NM1 - 19

GENERAL CORRESPONDENCE

YEAR(S):

2006 - 2000

GANDY MARLEY INC.
NM-01-0020

AMENDMENTS
Minor Modification
Evaporation Pond

June 5, 2006

NMOCD Environmental
ATTN: Wayne Price
1220 S. Saint Francis Drive
Santa Fe, NM 87504

RE: Gandy Marley Inc. NM-01-0020
Amendment to C-137
Minor Modification, Evaporation Pond

Mr. Price:

Find attached additional information as requested, and new form C-137, signed by Mr. Gandy.

We hope this will help clear up any questions you have concerning the recent application.

If you have additional questions, please call and we can discuss them.

Thanks for your help and time in this process.

Sincerely,

Eddie W. Seay, Agent
Eddie Seay Consulting
601 W. Illinois
Hobbs, NM 88242
(505)392-2236
seay04@leaco.net

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

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-137
Revised June 10, 2003

Submit Original Plus 1
Copy to Santa Fe
1 Copy Appropriate
District Office

APPLICATION FOR WASTE MANAGEMENT FACILITY

(Refer to the OCD Guidelines for assistance in completing the application)

☐ Commercial ☐ Centralized

1. Type: ☒ Evaporation ☐ Injection ☐ Other
   ☐ Solids/Landfarm ☐ Treating Plant
2. Operator: Gandy Marley Inc.
   Address: P.O. Box 1658 Roswell, NM 88202
   Contact Person: Larry Gandy Phone: (505)398-4960
3. Location: SW /4 /4 Section 4 Township 11 S. Range 31 E.
   Submit large scale topographic map showing exact location
4. Is this a modification of an existing facility? ☒ Yes ☐ No
5. Attach the name and address of the landowner of the facility site and landowners of record within one mile of the site.
6. Attach description of the facility with a diagram indicating location of fences, pits, dikes, and tanks on the facility.
7. Attach designs prepared in accordance with Division guidelines for the construction/installation of the following: pits or ponds, leak-detection systems, aerations systems, enhanced evaporation (spray) systems, waste treating systems, security systems, and landfarm facilities.
8. Attach a contingency plan for reporting and clean-up for spills or releases.
9. Attach a routine inspection and maintenance plan to ensure permit compliance.
10. Attach a closure plan.
11. Attach geological/hydrological evidence demonstrating that disposal of oil field wastes will not adversely impact groundwater. Depth to and quality of ground water must be included.
12. Attach proof that the notice requirements of OCD Rule 711 have been met.
13. Attach a contingency plan in the event of a release of H_2S.
14. Attach such other information as necessary to demonstrate compliance with any other OCD rules, regulations and orders.
15. CERTIFICATION
    I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: Larry Gandy Title: Vice-President

Signature: Larry D Gandy Date: 04-12-06

E-mail Address:

AMENDMENTS
MINOR MODIFICATION C-137
GANDY MARLEY NM-01-0020

1) I have attached a new C-137 form signed by Mr. Larry Gandy, Vice President of Gandy-Marley. Also, a letter is being sent to the OCD designating Eddie W. Seay as agent for Gandy Marley.

2) The proposed pond is located between cells 1 and 6, all within the permitted landfarm area. I think the old plat plan was unclear. We have supplied new map showing pond location. (Attachment 1)

3) (Attachment 2) A signed and certified copy of the drawing by Falcon's Engineer.

Gandy Marley is ready to construct the evaporation pond as soon as the OCD approves.

1) Clear a site and excavate down 4 feet using excavated material for berms.
2) Prepare subgrade with red clay compacted to a minimum of 90%, the materials dry density as determined by ASTM D 1557.
3) Compact berms prior to installing liner material.
4) Slope pit floor at 2% to middle and slope leak detection 2% to sump.
5) Prepare leak detection and sump as OCD outlines.
6) Properly install liner and anchor.
7) Construct concrete loading area.

Falcon Engineering will monitor all aspects of the construction to ensure that all protocol and design specifications are followed.

4) See Attachment 3, Product Data Sheet. This information covers all aspects of the geo-net liner.

5) Gandy Marley has decided to use schedule 80 pvc piping for its leak detection laterals. The 4 inch pvc pipe will be sloped at 1.2%. The pvc pipe will be perforated on location using four half inch holes per foot. The up gradient end of the leak detection pipe will be capped so we can remove cap and flush laterals with fresh water to ensure pipe is clear and all fluids are disposed of.

6) The bottom of the proposed evaporation pond will be sloped at 1.6% towards the middle to the leak detection line.

7) Gandy Marley has decided not to use the pipe boot system. The leak detection line will run up the side slopes of the pond.

8) The leak detection sump will be installed below the subgrade as that fluid, if a leak were to occur, would run into sump. The sump will have capacity of 10 bls. A pump will be

installed in the sump to put any accumulation of fluid into an onsite tank. The pump will have a meter built in to measure total volume of leakage. Any fluids that show up in sump will be tested for TPH, BTEX and Chloride.

As per Rule 116, any suspected leak will be reported to the OCD immediately. Gandy Marley will promptly investigate and make repairs as needed.

9) The cement containment is the unloading point for vacuum trucks. (See Attachment 4) The cement containment will be 60′ x 40′ in size, installed on top of 60 mil poly liner. The cement containment will be designed to separate solids and oil from containment, and only water will be pumped to evaporation pond. The solids will be put into the landfill and any oil will be stored in 750 bl. tank on site. Any accumulation of oil will be taken to a reclaiming facility permitted with C-117.

10) See previous answer 9.

11) After refiguring the volume of the proposed pond, it calculates to be approximately 85,000 bls. not including freeboard.

Bill Marley visited with the State Engineer concerning construction of pond. State Engineers told him they only regulated fresh water ponds and/or containments.

12) The proposed pond will be approximately 4 feet below grade and approximately 4 feet above grade. The berm will be approximately 4 feet above grade and approximately 24 feet thick. The berms will be machine compacted prior to installing liner.

The proposed evaporation pond will be inside the landfarm area. The landfarm is already constructed to prevent storm water run off and run on.

13) Fluids will enter the pond through poly pipe pumped from cement containment over the top of berm into pond. The area where the water enters the pond will be a reinforced pad over a 60 mil liner.

14) Item 5-14 have been addressed in the Gandy Marley Permit NM-01-20.

The closure information for the pond:

1) Notify OCD to stop operation.
2) Continue to allow pond to fully evaporate.
3) Remove liner, cement containment and loading area and deposit in Gandy Marley landfill.
4) Backfill and level pond area.

Contingency plan for leak:

1) Notify OCD that pond has leak.
2) Stop putting fluid into pond.

3) Empty pond by vacuum truck and haul fluid to an OCD approved disposal.
4) Repair and inspect pond liner.
5) All work will be done only after OCD approved a plan for correction.

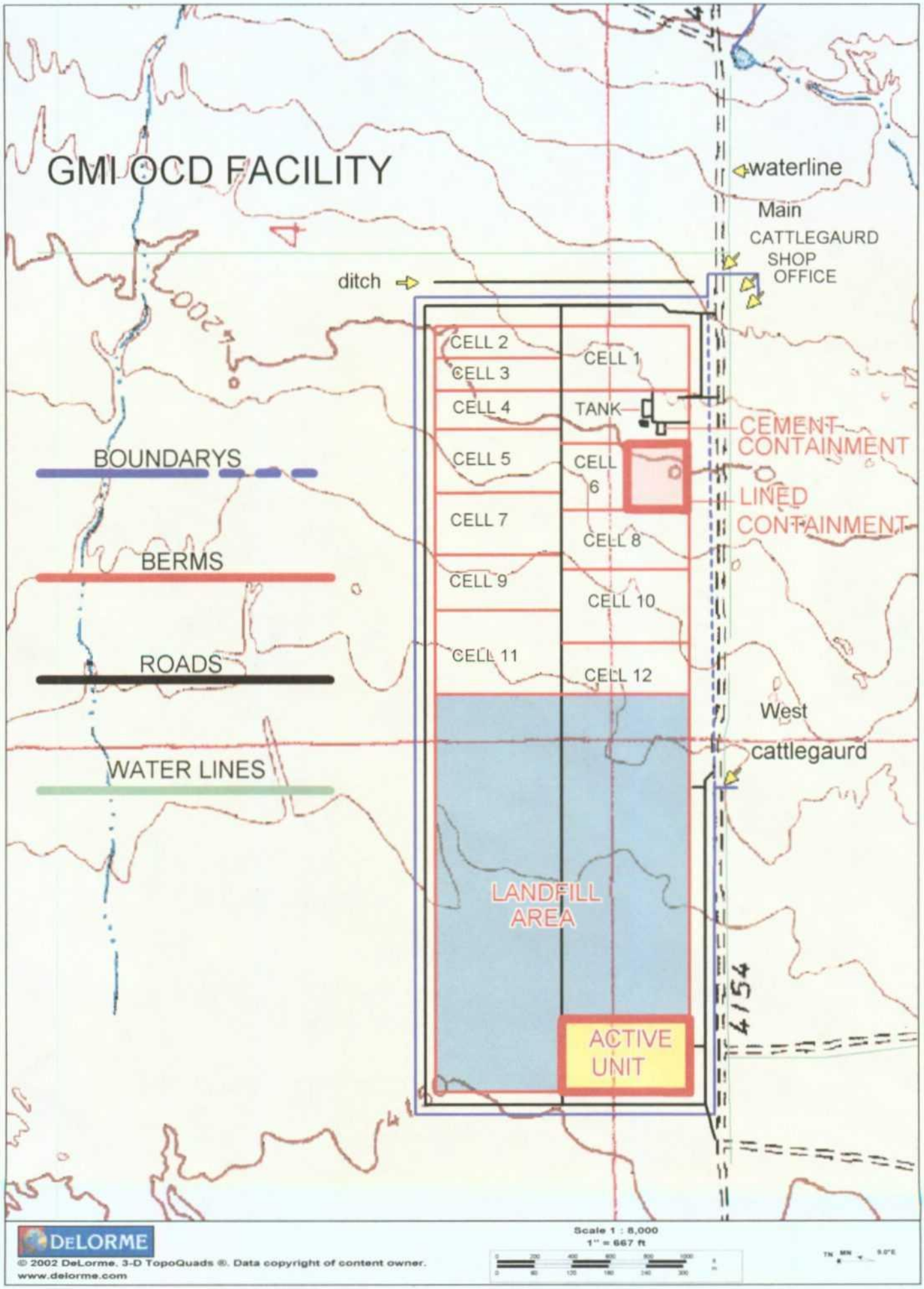
To remove liner, and concrete, all this material will go to Gandy Marley.
Use dozer to level and backfill.
The financial assurance to perform work is approximately $7,500.00.

15) The subgrade at the proposed pond will be native soil screened and graded to remove all rocks, no larger that 2 inches in diameter. Lay down 12 inches of clay compacted, below pond liner. This clay will have a hydraulic conductivity of not more than 1 x 10_7 cm/sec when compacted and tested in accordance with ASTM D 5084.

The work will be performed using a caterpillar 825 compactor or equal equipment. The redbed liner will be tested by an Engineer to assure the total surface has a good clay bed.

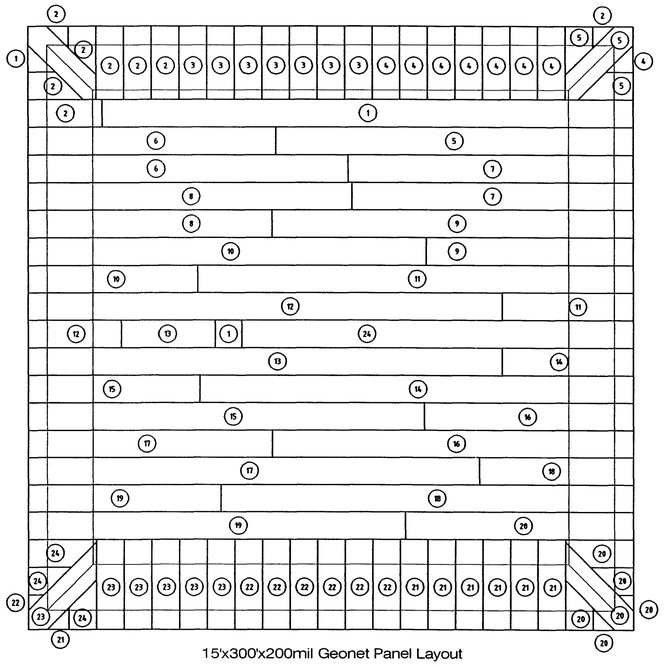
ATTACHMENT

1

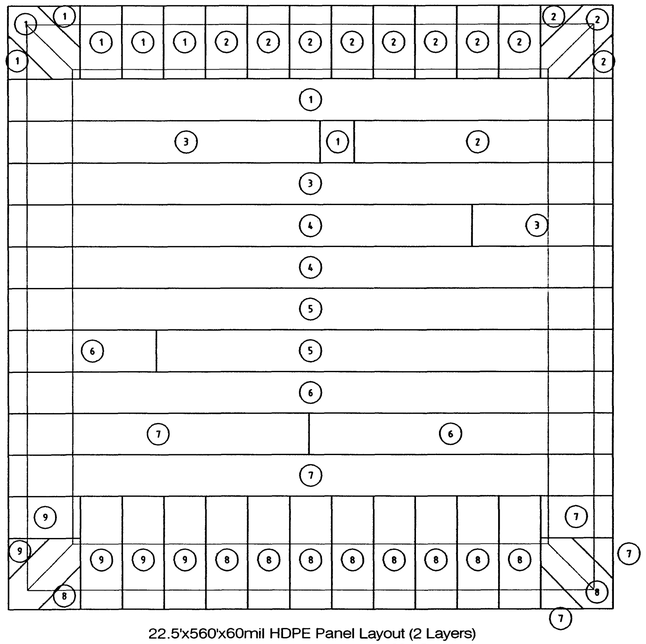

GMI OCD FACILITY
waterline
Main
CATTLEGAURD
SHOP
OFFICE
ditch
CELL 2
CELL 3
CELL 4
CELL 5
CELL 7
CELL 9
CELL 11
CELL 1
TANK
CELL 6
CELL 8
CELL 10
CELL 12
CEMENT CONTAINMENT
LINED CONTAINMENT
BOUNDARYS
BERMS
ROADS
WATER LINES
West
cattlegaurd
LANDFILL AREA
ACTIVE UNIT
4154
DELORME
© 2002 DeLorme. 3-D TopoQuads ®. Data copyright of content owner.
www.delorme.com
Scale 1 : 8,000
1" = 667 ft

ATTACHMENT

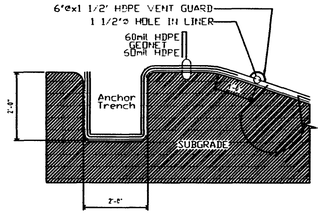
2



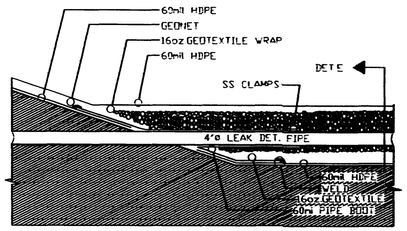
15'x300'x200mil Geonet Panel Layout
SCALE : 1"=40'



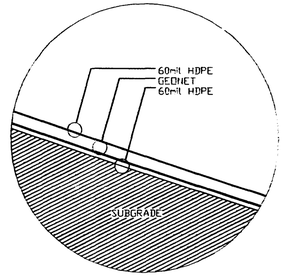
22.5'x560'x60mil HDPE Panel Layout (2 Layers)
SCALE : 1"=40'



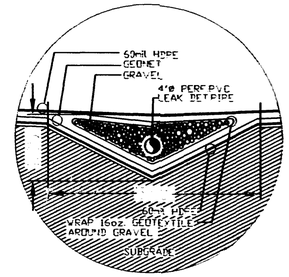
Section Thru 'B'
not to scale



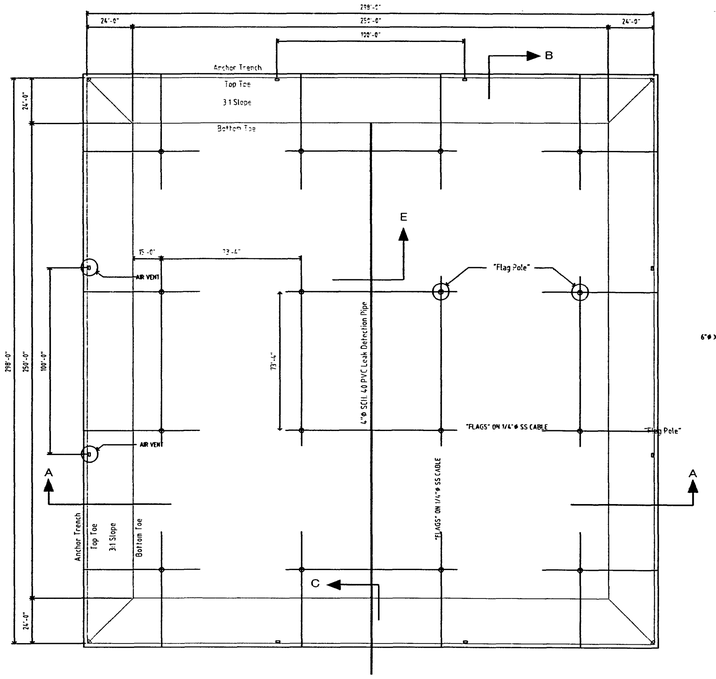
Section Thru 'C'
not to scale



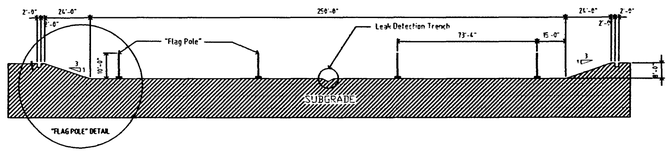
Section Thru 'D'
not to scale



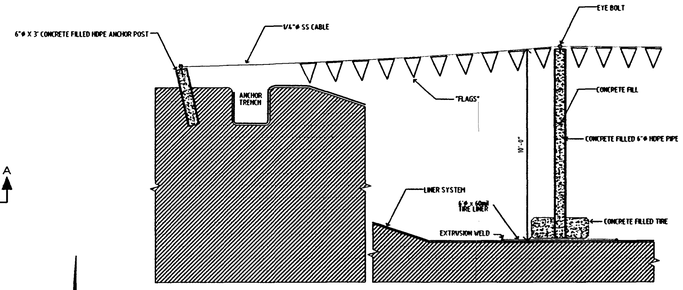
Section Thru 'E'
not to scale



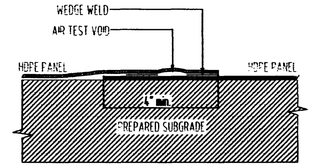
Brine Pond Layout
SCALE : 1"=40'



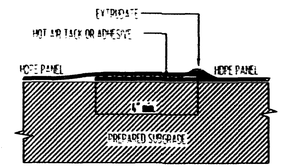
Section Thru 'A'



"FLAG POLE" DETAIL
not to scale



Wedge Weld Detail
not to scale



Extrusion Weld Detail
not to scale

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY WM. RAY CAMPBELL, JR. P.E. NO. 47948 ON APRIL 19 2006

NO.	REVISIONS	DATE:	DWN BY	APP BY

LANDTEC engineers

1700 ROBERT ROAD
MANSFIELD, TX 76063
PHONE 682.518.5498
FAX 682.518.5139

PROPOSED LINER LAYOUT & DETAILS

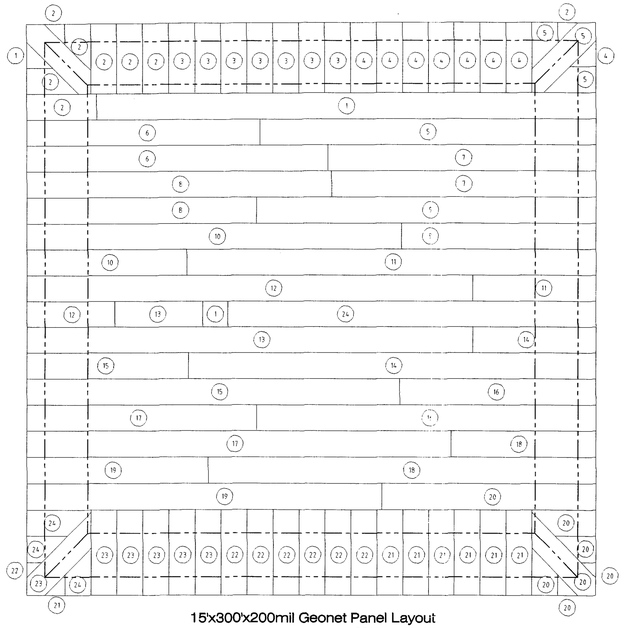
GANDY MARLEY BRINE POND
TATUM, NM

DATE: 04/2006
PROJ NO: 0406-831

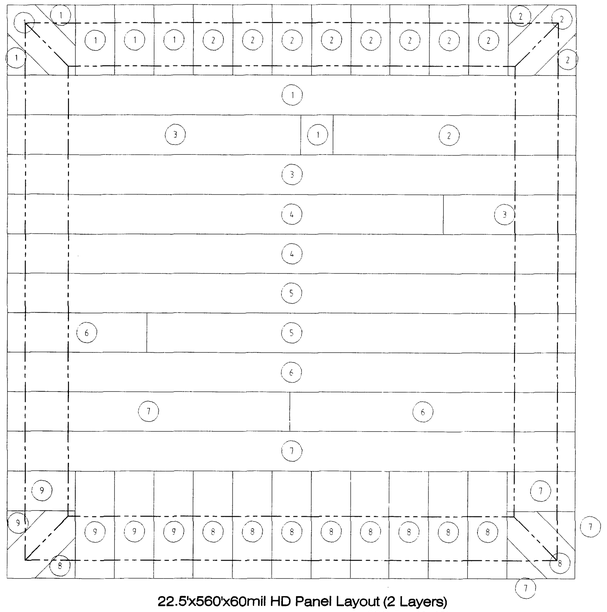
DRAWN BY: TOR
APPD BY: WRC

DRAWING A1

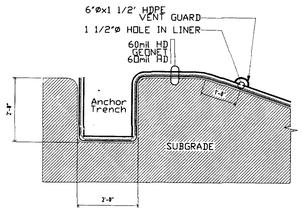
Q:\Projects\Gandy Marley\Brine Pond-831\Liner layout & Details.dwg Layout: Layout1 User: tobeson



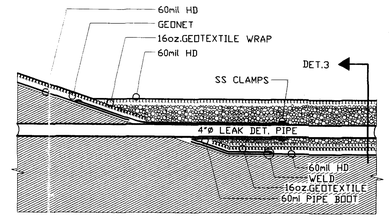
15'x300'x200mil Geonet Panel Layout
SCALE : 1"=40'



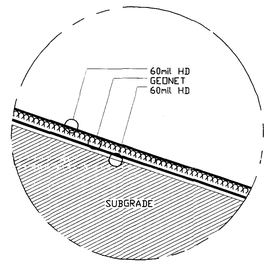
22.5'x560'x60mil HD Panel Layout (2 Layers)
SCALE : 1"=40'



