

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources
Department
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505



Form C-144
July 21, 2008

LM
For temporary pits, closed-loop systems, and below-grade tanks, submit to the appropriate NMOCD District Office.
For permanent pits and exceptions submit to the Santa Fe Environmental Bureau office and provide a copy to the appropriate NMOCD District Office.

Pit, Closed-Loop System, Below-Grade Tank, or
Proposed Alternative Method Permit or Closure Plan Application

AUG - 8 2008

OCD-ARTESIA

- Type of action: ☒ Permit of a pit, closed-loop system, below-grade tank, or proposed alternative method
☐ Closure of a pit, closed-loop system, below-grade tank, or proposed alternative method
☐ Modification to an existing permit
☐ Closure plan only submitted for an existing permitted or non-permitted pit, closed-loop system, below-grade tank, or proposed alternative method

Instructions: Please submit one application (Form C-144) per individual pit, closed-loop system, below-grade tank or alternative request

Please be advised that approval of this request does not relieve the operator of liability should operations result in pollution of surface water, ground water or the environment. Nor does approval relieve the operator of its responsibility to comply with any other applicable governmental authority's rules, regulations or ordinances.

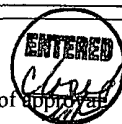
1.
Operator: McKay Oil Corporation OGRID #: 14424
Address: PO Box 2014, Roswell, NM 88201-2014
Facility or well name: Four Mile Draw C Federal #8 See Conditions of Approval attached
API Number: 30-005-* 64065 OCD Permit Number: _____
U/L or Qtr/Qtr SE1/4/NE1/4 Section 15 Township 6S Range 22E County: Chaves
Center of Proposed Design: Latitude 33°79' North Longitude 104°71' West NAD: ☐ 1927 ☐ 1983
Surface Owner: ☒ Federal ☐ State ☐ Private ☐ Tribal Trust or Indian Allotment

2.
☒ **Pit:** Subsection F or G of 19.15.17.11 NMAC
Temporary: ☒ Drilling ☐ Workover
☐ Permanent ☐ Emergency ☐ Cavitation ☐ P&A
☒ Lined ☐ Unlined Liner type: Thickness 20 mil ☒ LLDPE ☐ HDPE ☐ PVC ☐ Other _____
☒ String-Reinforced
Liner Seams: ☒ Welded ☒ Factory ☐ Other geo-membrane Volume: 2,565 bbl Dimensions: L 60' x W 40' x D 8'

3.
☐ **Closed-loop System:** Subsection H of 19.15.17.11 NMAC
Type of Operation: ☐ P&A ☐ Drilling a new well ☐ Workover or Drilling (Applies to activities which require prior approval of a permit or notice of intent)
☐ Drying Pad ☐ Above Ground Steel Tanks ☐ Haul-off Bins ☐ Other _____
☐ Lined ☐ Unlined Liner type: Thickness _____ mil ☐ LLDPE ☐ HDPE ☐ PVC ☐ Other _____
Liner Seams: ☐ Welded ☐ Factory ☐ Other _____

4.
☐ **Below-grade tank:** Subsection I of 19.15.17.11 NMAC
Volume: _____ bbl Type of fluid: _____
Tank Construction material: _____
☐ Secondary containment with leak detection ☐ Visible sidewalls, liner, 6-inch lift and automatic overflow shut-off
☐ Visible sidewalls and liner ☐ Visible sidewalls only ☐ Other _____
Liner type: Thickness _____ mil ☐ HDPE ☐ PVC ☐ Other _____

5.
☐ **Alternative Method:**
Submittal of an exception request is required. Exceptions must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.



6.

Fencing: Subsection D of 19.15.17.11 NMAC (*Applies to permanent pits, temporary pits, and below-grade tanks*)

- ☐ Chain link, six feet in height, two strands of barbed wire at top (*Required if located within 1000 feet of a permanent residence, school, hospital, institution or church*)
- ☒ Four foot height, four strands of barbed wire evenly spaced between one and four feet
- ☐ Alternate. Please specify _____

7.

Netting: Subsection E of 19.15.17.11 NMAC (*Applies to permanent pits and permanent open top tanks*)

- ☐ Screen ☐ Netting ☐ Other _____
- ☐ Monthly inspections (If netting or screening is not physically feasible)

8.

Signs: Subsection C of 19.15.17.11 NMAC

- ☐ 12"x 24", 2" lettering, providing Operator's name, site location, and emergency telephone numbers
- ☒ Signed in compliance with 19.15.3.103 NMAC

9.

Administrative Approvals and Exceptions:

Justifications and/or demonstrations of equivalency are required. Please refer to 19.15.17 NMAC for guidance.

Please check a box if one or more of the following is requested, if not leave blank:

- ☐ Administrative approval(s): Requests must be submitted to the appropriate division district or the Santa Fe Environmental Bureau office for consideration of approval.
- ☐ Exception(s): Requests must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.

10.

Siting Criteria (regarding permitting): 19.15.17.10 NMAC

Instructions: The applicant must demonstrate compliance for each siting criteria below in the application. Recommendations of acceptable source material are provided below. Requests regarding changes to certain siting criteria may require administrative approval from the appropriate district office or may be considered an exception which must be submitted to the Santa Fe Environmental Bureau office for consideration of approval. Applicant must attach justification for request. Please refer to 19.15.17.10 NMAC for guidance. Siting criteria does not apply to drying pads or above-grade tanks associated with a closed-loop system.

Ground water is less than 50 feet below the bottom of the temporary pit, permanent pit, or below-grade tank. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; Visual inspection (certification) of the proposed site	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. (Applies to temporary, emergency, or cavitation pits and below-grade tanks) - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. (Applies to permanent pits) - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
Within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; Written approval obtained from the municipality	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within a 100-year floodplain. - FEMA map	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

11.

Temporary Pits, Emergency Pits, and Below-grade Tanks Permit Application Attachment Checklist: Subsection B of 19.15.17.9 NMAC**Instructions:** Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Hydrogeologic Report (Below-grade Tanks) - based upon the requirements of Paragraph (4) of Subsection B of 19.15.17.9 NMAC
- ☒ Hydrogeologic Data (Temporary and Emergency Pits) - based upon the requirements of Paragraph (2) of Subsection B of 19.15.17.9 NMAC
- ☒ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☒ Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☒ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☒ Closure Plan (Please complete Boxes 14 through 18, if applicable) - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

☒ Previously Approved Design (attach copy of design) API Number: 30-005-64002 or Permit Number: 0208123

12.

Closed-loop Systems Permit Application Attachment Checklist: Subsection B of 19.15.17.9 NMAC**Instructions:** Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Geologic and Hydrogeologic Data (only for on-site closure) - based upon the requirements of Paragraph (3) of Subsection B of 19.15.17.9
- ☐ Siting Criteria Compliance Demonstrations (only for on-site closure) - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☐ Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☐ Closure Plan (Please complete Boxes 14 through 18, if applicable) - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

☐ Previously Approved Design (attach copy of design) API Number: _____

☐ Previously Approved Operating and Maintenance Plan API Number: _____ (Applies only to closed-loop system that use above ground steel tanks or haul-off bins and propose to implement waste removal for closure)

13.

Permanent Pits Permit Application Checklist: Subsection B of 19.15.17.9 NMAC**Instructions:** Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

- ☐ Hydrogeologic Report - based upon the requirements of Paragraph (1) of Subsection B of 19.15.17.9 NMAC
- ☐ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC
- ☐ Climatological Factors Assessment
- ☐ Certified Engineering Design Plans - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Dike Protection and Structural Integrity Design - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Leak Detection Design - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Liner Specifications and Compatibility Assessment - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Quality Control/Quality Assurance Construction and Installation Plan
- ☐ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
- ☐ Freeboard and Overtopping Prevention Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
- ☐ Nuisance or Hazardous Odors, including H₂S, Prevention Plan
- ☐ Emergency Response Plan
- ☐ Oil Field Waste Stream Characterization
- ☐ Monitoring and Inspection Plan
- ☐ Erosion Control Plan
- ☐ Closure Plan - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC

14.

Proposed Closure: 19.15.17.13 NMAC**Instructions:** Please complete the applicable boxes, Boxes 14 through 18, in regards to the proposed closure plan.

Type: ☒ Drilling ☐ Workover ☐ Emergency ☐ Cavitation ☐ P&A ☐ Permanent Pit ☐ Below-grade Tank ☐ Closed-loop System

☐ Alternative

Proposed Closure Method: ☐ Waste Excavation and Removal

☐ Waste Removal (Closed-loop systems only)

☒ On-site Closure Method (Only for temporary pits and closed-loop systems)

☐ In-place Burial ☒ On-site Trench Burial

☐ Alternative Closure Method (Exceptions must be submitted to the Santa Fe Environmental Bureau for consideration)

15.

Waste Excavation and Removal Closure Plan Checklist: (19.15.17.13 NMAC) **Instructions:** Each of the following items must be attached to the closure plan. Please indicate, by a check mark in the box, that the documents are attached.

- ☒ Protocols and Procedures - based upon the appropriate requirements of 19.15.17.13 NMAC
- ☒ Confirmation Sampling Plan (if applicable) - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC
- ☒ Disposal Facility Name and Permit Number (for liquids, drilling fluids and drill cuttings)
- ☒ Soil Backfill and Cover Design Specifications - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
- ☒ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC
- ☒ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

16.

Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only: (19.15.17.13.D NMAC)

Instructions: Please identify the facility or facilities for the disposal of liquids, drilling fluids and drill cuttings. Use attachment if more than two facilities are required.

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

Disposal Facility Name _____ Disposal Facility Permit Number: _____

Will any of the proposed closed-loop system operations and associated activities occur on or in areas that *will not* be used for future service and operations?

☐ Yes (If yes, please provide the information below) ☐ No

Required for impacted areas which will not be used for future service and operations:

☐ Soil Backfill and Cover Design Specifications - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC

☐ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC

☐ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

17.

Siting Criteria (regarding on-site closure methods only): 19.15.17.10 NMAC

Instructions: Each siting criteria requires a demonstration of compliance in the closure plan. Recommendations of acceptable source material are provided below. Requests regarding changes to certain siting criteria may require administrative approval from the appropriate district office or may be considered an exception which must be submitted to the Santa Fe Environmental Bureau office for consideration of approval. Justifications and/or demonstrations of equivalency are required. Please refer to 19.15.17.10 NMAC for guidance.

Ground water is less than 50 feet below the bottom of the buried waste.

- NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells

☐ Yes ☒ No

☐ NA

Ground water is between 50 and 100 feet below the bottom of the buried waste

- NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells

☐ Yes ☒ No

☐ NA

Ground water is more than 100 feet below the bottom of the buried waste. **Ground Water Depth = 680'**

- NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells

☒ Yes ☐ No

☐ NA

Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark).

- Topographic map; Visual inspection (certification) of the proposed site

☐ Yes ☒ No

Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application.

- Visual inspection (certification) of the proposed site; Aerial photo; Satellite image

☐ Yes ☒ No

Within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application.

- NM Office of the State Engineer - iWATERS database; Visual inspection (certification) of the proposed site

☐ Yes ☒ No

Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended.

- Written confirmation or verification from the municipality; Written approval obtained from the municipality

☐ Yes ☐ No

☒ NA

Within 500 feet of a wetland.

- US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site

☐ Yes ☒ No

Within the area overlying a subsurface mine.

- Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division

☐ Yes ☒ No

Within an unstable area.

- Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map

☐ Yes ☒ No

Within a 100-year floodplain.

- FEMA map

☐ Yes ☒ No

18.

On-Site Closure Plan Checklist: (19.15.17.13 NMAC) **Instructions:** Each of the following items must be attached to the closure plan. Please indicate, by a check mark in the box, that the documents are attached.

☒ Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC

☒ Proof of Surface Owner Notice - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC

☒ Construction/Design Plan of Burial Trench (if applicable) based upon the appropriate requirements of 19.15.17.11 NMAC

☒ Construction/Design Plan of Temporary Pit (for in-place burial of a drying pad) - based upon the appropriate requirements of 19.15.17.11 NMAC

☒ Protocols and Procedures - based upon the appropriate requirements of 19.15.17.13 NMAC

☒ Confirmation Sampling Plan (if applicable) - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC

☒ Waste Material Sampling Plan - based upon the appropriate requirements of Subsection F of 19.15.17.13 NMAC

☒ Disposal Facility Name and Permit Number (for liquids, drilling fluids and drill cuttings or in case on-site closure standards cannot be achieved)

☒ Soil Cover Design - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC

☒ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC

☒ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

19.

Operator Application Certification:

I hereby certify that the information submitted with this application is true, accurate and complete to the best of my knowledge and belief.

Name (Print): Carol Shanks Title: Production Analyst

Signature: Carol Shanks Date: 8/8/2008

e-mail address: carol@mckayoil.com Telephone: (575) 623-4735

20.

OCD Approval: ☒ Permit Application (including closure plan) ☐ Closure Plan (only) ☒ OCD Conditions (see attachment)

OCD Representative Signature: M. L. Brannon Signed By: M. L. Brannon Approval Date: SEP 19 2008

Title: OCD District IV OCD Permit Number: 0208527

21.

Closure Report (required within 60 days of closure completion): Subsection K of 19.15.17.13 NMAC

Instructions: Operators are required to obtain an approved closure plan prior to implementing any closure activities and submitting the closure report. The closure report is required to be submitted to the division within 60 days of the completion of the closure activities. Please do not complete this section of the form until an approved closure plan has been obtained and the closure activities have been completed.

☐ Closure Completion Date: _____

22.

Closure Method:

☐ Waste Excavation and Removal ☐ On-Site Closure Method ☐ Alternative Closure Method ☐ Waste Removal (Closed-loop systems only)
☐ If different from approved plan, please explain.

23.

Closure Report Regarding Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only:

Instructions: Please identify the facility or facilities for where the liquids, drilling fluids and drill cuttings were disposed. Use attachment if more than two facilities were utilized.

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

Disposal Facility Name: _____ Disposal Facility Permit Number: _____

Were the closed-loop system operations and associated activities performed on or in areas that *will not* be used for future service and operations?

☐ Yes (If yes, please demonstrate compliance to the items below) ☐ No

Required for impacted areas which will not be used for future service and operations:

- ☐ Site Reclamation (Photo Documentation)
☐ Soil Backfilling and Cover Installation
☐ Re-vegetation Application Rates and Seeding Technique

24.

Closure Report Attachment Checklist: *Instructions: Each of the following items must be attached to the closure report. Please indicate, by a check mark in the box, that the documents are attached.*

- ☐ Proof of Closure Notice (surface owner and division)
☐ Proof of Deed Notice (required for on-site closure)
☐ Plot Plan (for on-site closures and temporary pits)
☐ Confirmation Sampling Analytical Results (if applicable)
☐ Waste Material Sampling Analytical Results (required for on-site closure)
☐ Disposal Facility Name and Permit Number
☐ Soil Backfilling and Cover Installation
☐ Re-vegetation Application Rates and Seeding Technique
☐ Site Reclamation (Photo Documentation)

On-site Closure Location: Latitude _____ Longitude _____ NAD: ☐ 1927 ☐ 1983

25.

Operator Closure Certification:

I hereby certify that the information and attachments submitted with this closure report is true, accurate and complete to the best of my knowledge and belief. I also certify that the closure complies with all applicable closure requirements and conditions specified in the approved closure plan.

Name (Print): _____ Title: _____

Signature: _____ Date: _____

e-mail address: _____ Telephone: _____

New Mexico Energy, Minerals and Natural Resources Department

Bill Richardson
Governor

Joanna Prukop
Cabinet Secretary
Reese Fullerton
Deputy Cabinet Secretary

Mark Fesmire
Division Director
Oil Conservation Division



Conditions of approval for a drilling pit w/onsite disposal

Notify NMOCD District 2 office 48 hours prior to construction of pit.

Notify NMOCD District 2 office 48 hours prior to commencement of closure of pit.

Notify NMOCD District 2 office 48 hours prior to obtaining samples of pit contents.

Sample analyses of pit contents are to be submitted to NMOCD and approval obtained prior to commencement of onsite disposal operations. In the event analytical requirements are not met, the alternative closure method will be required.

Notify NMOCD District 2 office 48 hours prior to obtaining samples of pit bottom.



MCKAY OIL CORPORATION

FOUR MILE DRAW "C" Fed #8
SEC 15, T6S, R22E, SENE, CHAVES
CO.

SEP - 4 2000
OCD-ARTESIA



APPROXIMATE SCALE
2000 0 2000 FEET

4MD "C" Fed #8



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CHAVES COUNTY,
NEW MEXICO
(UNINCORPORATED AREAS)

PANEL 600 OF 1625
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
350125 0600 B

EFFECTIVE DATE:
FEBRUARY 2, 1983



Federal Emergency Management Agency

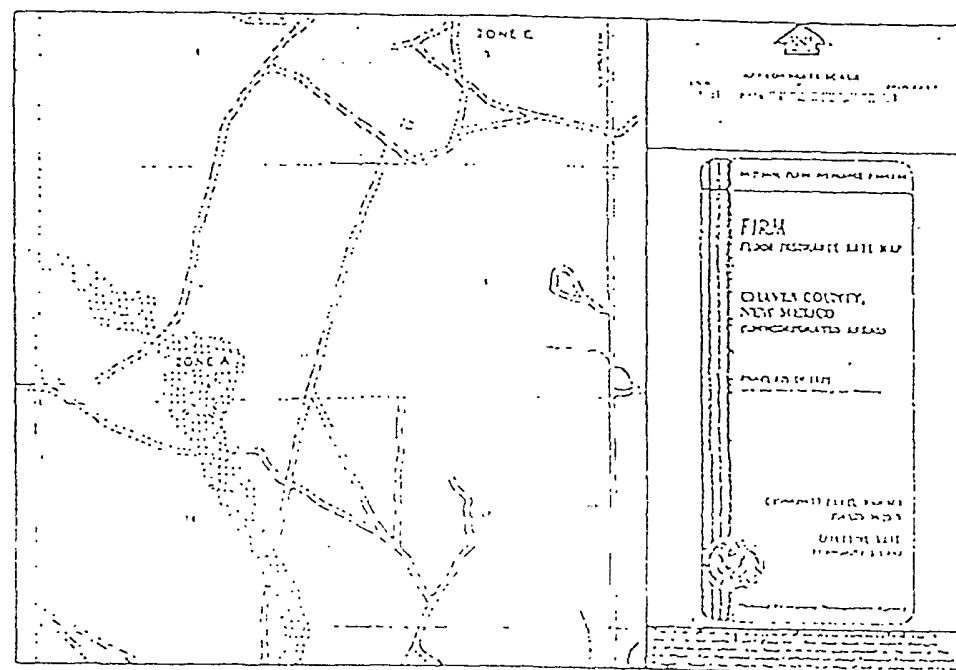
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Siting Requirement (K)

MCKAY OIL CORPORATION - FOUR MILE DRAW C FEDERAL #8
 1950' FNL & 330' FWL, SE¼NE¼, Unit E, SEC15, T6S, R22E
 API: 30-005*

siting requirement k.

