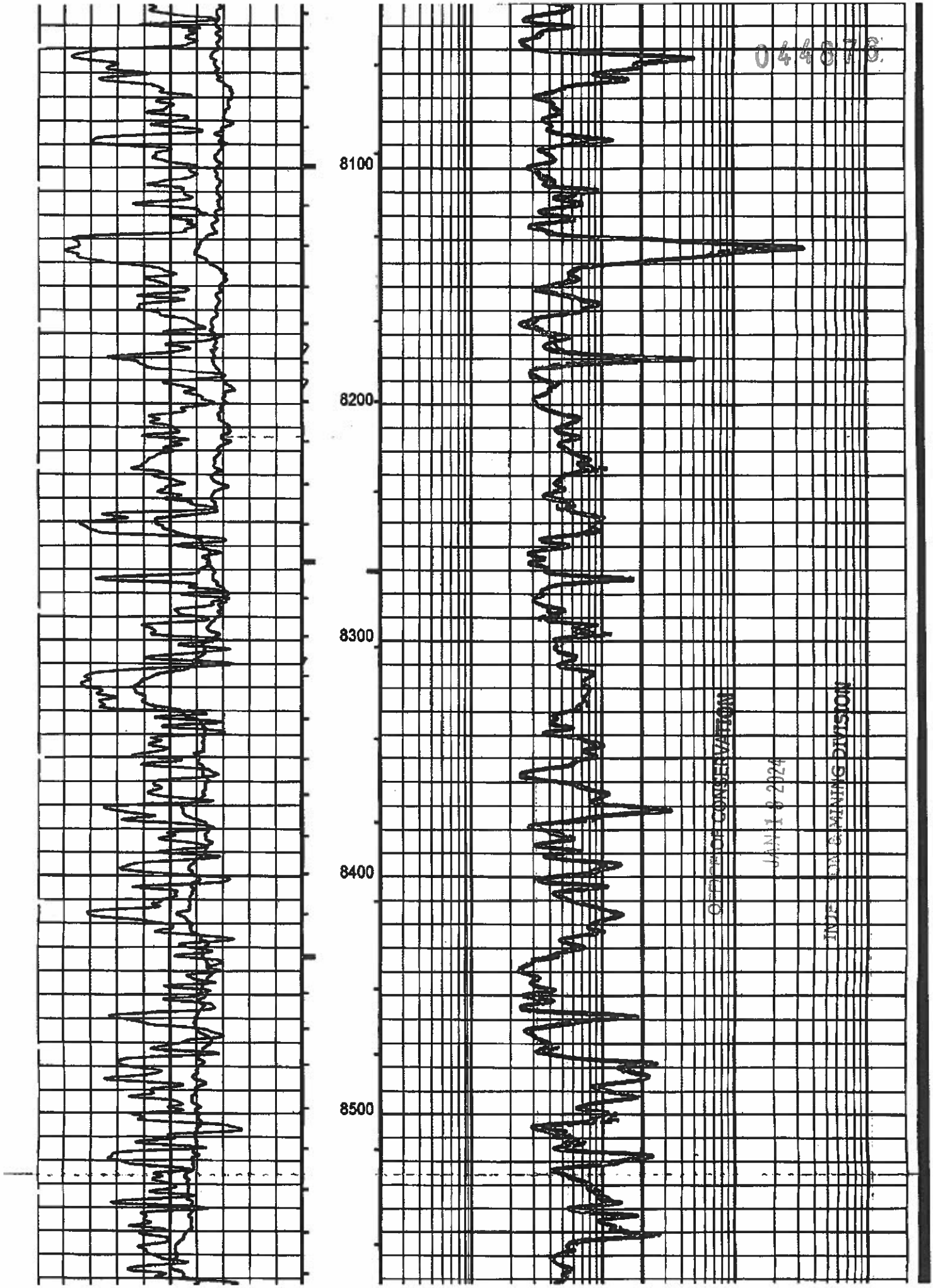

5400
5500
5600
5700
5800
Base of Conv. Core & Top of Bexar Shale 5,724'
S2O SWD 1 Plug Back Depth 5,750'
S2O SWD 1 Plan TD 5,800'
RECEIVED
JAN 18 2021
RAILROAD COMMISSION
INJECTION & MINING DIVISION

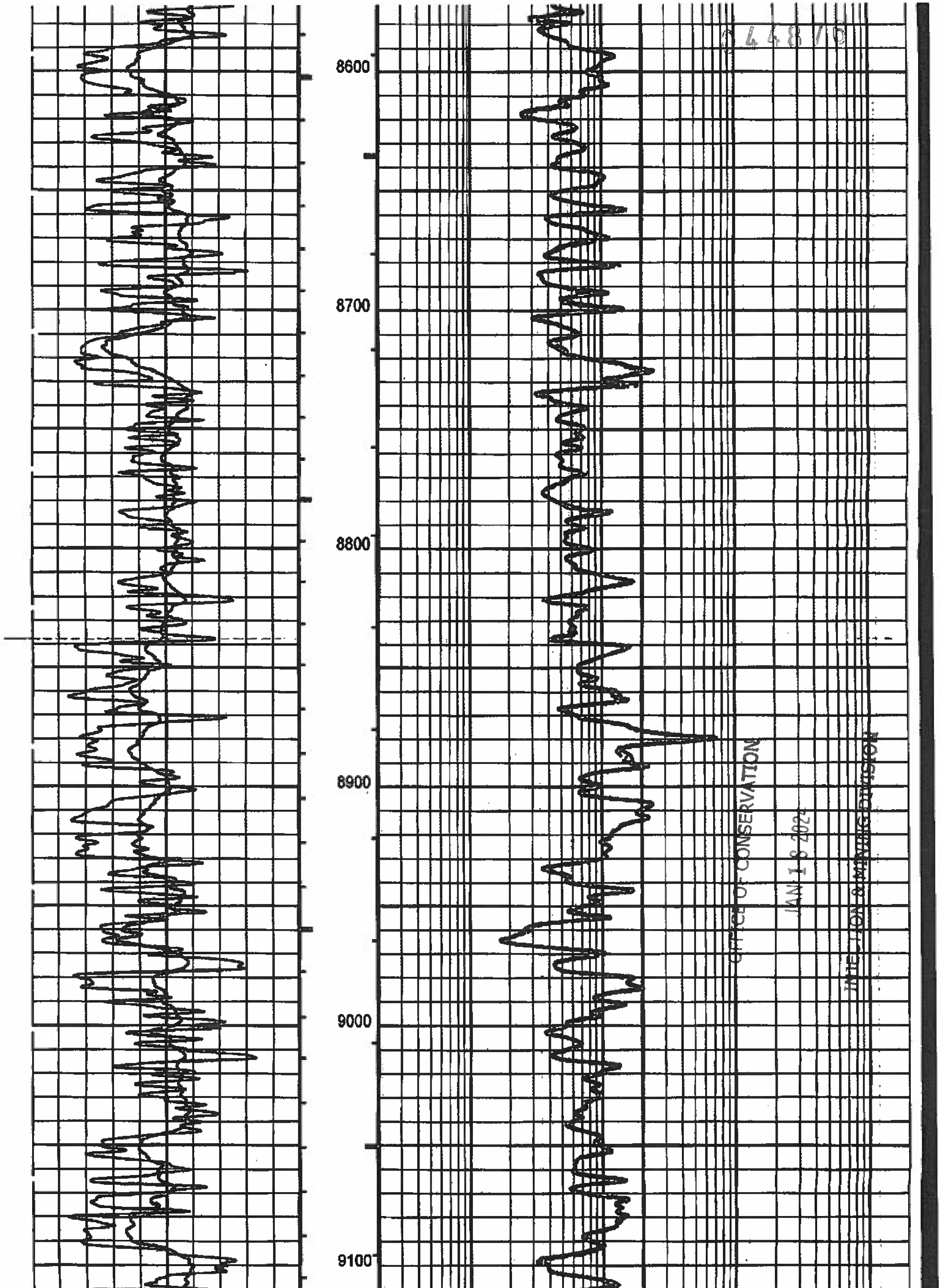

Top of James Lime 5,900'
5900
6000
6100
6200
6300
6400
045076
OFFICE OF CONSERVATION
JAN 16 2024
INJECTION & MINING DIVISION