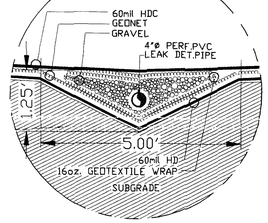
Section Thru 'B'
not to scale



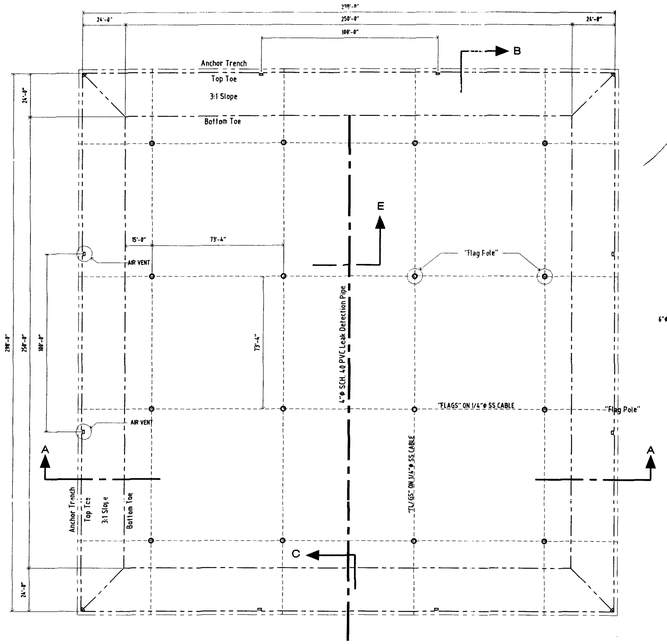
Section Thru 'C'
not to scale



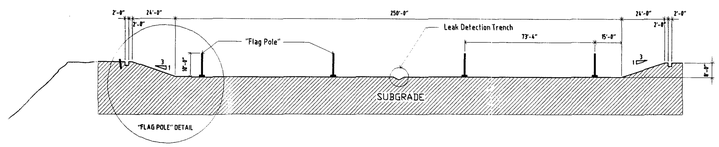
Section Thru 'D'
not to scale



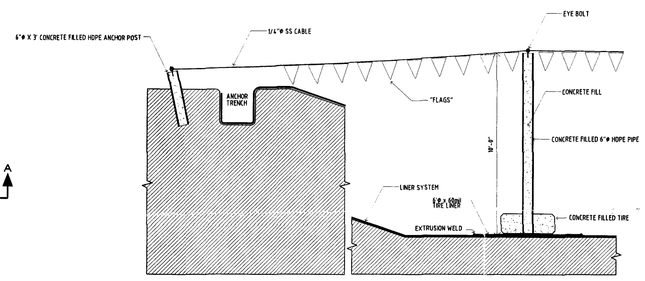
Section Thru 'E'
not to scale



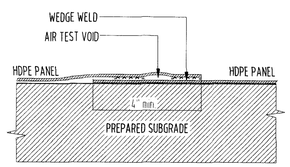
Brine Pond Layout
SCALE : 1"=40'



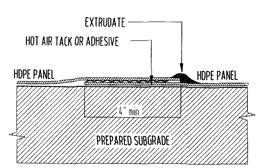
Section Thru 'A'



"FLAG POLE" DETAIL
not to scale



Wedge Weld Detail
not to scale



Extrusion Weld Detail
not to scale

PROPOSED BRINE POND & LINER LAYOUT

SCALE : AS SHOWN

PROPOSED LINER LAYOUT & DETTAILS

GANDY MARLEY BRINE POND
TATUM, NM

Drawn By :	JASMIN	Material :	60 mil HD GEOTEXTILE
Date :	03/06/06	Checked By :	
Scale :	AS SHOWN	Sheet No.	1/1

FALCON ENVIRONMENTAL LINING SYSTEMS, INC.
5200 Johnson Road, Odessa, TX 79764
(432) 366 2611 FAX - 366 2999

ATTACHMENT

3

GSE®

Product Data Sheet

GSE STANDARD PRODUCTS

GSE HD

GSE HD is a smooth, high quality, high density polyethylene (HDPE) geomembrane produced from specially formulated, virgin polyethylene resin. This polyethylene resin is designed specifically for flexible geomembrane applications. It contains approximately 97.5% polyethylene, 2.5% carbon black and trace amounts of antioxidants and heat stabilizers; no other additives, fillers or extenders are used. GSE HD has outstanding chemical resistance, mechanical properties, environmental stress crack resistance, dimensional stability and thermal aging characteristics. GSE HD has excellent resistance to UV radiation and is suitable for exposed conditions. *These product specifications meet or exceed GRI GM13.*

Product Specifications

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM VALUE				
Product Code			HDE 030A000	HDE 040A000	HDE 060A000	HDE 080A000	HDE 100A000
Thickness, (minimum average) mil (mm)	ASTM D 5199	every roll	30 (0.75)	40 (1.00)	60 (1.50)	80 (2.00)	100 (2.50)
Lowest individual reading (-10%)			27 (0.69)	36 (0.91)	54 (1.40)	72 (1.80)	90 (2.30)
Density, g/cm³	ASTM D 1505	200,000 lb	0.94	0.94	0.94	0.94	0.94
Tensile Properties (each direction)	ASTM D 6693, Type IV	20,000 lb					
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm		114 (20)	152 (27)	228 (40)	304 (53)	380 (67)
Strength at Yield, lb/in-width (N/mm)			63 (11)	84 (15)	126 (22)	168 (29)	210 (37)
Elongation at Break, %	G.L. 2.0 in (51 mm)		700	700	700	700	700
Elongation at Yield, %	G.L. 1.3 in (33 mm)		12	12	12	12	12
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	21 (93)	28 (125)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	54 (240)	72 (320)	108 (480)	144 (640)	180 (800)
Carbon Black Content, %	ASTM D 1603	20,000 lb	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	+Note 1	+Note 1	+Note 1	+Note 1	+Note 1
Notched Constant Tensile Load, hr	ASTM D 5397, Appendix	200,000 lb	300	300	300	300	300
REFERENCE PROPERTY	**TEST METHOD**	**FREQUENCY**	**NOMINAL VALUE**				
Oxidative Induction Time, min	ASTM D 3895, 200° C; O_2, 1 atm	200,000 lb	>100	>100	>100	>100	>100
Roll Length[1] (approximate), ft (m)			1,120 (341)	870 (265)	560 (171)	430 (131)	340 (104)
Roll Width[1], ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft² (m²)			25,200 (2,341)	19,575 (1,819)	12,600 (1,171)	9,675 (899)	7,650 (711)

NOTES:

- +Note 1: Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- GSE HD is available in rolls weighing about 3,900 lb (1,769 kg)
- All GSE geomembranes have dimensional stability of ±2% when tested with ASTM D 1204 and LTB of <-77° C when tested with ASTM D 746.
- [1]Roll lengths and widths have a tolerance of ± 1%.

DS005 HD R03/09/06

North America	GSE Lining Technology, Inc.	Houston, Texas	800 435 2008	281 443 8564	Fax: 281 230 8650
South America	GSE Lining Technology Chile S.A.	Santiago, Chile		56 2 595 4200	Fax: 56 2 595 4290
Asia Pacific	GSE Lining Technology Company Limited	Bangkok, Thailand		66 2 937 0091	Fax: 66 2 937 0097
Europe & Africa	GSE Lining Technology GmbH	Hamburg, Germany		49 40 767420	Fax: 49 40 7674234
Middle East	GSE Lining Technology-Egypt	The 6th of October City, Egypt		202 2 828 8888	Fax: 202 2 828 8889

www.gseworld.com

GSE®

GSE STANDARD PRODUCTS

Product Data Sheet

GSE HyperNet, HF, HS and UF Geonet

GSE HyperNet geonets are synthetic drainage materials manufactured from a premium grade high density polyethylene (HDPE) resin. The structure of the HyperNet geonet is formed specifically to transmit fluids uniformly under a variety of field conditions. HDPE resins are inert to chemicals encountered in most of the civil and environmental applications where these materials are used. GSE geonets are formulated to be resistant to ultraviolet light for time periods necessary to complete installation. GSE HyperNet geonets are available in standard, HF, HS, and UF varieties.

The table below provides index physical, mechanical and hydraulic characteristics of GSE geonets. Contact GSE for information regarding performance of these products under site-specific load, gradient, and boundary conditions.

Product Specifications

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM AVERAGE ROLL VALUE[b]			
			HyperNet	HyperNet HF	HyperNet HS	HyperNet UF
Product Code			XL4000N004	XL5000N004	XL7000N004	XL8000N004
Transmissivity[a], gal/min/ft (m^2/sec)	ASTM D 4716	1/540,000 ft^2	9.66 (2×10^{-4})	14.49 (3×10^{-4})	28.98 (6×10^{-4})	38.64 (8×10^{-4})
Thickness, mil (mm)	ASTM D 5199	1/50,000 ft^2	200 (5)	250 (6.3)	275 (7)	300 (7.6)
Density, g/cm^3	ASTM D 1505	1/50,000 ft^2	0.94	0.94	0.94	0.94
Tensile Strength (MD), lb/in (N/mm)	ASTM D 5035	1/50,000 ft^2	45 (7.9)	55 (9.6)	65 (11.5)	75 (13.3)
Carbon Black Content, %	ASTM D 1603, modified	1/50,000 ft^2	2.0	2.0	2.0	2.0
Roll Width[c], ft (m)			15 (4.6)	15 (4.6)	15 (4.6)	15 (4.6)
Roll Length[c], ft (m)			300 (91)	250 (76)	220 (67)	200 (60)
Roll Area, ft^2 (m^2)			4,500 (418)	3,750 (348)	3,300 (305)	3,000 (278)

NOTES:

- [a]Gradient of 0.1, normal load of 10,000 psf, water at 70° F (20° C), between steel plates for 15 minutes.
- [b]These are MARV values that are based on the cumulative results of specimens tested by GSE.
- [c]Roll widths and lengths have a tolerance of ±1%.

North America	GSE Lining Technology, Inc.	Houston, Texas	800 435 2008	281 443 8564	Fax: 281 230 8650
South America	GSE Lining Technology Chile S.A.	Santiago, Chile		56 2 595 4200	Fax: 56 2 595 4290
Asia Pacific	GSE Lining Technology Company Limited	Bangkok, Thailand		66 2 937 0091	Fax: 66 2 937 0097
Europe & Africa	GSE Lining Technology GmbH	Hamburg, Germany		49 40 767420	Fax: 49 40 7674234
Middle East	GSE Lining Technology-Egypt	The 6th of October City, Egypt		202 2 828 8888	Fax: 202 2 828 8889

www.gseworld.com

GSE®

GSE STANDARD PRODUCTS

Product Data Sheet

GSE Nonwoven Geotextile

GSE Nonwoven Geotextiles is a family of polypropylene, staple fiber, nonwoven, needlepunched geotextiles. Manufactured using an advanced manufacturing and quality system, these products are the most uniform and consistent nonwoven, needlepunched geotextile currently available in the industry. GSE combines a fiber selection and approval system with in-line quality control and a state-of-the-art laboratory to ensure that every roll shipped meets customer specifications. The company has performed extensive performance testing to evaluate suitability of its nonwovens for various applications. GSE Nonwoven Geotextiles are available in a range of weights to meet your specific project needs. *These product specifications meet or exceed GRI GT12, GRI GT13 and AASHTO M288.*

Product Specifications

TESTED PROPERTY	TEST METHOD	FREQUENCY	NW4	NW6	NW8	NW10	NW12	NW16
Product Code			GEO 0408002	GEO 0608002	GEO 0808002	GEO 1008002	GEO 1208002	GEO 1608002
AASHTO M288 Class			3	2	1	>1	>>1	>>>1
Mass per Unit Area, oz/yd² (g/m²)	ASTM D 5261	90,000 ft²	4 (135)	6 (200)	8 (270)	10 (335)	12 (405)	16 (540)
Thickness	ASTM D 5199	1/90,000 ft²	45 mil	70 mil	80 mil	100 mil	110 mil	155 mil
Grab Tensile Strength, lb (N)	ASTM D 4632	90,000 ft²	120 (530)	170 (755)	220 (975)	260 (1,155)	320 (1,420)	390 (1,735)
Grab Elongation, %	ASTM D 4632	90,000 ft²	50	50	50	50	50	50
Puncture Strength, lb (N)	ASTM D 4833	90,000 ft²	60 (265)	90 (395)	120 (525)	165 (725)	190 (835)	240 (1,055)
Trapezoidal Tear Strength, lb (N)	ASTM D 4533	90,000 ft²	50 (220)	70 (310)	95 (420)	100 (445)	125 (555)	150 (665)
Apparent Opening Size, Sieve No. (mm)	ASTM D 4751	540,000 ft²	70 (0.212)	70 (0.212)	80 (0.180)	100 (0.150)	100 (0.150)	100 (0.150)
Permittivity, sec⁻¹	ASTM D 4491	540,000 ft²	1.50	1.50	1.50	1.20	0.80	0.70
Permeability, cm/sec	ASTM D 4491	540,000 ft²	0.22	0.30	0.30	0.30	0.29	0.27
Water Flow Rate, gpm/ft² (l/min/m²)	ASTM D 4491	540,000 ft²	120 (4,885)	110 (4,480)	110 (4,480)	85 (3,460)	60 (2,440)	50 (2,035)
UV Resistance (% retained after 500 hours)	ASTM D 4355	per formulation	70	70	70	70	70	70
Roll Length[1], ft (m)			600 (182)	600 (182)	600 (182)	300 (91)	300 (91)	300 (91)
Roll Width[1], ft (m)			15 (4.6)	15 (4.6)	15 (4.6)	15 (4.6)	15 (4.6)	15 (4.6)
Roll Area, ft² (m²)			9,000 (836)	9,000 (836)	9,000 (836)	4,500 (418)	4,500 (418)	4,500 (418)

NOTES:

- The property values listed are in weaker principal direction. All values listed are Minimum Average Roll Values (MARV) except apparent opening size in mm and UV resistance. Apparent opening size (mm) is a Maximum Average Roll Value. UV is a typical value.
- [1]Roll lengths and widths have a tolerance of ±1%.

GS037 NW R03/15/06

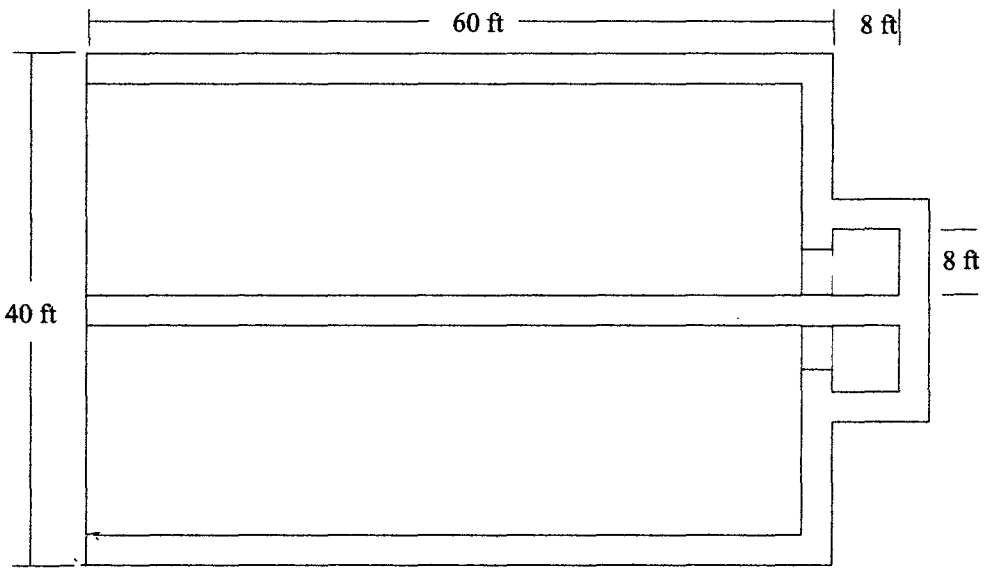
North America	GSE Lining Technology, Inc.	Houston, Texas	800 435 2008	281 443 8564	Fax: 281 230 8650
South America	GSE Lining Technology Chile S.A.	Santiago, Chile		56 2 595 4200	Fax: 56 2 595 4290
Asia Pacific	GSE Lining Technology Company Limited	Bangkok, Thailand		66 2 937 0091	Fax: 66 2 937 0097
Europe & Africa	GSE Lining Technology GmbH	Hamburg, Germany		49 40 767420	Fax: 49 40 7674234
Middle East	GSE Lining Technology-Egypt	The 6th of October City, Egypt		202 2 828 8888	Fax: 202 2 828 8889

www.gseworld.com

ATTACHMENT

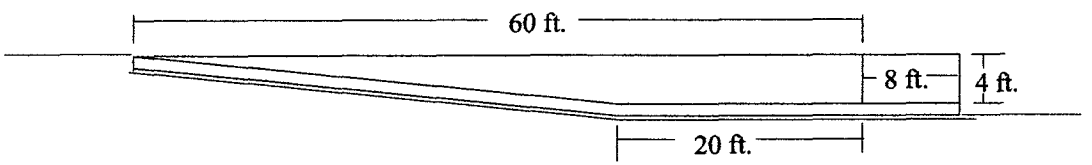
4

CEMENT CONTAINMENT
OVERHEAD VEIW



2 Ft. thick end walls
18 In. thick side walls
9 In. thick floor
All cement will be reinforced with #4 rebar on 1 ft. centers

CEMENT CONTAINMENT
SIDE VEIW



Poly liner ————
Soil ————

Cement floor will be poured on a poly liner
All seams will be sealed

Martin, Ed, EMNRD

From: Price, Wayne, EMNRD
Sent: Friday, May 12, 2006 1:24 PM
To: seay04@leaco.net; gandy2@leaco.net
Cc: Martin, Ed, EMNRD
Subject: Gandy Marly Minor Modification
Attachments: OCD Technical Review of Gandy Marley Inc4.doc

Dear Gentlemen:

The OCD has conducted a technical review of the recent application for a new brine pond at the Gandy Marley permitted surface waste management facility permit # NM-1-019. In order for OCD to proceed it will be necessary to have a technical meeting to discuss issues noted in the attached document. Please make arrangements with OCD to discuss these issues.

Wayne Price- Environmental Bureau Chief
Oil Conservation Division
1220 S. Saint Francis
Santa Fe, NM 87505
E-mail wayne.price@state.nm.us
Tele: 505-476-3487
Fax: 505-4763462

May 12, 2006

Comments of Technical Review:

OCD Technical Review of Application for Minor Modification submitted April 12, 2006 Gandy Marley Inc. NM-01-0020. Proposed Brine Pond & Liner system application and layout drawing sheet 1/1 Falcon Environmental Lining Systems, Inc. dated 03/06/06 drawn by: JASMIN.

1. The application needs to be signed by the owner/operator or a letter supplied indicating that the consultant is an agent of the owner/operator.

2. The description indicates the pit will be located between landfarm cells 1 and 6. The two plot plans supplied appears to show the new (pit) pond located outside of the landfarm area. The two plot plans supplied is showing a proposed landfill site which OCD believes is actually installed. OCD needs to know exactly where the new pond is to be located. Is the new pond (pit) located outside of the original permit boundary? OCD would like to see a new up-dated plot plan.

3. The drawing submitted was not checked by a representative of Falcon or design engineer. There was no scope of work, construction or material specifications, quality control plan, or testing program provided.

4. There was no liner and geo-net product information provided.

5. Please provide information that schedule 40 PVC pipe will withstand the structure and hydrostatic loading of the system. The 4 inch leak detection pipe does not appear to be sloped. There is no product information on the slotted pipe. Is there a way to check if pipe has been plugged and a way to clean it out?

6. The bottom of the pond does not appear to have an adequate drainage slope.

7. Section C shows a pipe boot system. OCD is concerned this may be a weak point in the system for undetected leaks.

8. The drawing did not show the external leak detection sump. The application did not adequately address how fluids in the pond and leak detection will be tested and for what parameters. The leak detection sump should be designed to be able to check total volume of leakage and installed with a sump pump or other fluid removal system.

9. The application contained a drawing of a cement containment. There was no explanation for what this device is to be used for.

10. The only waste proposed in the application was drilling fluids. How will oil and solids be screened out? If solids build up in the pond how will they be monitored and removed with out damaging the liner? Where will these solids be disposed of? How will accumulations of oils be handled?

11. OCD calculations show the pond volume capacity will exceed the proposed 50,000 bbls by at least 44%. If the pond exceeds 10 acre feet then it may have to be designed and permitted pursuant to the NM State Engineers requirements for dams. This should be verified and volume calculations provided.

12. Will the pond be below grade, above grade, or combination of both? If any part is above grade, how will the dike be designed and protected? If below grade, how will stormwater run-in be prevented?

13. How will fluids enter and exit the pond? Is there a design to protect the liner in this area?

14. The application did not address items 5-14. If these items are adequately addressed in the current plan then a statement should be made to point this out and reference to the original permit. There was no closure plan submitted for the pond or contingency plan if a leak develops. How will this additional impact the financial assurances?

15. There was no subgrade design specifications, e.g. thickness, type of soils, compaction information, testing or survey information, etc. OCD recommends that Gandy Marley supply permeability information for the prepared subgrade. This would provide a safety net for any future leaks.

April 12, 2006

NMOCD Environmental
ATTN: Ed Martin
1220 S. Saint Francis Drive
Santa Fe, NM 87504

RE: Gandy Marley Inc. (NM-01-0020)
Minor Modification
Evaporation Pond

Mr. Martin:

On behalf of Gandy Marley Inc., I submit an application to construct an evaporation pond for the purpose of depositing drilling fluids from oil and gas operations.

The pit will be lined and will have a leak detection system as OCD requires.

After reviewing the application, call if you have any questions.

Sincerely,

Eddie W. Seay

Eddie W. Seay, Agent
Eddie Seay Consulting
601 W. Illinois
Hobbs, NM 88242
(505)392-2236
seay04@leaco.net

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

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-137
Revised June 10, 2003

Submit Original Plus 1
Copy to Santa Fe
1 Copy Appropriate
District Office

APPLICATION FOR WASTE MANAGEMENT FACILITY

(Refer to the OCD Guidelines for assistance in completing the application)

☐ Commercial ☐ Centralized

1. Type: ☒ Evaporation ☐ Injection ☐ Other
   ☐ Solids/Landfarm ☐ Treating Plant
2. Operator: Gandy Marley Inc.
   Address: P.O. Box 1658 Roswell, NM 88202
   Contact Person: Larry Gandy Phone: (505)398-4960
3. Location: ____/4 ____/4 Section 4,5,8,9 Township 11S Range 31E
   Submit large scale topographic map showing exact location
4. Is this a modification of an existing facility? ☒ Yes ☐ No
5. Attach the name and address of the landowner of the facility site and landowners of record within one mile of the site.
6. Attach description of the facility with a diagram indicating location of fences, pits, dikes, and tanks on the facility.
7. Attach designs prepared in accordance with Division guidelines for the construction/installation of the following: pits or ponds, leak-detection systems, aerations systems, enhanced evaporation (spray) systems, waste treating systems, security systems, and landfarm facilities.
8. Attach a contingency plan for reporting and clean-up for spills or releases.
9. Attach a routine inspection and maintenance plan to ensure permit compliance.
10. Attach a closure plan.
11. Attach geological/hydrological evidence demonstrating that disposal of oil field wastes will not adversely impact groundwater. Depth to and quality of ground water must be included.
12. Attach proof that the notice requirements of OCD Rule 711 have been met.
13. Attach a contingency plan in the event of a release of H_2S.
14. Attach such other information as necessary to demonstrate compliance with any other OCD rules, regulations and orders.
15. CERTIFICATION
    I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: Eddie W. Seay Title: Agent

Signature: Eddie W. Seay Date: 04-12-06

E-mail Address: seay04@leaco.net

2006 APR 18 PM 1 11

GANDY MARLEY INC.
NM-01-0020

Minor Modification
Evaporation Pond

EDDIE SEAY

CONSULTING SERVICES

ENVIRONMENTAL,
GEOLOGICAL & REGULATORY
SPECIALISTS

601 W. ILLINOIS
HOBBS, NEW MEXICO 88242
(505) 392-2236
FAX (505) 392-6949
MOBILE (505) 390-2454

EDDIE W. SEAY
CEI, CES
seay04@leaco.net

Evaporation Pond

Gandy Marley is requesting to construct a 200′ x 200′ x 8′ evaporation pond at its existing facility. The pond will be double lined with 60 mil. plastic and will have an OCD designed leak detection system.