EBM - MSC Viewer



KEY TO MAP

SPECIAL FLOOD HAZARD AREA

ZONE A

EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100 year flood; base flood elevations and flood hazard factors not determined.
C	Areas of minimal flooding (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100 year coastal flood with velocity (wave)

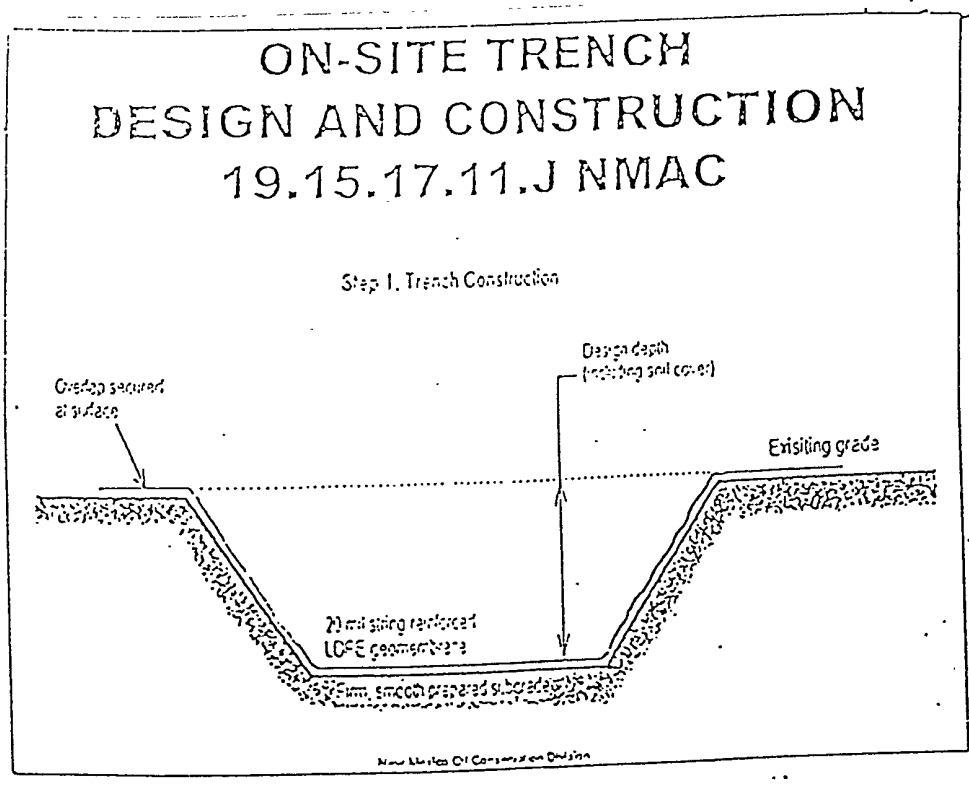
MCKAY OIL CORPORATION – FOUR MILE DRAW C FEDERAL #8
1950' FNL & 330' FWL, SE¼NE¼, Unit E, SEC15, T6S, R22E
API: 30-005-*

McKay Oil Corporation
P. O. Box 2014
Roswell, NM 88202

PIT DESIGN AND CONSTRUCTION SPECIFICATIONS (19.15.17.11)

General Specifications

1. Any topsoil, which can sustain plant vegetation, will be bladed and piled for future rehabilitation.
2. The location slopes very slightly to the east and southeast.
3. The 40' X 60' pit shall be constructed and maintained so that runoff water from outside the location is not allowed to enter the pit. The berms surrounding the entire perimeter of the pit shall extend a minimum of two (2) feet above ground level. At no time will standing fluids in the pit be allowed to rise above ground level.
4. Pit will be properly constructed on firm unyielding base, free of large rocks, debris and sharp edges to support all liquids and prevent tears.
5. A 20 MIL, low linear density polyethylene (LLDPE), string-reinforced liner, with factory-welded seams will be placed on excavated ground bed by qualified a qualified backhoe service. Liner will be large enough to reduce stress-strain on the liner.
6. Anchor trench will be 18" deep and all edges anchored securely.
7. A four-foot high, four-stranded barbed wire fence, evenly spaced between 4', will be erected around 3 sides on three (3) sides during drilling operations. The fourth side shall be fenced immediately upon rig release.
8. A well sign has been placed at entrance of facility, thus Operator is exempt from placing an additional sign on location, per Rule 103, 19.15.3.103, NMAC.



MCKAY OIL CORPORATION – FOUR MILE DRAW C FEDERAL #8
1950' FNL & 330' FWL, SE¼NE¼, Unit E, SEC15, T6S, R22E
API: 30-005-*

McKay Oil Corporation
P O. Box 2014
Roswell, NM 88202

PIT OPERATING AND MAINTENANCE PLAN (19.15.17.12)

General Specifications

1. Thru the end of drilling operations, fluid contents will be monitored and reported daily on drilling reports submitted and maintained in Operator's Office.
2. At least two feet of freeboard will be maintained for pit.
3. Only fluids generated during drilling process will be discharged into pit.
4. Pit liner will be inspected daily for tears and/or leaks and for pit liner's integrity.
5. Division office will be notified within 48 hours if damage is discovered and liner will be repaired.
6. Free liquids will be removed from pit within 30 days from the date rig is released.

PIT CLOSURE PLAN (19.15.17.13)

Onsite Trench burial Closure Method

1. Operator will remove all liquid contents in 40' X 60' pit and allow to the bottom of pit to dry.
2. Dig trench 2 (west side of trench 1 pit area) big enough to put all of the cuttings in. Leave enough room for 4' backfill material. (NOTE: Trench size depends on the amount of cuttings, rock formations, surrounding terrain and mud solidity.)
3. Line trench 2 with 20 MIL liner, and in accordance with the design and construction requirements specified in Subsection J of 19.15.17.11 NMAC.
4. Fill trench 2 with cuttings, original pit liner and any contaminated soil.
5. Solidify the contents to a bearing capacity sufficient to support the temporary pit's final cover of the trench burial. Operator shall not exceed the 3:1 mixing ratio (soil or other material to contents).
6. Collect *soil samples (see Exhibit A) from inside trench 1 area consisting of a five-point, composite soil sample. Collect individual grab samples from any area that is wet, discolored or showing other evidence of a release.
7. Cap trench 2 with 20 MIL liner.
8. Backfill trench 1 area with 4' of topsoil.
9. Backfill trench 2 area with 4' of topsoil, re-contour where applicable to conform to original topography of the area.
10. Place steel marker at the center of on-site burial. Marker shall be 4" in diameter, cemented 3' beneath ground and extending 4' above ground level. Sign engraved with: Operator, Lease, Unit letter, Section, Township and range.
11. File deed with Chaves County Clerk identifying exact location of on-site burial.
12. Seed entire pit area per BLM specifications.

Quality Control

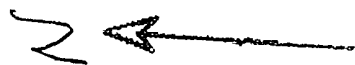
1. *Soil samples will be collected per EPA SWA-846 protocol. Samples will be kept in sterile sample-dedicated containers and homogenized with a trowel. After sample containers are filled, they will be immediately sealed, and processed for shipment to the Cardinal Laboratory in Hobbs, NM for TPH and Chloride testing. TPH not to exceed 2.500 mg. Chlorides not to exceed 250mg. Cardinal Lab will prepare an analytical data report of the soil.
2. Cardinal Lab will report back to McKay Oil, results from soil samples.
3. Operator to submit Form C-141, with Analytical Data Report, to OCD.

Cardinal Laboratories (Soil Analysis)

101 E. Marland
Hobbs, NM 88240
Contact: Larry Bailey
(575) 393-2326 (or) 800-588-5227

Talon, LPE (Soil Sampler)

318 E. Taylor
Hobbs, NM 88240
Contact: Shelly Tucker
(575) 706-7234



Cent
Lin
bel
30'
40'

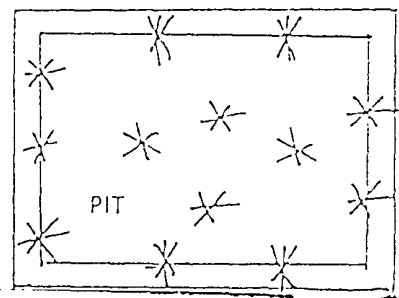
UNITED DRILLING, I

LOCATION PLAT

RIC 401112

Scale: 1"=40' 12-1

TRENCH 1 — 60' —

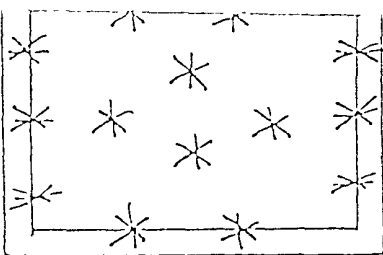


PIT

40'

25'
50'
18'
42'

TRENCH 2



Stinger

40'

30'

Access Road

McKay Oil Corporation
Four Mile Draw Federal C #8
Section 15, T6S, R22E
Chaves County, NM
Exhibit 'C'

MCKAY OIL CORPORATION – FOUR MILE DRAW C FEDERAL #8
1950' FNL & 330' FWL, SE¼NE¼, Unit E, SEC15, T6S, R22E
API: 30-005-*

McKay Oil Corporation
P. O. Box 2014
Roswell, NM 88202
(575) 623-4735

PIT CLOSURE METHOD (19.15.17.13) - ALTERNATE PLAN

Waste Excavation and Removal

1. Operator will remove all liquid contents in 40' X 60' pit and allow the bottom of pit to dry.
2. Pile cuttings and original pit liner in Roll-off Box on west side of pit area.
3. Collect *soil samples (see Exhibit A) from inside trench 1 area consisting of a five-point, composite soil sample. Collect individual grab samples from any area that is wet, discolored or showing other evidence of a release.
4. Haul off drill cuttings, liquid contents and any contaminated soil in Roll-off Box to *Gandy Marley Landfill.
5. Backfill trench 1 area with 4' of topsoil.
6. Re-contour where applicable to conform to original topography of the area.
7. Seed entire pit area per BLM specifications.