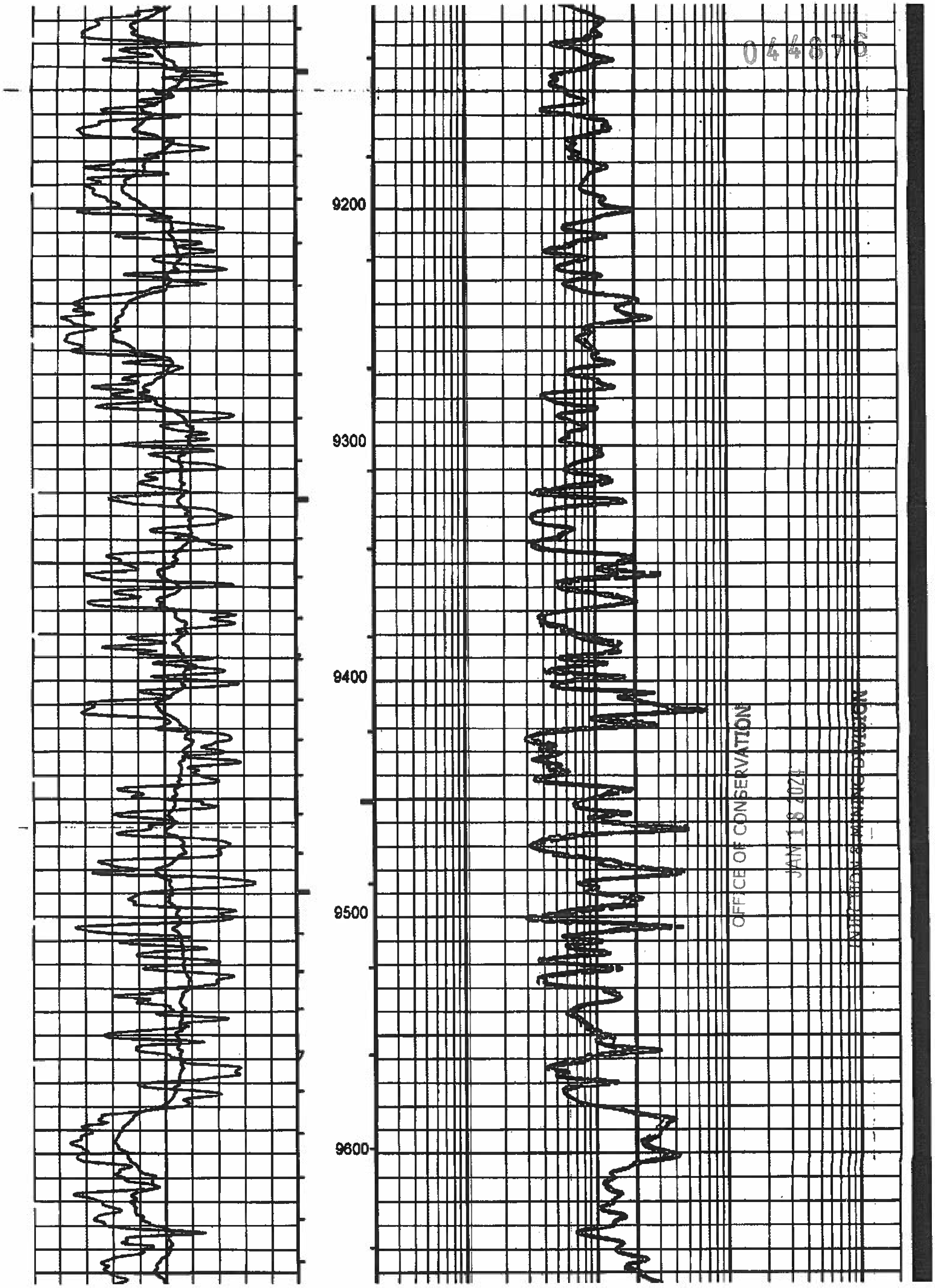

044876
6500
6600
6700
6800
6900
OFFICE OF CONSERVATION
JAN 18 2024
INJECTION & MINING DIVISION

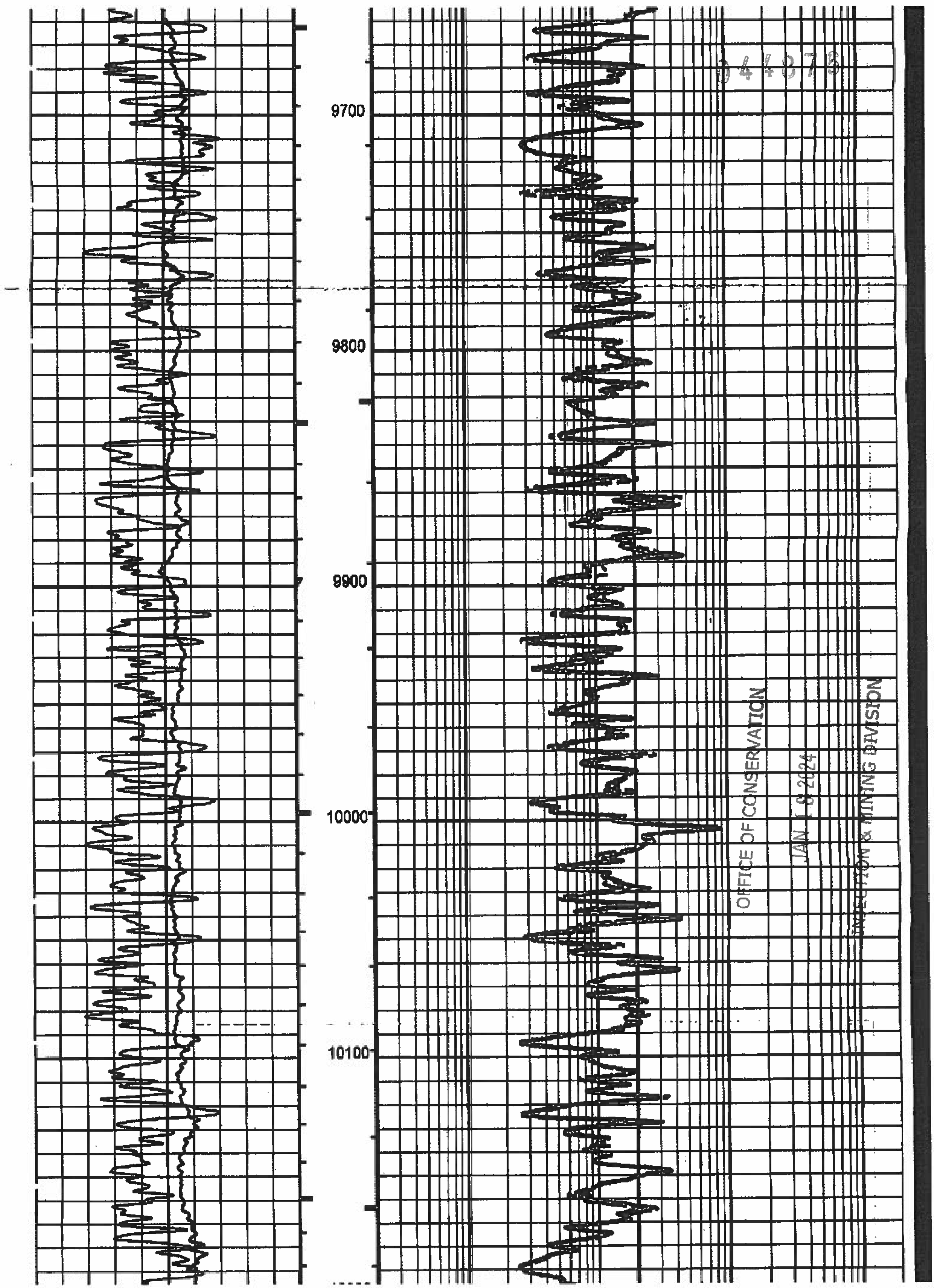

7000
7100
7200
7300
7400
044878
OIL & GAS CONSERVATION
JAN 16 2021
INJECTION & MINING DIVISION

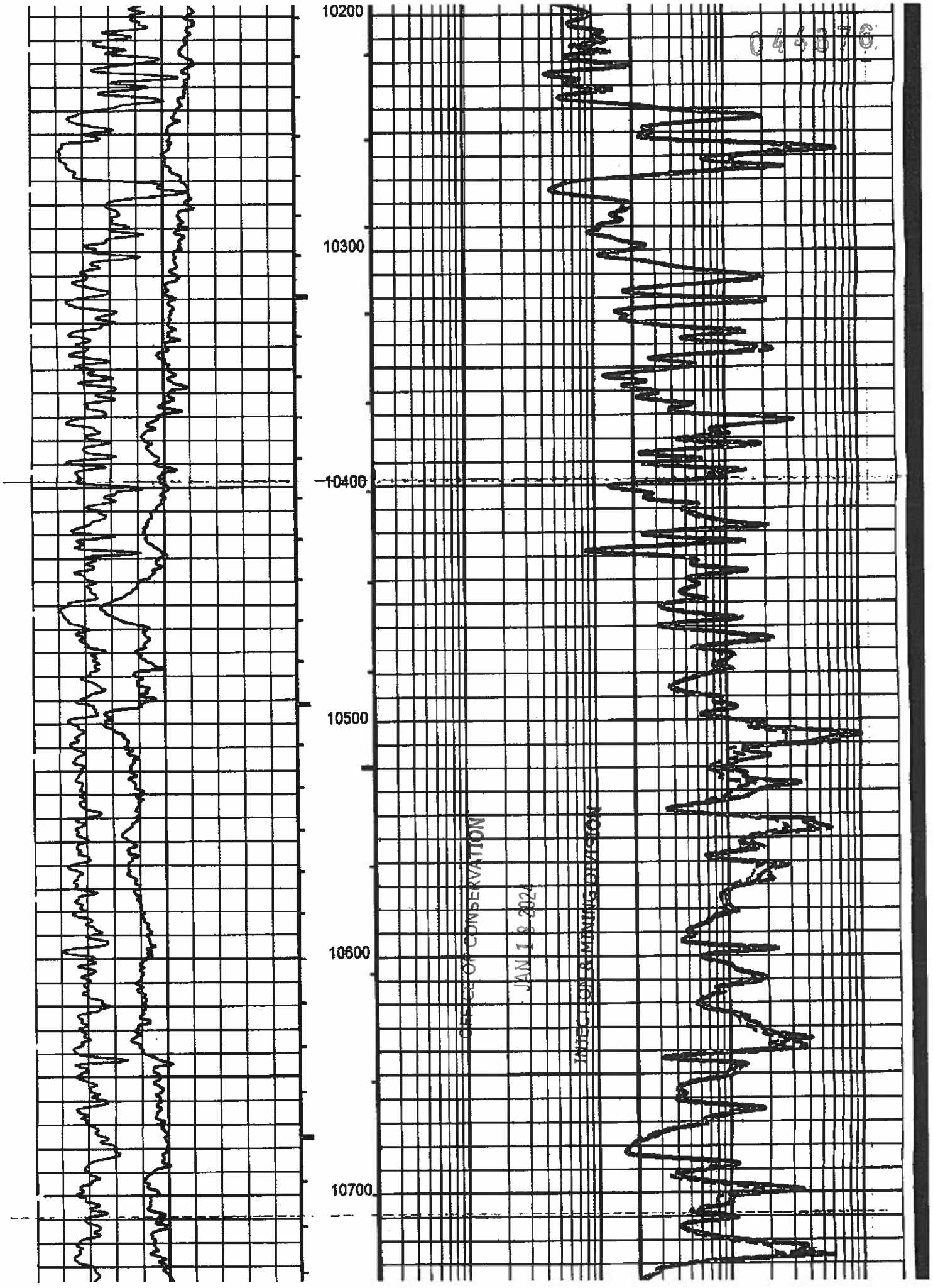

44876
7500
7600
7700
7800
7900
8000
OFFICE OF CONSERVATION
JAN 1 8 2024
INJECTION & MINING DIVISION

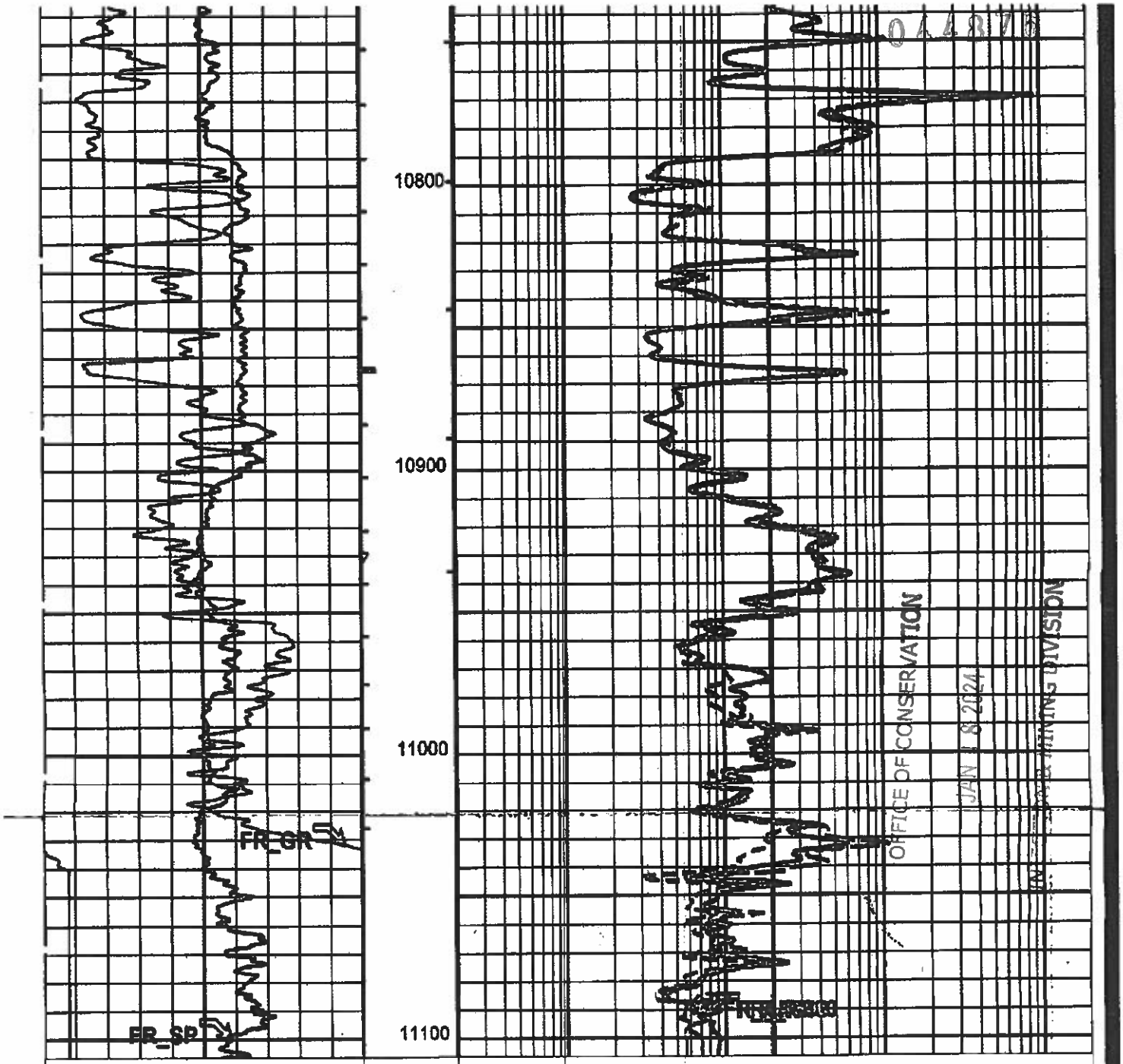

8100
8200
8300
8400
8500
044836
OFFICE OF CONSERVATION
JAN 18 2024
OIL & MINING DIVISION




9200
9300
9400
9500
9600
OFFICE OF CONSERVATION
JAN 18 2024




10200
10300
10400
10500
10600
10700
044076
OIL CONSERVATION DIVISION
JAN 18 2024
RECEIVED



PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

AITM Answer Product Processing Summary. Data taken with sonde # 1384

***** Bhole Correction *****

Effective Tool Standoff computed. Borehole diameter and mud res. taken as input (see GCSE and GRSE parameters)

Tool is run in ECCENTERED mode with a tool stand-off of 1.00 IN. Bit size is 8.88 IN.

044876

***** Input Selections to AITM Answer Product processing *****

Caliper (GCSE): HCAL Mud Resistivity (GRSE): AMF Temperature (GTSE): HTEM Porosity (FPHI): DPHZ

***** Other parameters used by AITM Answer Product processing *****

Form Factor Exponent (FEXP)	2.000	Form Factor Numerator (FNUM)	1.000
Mud Filtrate Sample Resistivity (RMFS)	0.799 OHMM	Mud Filtrate Sample Temperature (MFST)	65.000 DEGF
Resitivity Connate Water (RW)	1.000 OHMM		