The pit will be located at its permitted landfarm facility between cell 1 and 6. The fluids that are to be put into the pond will be from drilling pits at oil and gas operations.

The evaporation pond is designed using OCD guidelines for requirements and standards. (See map for details)

Design

1) 60 mil. liner will be used on top and bottom. The liner material is resistant to UV, hydrocarbons and salt.
2) The pond will have a leak detection system, using 4″ schedule 40 pvc as the lateral, and having a drainage and sump system as the inspection hole. The slotted pvc will be installed between the two lines. The leak detection will be checked weekly.
3) Complete details about the construction are on the attached map.
4) The evaporation pond is approximately 1 acre in size and has an evaporation rate of 2000 bls. per month per acre. This information comes from an Examiner Hearing Case #7329, Page 33-34 (Loco Hills Disposal).

   The pond will have capacity of holding approximately 50,000 bls., which will allow for a 18″ freeboard to prevent overspraying and spillage, a water level marker will be installed at top to indicate full level.
5) The grade and slope of the levees are 3:1 as guidelines specify.
6) The pond bed will be prepared properly before installing liner.
7) The liner will be properly anchored and smooth.
8) The pond will be flagged to prevent migratory birds from settling on pond.

The pond is designed to prevent migration of fluids and waste.

Gandy will notify the OCD prior to construction so that they can monitor all aspects of construction. Any changes in construction will be made only after OCD approves.

If you have any questions concerning this project, please call.

Your cooperation is appreciated.

Thanks.

Figures:

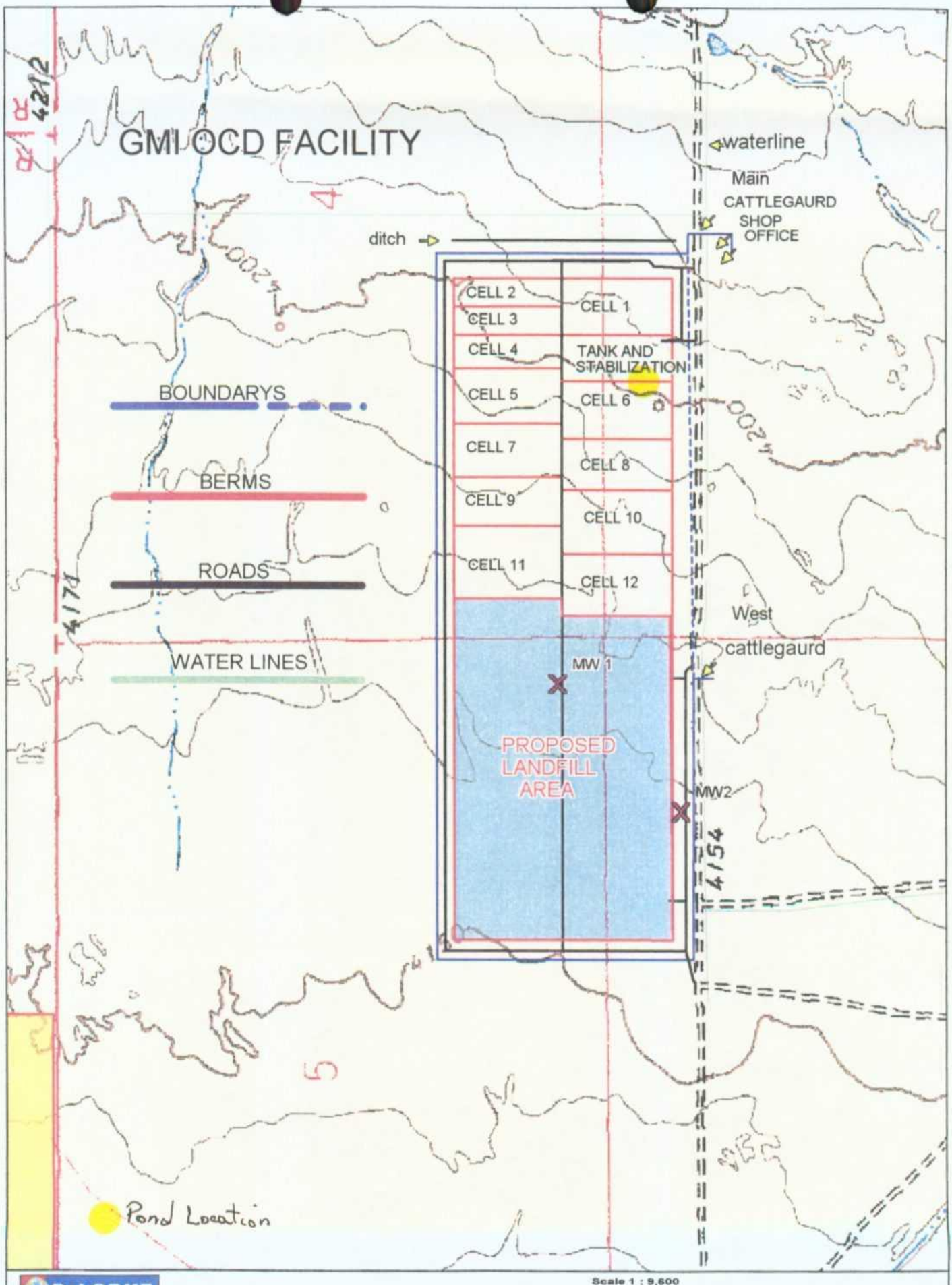
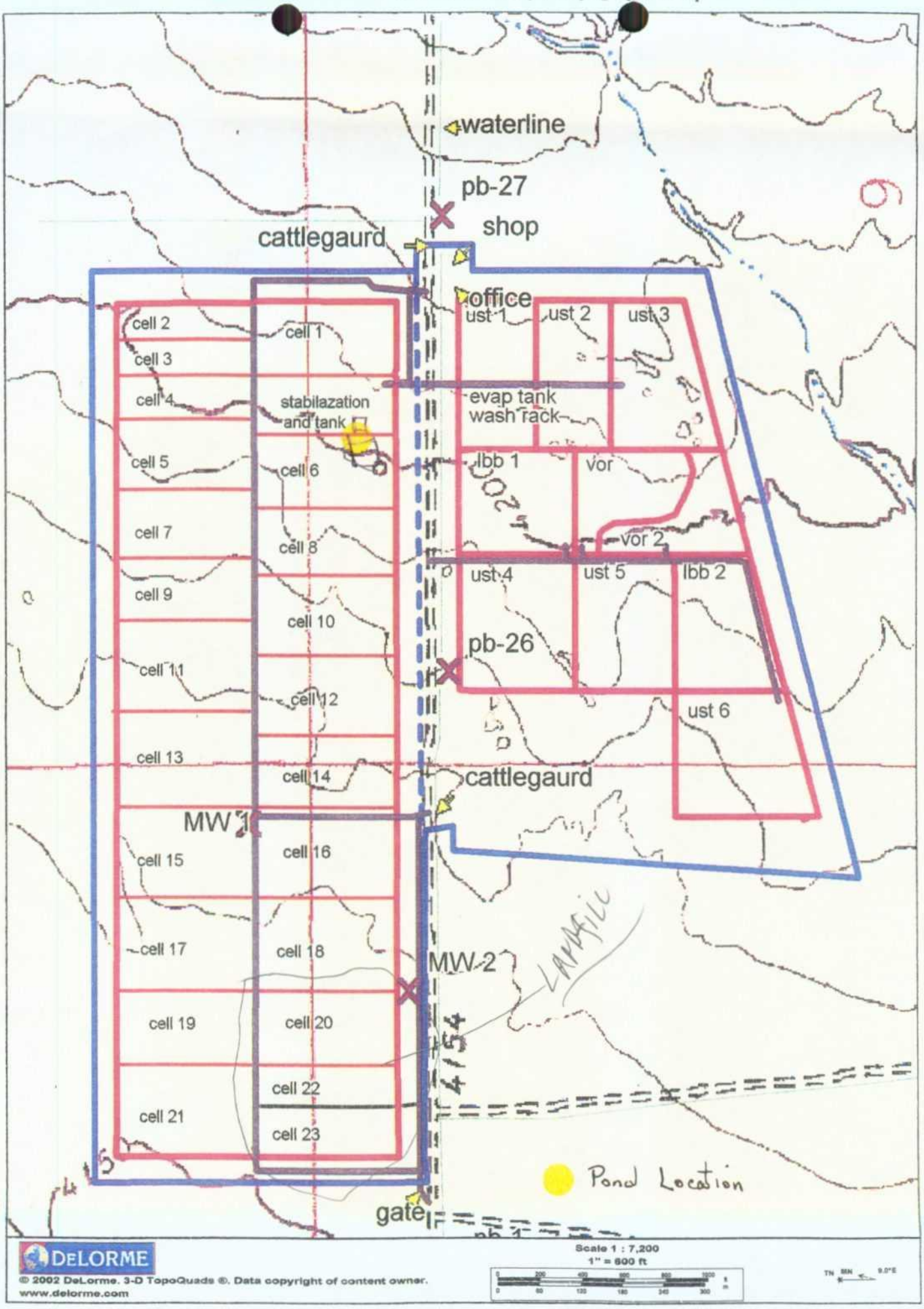
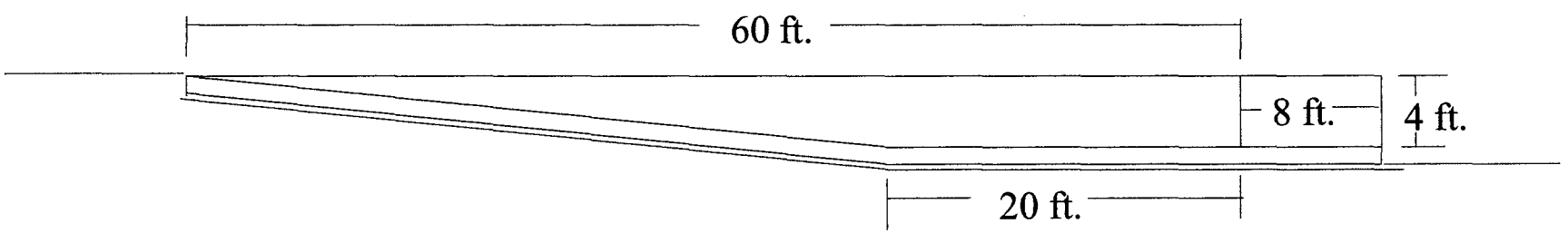

GMI OCD FACILITY
waterline
Main
CATTLEGAURD
SHOP
OFFICE
ditch
CELL 2
CELL 1
CELL 3
CELL 4
TANK AND
STABILIZATION
CELL 5
CELL 6
CELL 7
CELL 8
CELL 9
CELL 10
CELL 11
CELL 12
BOUNDARYS
BERMS
ROADS
WATER LINES
West
cattlegaurd
MW 1
PROPOSED
LANDFILL
AREA
MW2
4212
4171
4154
Pond Location
DeLORME
© 2002 DeLorme. 3-D TopoQuads ®. Data copyright of content owner.
www.delorme.com
Scale 1 : 9,600
1" = 800 ft

Figure 1-1

Figure 1: Site Map / Topographic Map



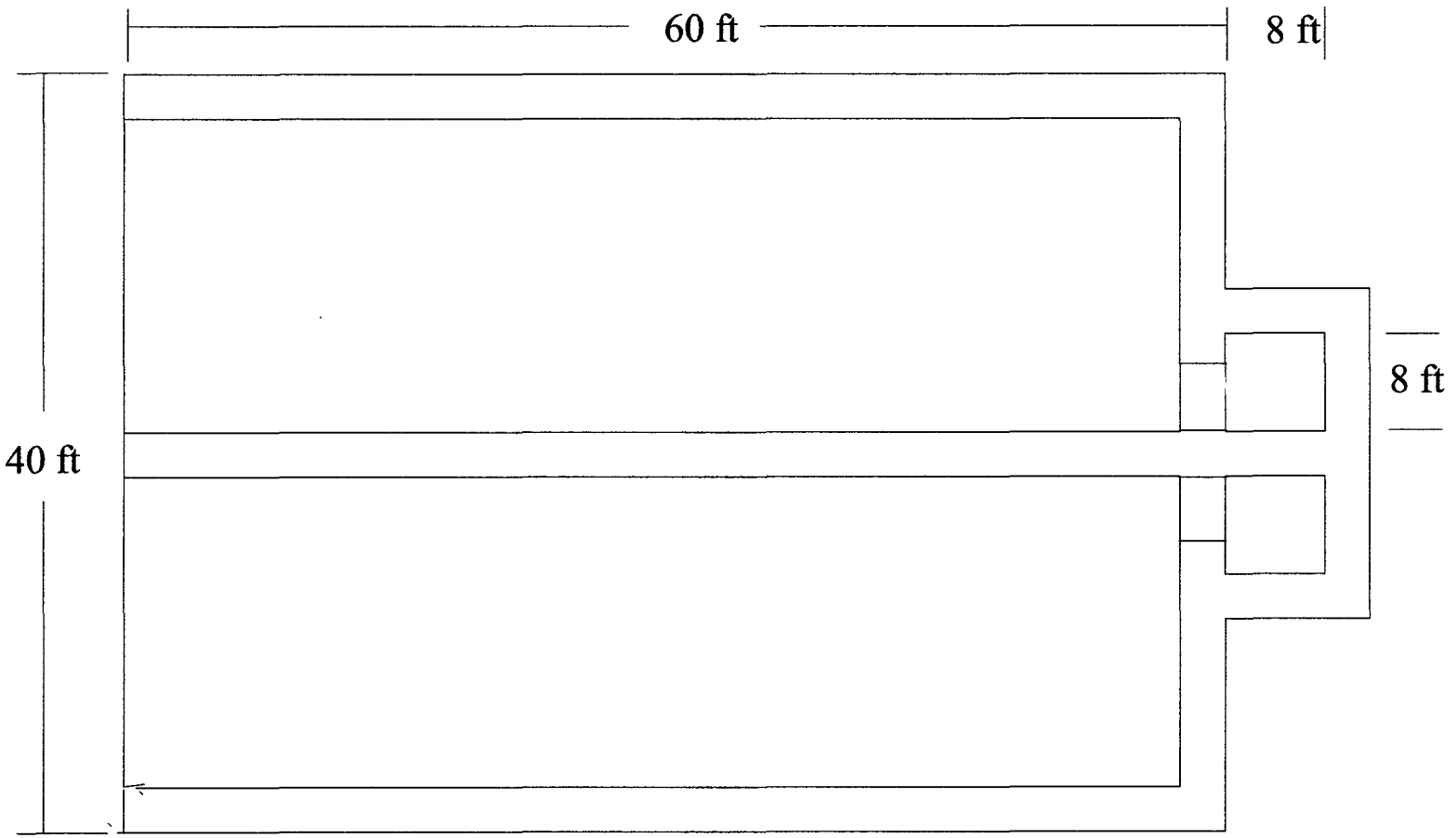
CEMENT CONTAINMENT
SIDE VEIW



Poly liner ————
Soil ————

Cement floor will be poured on a poly liner
All seams will be sealed

CEMENT CONTAINMENT
OVERHEAD VEIW



2 Ft. thick end walls
18 In. thick side walls
9 In. thick floor
All cement will be reinforced with #4 rebar on 1 ft. centers

Martin, Ed, EMNRD

From: Brooks, David K., EMNRD
Sent: Monday, January 09, 2006 9:45 AM
To: 'Lorraine Hollingsworth'
Cc: Fesmire, Mark, EMNRD; Martin, Ed, EMNRD; Davidson, Florene, EMNRD
Subject: RE: Gandy Marley permit modification

Lorraine:

The proposed method of proceeding seems appropriate. The protests to this permit application having been withdrawn, I see no reason why it cannot be issued administratively.

David Brooks

From: Lorraine Hollingsworth [mailto:LHollingsworth@domenicilaw.com]
Sent: Friday, January 06, 2006 9:50 AM
To: Brooks, David K., EMNRD
Cc: Pete Domenici
Subject: Gandy Marley permit modification

Dear Mr. Brooks,

Our client, Bill Marley, has talked to Ed Martin about the status of Gandy Marley's permit application. Notice of the modification request was published on December 5, 2005 and Mr. Martin has not recieved any comments on the modification. Mr. Martin has stated that he expects to issue the modified permit on or before January 12. Because no other interested parties have made comments on the modification request and because our clients are in agreeement with the permit as drafted by Mr. Martin, we do not believe that a hearing is needed on the permit modification request nor does the OCC need to take any further action on the permit modification. The issuance of the modified permit also eliminates the need to go forward with the de novo appeal and we would like to have the appeal dismissed. We have drafted a motion for dismissal of the de novo appeal and a proposed order, a copy of which is attached. We are open to suggestions if there is a different way that you think we should proceed to close this matter.

Thank you for your assistance in this matter,

Lorraine Hollingsworth

<<motion for dismissal.doc>>

Lorraine Hollingsworth, Esq.
Domenici Law Firm, P.C.
320 Gold SW Suite 1000
Albuquerque, New Mexico 87102
505-883-6250

DOMENICI LAW FIRM, P.C.
ATTORNEYS AT LAW
320 Gold Ave SW Suite 1000
Albuquerque, New Mexico 87102

(505) 883-6250 Telephone
(505) 884-3424 Facsimile

Pete V. Domenici, Jr.
pdomenici@domenicilaw.com

Jeanne Cameron Washburn
jwashburn@domenicilaw.com

Charles N. Lakins
clakins@domenicilaw.com

Lorraine Hollingsworth
lhollingsworth@domenicilaw.com

December 22, 2005

Ed Martin
Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

Re: Gandy Marley Surface Waste Management Facility, OCD Permit No. NM-01-019

Dear Mr. Martin:

Enclosed please find a copy of the Affidavit of Publication from the Roswell Daily Record.

Sincerely,

DOMENICI LAW FIRM, P.C.

Lorraine Hollingsworth, Esq.

Cc: Gandy Marley

Sylvia Rudy, Administrative Assistant
srudy@domenicilaw.com

Glenna Bergeron, Administrative Assistant
gbergeron@domenicilaw.com

AFFIDAVIT OF PUBLICATION
STATE OF NEW MEXICO

I, Fran Saunders
Legals Clerk

Of the Roswell Daily Record, a daily newspaper published at Roswell, New Mexico, do solemnly swear that the clipping hereto attached was published in the regular and entire issue of said paper and not in a supplement thereof for a period of:

one time

beginning with the issue dated

December 5th 2005

and ending with the issue dated

December 5th 2005

Fran Saunders
Clerk

Sworn and subscribed to before me

this 5th Day of December 2005

Marylon S. Shipley
Notary Public

My Commission expires
July 25, 2006

(SEAL)

Publish December 5, 2005

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Notice is hereby given that pursuant to New Mexico Oil Conservation Division Regulations, the following application has been submitted to the Director of the Oil Conservation Division, 1220 St. Francis Dr., Santa Fe, New Mexico 87505, Telephone (505) 476-3440:

Gandy Marley, Inc., Bill Marley, Telephone (505) 626-6513, P.O. Box 1658, Roswell, NM 88201, has submitted a Permit Modification Application for the surface waste management facility, located in Sections 4, 5, 8, and 9 of Township 11 South, Range 31 East, NMPM, Chaves County, New Mexico. Gandy Marley, Inc. operates a surface waste management facility (landfarm) at the site. Gandy Marley, Inc. intends to convert certain landfarm cells within the facility to landfill-type cells in which oilfield waste other than hydrocarbon-contaminated soils may be disposed. The application includes: a topographic map of the site, a site plan, anticipated waste streams, engineering drawings of the proposed landfill-type cell, descriptions of how Gandy Marley, Inc. will handle spills and leaks at the site, site operations and emergency equipment on hand. The application also includes a closure plan, site geology and hydrology information, and soil boring data, and a hydrogen sulfide contingency plan.

Any interested person may obtain further information from the Oil Conservation Division and may submit to the Director of the Oil Conservation Division, at the address given above, written comments or a written request for a public hearing that include reasons why a hearing should be held. The modification application may be viewed at the above address or at the Oil Conservation Division website at http://www.emnrd.state.nm.us/emnrd/ocd/ENV-DraftPublicEtc.htm. Prior to ruling on the permit modification application, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which written comments or a written request for a hearing may be submitted.

DOMENICI LAW FIRM, P.C.
ATTORNEYS AT LAW
320 Gold Ave SW Suite 1000
Albuquerque, New Mexico 87102

(505) 883-6250 Telephone
(505) 884-3424 Facsimile

Pete V. Domenici, Jr.
pdomenici@domenicilaw.com

Jeanne Cameron Washburn
jwashburn@domenicilaw.com

Charles N. Lakins
clakins@domenicilaw.com

Lorraine Hollingsworth
lhollingsworth@domenicilaw.com

2005

December 13, 2005

Ed Martin
Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

Re: Gandy Marley Surface Waste Management Facility, OCD Permit No. NM-01-019

Dear Mr. Martin:

The purpose of this letter is to confirm that, based on our telephone conversation yesterday, GMI is not required to publish notice of the request for permit modification in the Albuquerque Journal.

Sincerely,

DOMENICI LAW FIRM, P.C.

Lorraine Hollingsworth, Esq.

Cc: Gandy Marley

Sylvia Rudy, Administrative Assistant
srudy@domenicilaw.com

Glenna Bergeron, Administrative Assistant
gbergeron@domenicilaw.com

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Mark E. Fesmire, P.E.
Director
Oil Conservation Division

December 1, 2005

Mr. Bill Marley
Gandy Marley, Inc.
P.O. Box 1658
Roswell, NM 88201

RE: Permit Modification Application for Permit Number NM-01-0019 Covering Surface Waste Management Facility Located in Sections 4, 5, 8, and 9 of Township 11 South, Range 31 East NMPM, Chaves County, New Mexico

Dear Mr. Marley:

The New Mexico Oil Conservation Division (NMOCD) has received and reviewed Gandy Marley, Inc.'s (GMI) application as shown above.

The NMOCD has determined that the above referenced application is **administratively complete**. Before the OCD can complete a technical review of the application, the OCD requires that:

1. GMI issue, by December 31, 2005, a notice of publication in the Albuquerque Journal and Roswell Daily Record using the format attached.

2. Plains provide the OCD with proof of publication January 15, 2006.

If you have any questions, please contact Ed Martin at (505) 476-3492.