Quality Control

1. *Soil samples will be collected per EPA SWA-846 protocol. Samples will be kept in sterile sample-dedicated containers and homogenized with a trowel. After sample containers are filled, they will be immediately sealed, and processed for shipment to the Cardinal Laboratory in Hobbs, NM for benzene and chloride analytical testing. Cardinal Lab will prepare an analytical data report of the soil.
2. Cardinal Lab will report back to McKay Oil, results from soil samples.
3. Operator to submit Form C-141, with Analytical Data Report, to OCD.

Cardinal Laboratories (Soil Analysis)

101 E. Marland
Hobbs, NM 88240
Contact: Larry Bailey
(575) 393-2326 (or) 800-588-5227

Talon, LPE (Soil Sampler)

318 E. Taylor
Hobbs, NM 88240
Contact: Shelly Tucker
(575) 706-7234

Gandy Marley (Waste Disposal)

PERMIT NO: NM-711-1-0020
Mile Marker 196, US 380 E
Roswell, NM 88201
(575) 626-6513

**MCKAY OIL CORPORATION – FOUR MILE DRAW C FEDERAL #8
1950' FNL & 330' FWL, SE¼NE¼, Unit E, SEC15, T6S, R22E
API: 30-005-***

McKay Oil Corporation
P. O. Box 2014
Roswell, NM 88202
(575) 623-4735

PIT PROOF OF SURFACE OWNER NOTICE (19.15.17.13)

Proof of Surface Owner Notice

1. APD Application to drill approved. Sundry Notice to be submitted on date well spud.

Application for Temporary Pit (C144) with Attachments

To: OCD District II
1301 W. Grand Avenue, Artesia, NM 88210

MCKAY OIL CORPORATION – FOUR MILE DRAW C FEDERAL #8
1950' FNL & 330' FWL, SE¼NE¼, Unit E, SEC15, T6S, R22E
API: 30-005-*

McKay Oil proposes to air drill the well and open hole test the ABO formation. Fresh water is to be used to pump the cementing plug down. The water will later be displaced with air before drilling out with air and mist for an open-hole completion.

The following attachments are submitted to describe the location of the proposed well, the proposed construction activities and operations plan, the magnitude of necessary surface disturbance involved, and the procedures to be followed in rehabilitating the surface after completion of the operation so that a complete appraisal can be made of the environmental effects associated with the operation.

AUG - 8 2008
OCD-ARTESIA

1. C-144 Permit Application
2. Design and Construction Specifications
3. Operating and Maintenance Plan
4. Closure Plan
5. Closure Plan – Alternate Method
6. Previously Approved Design
7. Proof of Surface Owner Notice
8. Siting Requirements
 - a. Ground Water – less than 50' below bottom of buried waste
 - b. Ground Water – between 50' & 100' below bottom of buried waste
 - c. Ground Water – more than 100' below bottom of buried waste
 - d. Within 300' of continuously flowing watercourse, or 200' of other significant lakebed, sinkhole or playa lake.
 - e. Within 300' from a permanent residence, school, hospital, institution, or church.
 - f. Within 500' horizontally of private, domestic fresh water well or spring, or within 1000' horizontally of any other fresh water well or spring.
 - g. Within incorporated municipal boundaries of fresh water well field covered under municipal ordinance.
 - h. Within 500' of a wetland
 - i. Within the area overlying a subsurface mine.
 - j. Within an unstable area.
 - k. Within a 100 yr. floodplain.
9. Maps

S

Form 3160-3
(August 2007)

AUG - 8 2008

OCD-ARTESIA

FORM APPROVED
OMB No. 1004-0137
Expires July 31, 2010UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT


APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No. NM 36193
1b. Type of Well. <input type="checkbox"/> Oil Well <input checked="" type="checkbox"/> Gas Well <input type="checkbox"/> Other <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		6. If Indian, Allottee or Tribe Name
2. Name of Operator McKay Oil Corporation		7. If Unit or CA Agreement, Name and No.
3a. Address PO Box 2014 Roswell, NM 88202-2014		8. Lease Name and Well No. 4 Mile Draw Federal C #8
3b. Phone No. (include area code) 575-623-4735		9. API Well No.
4. Location of Well (Report location clearly and in accordance with any State requirements *) At surface 1950' FNL & 330' FWL At proposed prod. zone		10. Field and Pool, or Exploratory W. Pecos ABO Slope
14. Distance in miles and direction from nearest town or post office* Approximately 25 miles		11. Sec., T. R. M. or Blk. and Survey or Area Unit E, Sec. 15, T6S, R22E
15. Distance from proposed* 330' location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No. of acres in lease 927.51	12. County or Parish Chaves
17. Spacing Unit dedicated to this well 160'	13. State NM	
18. Distance from proposed location* 75' to nearest well, drilling, completed, applied for, on this lease, ft	19. Proposed Depth 4000'	20. BLM/BIA Bond No. on file
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 4356'	22. Approximate date work will start* 06/15/2008	23. Estimated duration 7-10 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, must be attached to this form:

- | | |
|---|---|
| 1. Well plat certified by a registered surveyor. | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above). |
| 2. A Drilling Plan. | 5. Operator certification |
| 3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office) | 6. Such other site specific information and/or plans as may be required by the BLM. |

25. Signature 	Name (Printed/Typed) James L. Schultz	Date 05/15/2008
Title Agent		
Approved by (Signature)	Name (Printed/Typed)	Date
Title	Office	

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

MCKAY OIL CORPORATION – FOUR MILE DRAW C FEDERAL #8
1950' FNL & 330' FWL, SE¼NE¼, Unit E, SEC15, T6S, R22E
API: 30-005-*

McKay Oil Corporation
P. O. Box 2014
Roswell, NM 88202
(575) 623-4735

PIT SITING REQUIREMENTS (19.15.17.10)

Siting Requirements

See attachments - applicable to this permit request.

<p><u>Siting Criteria (regarding permitting):</u> 19.15.17.10 NMAC</p> <p><i>Instructions: The applicant must demonstrate compliance for each siting criteria below in the application. Recommendations of acceptable source material are provided below. Requests regarding changes to certain siting criteria may require administrative approval from the appropriate district office or may be considered an exception which must be submitted to the Santa Fe Environmental Bureau office for consideration of approval. Applicant must attach justification for request. Please refer to 19.15.17.10 NMAC for guidance. Siting criteria does not apply to drying pads or above-grade tanks associated with a closed-loop system.</i></p>	
<p>a. Ground water is less than 50 feet below the bottom of the temporary pit, permanent pit, or below-grade tank. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>b. Ground water is between 50 and 100 feet below the bottom of the buried waste - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>c. Ground water is more than 100 feet below the bottom of the buried waste. - NM Office of the State Engineer - iWATERS database search; USGS; Data obtained from nearby wells</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<p>d. Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map; Visual inspection (certification) of the proposed site</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>e. Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. <i>(Applies to temporary, emergency, or cavitation pits and below-grade tanks)</i> - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>f. Within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>g. Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; Written approval obtained from the municipality</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
<p>h. Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>i. Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>j. Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>k. Within a 100-year floodplain. - FEMA map</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

McKay Oil Corporation
Four Mile Draw C Federal #8
SEC 15, T6S, R22E

Siting Requirement a. b. c.

1. Per BLM Hydrologist dated July 2008, Ground Water Depth = 780'
2. Per 'Declaration Owner of Underground Water Right No RA-8327', dated 1/7/83 (SEC 19 for comparison) Ground Water Depth = 595' below land surface.
*Note: No records established in NM State Engineer's office specific to SEC34, as of July 2008.

SEC 15					
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15 4MD "C" FED #8	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

IMPORTANT — READ INSTRUCTIONS ON BACK BEFORE FILLING OUT THIS FORM.