***** AITM Answer Product processing control parameters *****

Playback Mode: RECOMPUTE

(AEBC): Yes (AEBL): Yes (AERP): Yes

(ABHM): 2_ComputeStandoff (ABLM): 6_One_Two_and_Four (ARPM): 6_One_Two_and_Four

Format: AIT_2in Vertical Scale: 2" per 100' Graphics File Created: 03-Dec-2009 17:16

OP System Version: 17C0-154

AIT-M	17C0-154	DSLT-FTB	17C0-154
PPC1-B	17C0-154	HILTH-FTB	17C0-154
DTC-H	17C0-154		

Input DLIS Files

DEFAULT	AIT_SONIC_CAL_TLD_013LUP	FN:12	PRODUCER	03-Dec-2009 17:19	11100.0 FT	2202.0 FT

Output DLIS Files

DEFAULT	AIT_SONIC_CAL_TLD_034PUP	FN:31	PRODUCER	03-Dec-2009 17:15

February 23, 2024

Brad Hunsucker
Southern Disposal Solutions, LLC
bhunsucker@sdspetroleumconsultants.com

OFFICE OF CONSERVATION

STATE OF LOUISIANA
Christopher B. Hart
REG No. 27197
REGISTERED PROFESSIONAL ENGINEER IN PETROLEUM ENGINEERING

Christopher B. Hart
2/26/2024

MAR 01 2024

INJECTION & MINING DIVISION

RE: **P&A Turnkey Estimate**
S20 SWD #1
SN/API: NA
DeSoto, LA

Dear Brad Hunsucker,

Production Services, Inc. is happy to submit the following Estimate for the above-mentioned well. We will provide all P&A services according to the procedure on the **P&A Procedure** attached. This estimate procedure, to the best of our knowledge, will comply with all rules and regulations concerning P&A for the **State of Louisiana Department of Natural Resources**. ***However, if any changes are made by the regulatory agencies or the operator, the estimate will be adjusted accordingly.***