Sincerely,

Roger C. Anderson
Environmental Bureau Chief

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

Notice is hereby given that pursuant to New Mexico Oil Conservation Division Regulations, the following application has been submitted to the Director of the Oil Conservation Division, 1220 St. Francis Dr., Santa Fe, New Mexico 87505, Telephone (505) 476-3440:

Gandy Marley, Inc., Bill Marley, Telephone (505) 626-6513, P.O. Box 1658, Roswell, NM 88201, has submitted a Permit Modification Application for the surface waste management facility, located in Sections 4, 5, 8, and 9 of Township 11 South, Range 31 East, NMPM, Chaves County, New Mexico. Gandy Marley, Inc. operates a surface waste management facility (landfarm) at the site. Gandy Marley, Inc. intends to convert certain landfarm cells within the facility to landfill-type cells in which oilfield waste other than hydrocarbon-contaminated soils may be disposed. The application includes: a topographic map of the site, a site plan, anticipated waste streams, engineering drawings of the proposed landfill-type cell, descriptions of how Gandy Marley, Inc. will handle spills and leaks at the site, site operations and emergency equipment on hand. The application also includes a closure plan, site geology and hydrology information, and soil boring data, and a hydrogen sulfide contingency plan.

Any interested person may obtain further information from the Oil Conservation Division and may submit to the Director of the Oil Conservation Division, at the address given above, written comments or a written request for a public hearing that include reasons why a hearing should be held. The modification application may be viewed at the above address or at the Oil Conservation Division website at http://www.emnrd.state.nm.us/emnrd/ocd/ENV-DraftPublicEtc.htm. Prior to ruling on the permit modification application, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which written comments or a written request for a hearing may be submitted.

GSE

GSE STANDARD PRODUCTS

Product Data Sheet

GSE FabriNet Geocomposites

GSE FabriNet geocomposite consists of GSE HyperNet geonet heat-laminated on one or both sides with a GSE nonwoven needlepunched geotextile. GSE HyperNet is a 200 mil thick geonet manufactured from a premium grade high density polyethylene resin. For the purpose of lamination to geonets, GSE nonwoven needlepunched geotextiles are available in mass per unit area range of 6 oz/yd² (200 g/m²) to 16 oz/yd² (540 g/m²). GSE FabriNet geocomposites are designed and formulated to perform drainage function under a range of anticipated site loads, gradients and boundary conditions. Index properties for the product are provided in the table below. Please contact GSE for further information regarding performance under site-specific conditions.

Product Specifications

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM AVERAGE ROLL VALUE[d]		
Geocomposite			**6 oz/yd²**	**8 oz/yd²**	**10 oz/yd²**
Product Code			F420600605	F420800805	F421001005
Transmissivity[a], gal/min/ft (m²/sec)	ASTM D 4716-00	1/540,000 ft²	0.48 (1 x 10^{-4})	0.48 (1 x 10^{-4})	0.43 (9 x 10^{-5})
Ply Adhesion, lb/in (g/cm)	GRI GC-7	1/50,000 ft²	1.0 (178)	1.0 (178)	1.0 (178)
Roll Width, ft (m)			14.5 (4.4)	14.5 (4.4)	14.5 (4.4)
Roll Length, ft (m)			230 (70.1)	200 (60.9)	190 (58.0)
Roll Area, ft² (m²)			3,335 (310)	2,900 (269)	2,755 (256)
Geonet core[b]					
Transmissivity,[a] gal/min/ft (m²/sec)	ASTM D 4716-00		9.66 (2 x 10^{-3})	9.66 (2 x 10^{-3})	9.66 (2 x 10^{-3})
Thickness, mil (mm)	ASTM D 5199	1/50,000 ft²	200 (5)	200 (5)	200 (5)
Density, g/cm³	ASTM D 1505	1/50,000 ft²	0.94	0.94	0.94
Tensile Strength (MD), lb/in (N/mm)	ASTM D 5035	1/50,000 ft²	45 (7.9)	45 (7.9)	45 (7.9)
Carbon Black Content, %	ASTM D 1603	1/50,000 ft²	2.0	2.0	2.0
Geotextile (prior to lamination)[b,c]					
Mass per Unit Area, oz/yd² (g/m²)	ASTM D 5261	1/90,000 ft²	6 (200)	8 (270)	10 (335)
Grab Tensile, lb (N)	ASTM D 4632	1/90,000 ft²	170 (755)	220 (975)	260 (1,155)
Puncture Strength, lb (N)	ASTM D 4833	1/90,000 ft²	90 (395)	120 (525)	165 (725)
AOS, US sieve (mm)	ASTM D 4751	1/540,000 ft²	70 (0.212)	80 (0.180)	100 (0.150)
Permittivity, (sec⁻¹)	ASTM D 4491	1/540,000 ft²	1.5	1.5	1.2
Flow Rate, gpm/ft² (lpm/m²)	ASTM D 4491	1/540,000 ft²	110 (4,480)	110 (4,480)	85 (3,460)
UV Resistance, % retained	ASTM D 4355 (after 500 hours)	once per formulation	70	70	70

NOTES:

- [a]Gradient of 0.1, normal load of 10,000 psf, water at 70° F between steel plates for 15 minutes.
- [b]Component properties prior to lamination.
- [c]Several geotextiles are available and may be supplied as determined by GSE.
- [d]These are MARV values that are based on the cumulative results of specimens tested and determined by GSE. AOS in mm is maximum average roll value.

Americas	GSE Lining Technology, Inc.	Houston, Texas	800-435-2008	281-443-8564	Fax: 281-230-8650
Europe/Middle East/Africa	GSE Lining Technology GmbH	Hamburg, Germany		49-40-767420	Fax: 49-40-7674233
Asia/Pacific	GSE Lining Technology Company Ltd.	Bangkok, Thailand		66-2-937-0091	Fax: 66-2-937-0097

This product data sheet is also available on our website at:

www.gseworld.com

COPY

COMMERCIAL LAND FARMS

A New Mexico Enterprise
Serving New Mexico's Needs

STATE OF NEW MEXICO
EMERGY MINERALS AND NATURAL RESOURCES

OIL CONSERVATION DIVISION

GANDY MARLEY INC.
SURFACE WASTE MANAGEMENT FACILITY

PERMIT MODIFICATION APPLICATION

October 2005

SCANNED

Gandy Marley, Inc. • Box 1658 • Roswell, NM 88201 • (505) 398-4960 • FAX (505) 398-6887

COMMERCIAL LAND FARMS

A New Mexico Enterprise
Serving New Mexico's Needs

October 4, 2005

SCANNED

Mr. Ed Martin
OCD-Environmental Bureau
1220 S. St. Francis Dr
Santa Fe, New Mexico 87505

RE: Permit No. NM-01-20 Application for Permit Modification

Dear Mr. Martin:

Pursuant to OCD Rule 711, Gandy Marley, Inc. (GMI) hereby submits the attached Permit Modification Application for Permit No. NM-01-020. The purpose of the Permit Modification Application is to modify GMI's existing Rule 711 permit to allow the use of landfill-type cells for the disposal of oilfield waste classified as non-hazardous by RCRA Subtitle C exemption or by characteristic testing including hydrocarbon and salt-contaminated debris, mud, soils, sludges, tankbottoms and filters associated with the drilling, operating and maintenance of oil and gas wells and related operations of the oil and gas industry. The facility will also accept produced water and drilling completion fluids that either pass a paint filter test by EPA method 9095A or that have been stabilized to pass the paint filter test. The facility is currently permitted to accept hydrocarbon-contaminated waste for disposal in the landfarm cells, tank bottoms, and has a permitted stabilization process. The landfill-type cells will be constructed within the boundary of GMI's existing surface waste management facility. GMI will keep salt-contaminated oilfield waste separate from hydrocarbon-contaminated oilfield waste.

The Permit Modification Application includes evidence that there is no present or foreseeable beneficial use for the perched aquifer underlying the facility and GMI is requesting a finding by the OCD that there is no present or foreseeable beneficial use for the perched aquifer underlying the Gandy Marley facility.

If you have any questions or need additional information, please contact Mr. Bill Marley or Mr. Larry Gandy at 505-347-0434.

Sincerely,

Bill Marley
Vice President

NEW MEXICO OIL CONSERVATION DIVISION

COMMERCIAL SURFACE WASTE MANAGEMENT FACILITY
FORM C-137

The Permit Modification Application includes the following information:

FORM C-137

Attachment 5: Names and Addresses of Facility Landowner and Landowners Within One Mile of Site

Figure 5-1 Topographic map

Attachment 6: Description of Facility

General information
Figure 6-1 Site plan
Anticipated Waste Stream
Landfarm Area
Fences, Signs and Netting
Figure 6-2 Picture of Gandy Marley sign

Attachment 7: Facility Design and Construction

Engineering drawings

Attachment 8: Contingency Plan

Introduction
Spill/Leak Prevention
Emergency Response Procedures
Emergency Response Telephone Numbers
Emergency Response Checklists
Site Operations
Emergency Equipment

Attachment 9: Routine Inspection and Maintenance Plan

Requirements for Landfill Operation
Requirements for Landfarm Operation
Requirements for Overall Facility Operation
Waste Acceptance Criteria
Sample manifest and waste acceptance forms
Tank Bottom Acceptance
Reporting and Record Keeping

Attachment 10: Closure Plan

Closure
Post-closure

Attachment 11: Geological/Hydrological Information

Description of Site Geology and Hydrology
Soil Boring Data
Hydrologic Testing and Groundwater Monitoring
Laboratory Analysis of Groundwater

Attachment 12: Proof of Notice Requirements of OCD Rule 711

Proposed Notice
Proof of Notice to
- Chaves County Commission
- United States Bureau of Land Management
- New Mexico State Land Office

Attachment 13: H_2S Contingency Plan

Training
Safety Precautions to be Used Around H_2S
Equipment Required for Tank Cleaning
Personal/Health
Practices
Confined Space Entry Safety

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

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-137
Revised June 10, 2003

Submit Original Plus 1
Copy to Santa Fe
1 Copy Appropriate
District Office

APPLICATION FOR WASTE MANAGEMENT FACILITY

(Refer to the OCD Guidelines for assistance in completing the application)

☒ Commercial ☐ Centralized

1. Type: ☐ Evaporation ☐ Injection ☐ Other
☒ Solids/Landfarm ☐ Treating Plant

2. Operator: Gandy Marley, Inc.
Address: P.O. Box 1658, Roswell, New Mexico 88202
Contact Person: Bill Marley or Larry Gandy
Phone: 505-347-0434

3. Location: Sections 4, 5, 8, and 9 Township 11 South Range 31 East, Chaves County, New Mexico
Submit large scale topographic map showing exact location SEE FIGURE 5-1 (ATTACHMENT 5) and FIGURE 6-1 (ATTACHMENT 6)

4. Is this a modification of an existing facility? ☒ Yes ☐ No

5. Attach the name and address of the landowner of the facility site and landowners of record within one mile of the site. SEE ATTACHMENT 5

6. Attach description of the facility with a diagram indicating location of fences, pits, dikes, and tanks on the facility. SEE ATTACHMENT 6

7. Attach designs prepared in accordance with Division guidelines for the construction/installation of the following: pits or ponds, leak-detection systems, aerations systems, enhanced evaporation (spray) systems, waste treating systems, security systems, and landfarm facilities. SEE ATTACHMENT 7

8. Attach a contingency plan for reporting and clean-up for spills or releases. SEE ATTACHMENT 8

9. Attach a routine inspection and maintenance plan to ensure permit compliance. SEE ATTACHMENT 9

10. Attach a closure plan. SEE ATTACHMENT 10

11. Attach geological/hydrological evidence demonstrating that disposal of oil field wastes will not adversely impact groundwater. Depth to and quality of ground water must be included. SEE ATTACHMENT 11

12. Attach proof that the notice requirements of OCD Rule 711 have been met. SEE ATTACHMENT 12

13. Attach a contingency plan in the event of a release of H_2S. SEE ATTACHMENT 13

14. Attach such other information as necessary to demonstrate compliance with any other OCD rules, regulations and orders.

15. CERTIFICATION

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

Name: Bill Marley Title: Vice President

Signature: Date: 10/4/5

ATTACHMENT 5
OF
FORM C-137

NAMES AND ADDRESSES OF FACILITY LANDOWNER AND LANDOWNERS WITHIN ONE MILE OF SITE

Pete V. Domenici, Jr.
pdomenici@domenicilaw.com

Jeanne Cameron Washburn
jwashburn@domenicilaw.com

DOMENICI LAW FIRM, P.C.
ATTORNEYS AT LAW
320 Gold Ave SW Suite 1000
Albuquerque, New Mexico 87102

(505) 883-6250 Telephone
(505) 884-3424 Facsimile

Charles N. Lakins
clakins@domenicilaw.com

Lorraine Hollingsworth
lhollingsworth@domenicilaw.com

October 17, 2005

Ed Martin
Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

Re: Gandy Marley Surface Waste Management Facility, OCD Permit No. NM-01-019

Dear Mr. Martin:

Enclosed please find the return receipt for the certified notice letter to Tim Kreager of the U.S. Bureau of Land Management. Please include the notice as part of the Gandy Marley permit modification application.

Sincerely,

DOMENICI LAW FIRM, P.C.

Lorraine Hollingsworth, Esq.

cc: 1548

Sylvia Rudy, Administrative Assistant
srudy@domenicilaw.com

Glenna Bergeron, Administrative Assistant
gbergeron@domenicilaw.com

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Tim Kreager
Bureau of Land Mgmt
2909 West 2nd St.
Roswell, NM 88201-1287

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by (Printed Name)
C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7001 1140 0001 0566 7957

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

SCANNED

NAMES AND ADDRESSES OF FACILITY LANDOWNER AND LANDOWNERS WITHIN ONE MILE OF SITE

The landowner of the facility site is as follows:

Gandy Marley Inc.
P.O. Box 1658
Roswell, New Mexico 88203

The adjacent lands are owned by Robert W. (Bill) Marley, one of the owners of the facility. A map showing the location of landowners within one mile of the site is attached hereto. **(Figure 5-1).**

The United States Bureau of Land Management and the State of New Mexico are the only other landowners of record within one mile of the facility. Their addresses are as follows:

Tim Kreager
Bureau of Land Management
2909 West 2nd Street
Roswell, New Mexico 88201-1287

Patrick H. Lyons
Commissioner of Public Lands
New Mexico State Land Office
P.O. Box 1148
Santa Fe, New Mexico 87504-1148

Notice letters, sent by means of certified mail, for Chaves County authorities are in Attachment 12.

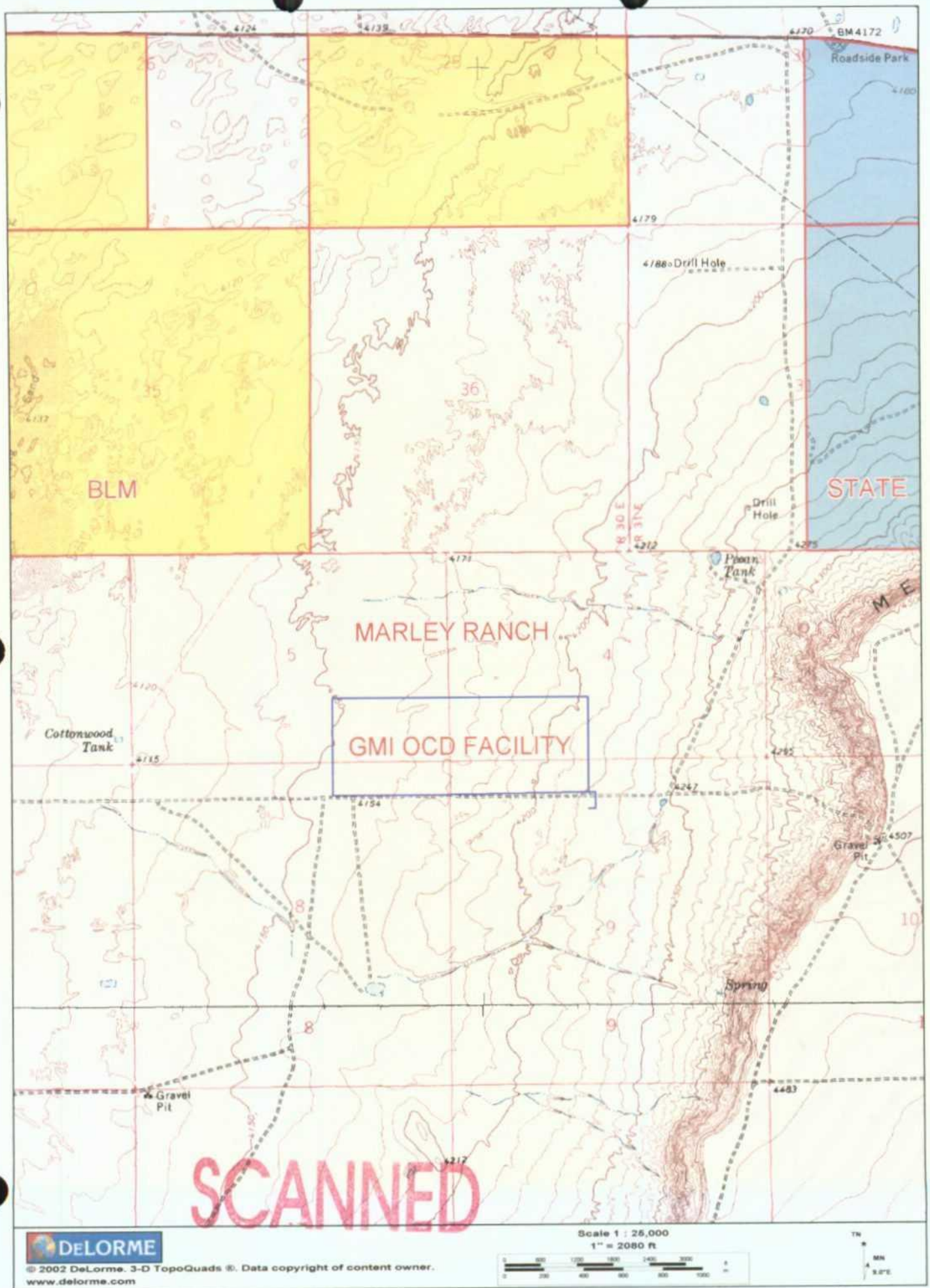

BM 4172
Roadside Park
4179
4188 Drill Hole
BLM
STATE
Drill Hole
Pecan Tank
MARLEY RANCH
GMI OCD FACILITY
Cottonwood Tank
Gravel Pit
Spring
Gravel Pit
SCANNED
DeLORME
© 2002 DeLorme. 3-D TopoQuads ®. Data copyright of content owner.
www.delorme.com
Scale 1 : 25,000
1" = 2080 ft

Figure 5-1

ATTACHMENT 6
OF
FORM C-137

DESCRIPTION OF FACILITY

DESCRIPTION OF FACILITY

General

The facility currently operates as a landfarm permitted pursuant to 19.15.9.711 (Rule 711), under permit number NM-01-0020. The facility is built on a natural crown and stormwater naturally drains to the north and south. The exterior berm of the facility is approximately five (5) feet high and fifteen (15) feet wide. A ditch is cut on the up-hill side, outside the facility, and is used to divert water around the facility. A site plan for the GMI facility is attached as **Figure 6-1**. The site plan shows the location of roads, fences, boundaries, berms, existing cells, the proposed cells, and buildings. The current location of facility boundaries, buffer zone, exterior berms, cattleguards, office and shop will not change and are shown on **Figure 6-1.** There are no pipelines crossing the facility. The only pipeline near the facility is a waterline used for livestock that runs along the southern edge of the landfarm. The pipeline is 1 1/4" in diameter and is owned by Mr. Bill Marley and located on property owned by Mr. Marley. There are no chemical storage areas and no on-site storage/disposal facilities for wastes other than those that will be placed in the disposal cells. The existing stabilization and tank area, approved by OCD on June 14, 1996, is used for the stabilization and absorption of liquids and sludges and will not be changed.

In order to minimize surface disturbance, the landfill cells will be constructed within the existing facility and will be in the same location as existing landfarm cells that have been remediated to the requirements of the existing permit. A description of the landfill cells and engineering design drawings are included in Attachment 7.

Anticipated Waste Stream

Only waste that meets the Waste Acceptance Criteria found in Attachment 9, Section IV will be accepted at the facility. This permit modification proposes to use landfill-type cells for the disposal of oilfield waste classified as non-hazardous by RCRA Subtitle C exemption or by characteristic testing including hydrocarbon and salt-contaminated debris, mud, soils, sludges, tankbottoms and filters associated with the drilling, operating and maintenance of oil and gas wells and related operations of the oil and gas industry. Debris will be managed in order to assure that the integrity of the cell liner and cover are protected. (See Attachment 9, Requirements for Landfill Operation). Tank bottoms will only be disposed of in accordance with existing permit conditions. (See Attachment 9, Tank Bottom Acceptance). The facility will also accept produced water and drilling completion fluids that either pass a paint filter test by EPA method 9095A or that have been stabilized to pass the paint filter test. The facility is currently permitted to accept hydrocarbon-contaminated waste for disposal in the landfarm cells, tank bottoms, and has a permitted stabilization process.

Landfarm area

The facility was originally permitted in January, 1995 as a commercial surface waste management facility pursuant to Rule 711. The landfarm uses cells to remediate oilfield soils contaminated with hydrocarbons. The facility also solidifies and remediates oilfield liquids and

sludges that are unacceptable for injection wells. Portions of the facility may still be used as a landfarm and, in those areas, waste will continue to be landfarmed in compliance with current permit requirements. No salt-contaminated waste will be landfarmed. GMI will continue to operate the stabilization and tank area in compliance with the existing permit conditions.

Fences, Signs and Netting

The facility is fenced, as shown in **Figure 6-1** and has a sign at the entrance that includes the name of the facility, and the location by section, township and range and an emergency phone number. A picture of the sign is included as **Figure 6-2**. The facility is operated and maintained as described in Attachment 9. Disposal will only occur when an attendant is on duty and the gate is locked when no attendant is present in order to prevent unauthorized disposal. All tanks at the facility are covered and netted as required.