Declaration of Owner of Underground Water Right

~~CHAVES COUNTY~~ RA

BASIN NAME

Declaration No. ~~03-65~~ RA-8327

Date received January 7, 1983

STATEMENT

- Name of Declarant H.W. Eppers
Mailing Address Dunlap Rt. Box 1139 Roswell, NM 88201
County of Chaves, State of NM
- Source of water supply Shallow
(artesian or shallow water aquifer)
- Describe well location under one of the following subheadings:
 - SE 1/4 NW 1/4 NE 1/4 of Sec 19 Twp 5S Rge 21E N M P M, in Chaves County.
 - Tract No _____ of Map No _____ of the _____
 - X = _____ feet, Y = _____ feet. N. M. Coordinate System _____ Zone _____ in the _____ Grant _____
On land owned by Declarant
- Description of well: date drilled 4-17-1952 driller Conrad Keys depth 615 feet.
outside diameter of casing 7 inches; original capacity Est. 20 gal. per min.; present capacity Est. 20 gal. per min.; pumping lift 605 feet; static water level 595 feet (above) (below) land surface;
make and type of pump 16' Aeromoto windmill
make, type, horsepower, etc., of power plant _____
Fractional or percentage interest claimed in well 100%
- Quantity of water appropriated and beneficially used 3.0
(acre feet per acre) (acre feet per annum)
for Stock water purposes.
- Acreage actually irrigated _____ acres, located and described as follows (describe only lands actually irrigated):

Subdivision	Sec.	Twp.	Range	Acres Irrigated	Owner

(Note: location of well and acreage actually irrigated must be shown on plat on reverse side.)

- Water was first applied to beneficial use 4 month 17 day 1952 year and since that time has been used fully and continuously on all of the above described lands or for the above described purposes except as follows: _____

- Additional statements or explanations Pipeline connects this well and well in the NW 1/4 Sec 28, T5S - R 21 E for supplemental purposes. Pipelines distribute water for livestock tubs in SW 1/4 Sec 18; SE 1/4 Sec 18; SE 1/4 Sec 19; NE 1/4 Sec 30; NE 1/4 Sec 31 T5S R 21 E. NW 1/4 Sec 24, SE 1/4 Sec 24 T5S R 20E

I, H. W. Eppers being first duly sworn upon my oath, depose and say that the above is a full and complete statement prepared in accordance with the instructions on the reverse side of this form and submitted in evidence of ownership of a valid underground water right, that I have carefully read each and all of the items contained therein and that the same are true to the best of my knowledge and belief.

by: H. W. Eppers, declarant.

Subscribed and sworn to before me this 7th

day of January, A.D. 19 83

My commission expires 2-13-83

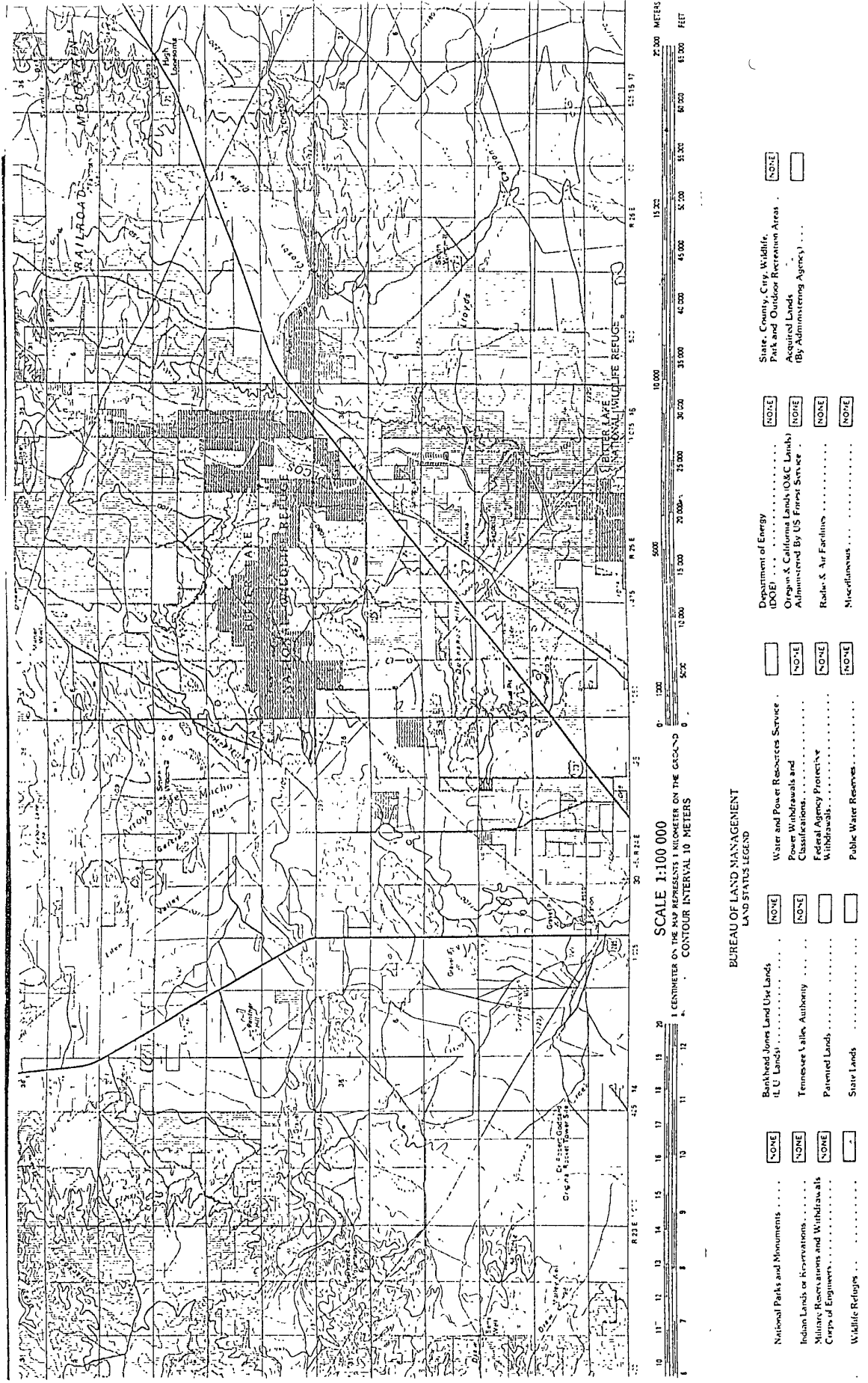
FILED

Patsy Felber Notary Public

UNDER NEW MEXICO LAW A DECLARATION IS ONLY A STATEMENT OF DECLARANT'S CLAIM.
ACCEPTANCE FOR FILING DOES NOT CONSTITUTE APPROVAL OR REJECTION OF THE CLAIM.

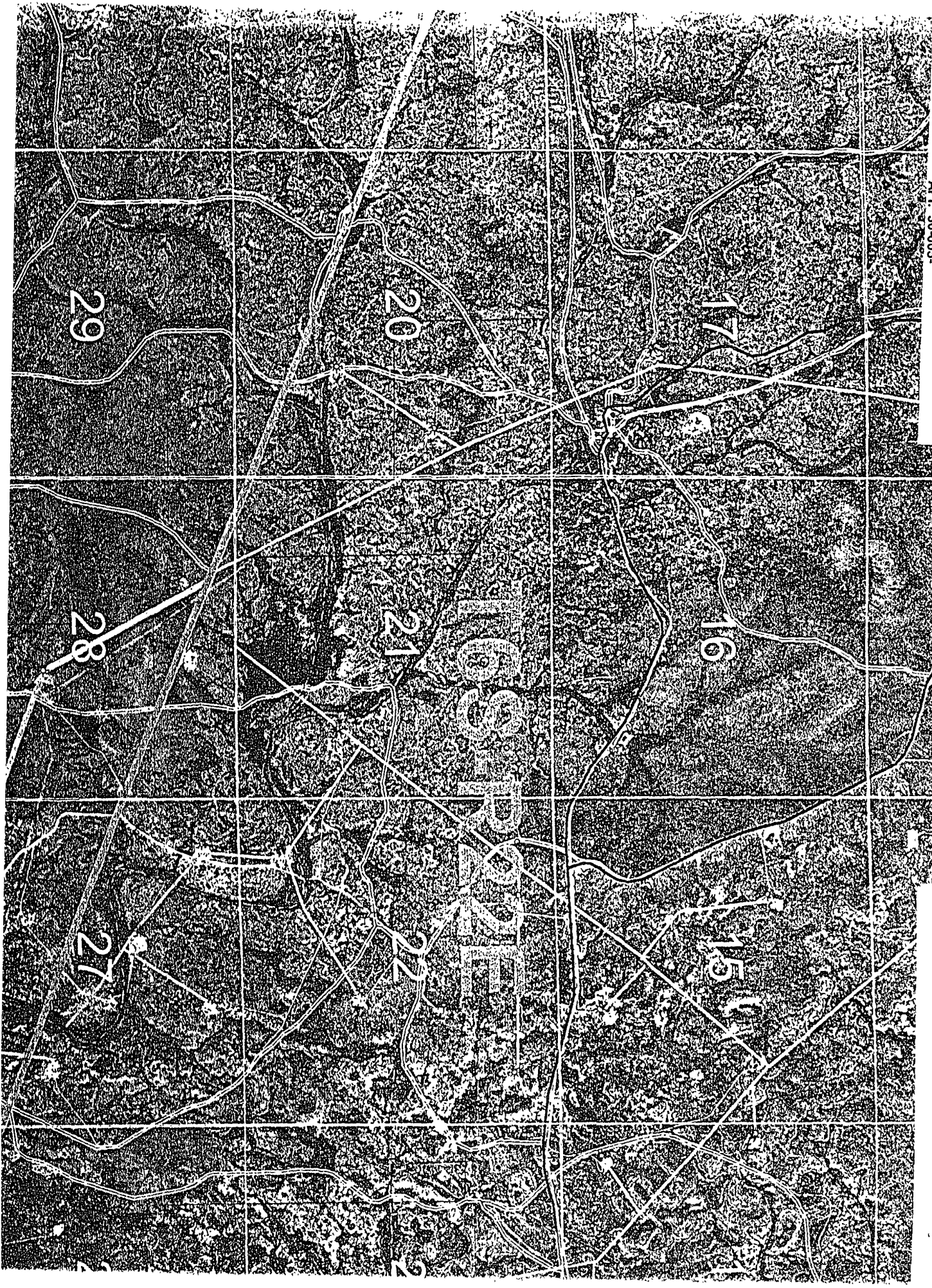
TN1-245861

MCKAY OIL CORPORATION - FOUR MILE DRAW C FEDERAL #8
1950' FNL & 330' FWL, SE¼NE¼, Unit E, SEC15, T6S, R22E
API: 30-005.*



MCKAY OIL CORPORATION - FOUR MILE DRAW C FEDERAL #8
1950' FNL & 330' FNL, SE 1/4, Unit E, SEC15, T6S, R22E
API: 30-005-4

siting requirement e.