Following is a list of ***estimated*** pricing scenarios, assumptions, and procedural changes:

1. Operator retaining all Equipment and Tubulars: **$40,000.00**
   a) **Rig, crew, and P&A equipment $29,574.00**
   b) **Cement.....$2,050.00**
   c) **9.0# WBM.....$5,750.00**
   d) **Wireline.....$2,626.00**
2. Contractor will pay Operator for Equipment and Tubulars:
   a) **4-1/2", 11.6#, L-80, IPC tubing $2.00/ft**
3. There is no clean up or remediation considered in this estimate other than general cleanup around wellhead area.
4. There is no additional salvage equipment other than listed above. Other equipment will be considered upon inspection.
5. Operator is responsible for disposal of all fluids circulated out of well.
6. Operator will be responsible for providing ingress and egress and costs associated therewith, including but not limited to, any bonds to be posted for bridge crossings, county/parish road permits, and landowner expenses.
7. If required, a 2-3/8" workstring can be provided at a cost of $0.10/ft/day with a 3-day minimum. There is also a $20/jt cleaning, inspection, and restocking fee plus any applicable freight charges**(Estimated: $6,000.00 additional)**.

The above is only an estimate. Once we receive a state regulatory agency approved plug and abandon procedure, we will be happy to update this estimate accordingly and provide a formal Bid Letter and Agreement for your consideration. If you have any questions or changes, please feel free to call or email. We appreciate the opportunity to provide this estimate with hopes of working together in the future.

Sincerely,

Tommy McWilliams

Response to 2/22/24 NOD

P&A Procedure

S20 SWD #1
Southern Disposal Solutions, LLC
DeSoto, LA

1. Road Rig and P&A equipment to well site. Rig up on well, stage equipment. Bleed any pressure from tubing and production casing.
2. Nipple down tree and nipple up BOP's (5k x 7-1/16" dual BOP w/blind and 2-3/8" or 2-7/8" pipe rams).
3. Release the tubing packer and POOH w/packer and 4.5" tubing.
4. Rig up Wireline Unit. Run gauge ring/junk basket to ≈ 5,265'. POOH w/gauge ring/junk basket. RIH w/ 7" CIBP and set ≈ 5,260'. POOH w/setting tool. TIH w/dump bailer and dump bail 10' of cement on top of CIBP (2 sacks, 15.6 #, class H)
5. Trip in hole with work string to ≈ 5,250'. Circulate well with 9.0# WBM.
6. Test plug at 300 psi for 30 minutes with no loss of pressure.
7. POOH with work string to 1,050'. Set balanced cement plug from 1,050'-950' in 7" (10 sacks, 15.6#, class H).
8. POOH with work string to 570'. Set balanced cement plug from 765'-515' in 7" casing (25 sacks, 15.6#, class H)
9. POOH with work string.
10. Nipple down BOP's.
11. Rig down
12. Dig out wellhead. Cut wellhead off 5' below ground level. Pump cement from 55'-5' in 7" casing with 1" poly pipe (5 sacks, 15.6#, class H).
13. Weld ½" steel plate across all casings with date and serial; number on top.
14. Backfill hole.
15. Load up P&A equipment.
16. Move off of location.

1160 Highway 79 South • PO Box 1885 • Magnolia, AR 71754-1885 • Office: (870) 234-0500 • Fax: (870) 234-6145

Response to 2/22/24 NOD

Drilling Outline

Well Name: SZO SWD #1
AFE No.:
Permit No.:
API No.:
Objective: P&A Wellbore
FW Depth: 715
Elevation: 330

Southern Dispoal Solutions, LLC

Area: Desoto Parish, LA
Survey:
Field:
Rig: Reliance
GL: 330
KB 345

Surface Loc.
BH Loc.

Directions:

Sands / Markers	Depths From KB MD	Depths From KB TVD	CASING PROFILE	BPV / Hole Size	Casing Details	Mud Wt. Type	Pore Pressure	Cement Details	Directional	Formation Eval. Open Hole Logging / Coring	Drilling Remarks/Problems
	± 90'	± 90'			16" Casing Preset @ ±90'			50' Cement (5 - 55')			
				12-1/4"		Water		15.6 ppg, Class H			
Water Board Letter Depth	715	715						250' Cement (515' - 765') 15.6 ppg, Class H	Inclination Surveys Every 200'		deviation is an issue in the area
Surface Csg Pt	1,000	1,000		12-1/4"	9-5/8" 36# K-55, BTC	8.4 - 8.8 ppg FW Spud Mud		100' Cement (950' - 1050')	DLS < 1°/100' Maximum Dev. of 3°		gumbo can be an issue in the area
				8-3/4"				15.6 ppg, Class H			
Taylor	1,250	1,250				9			DLS < 1°/100' Maximum Dev. of 3°	Mud Logger on at 2500'	deviation can be an issue possible straight hole motor to help ROP and with deviation
									Possible straight hole motor		
Base of Austin Chalk	2,932	2,932				9.6					
Glenrose	3,455	3,455				9.7				Conventional hole core 3271' - 3355'	some tight hole on trips and connections
Hosston	4,430	4,430				9.7					
Ferry Lake Anhydrite	5,000	5,000				9.8					KEEP MW AS LOW AS POSSIBLE THROUGHOUT
					CIBP @ 5260'			10' Cement (5250' - 5260') 15.6 ppg, Class H			
Rodessa	5,310	5,310			Proposed Rodessa perfs @ 5360' - 5375'	9.8 - 9.9				Conventional hole core 5310' - 5724'	
					5430' - 5490'					Triple Combo from TD to inside surface casing	
Bexar Shale	5,724	5,724				9.9					
PBTD	5,750	5,750			7" 26.0# L-80						
TD	5,800	5,800		8-3/4"		10					

NOT TO SCALE

Date: 10/19/2023
Revised Date: 2/23/2024

STATE OF LOUISIANA
Christopher B. Hart
REG No. 27197
REGISTERED PROFESSIONAL ENGINEER IN PETROLEUM ENGINEERING

Christopher B. Hart
2/26/2024

Response to 2/22/24 NOD

RESPONSE TO IT QUESTIONS

A. Have the potential and real adverse environmental effects of the proposed well been avoided to the maximum extent possible?

Yes, the potential and real adverse environmental effects of the proposed Class V well have been avoided to the maximum extent possible. All reasonable mitigation measures have been taken and the well will comply with applicable federal and state environmental statutes, rules, and regulations to avoid adverse environmental effects. At a minimum, the proposed well will utilize the following planning, design, and control procedures to avoid adverse environmental effects:

- The drilling rig will be equipped with blow out preventors (BOPs) to prevent uncontrolled flow from the well during drilling operations.
- All casing strings will be cemented from the casing shoe to the surface.
- All casing strings will have a bond log run to ensure good cement bond is achieved.
- All casing strings will have a positive pressure test done in the presence of a Louisiana Department of Energy and Natural Resources LDENR inspector.
- Surface casing will be set approximately 285' below the bottom of the deepest USDW.
- No injection shall occur until after the Class V well is converted into a Class II commercial SWD well via the LDENR application and permitting process.
- During drilling operations, a formation integrity test will be done on all casing shoes.
- The drilling rig will conduct daily safety meetings to review possible issues.

1. What are the potential environmental impacts of the permittee's proposed well?

A review of relevant information indicates the potential environmental impacts of this type of well would be to surface and/or groundwater and soil through accidental spills or uncontained flow from the well during drilling and completion operations or migration of subsurface fluids due to a bad primary cement job on one or both strings of casing. By implementing, at a minimum, procedures discussed above, the likelihood or risk potential of these types of releases is minimized.

a. What wastes will be handled?

The purpose of this well is to determine the suitability of the site for potential construction of a commercial SWD facility. As such, no waste will be handled by this well unless the operator deems the site favorable, and a Class II commercial SWD and facility permit is applied for and issued by the LDENR.

i. Classes of chemicals

United States Department of Transportation (DOT) classification is not applicable to the types of exploration and production (E&P) waste that will be produced while drilling this well. All produced waste will be non-hazardous.

ii. Quantities (hazardous and non-hazardous)

No hazardous waste will be produced in the drilling of this well. The exact amount of non-hazardous waste that will be produced is not known since the exact amount of drilling fluid and rock cuttings varies from well to well; however, they should not be more than a few hundred barrels due to the relatively shallow depth of the well.

iii. Physical and chemical characteristics

The physical and chemical characteristics of the E&P wastes that could be produced at this well site are:

- Mud Weight ~ 8.4 – 10 pounds per gallons (ppg)
- Boiling Point ~100°C
- Freezing Point ~0°C
- Yield Point >10
- pH ~ 7-9.5

iv. Hazardous waste classification (listed, characteristic, etc.)