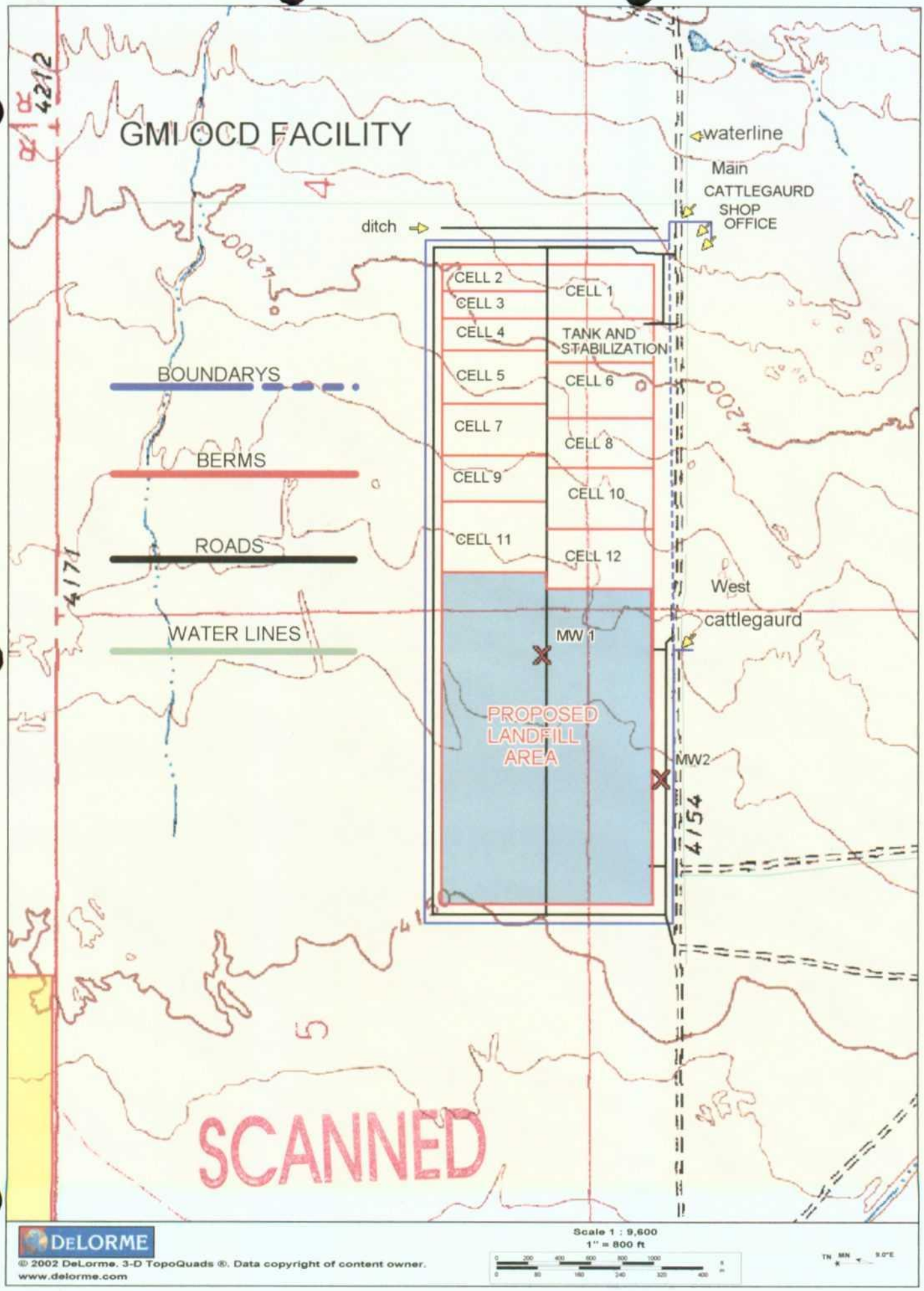

GMI OCD FACILITY
waterline
Main
CATTLEGAURD
SHOP
OFFICE
ditch
CELL 2
CELL 1
CELL 3
CELL 4
TANK AND
STABILIZATION
BOUNDARYS
CELL 5
CELL 6
CELL 7
CELL 8
BERMS
CELL 9
CELL 10
CELL 11
CELL 12
ROADS
West
cattlegaurd
WATER LINES
MW 1
PROPOSED
LANDFILL
AREA
MW2
4212
4171
4154
SCANNED
DeLORME
© 2002 DeLorme. 3-D TopoQuads ®. Data copyright of content owner.
www.delorme.com
Scale 1 : 9,600
1" = 800 ft

Figure 6-1

Figure 6-2

DOMENICI LAW FIRM, P.C.
ATTORNEYS AT LAW
320 Gold Ave SW Suite 1000
Albuquerque, New Mexico 87102

(505) 883-6250 Telephone
(505) 884-3424 Facsimile

Pete V. Domenici, Jr.
pdomenici@domenicilaw.com

Jeanne Cameron Washburn
jwashburn@domenicilaw.com

Charles N. Lakins
clakins@domenicilaw.com

Lorraine Hollingsworth
lhollingsworth@domenicilaw.com

November 1, 2005

HAND DELIVERED

Ed Martin
Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

Re: Gandy Marley Surface Waste Management Facility, OCD Permit No. NM-01-019

Dear Mr. Martin:

Enclosed please find two (2) copies of the revised Attachment 7 for the Gandy Marley Permit Modification Application. The revised Attachment 7 will replace the earlier Attachment, including the design drawings and the spec sheets.

If you have any questions, please feel free to call me.

Sincerely,

DOMENICI LAW FIRM, P.C.

Lorraine Hollingsworth, Esq.

cc: Bill Marley
Mike Feldewert
Hobbs District Office

Sylvia Rudy, Administrative Assistant
srudy@domenicilaw.com

Glenna Bergeron, Administrative Assistant
gbergeron@domenicilaw.com

ATTACHMENT 7
OF
FORM C-137

ENGINEERING DRAWINGS

GMI OCD Landfill Facility Description

The attached engineering drawings present the landfill cell design, landfill cover design and leachate collection system proposed for the Gandy Marley Commercial Surface Waste Management Facility.

The landfill cells will be located within the existing Gandy-Marley Inc. property boundary, which is located in southeastern New Mexico. The landfill footprint is shown on Drawing 2. The landfill area is approximately 1300-ft. by 1900-ft., or around 63.5-acres. No waste will be placed outside of the crest line of the landfill.

The maximum excavation depth will be 20-ft at the west end of the facility and the minimum excavation depth will be 12-ft. at the east end of the facility (see drawing Drawing 3).

The landfill floor will be graded at 2% towards the center of each cell and to the west. The side slopes and floor of the landfill will consist of the following (from top to bottom):

- Operations layer
- Geocomposite drainage layer
- 40 ml poly-liner
- Compacted clay liner
- Recompacted subgrade

Leachate will be collected in the geocomposite layer will be drained to an 8-inch perforated HDPE centerline floor drains. The floor drains will carry leachate to sumps in each cell located at the center of the west toe of the berms where the leachate will collect and be pumped out periodically via 12-inch HDPE side slope risers. Drawing 7 shows details of the leachate collection system.

The specifications for materials to be used in the liner construction and the leachate collection system are presented in the GMI Specification for the OCD Landfill

Construction of the landfill will be a simultaneous process of excavation and waste filling. Excavation will begin in the South Cell (Drawing 4) and proceed east then resume on the west side of the north cell. Waste will be placed as the cell is being excavated with the excavation working face preceding the fill working face. The cells will be constructed to drain leachate to sumps for evacuation by pumps. Surface water that ponds within the cells during construction will be pumped out with surface pumps. All leachate and/or impacted water will be stabilized at site.

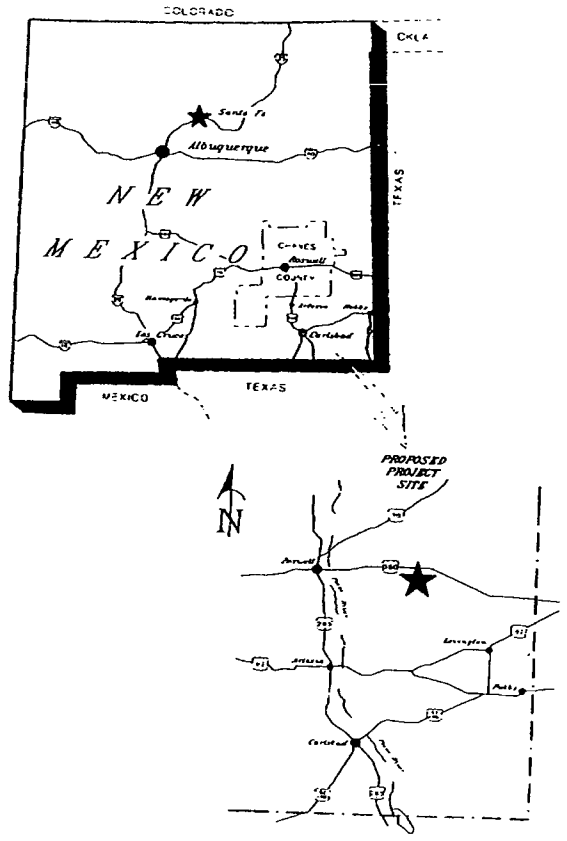
Once final cover grades are reached with waste placement, the final cover will be placed. This will allow the majority of the cover construction to be completed during the operational phase of the landfill.

GANDY MARLEY, INC. COMMERCIAL SURFACE WASTE MANAGEMENT FACILITY
CHAVES COUNTY, NEW MEXICO

SEPTEMBER 2005

DRAFT - REV A

NOT FOR CONSTRUCTION -
FOR PERMITTING PURPOSES ONLY



LIST OF DRAWINGS

DRAWING NO.	DRAWING TITLE
1	COVER SHEET
2	EXISTING CONDITIONS
3	ULTIMATE EXCAVATION PLAN AND CROSS-SECTIONS (2 SHEETS)
4	WASTE FILLING PLAN AND CROSS-SECTIONS - PHASE 1 (2 SHEETS)
5	WASTE FILLING PLAN AND CROSS-SECTIONS- PHASE 2 (2 SHEETS)
6	ULTIMATE CLOSURE PLAN AND CROSS-SECTIONS (2 SHEETS)
7	TYPICAL DETAILS

Prepared For:

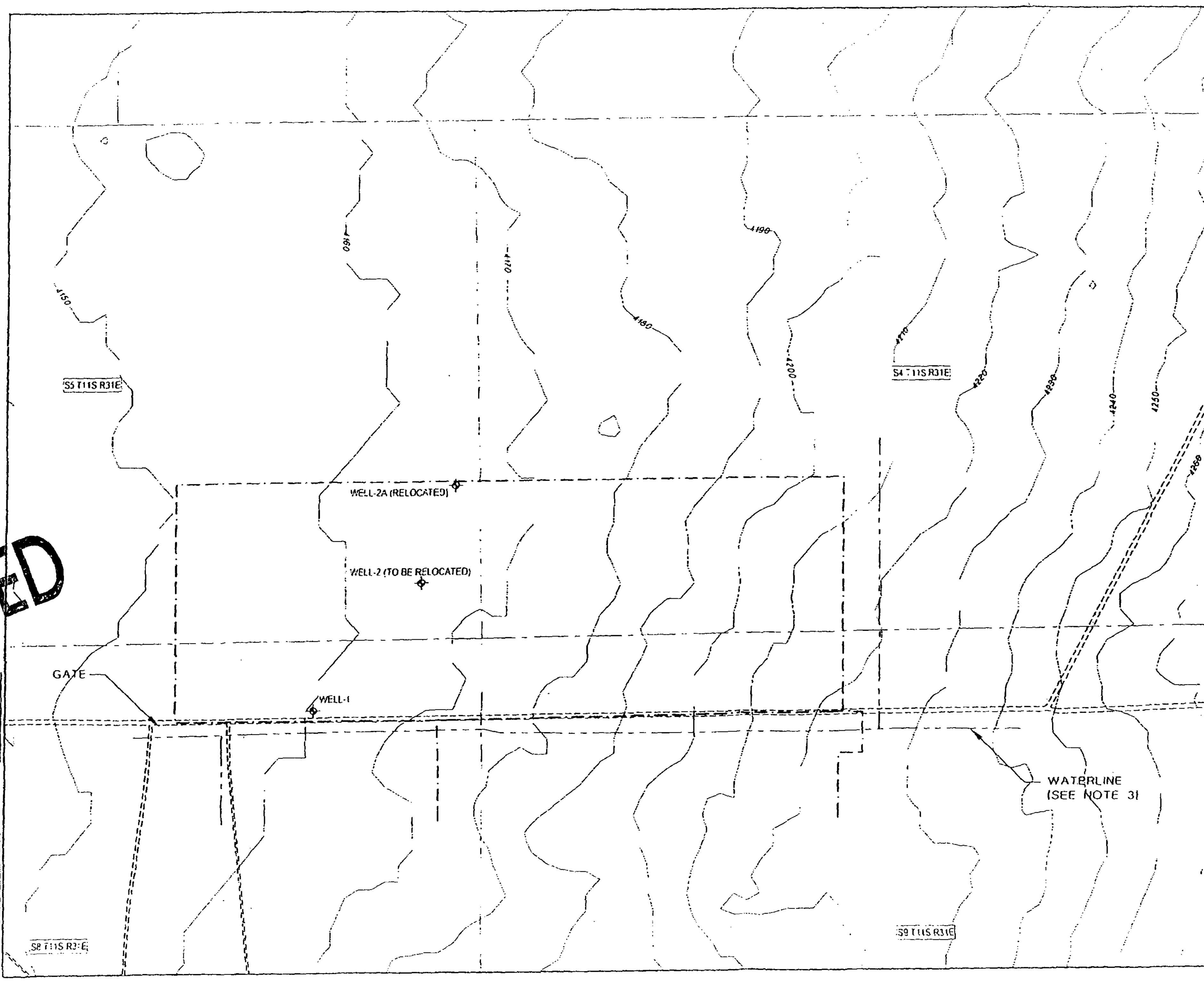
Gandy Marley, Inc.
P.O. Box 827
1109 East Broadway
Tatum, New Mexico 88267

Prepared By:

MWH

1475 Pine Grove Road
P.O. Box 774018
Steamboat Springs, Colorado 80477

SCANNED



LEGEND

- EXISTING ROADS
- CONTOURS
- S9 T11S R31E SECTION LINES
- PROPERTY BOUNDARY/FENCELINE
- EXISTING WATERLINE
- WELL-1 MONITORING WELL (INSTALLED 2005)

NOTES:
1. 10 FT. TOPOGRAPHY OBTAINED FROM THE US DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY, 1973, MESCALERO POINT NE QUADRANGLE.
2. 2 FT. TOPOGRAPHY INTERPOLATED FROM 10 FT. TOPOGRAPHY.
3. PROPERTY BOUNDARY, ROAD AND WATERLINE DIGITIZED FROM FAX PROVIDED BY GANDY-MARLEY, INC.
4. MONITORING WELL LOCATIONS ARE APPROXIMATE AS PROVIDED BY GANDY-MARLEY, INC.

SCALE

NOT FOR CONSTRUCTION - FOR PERMITTING PURPOSES ONLY

GANDY MARLEY, INC.

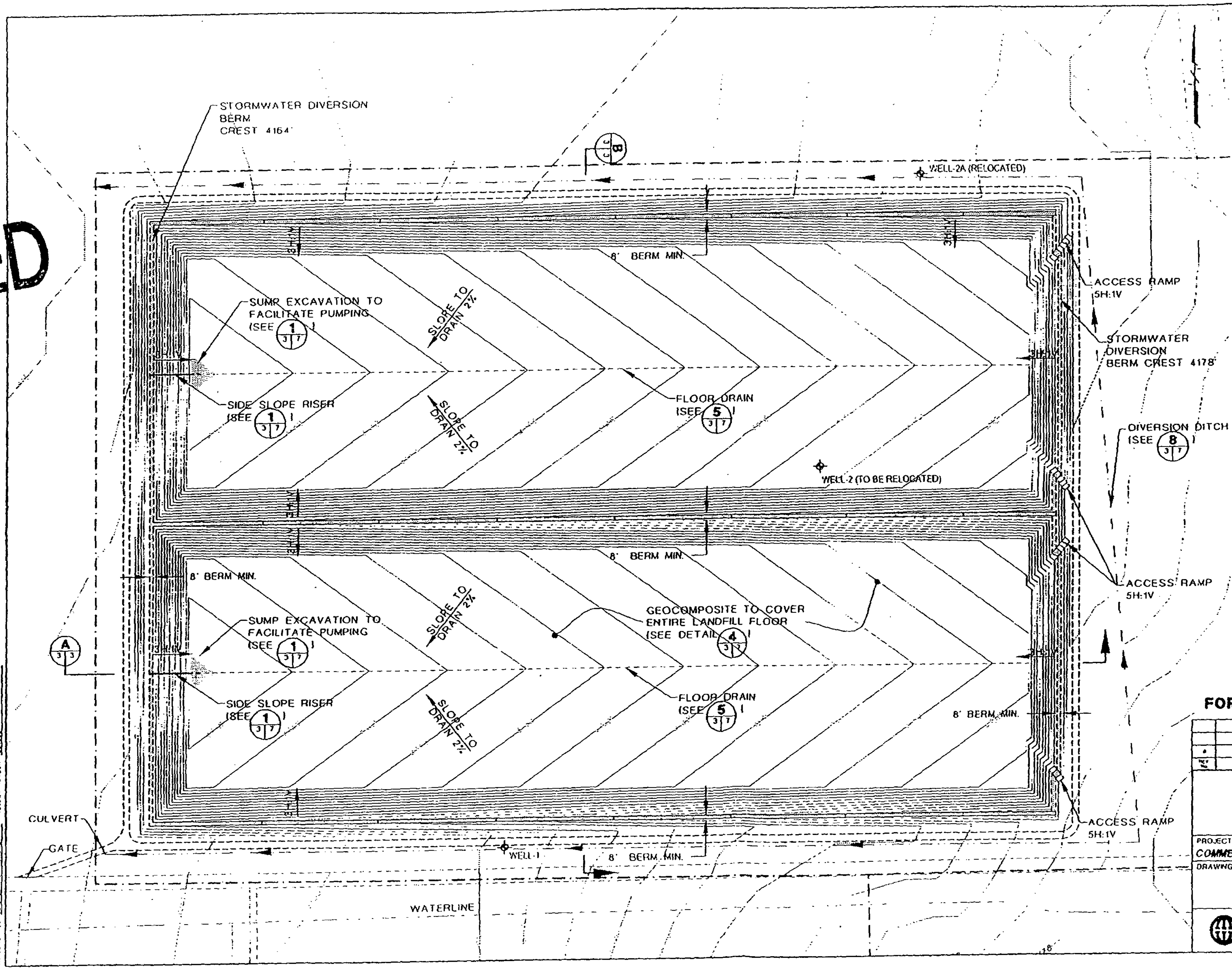
PROJECT:
COMMERCIAL SURFACE WASTE MANAGEMENT FACILITY

DRAWING TITLE:
EXISTING CONDITIONS

MWH

Sheet 1 of 1 Sheets
DRAWING No 02

SCANNED



LEGEND

- EXISTING ROADS
- CONTOURS
- PROPERTY BOUNDARY/FENCELINE
- EXISTING WATERLINE
- NEW ROAD
- BERM CREST
- STORMWATER DIVERSION DITCH AND FLOW DIRECTION
- WELL-1 MONITORING WELL (INSTALLED 2005)

DETAIL/SECTION NUMBER
DRAWING No. WHERE DETAIL/SECTION IS REFERENCED
DRAWING No. WHERE DETAIL/SECTION IS SHOWN

NOTES:
1. 10 FT. TOPOGRAPHY OBTAINED FROM THE US DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY, 1973, MESCALERO POINT NE QUADRANGLE.
2. 2 FT. TOPOGRAPHY INTERPOLATED FROM 10 FT. TOPOGRAPHY.
3. PROPERTY BOUNDARY, ROAD AND WATERLINE DIGITIZED FROM FAX PROVIDED BY GANDY-MARLEY, INC.
4. MONITORING WELL LOCATIONS ARE APPROXIMATE AS PROVIDED BY GANDY-MARLEY, INC.

PROPERTY BOUNDARY
LOCATION KEY
N.T.S.

SCALE

NOT FOR CONSTRUCTION - FOR PERMITTING PURPOSES ONLY

GANDY MARLEY, INC.

PROJECT: COMMERCIAL SURFACE WASTE MANAGEMENT FACILITY

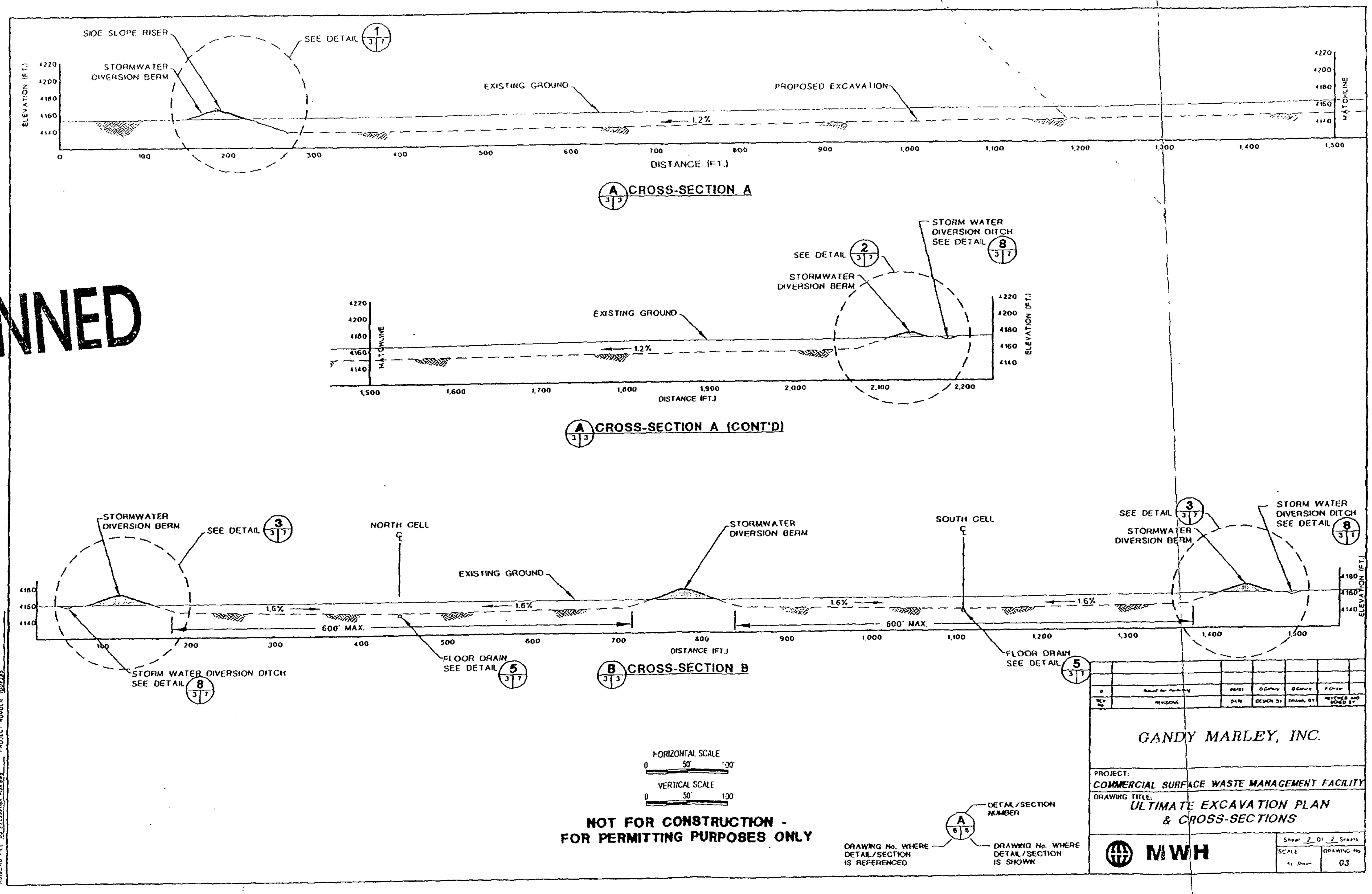
DRAWING TITLE: ULTIMATE EXCAVATION PLAN & CROSS-SECTIONS