MCKAY OIL CORPORATION - FOUR MILE DRAW C FEDERAL #8
 1950' FNL & 330' FWL, SE 1/4 NE 1/4, Unit E, SEC15, T6S, R22E
 API: 30-005-*

Office of the State Engineer
 POD Reports and Downloads

Township 06S Range 22E Sections 15

NAD27 X Y Zone ☐ Search Radius

County ☐ Basin ☐ Number Suffix

Owner Name (First) (Last) ☐ Non-Domestic ☒ Domestic ☐ All

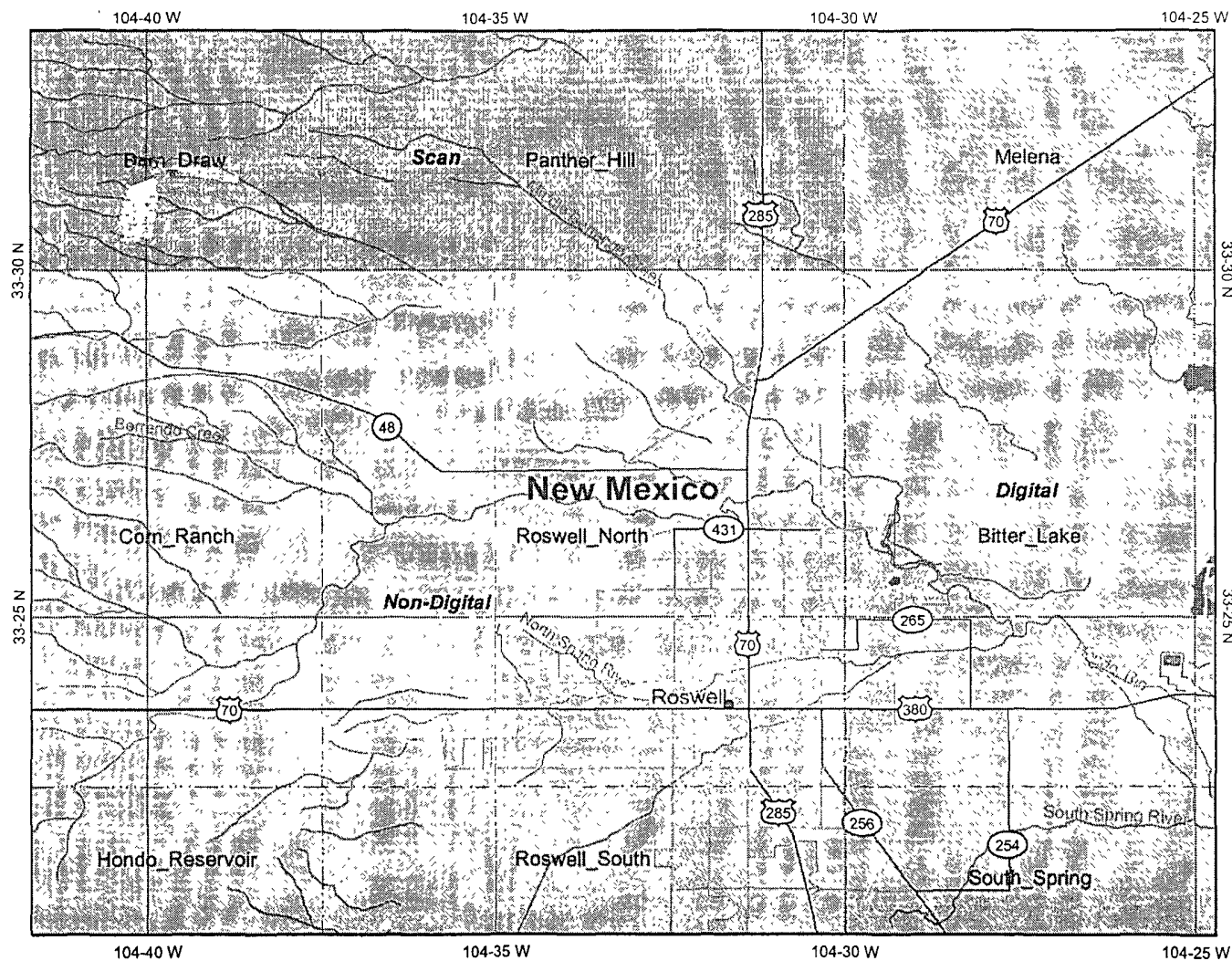
POD / SURFACE DATA REPORT 08/07/2008

(acre ft per annum)
 DB File Nbr Use Diversion Owner POD Number

(quarters are 1=NW 2=NE 3=SW 4=SE)
 (quarters are biggest to smallest X Y are in Feet
 Source Tws Rng Sec q q q Zone X Y

No Records found, try again

Internet Mapping Framework



Legend

- Interstate
- Major Roads
- Other Road
- Interstate
- State highway
- US highway
- Cities
- USGS Quad Index 24K
- Lower 48 Available Wetland Data
- Non-Digital
- Digital
- No Data
- Scan
- NHD Waterbodies
- LAKE/POND
- RESERVOIR
- STREAM/RIVER
- NHD Streams
- Counties 100K
- Urban Areas 300K
- States 100K
- South America
- North America



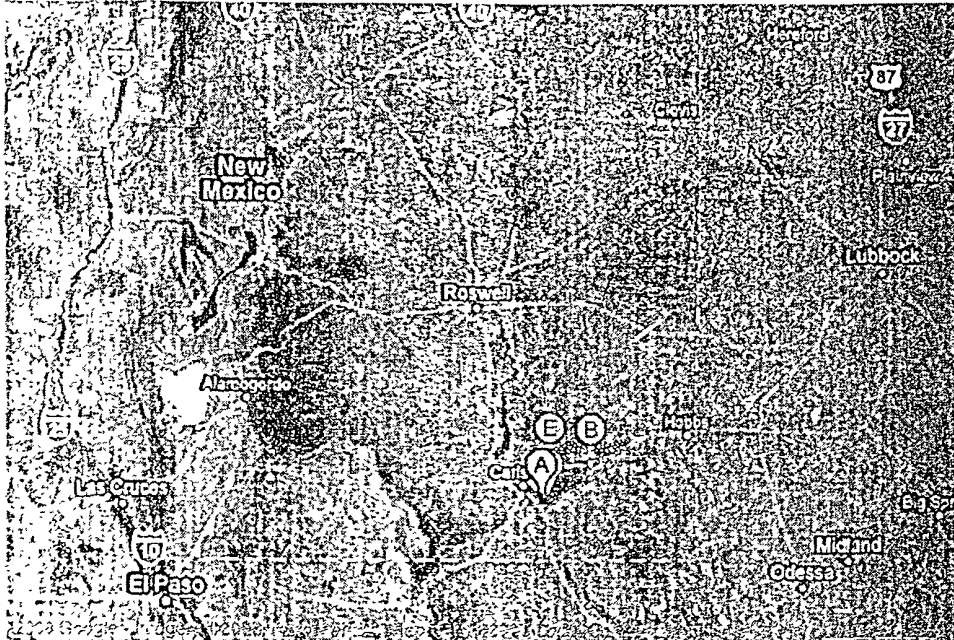
Scale: 1:169,243

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Map center: 33°26' N, 104°33' W