As defined in LAC 43:XIX.501, E&P waste is exempt from the Louisiana Hazardous Waste Regulations and Federal Resource Conservation and Recovery Act and is, therefore, not a hazardous waste.

b. How will they be handled?

i. Treatment

Treatment of E&P waste will not occur at this well site.

ii. Storage

No storage of E&P waste will occur at this well until such time as a Class II commercial SWD and facility permit is applied for and approved by the LDENR.

iii. Disposal

No injection tests or disposal of E&P waste will occur at this well until such time as a Class II commercial SWD and facility permit is applied for and approved by the LDENR. All generated waste from the drilling operations will be recycled or disposed of off-site in accordance with LAC 43:XIX Chapter 5.

c. Sources of waste

i. On-site generation (type and percentage of total handled)

The only type of waste generated by the drilling of the well will be normal E&P waste (drilling and completions fluids).

ii. Off-site generation (type and percentage of total handled)

No waste associated with the drilling of S2O SWD 1 will be generated off-site.

d. Where will the wastes be shipped if not handled at this site?

It is anticipated wastes generated but not handled on-site will be recycled or disposed either as non-hazardous waste at a permitted landfill or at a permitted E&P waste facility in accordance with applicable rules and regulations.

e. What wastes will remain on-site permanently?

No waste will remain on-site permanently.

2. **Which of the following potential pathways could release hazardous materials from the proposed well endangering local residents or other living organisms?**

a. Air

Based on the knowledge and estimated quantity of potential emissions from the drilling rig, air should not be considered a potential pathway for the release of hazardous materials from the proposed well that could endanger local residents or other living organisms.

b. Water

A review of relevant information indicates water may be considered a potential pathway that could endanger nearby residents or other living organisms. However, any accidental release of drilling fluids should not be in sufficient quantities to reach freshwater drainage features, and any poor cement bonds on either casing string will be identified after running the casing bond logs and then remedied with a cement squeeze before drilling resumes, thereby protecting the nearest USDW. Furthermore, the drilling rig will be equipped with BOPs to prevent any uncontrolled flow from the well during drilling and completion operations.

c. Soil

A review of relevant information indicates soil may be considered a potential pathway that could endanger nearby residents or other living organisms. The drilling and completion fluids will be stored either in tanks or an earthen pit constructed and operated in accordance with the regulations in LAC 43:XIX Chapter 3. In addition, the rig will be equipped with BOPs to ensure that no uncontrolled flow from the well occurs during drilling and completion operations.

d. Food

It is not anticipated food is a potential pathway for release of hazardous materials that could endanger local residents or other living organisms.

3. **What is the likelihood or risk potential of such releases?**

The likelihood/risk potential of a release to the water or soil is minimal since numerous safeguards, policies and procedures will be implemented to minimize the potential for occurrence and the possible impact is small since the waste is non-hazardous.

4. What are the real adverse environmental impacts of the permittee's proposed facility?

a. Short-term effects

i. Land area taken out of system.

- Natural features, such as drainage ways, do not exist on the portion of the property used to drill the well or construct any future facility.
- The land to be developed already has a well pad built and is not part of the natural ecosystem.

b. Long-term effects

Long-term effects of this well are not expected since after drilling and completion the well will be permanently abandoned in accordance with the applicable regulations unless a Class II commercial SWD permit is applied for and received.

B. Does a cost benefit analysis of the environmental impact costs balanced against the social and economic benefits of the proposed well demonstrate that the latter outweighs the former?

Yes, the cost benefit analysis indicates: 1) if the proposed stratigraphic test well provides adequate scientific data indicating the subsurface in this area is geologically conducive to deep well injection, then the well will be converted to a commercial saltwater disposal well through the appropriate LDENR permitting process and will provide an environmentally acceptable disposal option needed in this area; 2) the environmental impacts of the proposed well will be avoided or mitigated; and 3) the minimal disruption to the environment is outweighed by the benefits this well will provide.

1. How was it determined that this facility was needed?

a. Local or regional survey

A facility will not be constructed as part of this Class V stratigraphic test well drilling and completion. However, if this stratigraphic test well provides adequate scientific data indicating the subsurface in this area is geologically conducive to deep well injection, then the well will be converted to a commercial saltwater disposal well and facility through the appropriate LDENR permitting process. The need for the proposed commercial facility was determined by researching available LDENR information and discussing the need for a commercial E&P waste facility with oil and gas operators in the area.

i. On-site or off-site needs

One reason this location was selected for the well was because on-site needs are minimal. For example, utility access is nearby and a well pad has already been constructed on part of the property.

ii. Regional solid waste management benefit

In and of itself the well will have no effect on regional solid waste management unless it is eventually converted to a Class II commercial SWD well through the appropriate LDENR permitting process.

iii. Generic survey of solid waste needs (compatibility with master plan)

Through discussions with several oil and gas producers in the area, Southern Disposal Solutions, LLC determined there was a significant need for a commercial E&P waste facility located closer to the operators' well sites. The drilling of this Class V stat test is the first step in evaluating the subsurface for suitability of commercial E&P waste disposal at the site.

2. What will be the positive economic effects on the local community?

a. How many permanent jobs will be created?

This Class V well, in and of itself, will create no permanent jobs.

b. What is the expected annual payroll?

Not applicable.

c. What is the expected economic multiplier from item B2?

Not applicable.

d. What is the expected tax base and who will receive benefits?

Not applicable.

3. What will be the potential negative economic effects on the local community?

a. What are the possible effects on property values?

Overall, property values are not expected to be impacted positively or negatively. This was determined by discussing the potential effects with knowledgeable real estate agents, including one who sells property in and around Desoto Parish. More specifically, it was suggested no positive or negative effect is expected since people will likely not move to or from the area because of the well.

b. Will public costs rise for:

i. Police protection

To mitigate the needs of police protection, limited access to the well site will be ensured and private security will be used, if needed, rather than police resources.

ii. Fire protection

To mitigate the needs of fire protection, equipment will be provided at the well site to respond in case of an emergency, such as fire extinguishers and spill kits. Therefore, it is not anticipated public costs for fire protection will increase because of this well.

iii. Medical facilities

Public costs for medical facilities should not increase or be affected by the proposed well. The closest hospital, DeSoto Regional Health System, is located approximately 16 miles northwest of the proposed well site at 207 Jefferson St, Mansfield, LA 71052 and is not located on the expected trucking routes for drilling materials. Although other medical facilities such as clinics and doctors' offices may exist along the anticipated truck routes, additional public cost for and impact to these facilities because of the proposed well are not anticipated, primarily since the majority of the anticipated traffic patterns currently exist.

iv. Schools

The well site is not located near a school and the 5 closest schools identified along the possible traffic routes are either on the perimeter of those routes or setback from the road. Additionally, the majority of the anticipated traffic patterns currently exist, therefore, it is not anticipated public costs for schools will increase as a result of this well or the anticipated traffic routes.

v. Roads (also see below)

It is not anticipated public costs for roads will increase because of this well. The drilling and completion process should take only a small pad extension and two rig moves (in and out). The rest of the necessary trucking should not have many loads that would require overweight permits, therefore, excessive wear or tear to the roads is not anticipated.

c. Does the prospective site have the potential for precluding economic development of the area by business or industry because of risk associated with establishing such operations adjacent to the proposed well?

It is not anticipated that the prospective site will preclude economic development of the area by business or industry due to risk associated with establishing adjacent to the proposed well.

4. Was transportation a factor in choosing the proposed site?

Yes, access to transportation was a factor in choosing the proposed site. The site is located near the intersection of a federal highway and a state highway that will allow for safer and more efficient transportation of materials and the drilling rig.

a. What mode(s) of transportation will be used for the site?

i. Truck

Trucks will be the sole mode of transportation for this well site.

ii. Rail

Rail will not be a mode of transportation for this site.

iii. Barge

Barge will not be a mode of transportation for this site.

iv. Other

No other mode of transportation is anticipated at this site.

b. What geographical area will it serve?

The proposed well will not serve as an injection well unless a Class II commercial SWD permit is submitted and approved by the LDENR.

c. By how much will local road traffic volume increase?

Any local road traffic increase will be temporary as drilling and completion activities (which are responsible for most of the traffic) are expected to take only 2-3 weeks. The exact increase is not known but expected to be around 10-20% of the overall traffic counts in the area.

i. Can local roads handle the traffic volume expected?

Yes, the local roads can handle the traffic volume expected. The traffic counts on HWY 512 near the proposed site in 2022 were 224 vehicles per day (VPD) compared to 820 VPD in 2011. This demonstrates that the local roads have historically been able to adequately handle much larger volumes of daily traffic than they currently do.

ii. Can local roads handle the weight of trucks?

The chosen site is only a few miles from US 171, which is a major trucking route and there are no posted bridges or other restrictions on LA HWY 512 other than normal weight permitting requirements, which will be adhered to.

d. What are the long-term expectations of the proposed site?

i. Longevity of the well

It is anticipated the life of the well will be 15-20 years unless it is immediately plugged and abandoned (P&A) due to test data showing the subsurface zones are inadequate for use as future disposal intervals.

ii. Who owns the well?