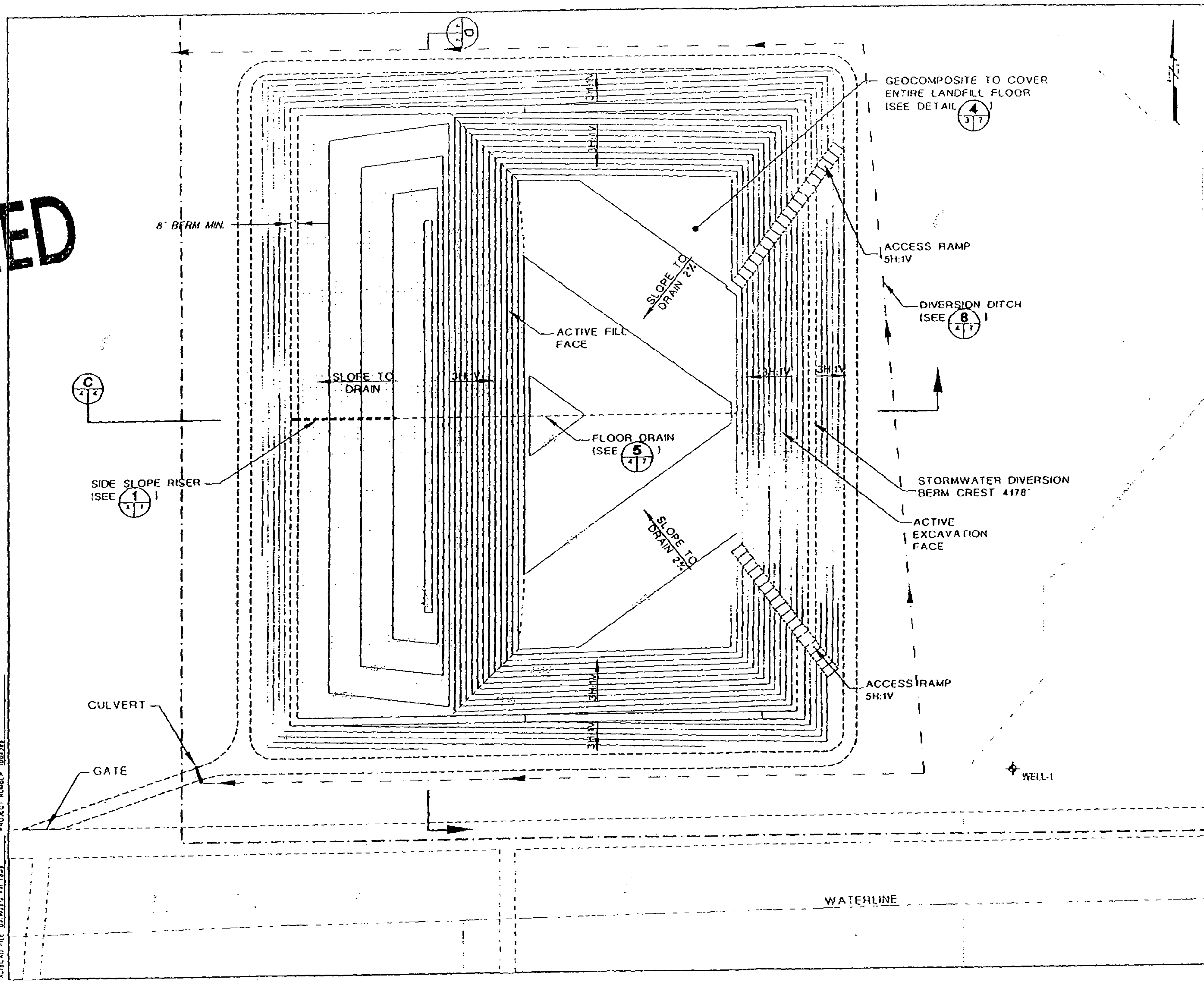
MWH

Sheet 1 Of 2 Sheets

DRAWING No. 03

SCANNED


SIDE SLOPE RISER
SEE DETAIL 1 3/7
STORMWATER DIVERSION BERM
EXISTING GROUND
PROPOSED EXCAVATION
1.2%
MATCHLINE
ELEVATION (FT.)
DISTANCE (FT.)
A 3/3 CROSS-SECTION A
STORM WATER DIVERSION DITCH SEE DETAIL 8 3/7
SEE DETAIL 2 3/7
STORMWATER DIVERSION BERM
EXISTING GROUND
A 3/3 CROSS-SECTION A (CONT'D)
STORMWATER DIVERSION BERM
SEE DETAIL 3 3/7
NORTH CELL
EXISTING GROUND
1.6%
600' MAX.
SOUTH CELL
STORM WATER DIVERSION DITCH SEE DETAIL 8 3/7
FLOOR DRAIN SEE DETAIL 5 3/7
B 3/3 CROSS-SECTION B
HORIZONTAL SCALE
VERTICAL SCALE
NOT FOR CONSTRUCTION - FOR PERMITTING PURPOSES ONLY
DETAIL/SECTION NUMBER
DRAWING No. WHERE DETAIL/SECTION IS REFERENCED
DRAWING No. WHERE DETAIL/SECTION IS SHOWN
REVISIONS
DATE
DESIGN BY
DRAWN BY
REVIEWED AND SIGNED BY
GANDY MARLEY, INC.
PROJECT:
COMMERCIAL SURFACE WASTE MANAGEMENT FACILITY
DRAWING TITLE:
ULTIMATE EXCAVATION PLAN & CROSS-SECTIONS
MWH
Sheet 2 of 2 Sheets
SCALE
As Shown
DRAWING No.
03

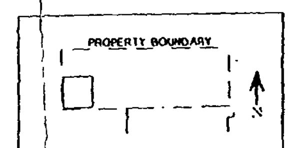


LEGEND

- EXISTING ROADS
- CONTOURS
- PROPERTY BOUNDARY/FENCELINE
- NEW ROAD
- BERM CREST
- COVER
- STORMWATER DIVERSION DITCH AND FLOW DIRECTION
- WELL-1 MONITORING WELL (INSTALLED 2005)

DETAIL/SECTION NUMBER (A) — DRAWING No. WHERE DETAIL/SECTION IS REFERENCED — DRAWING No. WHERE DETAIL/SECTION IS SHOWN

NOTES:
1. 10 FT. TOPOGRAPHY OBTAINED FROM THE US DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY, 1973, MESCALERO POINT NE QUADRANGLE.
2. 2 FT. TOPOGRAPHY INTERPOLATED FROM 10 FT. TOPOGRAPHY.
3. PROPERTY BOUNDARY, ROAD AND WATERLINE DIGITIZED FROM FAX PROVIDED BY GANDY-MARLEY, INC.
4. MONITORING WELL LOCATIONS ARE APPROXIMATE AS PROVIDED BY GANDY-MARLEY, INC.
5. COVER SHALL BE CONSTRUCTED TO FORM A SLOPE OF 5-20% AFTER CONSOLIDATION. 6% GRADE SHOWN.



LOCATION KEY
N.T.S.

NOT FOR CONSTRUCTION - FOR PERMITTING PURPOSES ONLY

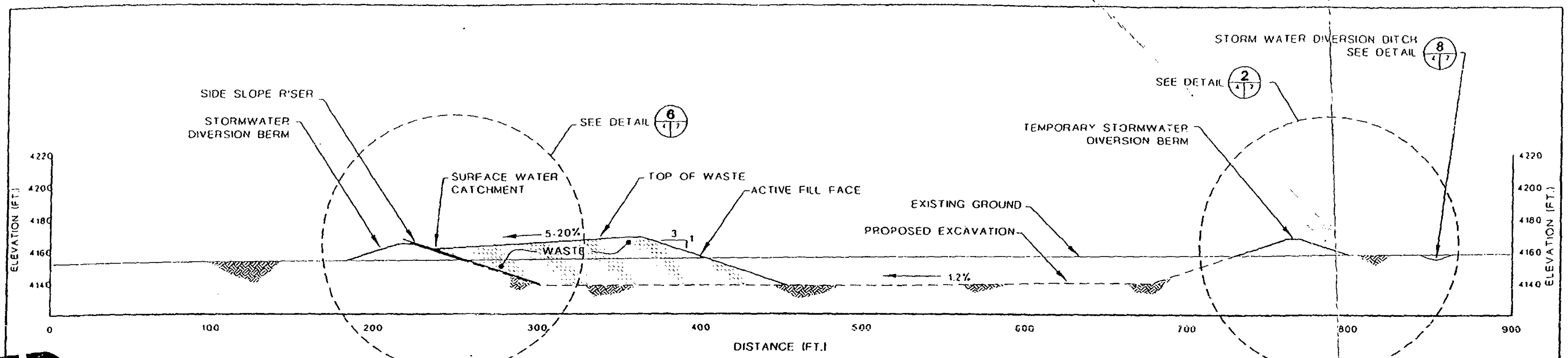
GANDY MARLEY, INC.

PROJECT:
COMMERCIAL SURFACE WASTE MANAGEMENT FACILITY

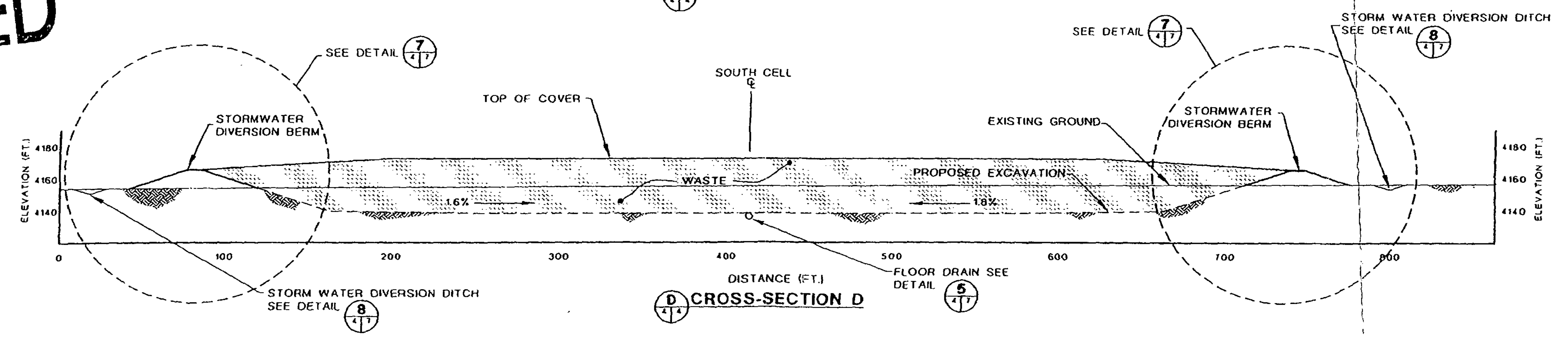
DRAWING TITLE:
WASTE FILLING PLAN & CROSS-SECTIONS
PHASE 1

MWH

Sheet 1 of 2 Sheets — SCALE As Shown — DRAWING No. 04



C CROSS-SECTION C



D CROSS-SECTION D

HORIZONTAL SCALE 0 30 60

VERTICAL SCALE 0 30 60

NOTE:
COVER SHALL BE CONSTRUCTED TO FORM A SLOPE OF 5-20% AFTER CONSOLIDATION. 6% GRADE SHOWN.

NOT FOR CONSTRUCTION - FOR PERMITTING PURPOSES ONLY

DETAIL/SECTION NUMBER
DRAWING No. WHERE DETAIL/SECTION IS REFERENCED
DRAWING No. WHERE DETAIL/SECTION IS SHOWN

GANDY MARLEY, INC.

PROJECT: COMMERCIAL SURFACE WASTE MANAGEMENT FACILITY

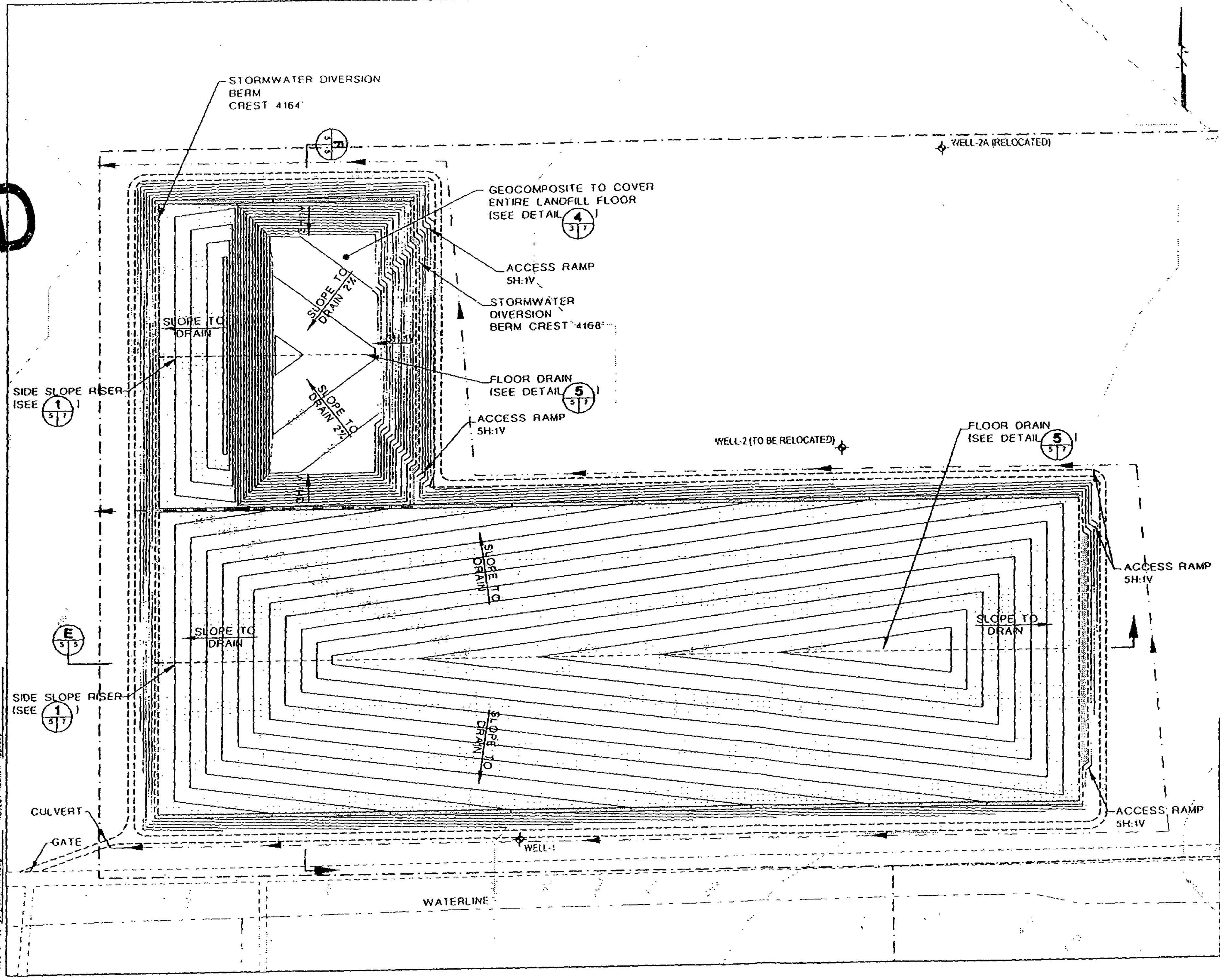
DRAWING TITLE: WASTE FILLING PLAN & CROSS-SECTIONS PHASE 1

MWH

Sheet 2 Of 2 Sheets

SCALE: As Shown

DRAWING No: 04

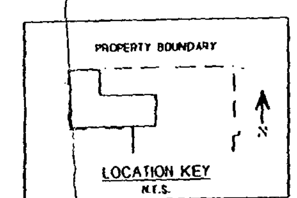


LEGEND

- EXISTING ROADS
- CONTOURS
- PROPERTY BOUNDARY/FENCELINE
- NEW ROAD
- BERM CREST
- COVER
- STORMWATER DIVERSION DITCH AND FLOW DIRECTION
- WELL-1 MONITORING WELL (INSTALLED 2005)

A — DETAIL/SECTION NUMBER; DRAWING No. WHERE DETAIL/SECTION IS REFERENCED; DRAWING No. WHERE DETAIL/SECTION IS SHOWN

NOTES:
1. 10 FT. TOPOGRAPHY OBTAINED FROM THE US DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY, 1973, MESCALERO POINT NE QUADRANGLE.
2. 2 FT. TOPOGRAPHY INTERPOLATED FROM 10 FT. TOPOGRAPHY.
3. PROPERTY BOUNDARY, ROAD AND WATERLINE DIGITIZED FROM FAX PROVIDED BY GANDY-MARLEY, INC.
4. MONITORING WELL LOCATIONS ARE APPROXIMATE AS PROVIDED BY GANDY-MARLEY, INC.
5. COVER SHALL BE CONSTRUCTED TO FORM A SLOPE OF 5-20% AFTER CONSOLIDATION. 6% GRADE SHOWN



SCALE

CONTOUR INTERVAL 2FT

NOT FOR CONSTRUCTION - FOR PERMITTING PURPOSES ONLY

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
#	[illegible]	08/05	B.Gandy	D.Gandy	F.Carson

GANDY MARLEY, INC.

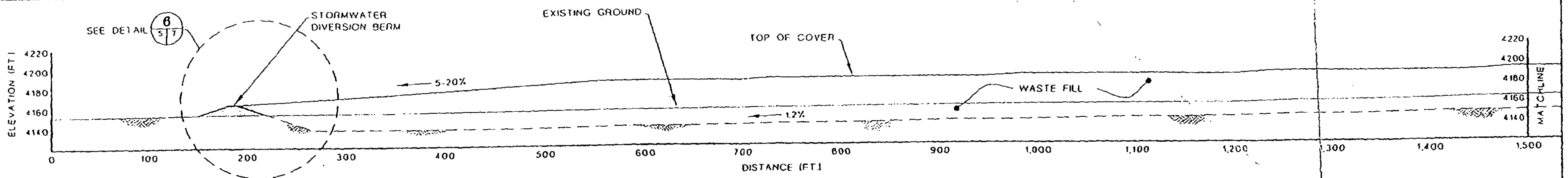
PROJECT: *COMMERCIAL SURFACE WASTE MANAGEMENT FACILITY*

DRAWING TITLE: *WASTE FILLING PLAN & CROSS-SECTIONS PHASE 2*

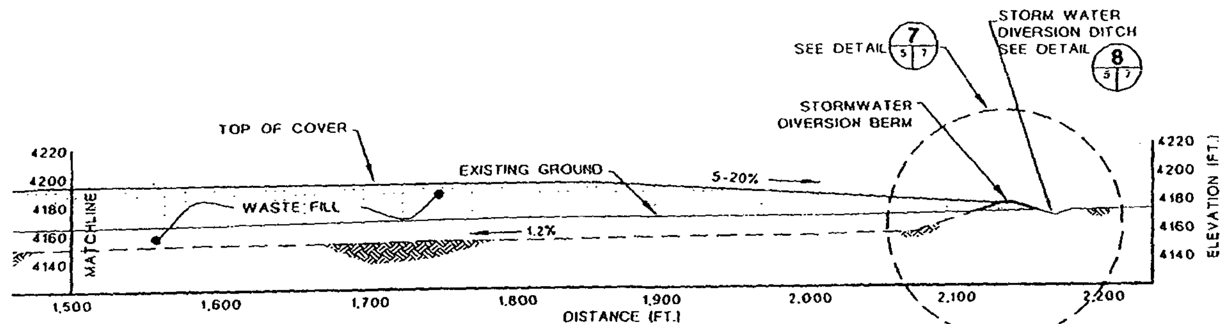
MWH

Sheet 1 Of 2 Sheets | SCALE: As Shown | DRAWING No. 05

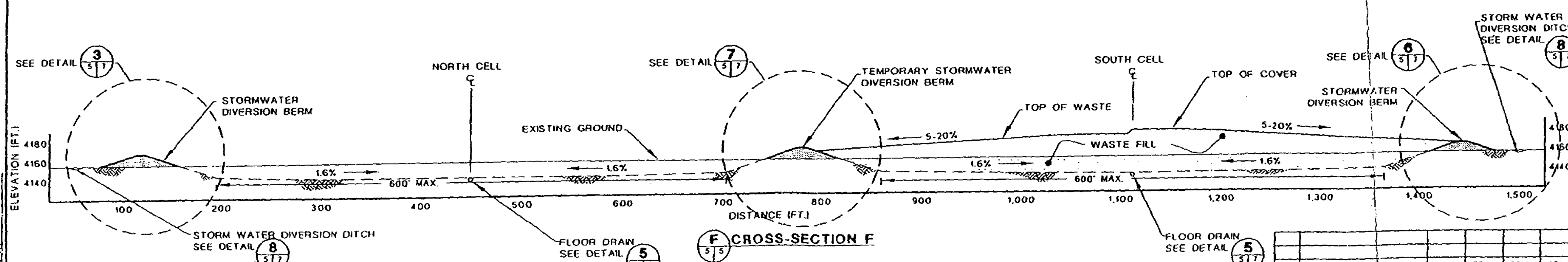
SCANNED



E 5/5 CROSS-SECTION E



E 5/5 CROSS-SECTION E (CONT'D)



F 5/5 CROSS-SECTION F

HORIZONTAL SCALE 0 50' 100'

VERTICAL SCALE 0 50' 100'

NOTE:
COVER SHALL BE CONSTRUCTED TO FORM A SLOPE OF 5-20% AFTER CONSOLIDATION. 6% GRADE SHOWN.

A 6/6 — DETAIL/SECTION NUMBER; DRAWING No. WHERE DETAIL/SECTION IS REFERENCED; DRAWING No. WHERE DETAIL/SECTION IS SHOWN

NOT FOR CONSTRUCTION - FOR PERMITTING PURPOSES ONLY

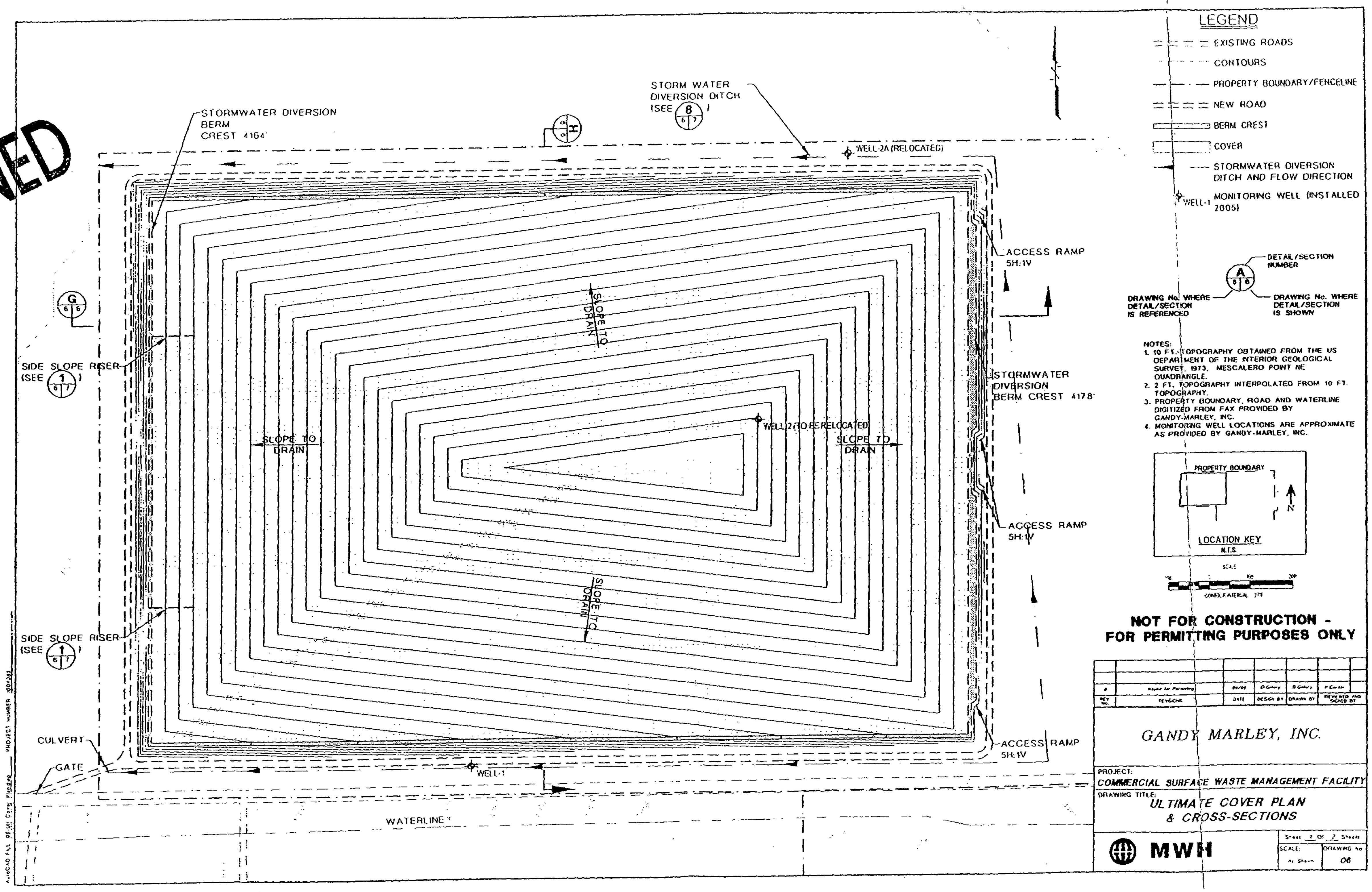
GANDY MARLEY, INC.