Google

Results 1-5 of about 17 for potash mines
near Chaves County, New Mexico



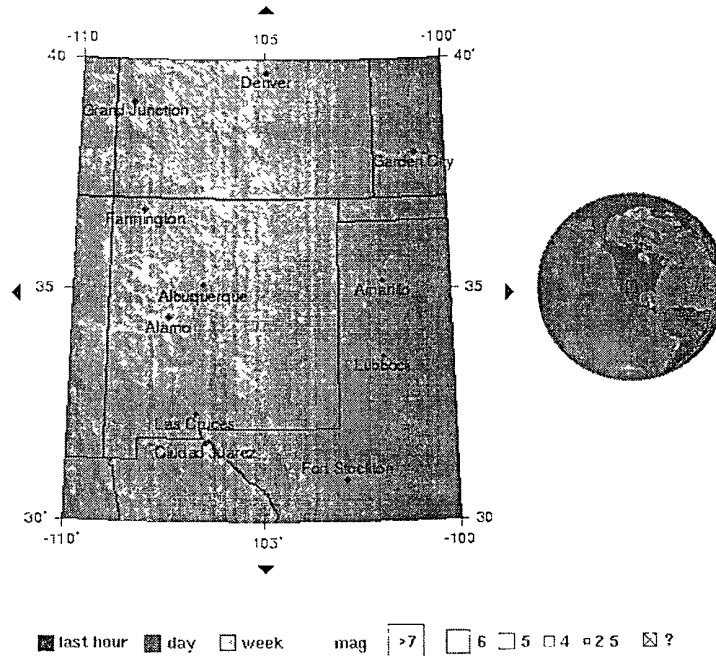
- | | |
|---|--|
| A Mosaic Potash Carlsbad
1361 Potash Mines Rd, Carlsbad, NM - (575) 887-2871 | B Intrepid Potash East
210 Red Cloud, Carlsbad, NM - (575) 887-1117 |
| C Highlands Gas
260 Potash Mines Rd, Loving, NM - (575) 745-2315 | D Intrepid Potash
1996 Potash Mines Rd, Carlsbad, NM - (575) 887-5591 |
| E Intrepid Potash
6288 Hobbs Hwy, Carlsbad, NM - (575) 885-3134 | |

No mining activity in Chaves County, New Mexico



Earthquake Hazards Program

10-degree Map Centered at 35°N,105°W



Instructions

- Click on an earthquake for more information
- Click on blue arrows around map to see next map in that direction

Tips

- To convert UTC to US time zones, see this list or this table
- Magnitude = ? for new earthquakes until a magnitude is determined
- Maps show events recorded in the last 7 days with M2.5+ within the United States and adjacent areas, M4.0+ in the rest of the world
- Maps are updated whenever a new earthquake has been located. Try to reload this page if you do not have the most current map

Earthquake Lists

- [List of Earthquakes on this Map](#)
- [World M2.5/4+ Earthquake list](#)
- [World M5+ Earthquake list](#)

Did you feel it?

- [Report an Earthquake](#)

Back

- [Back to List of Regional Maps](#)
- [Back to World Map](#)

U.S. Department of the Interior | U.S. Geological Survey

URL: http://earthquake.usgs.gov/eqcenter/recenteqsw/Maps/degree10/255_35.php

Page Contact Information: [EHP_Web_Team](#)

Page Last Modified: September 04, 2007 22:31:33 UTC



Earthquake Hazards Program

Earthquake List for 10-degree Map Centered at 35°N, 105°W

Update time = Fri Jun 13 20 12 07 UTC 2008

There are no earthquakes on the 10-degree Map Centered at 35°N, 105°W at this time.

[Back to 10-degree Map Centered at 35°N, 105°W](#)

[U.S. Department of the Interior](#) | [U.S. Geological Survey](#)

URL: http://earthquake.usgs.gov/eqcenter/recenteqsww/Maps/degree10/255_35_eqs.php

Page Contact Information: [EHP Web Team](#)

Page Last Modified: June 13, 2008 20:12:12 UTC

Page Last Modified: June 13, 2008 20:12:12 UTC



Earthquake Hazards Program

New Mexico

Earthquake History

Most of New Mexico's historical seismicity has been concentrated in the Rio Grande Valley between Socorro and Albuquerque. About half of the earthquakes of intensity VI or greater (Modified Mercalli intensity) that occurred in the State between 1868 and 1973 were centered in this region.

The earliest reported earthquake in New Mexico was an intensity V tremor that occurred near Socorro on April 20, 1855. In the years that followed, Socorro was struck by numerous low to moderate intensity earthquakes. Most of these caused little or no damage and were felt over a small area. However, beginning on July 2, 1906, and lasting well into 1907 the area was affected by shocks almost daily. There were three fairly severe shocks in this series. The first was an intensity VII tremor that struck on July 12 and cracked some adobe walls and threw others down. Ground fissures and visible waves on the surface were reported with this earthquake. Another shock of intensity VII on July 16, was felt at Raton, about 370 km northeast of Socorro and at Douglas, Arizona, about 420 km southwest. The epicenter was probably about 16 km west of Socorro. On November 15, an intensity VII shock was felt over an area of about 250,000 square kilometers. Rumbling sounds were heard during this earthquake. Later shocks occurred at Socorro on July 18, 1913 (intensity V), January 31, 1919 (intensity IV-V), and February 1, 1919 (intensity V). An intensity V earthquake caused slight damage at Socorro on January 7, 1934. The most recent shock to affect the area occurred on July 3, 1961, causing slight damage at Socorro (intensity VI).

The towns of Bernardo and La Joya, about 30 kilometers and 40 kilometers north of Socorro, have been the center of a number of moderately strong earthquakes. On February 20, 1935, an intensity VI shock damaged adobe and concrete buildings at Bernardo. This earthquake was accompanied by a thunderous roar. On July 22, 1960, an intensity V tremor knocked some items from shelves at La Joya. The next day, a weak adobe wall was toppled and adobe buildings were cracked by an intensity VI earthquake. The total felt area of this shock was about 7,800 square kilometers. One day later on July 24, an intensity V shock broke two small windows at Boys Ranch and awakened many persons at Bernardo.

Belen, about 56 kilometers south of Albuquerque, experienced a series of earthquakes that lasted from December 12 to 30, 1935. Loud subterranean sounds accompanied a strong shock on December 17, that cracked the brick wall of an old public school buildings in Belen. In addition, there were reports of fallen plaster and small objects shaken from shelves. Numerous weak intermittent tremors were felt in the area, with additional slight damage from tremors on December 19 and 21.

The area around Los Lunas was affected by a series of earthquakes in 1893 that lasted for about 3 months. On September 7, 1893, five strong shocks, the most severe of intensity VII, struck Los Lunas. Many adobe buildings, weakened by earlier disturbances, were thrown down. Felt reports were also received from Sabinal.

Albuquerque has been the center of several moderately strong shocks. On July 12, 1893, three intensity V earthquakes shook every house in the city. Clocks stopped, and one report told of a chandelier swinging for 10 minutes. On December 3, 1930, two distinct shocks cracked plaster and dishes. A strong localized shock of intensity VI on February 4, 1931, caused people to leave houses and created a near panic situation in theaters. Many people

reported they were thrown from bed. Some building damage and landslides occurred. On November 6, 1947, Zamora, slightly east of Albuquerque, was shaken by an earthquake. Cracks were reported in plaster and a fireplace.

Minor plaster cracks in a bank building in Albuquerque were reported from an intensity V earthquake on November 3, 1954. The shock was also felt at Bernalillo, Sandoval, and Sandia Pueblo. A lighter shock on November 2 was felt over the same area. An earthquake, measured at 3.8, on November 28, 1970, awakened thousands at Albuquerque. The shock had a felt area of 3,000 square kilometers. The roof of a barn collapsed and a rooftop air-conditioner shook loose and fell through a skylight. Plaster cracks, broken windows, and many other instances of minor damage were reported. Many burglar alarms were activated. On January 4, 1971, another shock caused considerable minor damage in Albuquerque, principally at the University of Albuquerque.

An earthquake with strong local effects occurred on May 18, 1918, in Santa Fe county. At Cerrillos, people were thrown off their feet, a break in the earth's surface was noted, and fallen plaster was reported (intensity VII - VIII). Similar effects were noted at Stanley.

On January 22, 1966, a magnitude 5.5 earthquake centered near Dulce affected about 39,000 square kilometers of northwestern New Mexico and southwestern Colorado. Nearly every building in Dulce was damaged to some degree, many buildings had exterior and interior damage and considerable chimney damage was noted. The principal property damage was sustained at the Bureau of Indian Affairs School and Dormitory Complex and at the Dulce Independent Schools. Rockfalls and landslides occurred along Highway 17, about 15 to 25 km west of Dulce, in addition some minor cracks appeared in the highway. Minor damage was also reported at Lumberton, NM, and Edith, Colorado.

A magnitude 4.1 shock on December 24, 1973, occurred near Grants. The tremor caused minor damage in the Grants area and was also felt at Laguna, Bluewater, and Fort Wingate. Maximum reported intensity was V.

Abridged from Earthquake Information Bulletin, Volume 7, Number 3, May-June 1975, by Carl von Hake.