Southern Disposal Solutions, LLC will own and operate the well.

iii. Are the owners financially backed by others?

The owners of Southern Disposal Solutions are not financially backed by others.

iv. When is closure anticipated?

Closure is anticipated 15-20 years after the well is drilled but could be after only a few months if the scientific data show the subsurface intervals are inadequate for use as future disposal intervals.

v. Who is responsible for the site after closure?

Southern Disposal Solutions, LLC will be responsible for the site after closure.

vi. What assurances will there be that the site will be closed in accordance with the plan?

To ensure the well will be P&A in accordance with the LDENR-approved P&A plan, financial assurance as required by LAC 43:XIX.513 and 567, either in the form of a bond or irrevocable letter of credit, will be:

- In place prior to commencement of drilling;
- Reviewed, updated and submitted annually to LDENR; and,
- Maintained throughout the life of the well.

vii. What financial assurances will be established to demonstrate the ability to handle problems after closure?

Post closure financial assurance and/or monitoring is not required for this well. Although problems are not anticipated, any problems encountered would be addressed during P&A operations.

viii. Who certifies that the site is properly closed?

LDENR will certify the well is properly P&Ad.

ix. How are people protected from unwittingly buying land after closure?

(a) Is the closed well site recorded in the deed?

The well P&A will be recorded in the records of LDENR and be available to the public.

(b) What future uses are possible?

Given the property is in a rural area on a state highway, after closure, the property could be used as deemed necessary by the economy, such as commercial or industrial.

C. Are there alternative projects, which would offer more protection to the environment than the proposed well without unduly curtailing nonenvironmental benefits?

The stratigraphic test well being permitted under this Class V application will allow for the scientific testing of the subsurface formations to determine if they are geologically conducive to deep well injection at this site. If the subsurface formations are proven to be good intervals for injection, then the Class V well will be converted to a Class II commercial SWD well via the LDENR permitting process. There are no alternative projects which would offer more protection to the environment than the

proposed well without unduly curtailing non-environmental benefits. The proposed well is strategically located in an area that provides minimal exposure to the environment and the public while providing for the potential to be converted, via the applicable regulatory process, to a cost-effective means of E&P waste disposal via deep well injection.

1. Why was this technology chosen (e.g., incineration over landfilling?)

The stratigraphic test well being permitted under this Class V application will allow for the scientific testing of the subsurface formations to determine if they are geologically conducive to deep well injection at this site. Based on common industry information, Southern Disposal Solutions, LLC experiences, and EPA's document EPA 816-H-10-001 available at: http://www.dnr.louisiana.gov/assets/OC/im_div/uic_sec/EPAposterofwells.pdf, deep well injection is being considered for this site since it is protective of the environment and the most cost-effective means of disposal of produced saltwater and other E&P waste.

a. Are other technologies available?

Other technologies are available, such as landfilling, land treatment, water treatment and incineration; however, these technologies are not typically used for the types of E&P waste proposed.

b. Describe the engineering design and operating techniques used to compensate for any site deficiencies.

No site deficiencies have been identified.

2. Is the proposed technology an improvement over that presently available?

The stratigraphic test well being permitted under this Class V application will allow for the scientific testing of the subsurface formations to determine if they are geologically conducive to deep well injection at this site. The proposed technology of deep well injection offers improvements over other presently available technologies in that: 1) casing is designed to allow for increased volumes of fluid with less injection pressure at the surface; 2) improved separation and increased retention time at the surface allows "cleaner" saltwater to be injected; 3) monitoring of the types of fluids accepted is on-going; and 4) surface contamination is prevented since the waste is injected deep underground.

3. Describe the reliability of the technology chosen.

Deep well injection is a commonly used means to dispose of fluids associated with the drilling and production of oil and gas wells. As long as injection wells are installed and operated within the bounds of their permit, few to no environmental issues should arise. Through the evaluation of current and historical injection well operations, the technology of deep well injection proves to be a reliable and cost-effective means of disposal with limited negative environmental concerns.

a. Past experiences

Past experiences by the owners of Southern Disposal Solutions, LLC in operating commercial saltwater disposal wells indicates deep well injection, properly monitored, has proven to be an environmentally protective, cost-effective, reliable means of disposal of produced fluids generated from oil and gas operations.

b. Environmental Impacts

A review of on-line information, including National Response Center and Louisiana Department of Environmental Quality (LDEQ) records, indicate environmental impacts related to injection disposal facilities are minimal since they are typically identified and remediated promptly.

4. Describe the sequence of technology used from arrival of waste to the end process at the facility (flow chart).

a. Analysis of waste

Not applicable.

b. Unloading

Not applicable.

c. Storage

Not applicable.

d. Treatment

Not applicable.

e. Monitoring

Not applicable.

f. Closure

P&A of the well will be conducted in accordance with the LDENR-approved P&A plan.

g. Post-closure

Post-closure activities are not required for this type of well.

h. Disposal

Not applicable.

i. Any residuals requiring further handling

Not applicable.

5. Will this well replace an outmoded/worse polluting one?

No, this well will not replace an outmoded/worse polluting one.

6. What consumer products are generating the waste to be disposed? Are there alternative products that would entail less hazardous waste generation?

Not applicable.

D. Are there alternative sites that would offer more protection to the environment than the proposed well site without unduly curtailing nonenvironmental benefits?

Based on this site's characteristics, there are no alternative sites that would offer more protection to the environment than the proposed well without unduly curtailing nonenvironmental benefits. Denial of this permit based on the site location would prevent the project from being completed.

1. Why was this site chosen?

a. Specific advantages of the site.

This site was selected for reasons, such as:

1) Proximity to abundant oil and gas activities
2) Proximity to state and federal highways

3) Acceptable traffic routes
4) The proposed injection formation(s) is/are not productive in the area
5) The subsurface geology is consistent without any faulting within an approximately 2 mile radius
6) Conformance with siting criteria
7) Rural setting near active oil and gas locations
8) Not located in an environmentally sensitive area
9) Not located in a hurricane prone area

b. Were other sites considered and rejected?

Five (5) other sites were considered and rejected before purchase of the subject property. Four (4) of the sites were rejected based on geology, availability, access and/or siting criteria.

c. Is the location of the site irrevocable; i.e., would denial of permit based on site preclude the project?

The location of the site is irrevocable; denial of the permit would preclude the project.

2. Is the chosen site in or near environmentally sensitive areas?

a. Wetlands

The chosen site is not in a wetland. Anticipated traffic routes may travel near wetlands; however, this traffic should cause no additional effect to the wetlands since the roads are in place and similar traffic patterns already exist. Furthermore, LDENR siting criteria have been met.

b. Estuaries

The chosen site and anticipated traffic routes are not in or near an estuary. Furthermore, LDENR siting criteria have been met.

c. Critical habitat

A query of Critical Habitat for Threatened & Endangered Species was conducted on the United States Fish & Wildlife Service website (link below) Results of the query indicate neither the site nor the anticipated traffic routes are in or near critical habitat. Furthermore, LDENR siting criteria have been met.

https://fws.maps.arcgis.com/apps/mapviewer/index.html

d. Historic or culturally significant area

The following queries were conducted to identify if historic or culturally significant areas exist near the proposed site or along the anticipated traffic routes:

1. National Register Listings were reviewed on the Louisiana Department of Culture, Recreation & Tourism website at the following link:

https://laocd.maps.arcgis.com/apps/webappviewer/index.html?id=99f5fe696cef4121904ee7841f9df862

2. State parks, state preservation areas, state historic sites and wildlife management areas were reviewed on the Louisiana Department of Culture, Recreation & Tourism website and the Louisiana Department of Wildlife & Fisheries website at these links:

https://www.lastateparks.com/

http://www.wlf.louisiana.gov/wma

3. National parks were reviewed on the National Park Service website at the following link:

https://www.nps.gov/state/la/index.htm

4. Tourist attractions and facilities were reviewed on the Desoto Parish Tourist Commission website and the Louisiana Department of Culture, Recreation & Tourism website at the following links:

https://www.discoverdesoto.com/

http://www.louisianatravel.com

5. Churches were reviewed on Google Maps.

6. Cemeteries were reviewed on the following website and on USGS topographic maps: http://la-cemeteries.com/

Results of the queries indicate the proposed site is not located in or near a historic or culturally significant area. The anticipated traffic routes include 9 National Register listings (shown below).