PROJECT: COMMERCIAL SURFACE WASTE MANAGEMENT FACILITY

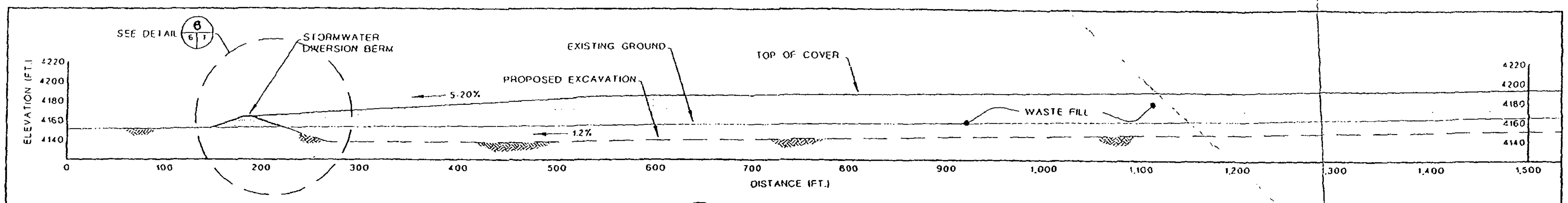
DRAWING TITLE: WASTE FILLING PLAN & CROSS-SECTIONS PHASE 2

MWH

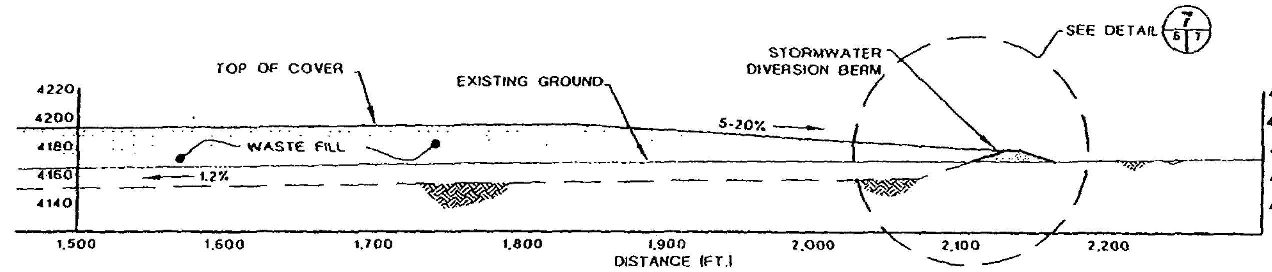
Sheet 2 of 2 Sheets — SCALE As Shown — DRAWING No. 05


SCANNED
STORMWATER DIVERSION BERM CREST 4164'
STORM WATER DIVERSION DITCH (SEE 8/6 7)
H
G
WELL-2A (RELOCATED)
ACCESS RAMP 5H:1V
SIDE SLOPE RISER (SEE 1/6 7)
SLOPE TO DRAIN
STORMWATER DIVERSION BERM CREST 4178'
WELL-2 (TO BE RELOCATED)
CULVERT
GATE
WELL-1
WATERLINE
LEGEND
EXISTING ROADS
CONTOURS
PROPERTY BOUNDARY/FENCELINE
NEW ROAD
BERM CREST
COVER
STORMWATER DIVERSION DITCH AND FLOW DIRECTION
WELL-1 MONITORING WELL (INSTALLED 2005)
DETAIL/SECTION NUMBER
DRAWING No. WHERE DETAIL/SECTION IS REFERENCED
DRAWING No. WHERE DETAIL/SECTION IS SHOWN
NOTES:
1. 10 FT. TOPOGRAPHY OBTAINED FROM THE US DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY, 1973, MESCALERO POINT NE QUADRANGLE.
2. 2 FT. TOPOGRAPHY INTERPOLATED FROM 10 FT. TOPOGRAPHY.
3. PROPERTY BOUNDARY, ROAD AND WATERLINE DIGITIZED FROM FAX PROVIDED BY GANDY-MARLEY, INC.
4. MONITORING WELL LOCATIONS ARE APPROXIMATE AS PROVIDED BY GANDY-MARLEY, INC.
PROPERTY BOUNDARY
LOCATION KEY
N.T.S.
N
NOT FOR CONSTRUCTION - FOR PERMITTING PURPOSES ONLY
GANDY MARLEY, INC.
PROJECT:
COMMERCIAL SURFACE WASTE MANAGEMENT FACILITY
DRAWING TITLE:
ULTIMATE COVER PLAN & CROSS-SECTIONS
MWH
DRAWING No. 06

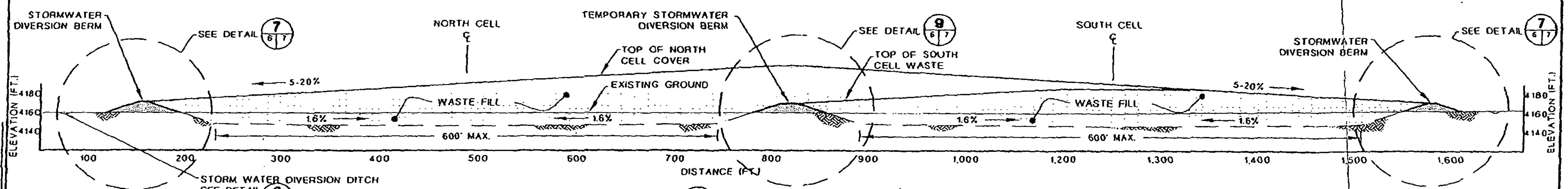
SCANNED



G/6/6 CROSS-SECTION G



G/6/6 CROSS-SECTION G (CONT'D)



H/6/6 CROSS-SECTION H

HORIZONTAL SCALE 0 50' 100'

VERTICAL SCALE 0 50' 100'

NOTE:
COVER SHALL BE CONSTRUCTED TO FORM A SLOPE OF 5-20% AFTER CONSOLIDATION. 6% GRADE SHOWN.

NOT FOR CONSTRUCTION - FOR PERMITTING PURPOSES ONLY

A/6/6 — DETAIL/SECTION NUMBER; DRAWING No. WHERE DETAIL/SECTION IS REFERENCED; DRAWING No. WHERE DETAIL/SECTION IS SHOWN

NO.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
0	Issued for Permitting	06/00	D.Corley	D.Corley	P.Carter

GANDY MARLEY, INC.

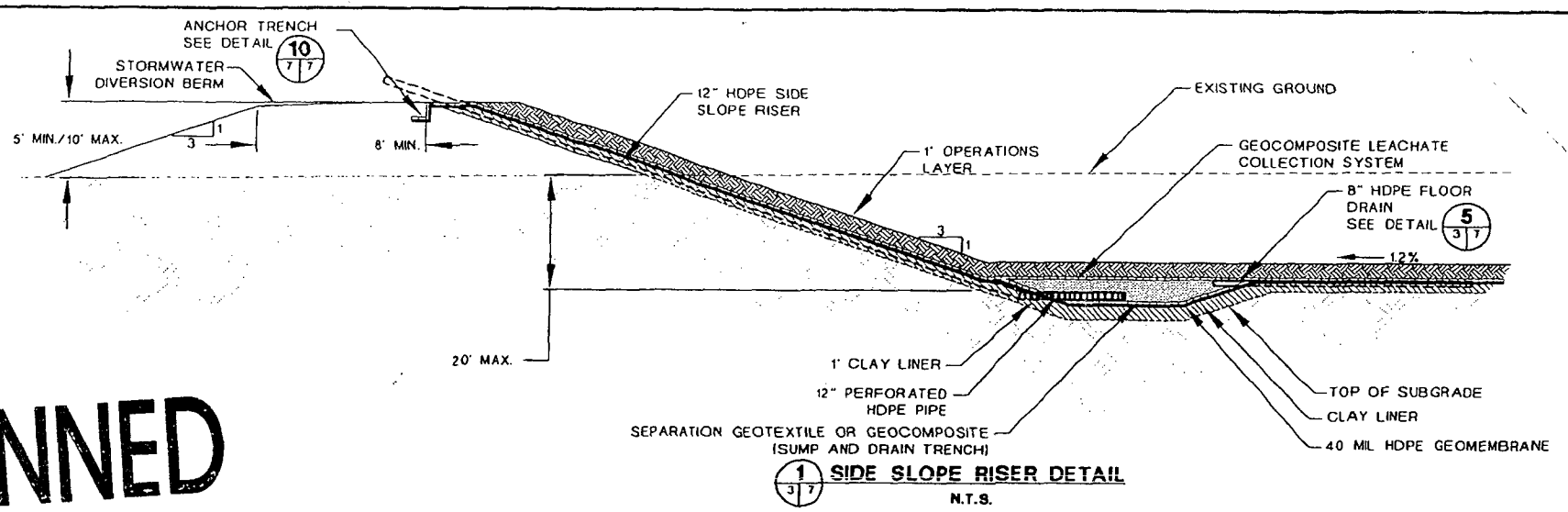
PROJECT:
COMMERCIAL SURFACE WASTE MANAGEMENT FACILITY

DRAWING TITLE:
ULTIMATE COVER PLAN CROSS-SECTIONS

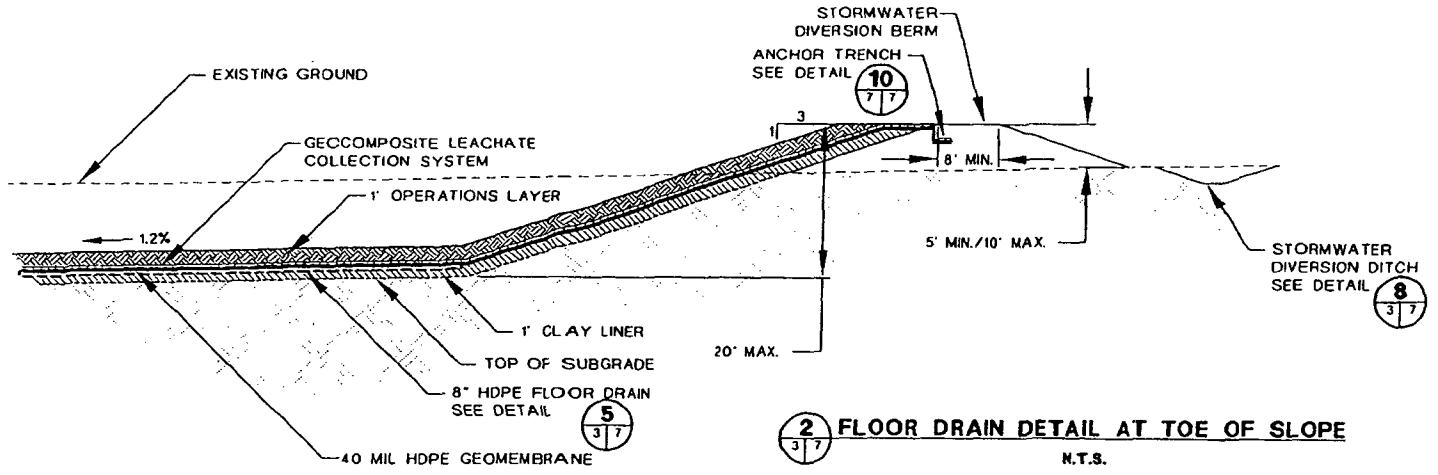
MWH

Sheet 2 Of 2 Sheets | SCALE: As Shown | DRAWING No.: 06

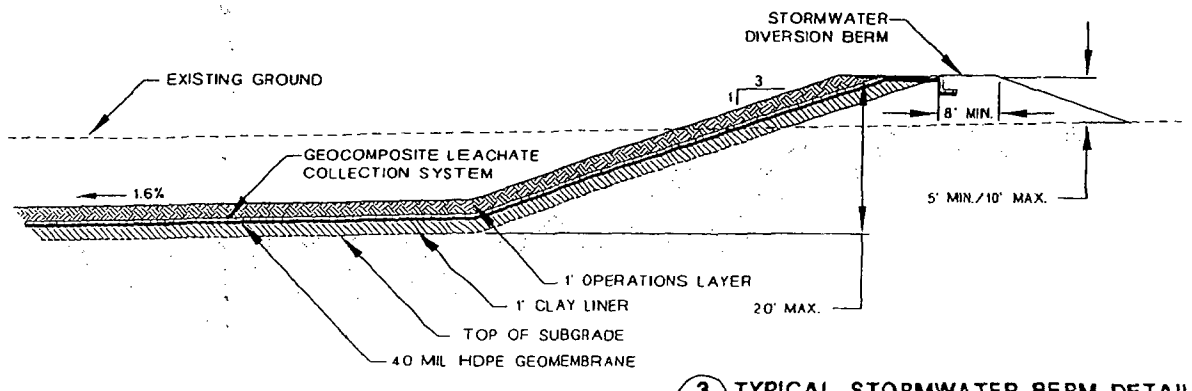
AutoCAD File: 06-Ult Cover Plan.dwg PROJECT NUMBER 1001285



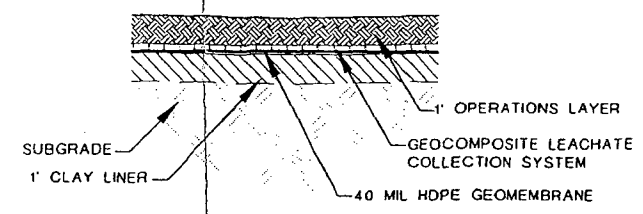
1 3|7 SIDE SLOPE RISER DETAIL
N.T.S.



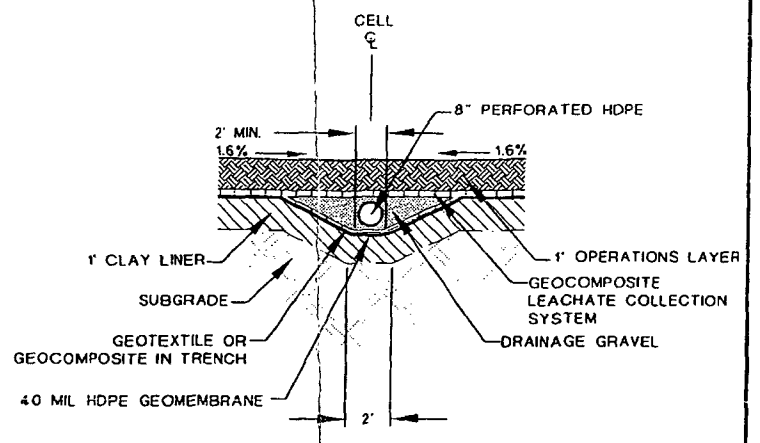
2 3|7 FLOOR DRAIN DETAIL AT TOE OF SLOPE
N.T.S.



3 3|7 TYPICAL STORMWATER BERM DETAIL
N.T.S.



4 3|7 LANDFILL LINER DETAIL



5 3|7 FLOOR DRAIN DETAIL
N.T.S.

DETAIL/SECTION NUMBER
A 6|6
DRAWING No. WHERE DETAIL/SECTION IS REFERENCED
DRAWING No. WHERE DETAIL/SECTION IS SHOWN

NOT FOR CONSTRUCTION - FOR PERMITTING PURPOSES ONLY

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
1	Add 40 ml HDPE Geomembrane	10/05	J.Pelliser	D.Gallery	J.Pelliser
0	Issued for Permitting	08/05	D.Gallery	D.Gallery	F.Cuevas

GANDY MARLEY, INC.

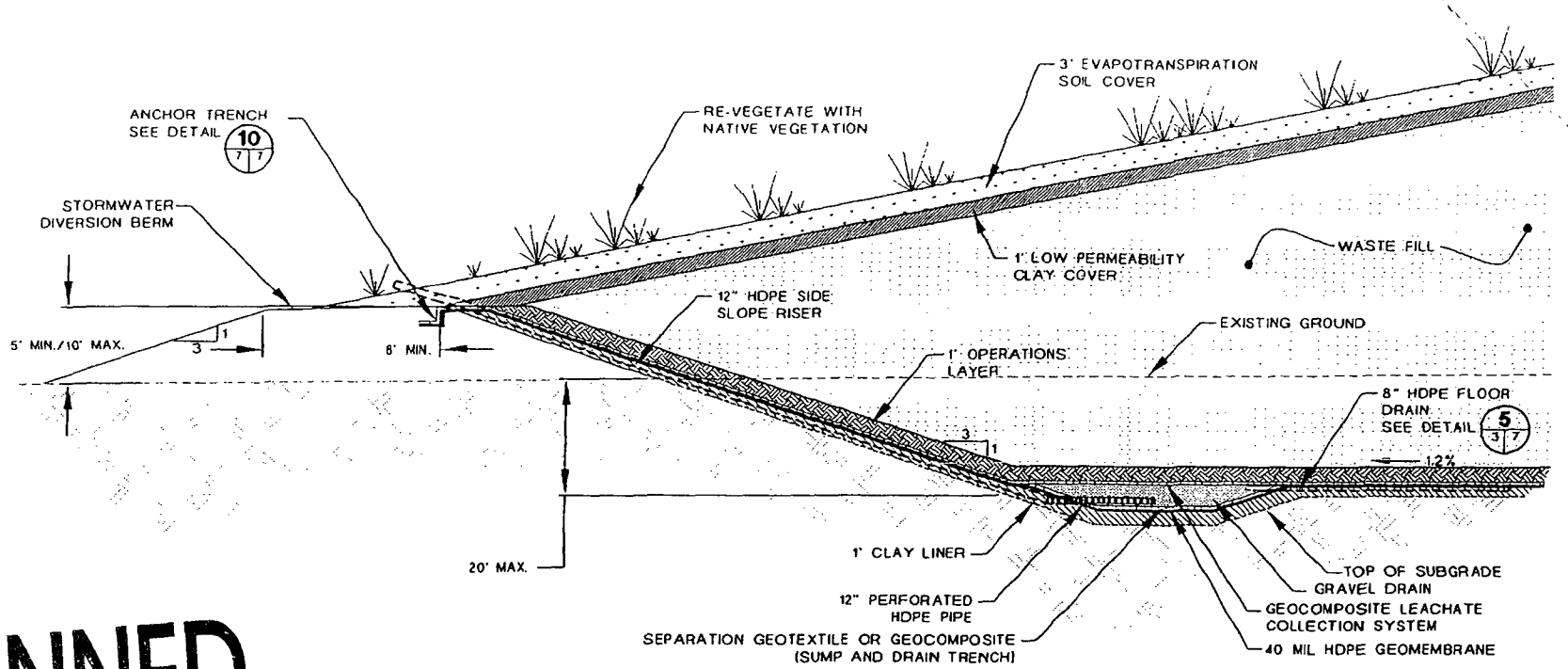
PROJECT:
COMMERCIAL SURFACE WASTE MANAGEMENT FACILITY

DRAWING TITLE:
TYPICAL DETAILS

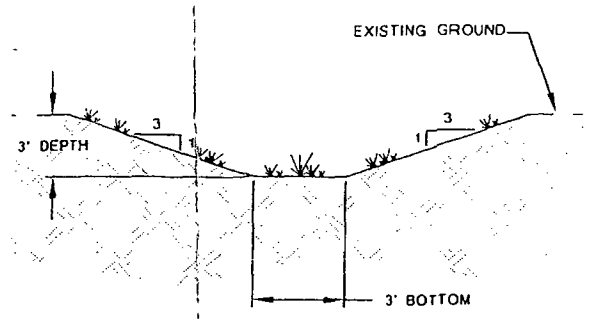
MWH

Sheet 7 Of 3 Sheets
SCALE: As Shown
DRAWING No: 07

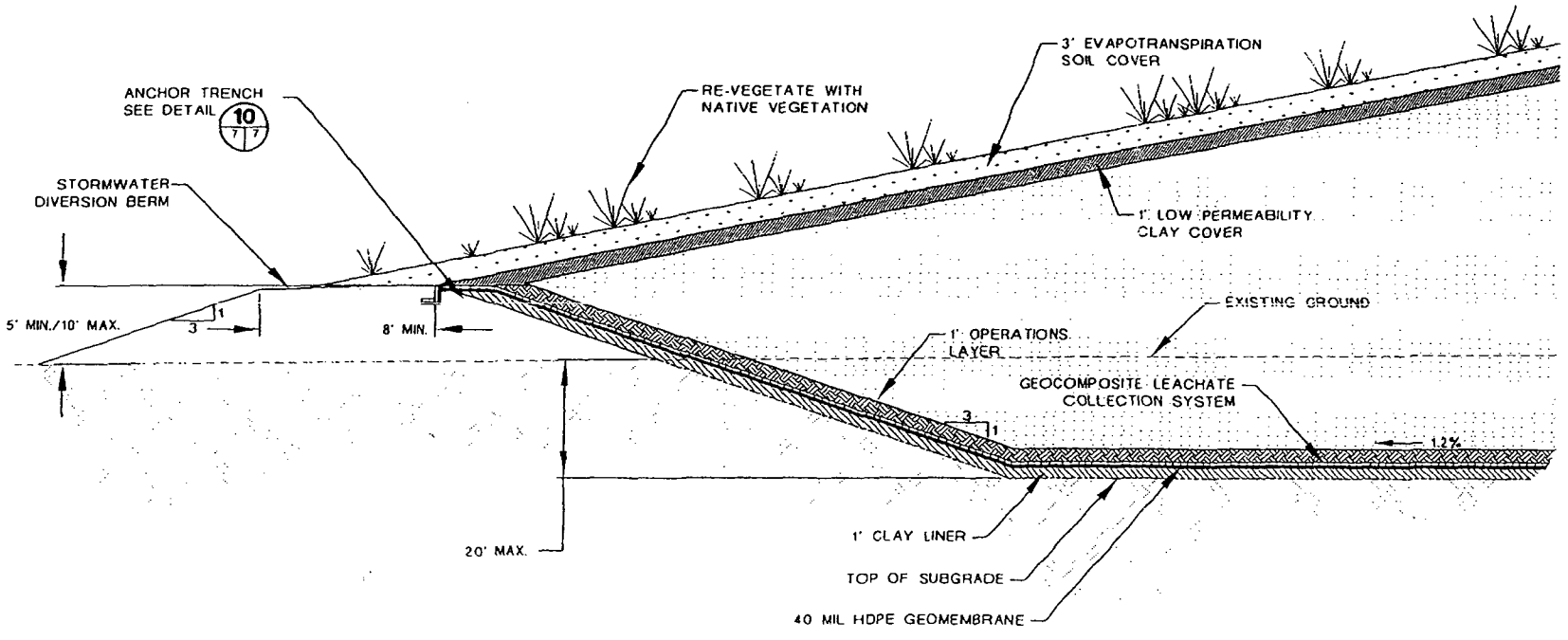
AutoCAD File: 01 Typical Details.dwg PROJECT NUMBER: 800385



6/4|7 **COVER DETAIL WITH SIDE SLOPE RISER**
N.T.S.