For a list of earthquakes that have occurred since this article was written, use the [Earthquake Search](#) U.S. Department of the Interior | U.S. Geological Survey

URL: http://earthquake.usgs.gov/regional/states/new_mexico/history.php

Page Contact Information: [EHP Web Team](#)

Page Last Modified: February 08, 2008 19:23:37 UTC

d: February 08, 2008 19:23:37 UTC

About.com Geology

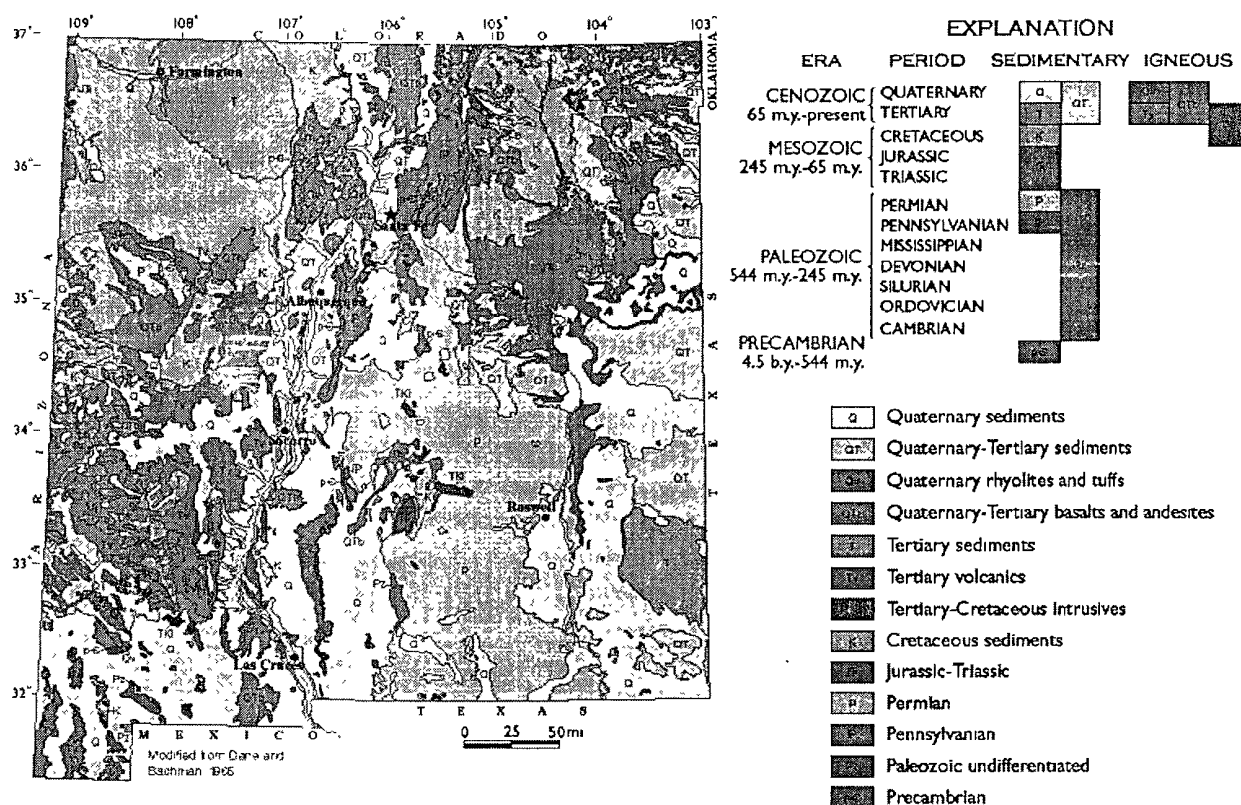


Geologic Map of New Mexico

Geologic Maps of the U.S. States

[Back to the New Mexico page](#)

GENERALIZED GEOLOGIC MAP OF NEW MEXICO



[Back to the New Mexico page](#)

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- Minerals, Gems & Resources

- Tectonics & Deep Earth
- Losses, Time & Evolution

Must Reads

- What Is Geology?
- Identify Rocks

Recent Helicorder Displays New Mexico Seismic Network

ANMO BHZ IU : Albuquerque USGS Seismological Lab

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00) | 06/28/2008 (00) | 06/27/2008 (00) |
06/26/2008 (00) | 06/25/2008 (00) | 06/24/2008 (00) | 06/23/2008 (00)

BAR EHZ SC : Barrett

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

BMT EHZ SC : Bear Mountains

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

CAR EHZ SC : Carthage

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

CARB BHE SC : Carthage Broadband Z

11/14/2007 (00) | 11/13/2007 (00) | 11/12/2007 (00) | 11/11/2007 (00) | 11/10/2007 (00) |
11/09/2007 (00) | 11/08/2007 (00) | 11/07/2007 (00) | 11/06/2007 (00) | 11/05/2007 (00) |
11/04/2007 (00) | 11/03/2007 (00) | 11/02/2007 (00) | 11/01/2007 (00)

CARB BHN SC : Carthage Broadband N

11/14/2007 (00) | 11/13/2007 (00) | 11/12/2007 (00) | 11/11/2007 (00) | 11/10/2007 (00) |
11/09/2007 (00) | 11/08/2007 (00) | 11/07/2007 (00) | 11/06/2007 (00) | 11/05/2007 (00) |
11/04/2007 (00) | 11/03/2007 (00) | 11/02/2007 (00) | 11/01/2007 (00)

CARB BHZ SC : Carthage Broadband E

11/14/2007 (00) | 11/13/2007 (00) | 11/12/2007 (00) | 11/11/2007 (00) | 11/10/2007 (00) |
11/09/2007 (00) | 11/08/2007 (00) | 11/07/2007 (00) | 11/06/2007 (00) | 11/05/2007 (00) |
11/04/2007 (00) | 11/03/2007 (00) | 11/02/2007 (00) | 11/01/2007 (00)

CBET EHZ SC : Carlsbad East Tower

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

CBKS BHZ US : Cedar Bluffs, KS

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

CL2B EHZ SC : Gnome Location

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

CL7 EHZ SC : WIPP Site

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

CPRX EHZ SC : Cap Rock

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

DAG EHZ SC : Dagger Draw

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

GDL2 EHZ SC : Guadalupe Mountains

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

HTMS EHZ SC : Hat Mesa

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

ISCO BHZ US : Idaho Springs, CO

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

LAZ EHZ SC : Sierra Ladrones

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

LEM EHE SC : Lemitar E

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

LEM EHN SC : Lemitar N

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

LEM EHZ SC : Lemitar Z

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

LPM EHZ SC : Los Pinos Mountains

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

MLM EHZ SC : Mesa Lucero

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

SBY EHZ SC : South Baldy

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

SDCO BHZ US : Sand Dunes National Park, CO

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

SMC EHZ SC : Southern Magdalena Mountains

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

SRH EHZ SC : Seven River Hills

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

SSS EHZ SC : San Simon Sink

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |

07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

WIS IS1 SC : Workman Infrasound

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

WTX EHZ SC : Wood's Tunnel (NMT)

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

WUAZ BHZ US : Wupatki, AZ

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

Y22D BHE TA : IRIS PASSCAL, Socorro, NM

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

Y22D BHN TA : IRIS PASSCAL, Socorro, NM

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

Y22D BHZ TA : IRIS PASSCAL, Socorro, NM

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

S21A BHE TA : Coal Bank Pass, CO

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

S21A BHN TA : Coal Bank Pass, CO

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

S21A BHZ TA : Coal Bank Pass, CO

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |

07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

121A BHE TA : Cook's Peak, NM

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

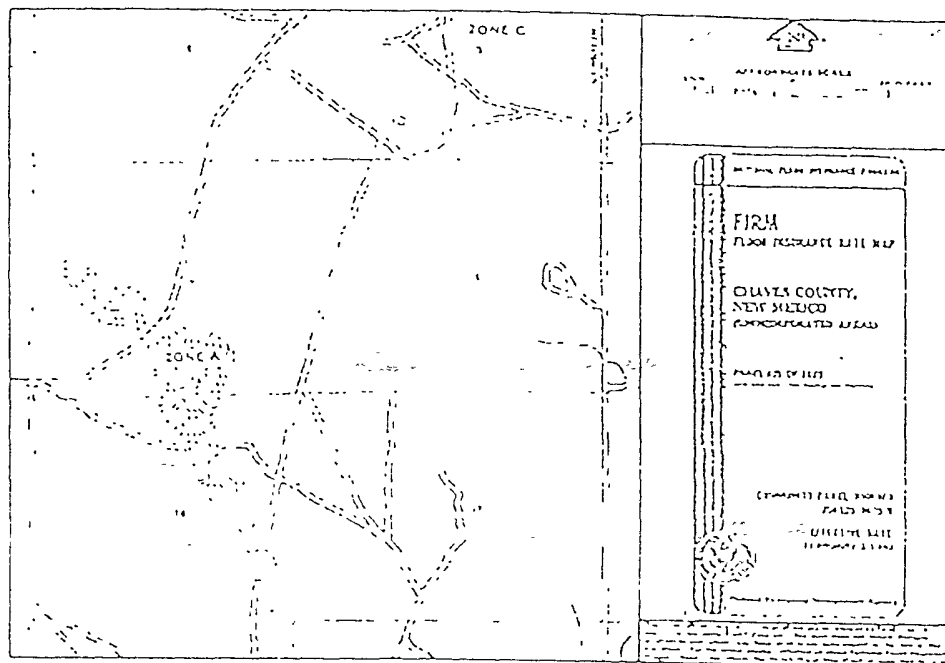
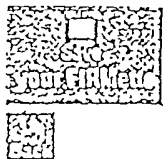
121A BHN TA : Cook's Peak, NM

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

121A BHZ TA : Cook's Peak, NM

07/14/2008 (00) | 07/13/2008 (00) | 07/12/2008 (00) | 07/11/2008 (00) | 07/10/2008 (00) |
07/09/2008 (00) | 07/08/2008 (00) | 07/07/2008 (00) | 07/06/2008 (00) | 07/05/2008 (00) |
07/04/2008 (00) | 07/01/2008 (00) | 06/30/2008 (00) | 06/29/2008 (00)

sitting requirement k



KEY TO MAP

SPECIAL FLOOD HAZARD AREA

ZONE A

EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100 year flood, base flood elevations and flood hazard factors not determined
C	Areas of minimal flooding (No shading)
D	Areas of undetermined, but possible, flood hazards
V	Areas of 100 year coastal flood with velocity (wave) forces