Site Name	Site Location	Classification
Kansas City Southern Depot	Polk Street near Cosby, Mansfield LA	DELISTED
Main Post Office	104 Jefferson Street, Mansfield LA	Private Residence
DeSoto Parish Courthouse	Corner of Adams and Texas, Mansfield LA	Public Building
Caddo Parish Confederate Monument	23271 LA Hwy. 175, Pelican LA	Monument
Mansfield Battle Park	15149 LA Hwy. 175, Mansfield LA	Battle Site
Stribling House	U.S. Hwy. 84, Mansfield LA	Antebellum Home
Guy House	LA Hwy. 513, Mansfield	Antebellum Home
Williams House	407 Texas, Mansfield LA	Antebellum Home
Mundy-McFarland House	200 Welsh Street, Mansfield LA	Antebellum Home

The National Register listings, antebellum homes, Wildlife Management Areas, churches, and cemeteries reviewed can generally be categorized as follows: a) Located along a main thoroughfare and, therefore, subject to current traffic patterns which are not expected to change significantly. b) Located in a remote area and, therefore, subject to minimal truck traffic related to the proposed facility which is already occurring. c) located away from the roadway and, therefore, not subject to traffic.

The one exception to this is St. Peter Baptist Church, located approximately 1,000' east of the proposed facility on LA Hwy. 512. Due to its proximity, approximately half the well traffic will pass by the church. The 2022 traffic counts for St Peters were 9 vehicles per hour. To put that in perspective, the 2011 traffic counts for the church were 34 vehicles per hour. According to the church's Facebook page, the congregation meets weekly for 1 hour on Thursday and 3 hours on Sunday. It is not anticipated that the increase in traffic will affect the congregation's ability to maintain their normal worship schedule. Furthermore, LDENR siting criteria have been met.

i. Indian mounds

The chosen site is not in or near Indian mounds and no known Indian mounds are located along the anticipated routes. Furthermore, LDENR siting criteria have been met.

ii. Antebellum houses

The chosen site is not near antebellum homes and no known antebellum homes, other than the 4 listed and discussed above, are located along the anticipated routes. Furthermore, LDENR siting criteria have been met.

iii. Tourist attractions or facilities (e.g., bed and breakfast inns)

Based on the queries discussed above, the chosen site is not in or near tourist attractions or facilities and no known tourist attractions or facilities are located along the anticipated routes. Furthermore, LDENR siting criteria have been met.

iv. Campgrounds or parks

The chosen site is not in or near campgrounds or parks. Campgrounds or parks (i.e., commercial campgrounds) located along the anticipated routes are in remote areas and, therefore, subject to minimal truck traffic related to the proposed well which is already occurring and/or located away from the roadway and, therefore, not subject to traffic. Furthermore, LDENR siting criteria have been met.

3. What is the zoning and existing land use of the prospective site and nearby area?

The prospective site is not located within the bounds of a zoning authority, and it is currently undeveloped. Existing land use in the area is mixed and consists of agricultural, commercial, residential, and undeveloped uses.

a. Is the site located near existing heavy industrial, chemical process or refinery operations?

Based on knowledge of the area and a review of the Louisiana Department of Environmental Quality's interactive mapping application (Make A Map), the site is not located near existing chemical process or refinery operations.

b. Is there a precedent for chemical contamination near the site or is the soil and water pristine?

There is no precedent for chemical contamination near the site.

c. Is the area particularly noted for its esthetic beauty?

The area is not particularly noted for its esthetic beauty.

4. Is the site flood prone?

Based on knowledge of site conditions, as well as reviews of FEMA's Flood Insurance Rate map (FIRM), USGS topographic maps and Google Earth aerial photography, the site is not flood prone.

a. Is the site in a flood plain?

The site is not in a flood plain.

i. How current are the maps used to make flood plain determinations?

The effective date of the FEMA FIRM used to make the flood plain determination is 12/15/2003, which is the most current map for the site.

ii. What is the elevation of the site?

According to the most recent USGS topographic map of the area, the elevation of the site varies from a low of approximately 316 feet above mean sea level (amsl) in the southwestern portion of the site to a high of approximately 323 feet amsl in the northeastern portion of the site.

iii. Is diking required or desired to provide flood protection?

Diking is neither required nor desired to provide flood protection.

(a) What is the design height of the dike?

Not applicable.

(b) How is the dike protected from erosion?

Not applicable.

(c) What frequency and design storm was used?

Not applicable.

(d) Is access to the site over or through dikes?

Not applicable.

b. Is the site hurricane vulnerable?

The site is not hurricane vulnerable. According to the National Weather Service, Southern Region Headquarters website: http://www.weather.gov/shv/ . Tropical disturbances are in the dissipating stages by the time they reach this portion of the state and winds from them are usually not a destructive factor. The National Oceanic and Atmospheric Administration's (NOAA) online Historical Hurricane Tracking system indicates that only 13 recorded hurricanes have passed through this area and only 3 of those sustained Hurricane force winds (greater than 74 miles per hour) this far inland. The most recent was Hurricane Laura in 2020, while the previous two were unnamed storms in 1879 and 1886. All other hurricanes have been downgraded to either a tropical storm (39-73 miles per hour) or tropical depression (less than 39 miles per hour) by the time they reach this area.

i. Is the site in an area subject to storm surge?

Information available on the National Weather Service, National Hurricane Center website, indicates the site is not located in an area subject to storm surge, especially since the site is located approximately 155 miles north of the nearest shoreline and is approximately 320 feet amsl.

ii. What are the design storm specifications?

Not applicable.

iii. Should damage from wave action be considered?

Damage from wave action should not be considered since the site is located approximately 155 miles north of the nearest shoreline and is approximately 320 feet amsl.

iv. For what levels of wind speed is the well designed?

The well design should be able to withstand any wind speed occurring in nature.

5. Is groundwater protected?

Groundwater is protected. The following LDENR requirements are designed to protect the USDW by

isolating the USDW and preventing the upward migration of injected fluids into the USDW.

1. The first string of casing, the surface casing, must extend at least 100 feet below the base of the USDW. This requirement will be met since the base of the USDW is expected at approximately 715 feet below ground level and the 9 5/8 inch surface casing that has a 0.70 inch wall thickness will be set at approximately 1,000 feet below ground level. Additionally, a second string of 7 inch casing that has a 0.816 inch wall thickness, will protect groundwater since it will be set from the surface to total depth of approximately 5,800 feet below ground level.

2. The packer must be set no higher than 150 feet above the top of the proposed injection zone. This requirement will be met.

3. Proof of isolation (bonded cement) of the Top of Proposed Injection Zone must be at or above the packer. Cement isolation confining the top of the proposed injection zone must be confirmed by a Cement Bond Log (CBL). The CBL must show cement in the wellbore bonded to the first isolating shale formation immediately above the approved injection zone. This requirement will be met.

a. **Are aquifers or recharge area underlying the site used for drinking water?**

The site is situated upon Paleocene to Eocene age Wilcox Group deposits that make up the Carrizo-Wilcox Aquifer. However, In Desoto Parish the Carrizo has eroded away and is not present. Sands of the Carrizo-Wilcox aquifer are generally thin and typically yield only moderate supplies of water 40 to 100 gal/min to public-supply or industrial wells. However, reported yields from wells screened in the Carrizo-Wilcox aquifer in De Soto Parish range from 1 to 350 gal/min (LDENR, 2011). This aquifer is the primary drinking water source around the prospective site. According to the USGS, the Wilcox is primarily recharged through precipitation in outcrop areas and vertical seepage of precipitation from overlying sediments.

b. What is the relationship of the site to the water table?

There are 6 water wells (5 registered, 1 unregistered) within approximately one-half (0.5) mile of the proposed well site. See table below:

Water Well Num	TYPE	STATUS	TOTAL DEPTH (ft)	Water Level (ft)	Date Measured
031-9654Z	RIG SUPPLY	ACTIVE	320	50	10/28/2015
031-8859Z	RIG SUPPLY	ACTIVE	280	60	12/19/2009
031-8971Z	RIG SUPPLY	INACTIVE	180	60	6/1/2010
031-8714Z	RIG SUPPLY	P&A	320	80	8/20/2009
031-220	DOMESTIC	ACTIVE	42	29	9/12/1955
UNREGISTERED	DOMESTIC	ACTIVE	UNKNOWN	UNKNOWN	UNKNOWN

All 5 registered wells are listed in the Wilcox Aquifer according to the LDENR SONRIS database. While no records exist for the unregistered well it is also assumed to be a Wilcox well as every registered water well within three (3) miles of the proposed facility is screened in the Wilcox, per SONRIS. The drillers' reports are available for 4 of the referenced wells (031-9654Z, 031-8859Z, 031-8971Z and 031-8714Z) and are consistent in their geologic descriptions from the surface to total depth.

c. What wells exist in the area?

There are no freshwater wells located within 0.25 miles of the proposed injection well.

d. What is the flow rate and direction of the groundwater flow?

http://deq.louisiana.gov/assets/docs/Water/SWAPdocument.pdf

The estimated average ground water velocity (aka, flow rate) for the Wilcox Aquifer is 31 feet per year, according to the LDEQ's Source Water Assessment Program. Groundwater flow direction within the Wilcox Aquifer in Desoto Parish is generally towards the Red River to the east/southeast. However, in southwestern De Soto Parish, groundwater flows from east to west toward the Sabine River valley. At the

proposed site the Wilcox most likely discharges into the Sabine River valley, but flow direction can be affected locally by groundwater withdrawals.

e. What is the groundwater quality in the underlying aquifers?

As reported on LDENR's website, data reported by the USGS indicates that the Wilcox aquifer system is a low yield aquifer system that generally produces water suitable for drinking water purposes which has been and is currently being used predominately for industrial, public and domestic water supply in mostly rural areas of Northwest Louisiana. However, water production from the aquifer system is reported to be physically restricted due to the aquifer's discontinuous nature and typically thin, lenticular and fine textured sand beds.

f. Is there a hydraulic connection between the aquifers?

According to the USGS, there is hydraulic connection between the shallow terrace water-bearing zones and the Wilcox Aquifer.

6. Does prospective site pose potential health risks as defined by proximity to:

a. Prime agricultural area (crop or pastureland)

The prospective site and anticipated traffic routes do not pose potential health risks as defined by proximity to prime agricultural area (crop or pastureland) since safeguards will be in place to prevent health risks.

b. Residential area

The prospective site does not pose potential health risks as defined by proximity to residential areas since it is not near residential areas and safeguards will be in place to prevent health risks.

c. Schools or day care centers

Since the prospective site is not located near schools or day care centers, it does not pose potential health risks as defined by proximity to schools or day care centers.

d. Hospitals or prisons

Since the prospective site is not located near hospitals, medical facilities, or prisons, it does not pose potential health risks as defined by proximity to hospitals or prisons.

e. Public buildings or entertainment facilities

Since the prospective site is not located near public buildings or entertainment facilities, it does not pose potential health risks as defined by proximity to public buildings or entertainment facilities.

f. Food storage area

Since the prospective site and anticipated traffic routes are not located near food storage areas, the site does not pose potential health risks as defined by proximity to food storage areas.

g. Existing community health problems that may be aggravated by operation of additional hazardous waste disposal capacity

Not applicable.

7. Is air quality protected?

Air quality is protected by operating and maintaining equipment at the well site per the manufacturer's specifications.

a. Is the site within an ozone or non-attainment area?

The site is within an ozone attainment area.

b. What contaminants are likely to be generated at the site?

Air pollutants emitted at the site include particulate matter (dust) and diesel exhaust.

c. What protection is afforded from each contaminant generated by the site?

Air quality is protected at the site by minimizing the release of contaminants to the air. For example, the site will implement procedures such as, operating and maintaining and repairing equipment in a timely manner to reduce diesel emissions, and ensuring areas of the site are adequately covered (i.e., limestone) and watered, as necessary to reduce dust emissions.

d. What is the potential for unregulated emissions?

The potential for unregulated emissions is negligible.

f. What plans are implemented to provide for odor control?

It is not anticipated that any odor control strategy will be initiated based on the estimated emissions projected from the proposed well site.

g. Who will be affected by emissions?

No effects from emissions are anticipated.

i. What is the direction of the prevailing winds?

The direction of the prevailing winds varies throughout the year but according to https://www.windfinder.com/windstatistics/natchitoches_regional_airport , the highest frequency wind direction distribution in the general area of the proposed site is from the south/southeast.

ii. Describe the expected frequency of "bad air" conditions.

"Bad air" conditions are not expected at this site.

h. Describe the control of vapors at various stages of process.

Not applicable.

8. Have physical site characteristics been studied; what has been done in terms of a geotechnical investigation?

Subsurface physical site characteristics have been evaluated by evaluating e-logs from nearby wells.

a. Site geology

The site is located on Tertiary age, Wilcox Group deposits. According to the Louisiana Geological Survey and US Geologic Survey, these deposits typically consist of sandstone and mudstone deposited in deltaic and shallow marine settings, are gray to brown lignitic sands, silty to sandy lignitic clays with many seams of lignite and some limestone and glauconite. More specifically, the National Resource Conservation Service (NRCS) Web Soil Survey identifies the site as Eastwood very fine sandy loam, sloping soils.

b. Hydrology

Surface water drainage at the site is generally in a southwesterly direction. A 0.18 acre man-made pond is located 140 feet east of the site, and a 4.6 acre manmade pond is located 594 feet southeast of the site. A low-lying drainage area is located approximately 0.4 mile south of the prospective site. During periods of heavy rainfall, this drainage area flows into an intermittent stream and then into San Patricio Bayou approximately 1.7 miles southwest of the site.

c. Topography

According to the most recent USGS topographic map of the area, the surface elevation at the site ranges from approximately 316 feet amsl in the southwestern portion to approximately 323 feet amsl in the northeastern portion, with a gentle gradient to the southwest.

d. Soil properties

The following soil description is a summary of the soil types associated with the proposed site and was obtained from the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service Web Soil Survey and the Soil Conservation Service 1980 Soil Survey of Desoto Parish, Louisiana.

i. Eastwood, sloping soils

(a) Tight Loamy Upland

According to the NRCS survey the entire proposed site is composed of Eastwood, very fine sandy loam, with approximately 47% being classified as Eastwood tight loamy upland soils with slopes of 1-5%. These soils are characterized as moderately deep to very deep uplands with loamy surfaces and dense subsoils; low natural fertility; seasonally wet or droughty; medium water holding capacity but poor to fair plant-soil-moisture relationship; medium to high production potential.

(b) Loamy Upland

The remaining 53% of the proposed site is classified as Eastwood loamy upland soil with slopes of 5-20%. These soils are characterized as moderately deep to very deep uplands with loamy surfaces and friable loamy subsoils; medium natural fertility; medium to high water holding capacity with good plant-soil-moisture relationship; medium to high production potential.

e. Aquifer location

The Wilcox Aquifer underlies the site and is the primary drinking water aquifer in the area. The base of this underground source of drinking water has been identified at approximately 520 feet below the surface on a nearby electric well log.

f. Subsidence problems

Subsidence problems are not known to exist at or near this site.

g. Climatic conditions

The following summary was adapted from the National Oceanic and Atmospheric Administration's National Weather Service's website, http://www.weather.gov/shv/ , and the Natural Resources Conservation Service's Desoto Parish Soil Survey. The spring and fall seasons are usually mild, while summer months are consistently quite warm and humid. The mean annual temperature ranges from 50 to 75 degrees Fahrenheit. The mean annual precipitation is 41 to 61 inches. Thunderstorms occur each month and on about 50 to 60 days each year. Large hail of a damaging nature is infrequent. The prevailing wind is from the south/southeast and average wind speed is highest, 9 miles per hour, in February through April. Tropical cyclones are in the dissipating stages by the time they reach this portion of the state and winds from them are usually not a destructive factor. Rainfall accompanying these systems can be heavy and can contribute to local flooding. The average growing season ranges between 230 and 240 days in length. The average annual snowfall is less than one inch. The average mean relative humidity is about 71 percent.

E. Are there mitigating measures that would offer more protection to the environment than the well as proposed without unduly curtailing nonenvironmental benefits?

No, there are no mitigating measures which would offer more protection to the environment than the well as proposed without unduly curtailing nonenvironmental benefits. The proposed well location has been developed with great attention to mitigating all environmental issues and has undertaken all reasonable measures regarding selection, design, construction, and operation of the well. If permitted, future activities will occur with the same intent; to provide a needed service for the oil and gas industry by operating and maintaining a well/facility that avoids or minimizes any environmental impacts.

1. Is this well part of a master plan to provide waste management? Whose plan?

This well is part of an informal master plan developed by Southern Disposal Solutions, LLC based on a market survey.

a. How does it fit into the plan?

This well is the first step to building a commercial SWD facility that will offer operators in the area a disposal option located closer to their well sites.

b. What geographical area is served by the plan?

The anticipated geographical area to be served is east of Toledo Bend, west of the Red River and south of US HWY 84.

2. Does this well fit into an integrated waste management system? (Reduction, recovery, recycling, sales tax, exchange, storage, treatment, disposal).

Yes, this well is anticipated to eventually fit into an integrated waste management system.

a. On-site

Not applicable.

b. Regional

Not applicable.

3. Can waste be disposed of by some other means?

Not applicable.

a. Technology limitations

Not applicable.

b. Cost factors

Not applicable.

c. Other reasons

Not applicable.

4. What quality assurance control will be utilized to protect the environment?

a. Plans for lab work

Not applicable.

b. How is out-of-spec waste handled?

Not applicable.

c. What happens to rejected waste?

Not applicable.

d. Treatment stabilization

No treatment will be conducted at this well site.

e. Segregation of noncompatible wastes

Not applicable.

f. Handling of containerized wastes

Not applicable.

5. Innovative techniques used to control release of waste or waste constituents into the environment.

a. Surface impoundment

E&P wastes associated with the drilling of this well will be contained within an earthen pit constructed, operated and closed according to LAC 43.XIX Chapter 3 and Chapter 5.

b. Land application treatment

Land application treatment will not be conducted at the site.

c. Landfill (burial)

A landfill will not be located at the site.

d. Incinerator

An incinerator will not be located at the site.

e. Container storage

Some E&P wastes generated by the drilling of this well may be temporarily held in suitable containers or tanks until recycling or disposal.

f. Tanks

Some E&P wastes generated by the drilling of this well may be temporarily held in suitable containers or tanks until recycling or disposal.