8/3|7 **STORMWATER DIVERSION DITCH**
N.T.S.



7/4|7 **TYPICAL COVER DETAIL**
N.T.S.

NOTE:
COVER SHALL BE CONSTRUCTED TO FORM A SLOPE OF 5-20% AFTER CONSOLIDATION.

A/6|6 — DETAIL/SECTION NUMBER
DRAWING No. WHERE DETAIL/SECTION IS REFERENCED
DRAWING No. WHERE DETAIL/SECTION IS SHOWN

NOT FOR CONSTRUCTION - FOR PERMITTING PURPOSES ONLY

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
1	Add 10 MIL HDPE Geomembrane	10/05	JPalker	DGallery	JPalker
0	Issued for Permitting	08/05	DGallery	DGallery	P.Carow

GANDY MARLEY, INC.

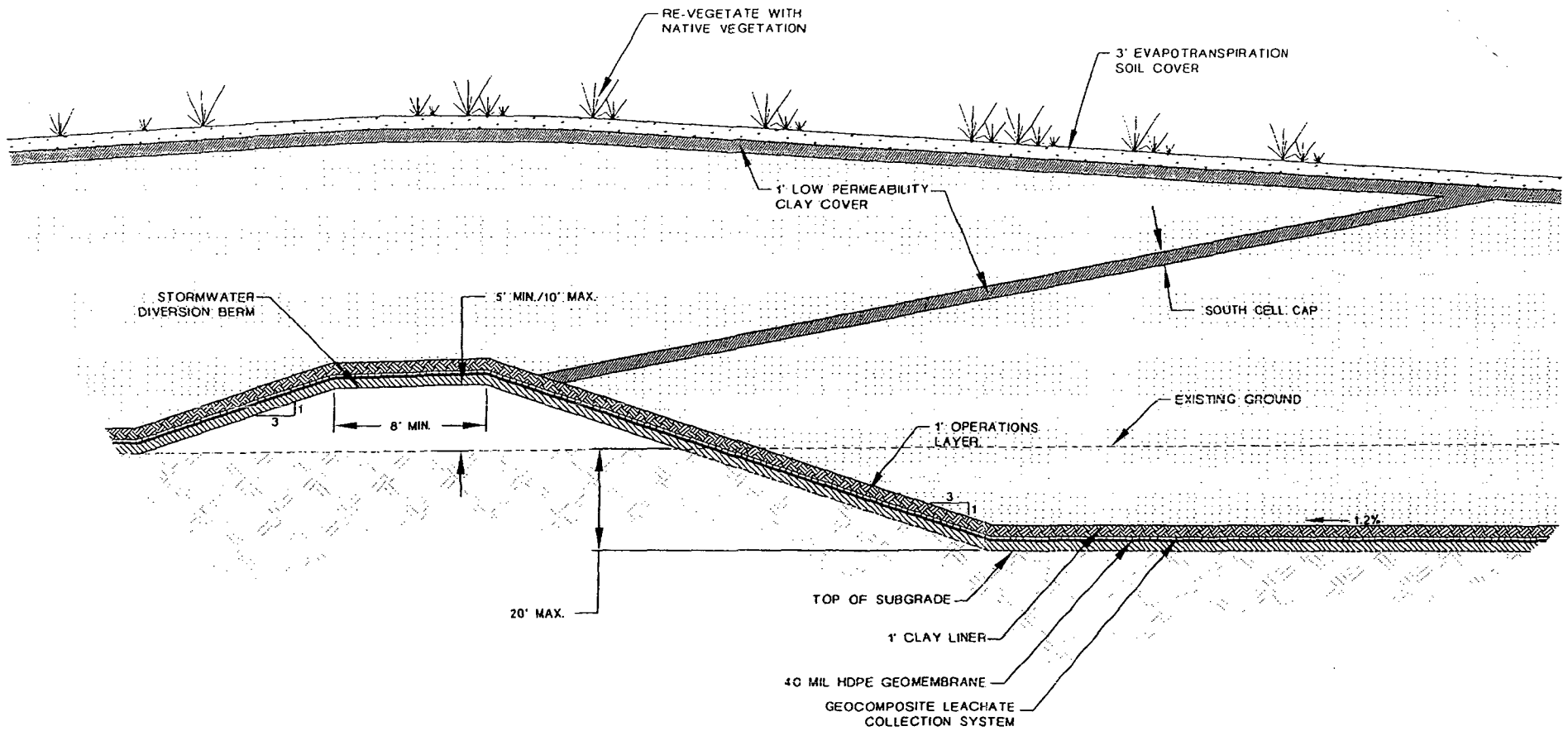
PROJECT: COMMERCIAL SURFACE WASTE MANAGEMENT FACILITY

DRAWING TITLE: TYPICAL DETAILS

MWH

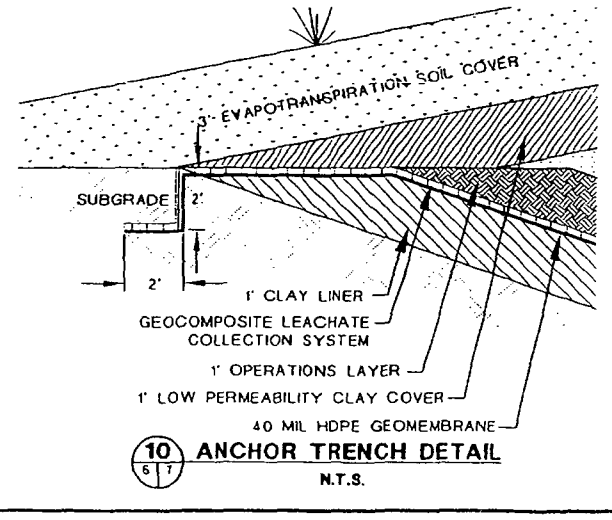
Sheet 7 Of 7 Sheets | SCALE: As Shown | DRAWING No. 07

AutoCAD File: 07-Typical Details.dwg PROJECT NUMBER: 1004385



9 / 6 7 **OVERLAPPING COVER DETAIL**

N.T.S.



10 / 6 7 **ANCHOR TRENCH DETAIL**

N.T.S.

NOTE:
COVER SHALL BE CONSTRUCTED TO FORM A SLOPE OF 5-20% AFTER CONSOLIDATION.

A / 6 5 — DETAIL/SECTION NUMBER

DRAWING No. WHERE DETAIL/SECTION IS REFERENCED

DRAWING No. WHERE DETAIL/SECTION IS SHOWN

NOT FOR CONSTRUCTION - FOR PERMITTING PURPOSES ONLY

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
1	Add 40 mil HDPE Geomembrane	10/05	JPalmer	B.Gallery	JPalmer
0	Issued for Permitting	08/05	B.Gallery	B.Gallery	P.Carver

GANDY MARLEY, INC.

PROJECT:
COMMERCIAL SURFACE WASTE MANAGEMENT FACILITY

DRAWING TITLE:
TYPICAL DETAILS

MWH

Sheet 3 Of 3 Sheets
SCALE: As Shown
DRAWING No. 07

AutoCAD FILE: 07-Typical Details.dwg PROJECT NUMBER: 1004383

CLAY LINER

MATERIALS

A. Clay liner material shall be obtained from borrow areas or stockpiles identified by the Owner.

B. Clay liner material for landfill or surface impoundment construction shall:

1. Be classified according to the Unified Soil Classification System (USCS) as CL or CH (ASTM D 2487) and exhibit a minimum liquid limit of 30 and a minimum plasticity index of 11.

2. Have a percentage of gravel (i.e., dry weight retained on a U.S. No. 4 sieve) of less than 15 percent.

3. Have particles no larger than 2 inches (in largest dimension) after processing but prior to placement and no larger than 1 inch (in largest dimension) after placement and compaction.

4. Have a hydraulic conductivity of not more than 1×10^{-7} cm/sec when compacted in accordance with these General Specifications and tested in the laboratory in accordance with ASTM D 5084 at an average effective confining pressure of 5 psi.

CLAY LINER COMPACTION

A. Clay liner be compacted to a minimum of 90% of the materials maximum dry density as determined by ASTM D1557.

B. Compaction of the clay liner for the landfill or surface impoundment shall be performed using a Caterpillar 825 compactor or equal.

C. The daily work area shall extend a sufficient distance so as to maintain soil moisture conditions within an acceptable range to allow continuous operations. Desiccation and crusting of the lift surface shall be avoided as much as possible.

D. The CQA Engineer will identify any areas of significant desiccation and crusting of a lift surface. The Contractor shall scarify the surface of such areas to a nominal depth of 1 to 2 inches or to the depth of desiccation identified by the CQA Engineer, and then water condition, disc or mix as necessary, and recompact the area.

PERFORATIONS

A. Perforations in the clay liner resulting from construction activities shall be filled. Such perforations may include, but are not limited to, the following:

1. Nuclear density test probe locations;
2. Shelby tube sample locations;
3. Sand-cone or rubber-balloon test locations; and,
4. Survey stake locations.

LOW PERMEABILITY CLAY COVER

MATERIALS

A. Low permeability clay cover material shall be obtained from borrow areas or stockpiles identified by the Owner.

B. Low permeability clay cover material for landfill or surface impoundment construction shall:

1. Be classified according to the Unified Soil Classification System (USCS) as CL or CH (ASTM D 2487) and exhibit a minimum liquid limit of 30 and a minimum plasticity index of 11.

2. Have a percentage of gravel (i.e., dry weight retained on a U.S. No. 4 sieve) of less than 15 percent.

3. Have particles no larger than 2 inches (in largest dimension) after processing but prior to placement and no larger than 1 inch (in largest dimension) after placement and compaction.

LOW PERMEABILITY CLAY COVER COMPACTION

A. Low permeability clay cover will be machine compacted .

B. Compaction of the clay liner for the landfill or surface impoundment shall be performed using a Caterpillar 825 compactor or equal.

C. The Contractor shall not place the clay layer until the CQA Officer confirms that the constructed grades and elevations of the waste meet the requirements of the Construction Drawings, all field testing is complete, and approved in accordance with the requirements of the CQA Plan.

PERFORATIONS

A. Perforations in the soil resulting from construction activities shall be filled. Such perforations may include, but are not limited to, the following:

1. Survey stake locations.

OPERATIONS LAYER

MATERIALS

A. Soil material shall be obtained from the landfill excavation or off-site borrow sources or remediated soil from the landfarm..

B. Soil layer material shall classify as CL, ML, SC, GC, SM, or GM according to the Unified Soil Classification System (ASTM D 2487) and shall have a maximum particle size not exceeding 6 inches.

PLACEMENT AND COMPACTION

A. The final in-place thickness of the soil layer shall be not less than 12 inches.

B. The soil material shall be spread in 1 lift.

EVAPOTRANSPIRATION COVER

MATERIALS

A. Evapotranspiration cover material shall be obtained from the landfill or from on-site or off-site borrow sources.

B. Evapotranspiration cover material shall classify as CL, ML, SC, GC, SM, or GM according to the Unified Soil Classification System (ASTM D 2487) and shall have a maximum particle size not exceeding 3 inches.

PLACEMENT AND COMPACTION

A. Evapotranspiration cover material shall be placed above the cover system at the locations and to the thicknesses shown on the Construction Drawings.

B. The final in-place thickness of the vegetative cover layer shall be not less than 36 inches.

C. Evapotranspiration cover material shall be compacted by two passes of tracked equipment such as a Caterpillar D6H-LGP or other equipment approved by the Owner.

GEOCOMPOSITE

GEOCOMPOSITE PROPERTIES

REQUIRED GEOCOMPOSITE PROPERTIES			
Properties	**Units**	**Specified Values[4]**	**Test Method**
Geonet Component:			
Polymer composition	%	95 polyethylene by weight	
Polymer specific gravity		0.92	ASTM D 1505
Polymer melt index	g/10 min.	0.1 - 0.5	ASTM D 1238
Carbon black content	%	2 - 3	ASTM D 1603
Nominal thickness	mm	5	ASTM D 374C or D1777
Geotextile Component (both sides of geonet):			
Polymer composition	%	95 polyester polypropylene, or polyethylene by weight	
Mass per unit area	oz/yd^2	7.1	ASTM D 3776
Apparent opening size	mm	$O_{95} < 0.210$ mm	ASTM D 4751
Permitivity	sec^{-1}	1.47	ASTM D 4491
Grab strength	lb	210	ASTM D 4632[1]
Tear strength	lb	75	ASTM D 4533[2]
Puncture strength	lb	95	ASTM D 4833[3]
Geocomposite:			
Transmissivity	m^2/s	2×10^{-4}	ASTM D 4716[5]
Peel Strength	lb/in.	2	ASTM D 413

NOTES:

(1) Minimum of values measured in machine and cross machine directions with 1 inch clamp on constant rate of extension (CRE) machine.

(2) Minimum value measured in machine and cross machine direction.

(3) Tension testing machine with a 1.75-inch diameter ring clamp, the steel ball being replaced with a 0.31-inch diameter solid steel cylinder with flat tip centered within the ring clamp.

(4) Values represent minimum average roll values (i.e., any roll in a lot should meet or exceed the values in this table). Where ranges of values are specified, the average roll value must be within the specified range. The apparent opening size specified is a maximum average roll value.

(5) The design transmissivity is the hydraulic transmissivity of the geocomposite measured using water at 68°F ± 3°F with a hydraulic gradient of 0.1, under a compressive stress of not less than 15,000 psf. For the test, the geocomposite shall be sandwiched between a layer of protective soil material representative of the material that will be used in the landfill and a 60-mil thick textured HDPE geomembrane. The minimum test duration shall be 24 hours and the report of results shall include measurements at intervals over the entire test duration.

HANDLING AND PLACEMENT

A. Geocomposite shall be installed at all locations shown on the Construction Drawings and to Manufacture specifications.

B.

PLACEMENT OF OVERLYING MATERIALS

A. Overlying materials as required by the Construction Drawings, shall be placed as soon as possible after placement and approval of the geocomposite. Placement of each overlying material shall be in accordance with the appropriate sections of these General Specifications.

B. The Contractor shall place overlying soil materials in such a manner as to ensure that:

1. The geocomposite and underlying geosynthetic materials are not damaged;

2. Minimal slippage occurs between the geocomposite and underlying layers; and,

3. Excessive stresses are not produced in the geocomposite.

C. Unless otherwise specified by the Owner, the equipment operating on soil material overlying a geocomposite shall comply with the following:

Maximum Allowable Equipment Ground Pressure (psi)	*Thickness of Soil Above Geocomposite (inches)*
<5	12
<10	18
<20	24
>20	36

The maximum allowable equipment ground pressure shall be 65 psi. The acceptability of equipment operating at ground pressures greater than 65 psi will be evaluated by the Owner at the Contractor's expense.

The requirements do not apply to equipment used to construct the sump secondary or primary clay liners; however, the Owner can restrict the use of equipment that, in the Owner's opinion, may be potentially damaging to the geocomposite.

D. The CQA Engineer will provide monitoring of the spreading of soils over the geocomposite in accordance with the CQA Plan.

VEGETATION AND SEEDING

MATERIALS

A. Seed mixture for planting shall be as specifed by the New Mexico SCS.

SITE PREPARATION

A. Remove all weeds from areas to be planted. Roughen seed bed to a depth of 2 to 4 inches by scarifying, disking, harrowing, or equivalent methods.

PLANTING

A. Plant seed using equipment and procedures appropriate for seed type at recommended by the seed supplier.

DRAINAGE GRAVEL

MATERIALS

A. Drainage gravel for the work shall consist of clean, hard, durable, non-carbonate, rounded, sub-rounded to sub-angular particles that are free of metals, roots, trees, stumps, concrete, construction debris, other organic matter, and deleterious materials and coatings.

B. The gravel shall be screened and washed to have a gradation (when tested in accordance with ASTM D 422) after placement equivalent to the following

Sieve	Percent Passing
1"	100%
¾"	85-100%
3/8"	12-30%
4"	1-4%
40"	0-1%

C. Drainage gravel shall have a hydraulic conductivity of at least 1 cm/sec when hand compacted in the laboratory in 3 lifts and tested in accordance with ASTM D 2434.

D. Drainage gravel shall have less than 30% loss when tested in accordance with ASTM C 131 for abrasion and less than 12% loss when tested in accordance with ASTM C 88.

E. Drainage gravel shall have less than 5 percent loss of weight, when tested for calcium carbonate content in accordance with ASTM D 4373. This requirement may be waived by the Owner if it can be otherwise demonstrated that the material contains no significant carbonate content.

PLACEMENT AND COMPACTION

A. Gravel shall be placed at the locations and to the thicknesses shown on the Construction Drawings.

B. Gravel shall not be placed directly on the geomembrane liner. Gravel may be placed on top of a geotextile cushion layer, geonet, geocomposite drainage layer, or geomembrane rub sheet, as shown on the Construction Drawings. Gravel may be placed using a backhoe, front-end loader, belt conveyor, spreader box, or other method approved by the Owner, as long as the ground-pressure requirements of this Section are not exceeded. The maximum acceptable gravel drop height is 3 feet.

C. Final spreading of the gravel may be performed using a low ground-pressure dozer (Caterpillar D6H-LGP or other similar equipment approved by the CQA Engineer), low-ground pressure front-end loader, or by hand. The tracked equipment shall operate only over previously-placed gravel or other soil. The Contractor shall not operate equipment directly on geosynthetics.

D. Unless otherwise specified by the Owner, the equipment used to spread gravel shall not exert ground pressures exceeding the following:

Allowable Equipment Ground Pressure (psi)	*Thickness of Gravel Above Geosynthetic (inches)*
<5	12
<10	18
<20	24
>20	36

The maximum allowable equipment ground pressure shall be 65 psi. The acceptability of equipment operating at ground pressures greater than 65 psi will be evaluated by the Owner at the Contractor's expense.

E. The Contractor shall operate equipment in a manner that is protective of polyethylene pipes and underlying geosynthetics. If it is suspected that damage to polyethylene pipes or underlying geosynthetics may have occurred, the Owner will instruct the Contractor to remove the overlying material to expose the potentially-damaged materials. The Contractor shall repair, at his own expense, any observed damage, in accordance with the requirements of these General Specifications.

F. Within 1 foot of the toe of a slope, gravel shall be spread by hand. Extreme care shall be taken when placing gravel to protect the installed components of the liner system.

G. Geotextile filter or cushion layers shall be placed as shown on the Construction Drawings. Geotextile filter and cushion layer placement shall be in accordance with Section 02714 of these General Specifications.

[END OF SECTION]

GEOMEMBRANE LINERS

RESIN

A. Reclaimed polymer shall not be added to the resin; however, the use of polymer recycled during the manufacturing process will be permitted if the recycled polymer does not exceed 2 percent by weight of the total polymer weight. The product shall be manufactured specifically for use in geomembranes, using new, first-quality polyethylene resin.

B. The resin shall comply with the following properties for high density polyethylene (HDPE):

1. Specific Gravity: 0.94 to 0.96 (ASTM D 792 Method A or ASTM D 1505)

2. Melt Index: 0.1 - 0.3 g/10 min. (ASTM D 1238 Condition E 190/C, 2.16 kg)

3. Water absorption: 0.1% max (ASTM D 570)

GEOMEMBRANE PROPERTIES

A. Smooth or textured HDPE geomembrane shall be used based on the following schedule:

B. The Contractor shall require that the geomembranes Manufacture furnish geomembrane with minimum average roll values, as defined by the Federal Highway Administration (FHWA), meeting or exceeding the criteria specified in Table 02775-1 and that meet the manufacturing quality control requirements of this section. The Contractor shall require the geomembrane Manufacturer to certify in writing as well as provide test results that demonstrate that the geomembrane delivered to the site complies with the properties listed in Table 02775-1.

C. In addition to the property values listed in Table 02775-1, the geomembrane material shall:

1. Contain a maximum of 1 percent by weight of additives, fillers, or extenders (not including carbon black).

2. Not have striations, roughness (except in the case of textured HDPE geomembranes where a roughened surface is characteristic), pinholes, or bubbles on the surface.

3. Be produced so as to be free of holes, blisters, undispersed raw materials, or any sign of contamination by foreign matter.

4. Be manufactured in a single layer or coextruded.

INSTALLATION

A. Install all geomembrane in accordance with manufacture' specifications.

TABLE 02775-1
REQUIRED GEOMEMBRANE

Property	Test Method	60 mil HDPE [1]
Thickness	ASTM D1593 Para 8.1.3 (Smooth)	60 mil
	ASTM D751 (Textured)	57 mil (min)
Specific Gravity	ASTM D1505	0.940
Elongation @ Yield	ASTM D638	13%
Elongation @ Break	ASTM D638 Speed C	500% Smooth 100% Textured
Tensile Strength @ Yield	ASTM D638 Test Specimen Type IV	132 lb/in
Tensile Strength @ Break	ASTM D638	228 lb/in Smooth 132 lb/in Textured
Carbon Black Content	ASTM D1603	2% to 3%
Carbon Black Dispersion	ASTM D3015 and ASTM D2663	A-1, A-2, B-1
Environmental Stress Crack	ASTM D1693	1,500 hrs
Low Temperature Brittleness	ASTM D746 Procedure B	-103°F
Dimensional Stability	ASTM D1204	<1.5% (max)
Puncture Resistance	FTMS 101C	78 lb Smooth 78 lb Textured

Note: [1]Values represent minimum average roll values (i.e., any roll in a lot should meet or exceed the values in this table). Where ranges of values are given, the average roll values must be within the specified range. The specified dimensional stability is a maximum average roll value.

TABLE 02775-2
REQUIRED GEOMEMBRANE SEAM PROPERTIES[1]

ASTM D4437		60 Mil HDPE			
Shear	Fusion lbs/in	120	Smooth	113	Textured
	Extrusion lbs/in	120	Smooth	113	Textured
Peel	Fusion lbs/in	90	Smooth	90	Textured
	Extrusion lbs/in	80	Smooth	80	Textured

Note: (1) Specified properties are minimums.

[END OF SECTION]

ATTACHMENT 8
OF
FORM C-137

CONTINGENCY PLAN

I. INTRODUCTION

The Contingency Plan for the Gandy Marley facility addresses the containment, clean-up and reporting of major and minor spills, and other emergencies that may occur during the operation of the facility. The plan has been prepared to meet the requirements of the New Mexico Oil Conservation Division (OCD) Rules 711 and 116.

The purpose of the Contingency Plan is to present organized, coordinated, and technically/financially feasible courses of action to be taken in response to contingencies during the operation of the Gandy Marley facility. This Plan will be implemented if emergency situations develop that could endanger public health, welfare or the environment. The Plan includes emergency procedure checklists to be followed in the event of the identified emergency. The Plan will be amended whenever: the facility permit is revised or modified; the plan fails in an emergency; there are changes in the design, construction, operation, maintenance or other circumstances in a way that increase the potential for fires or explosions, and subsequently changes the response necessary in an emergency; the list of Emergency Coordinators changes; or the list of emergency equipment changes.

II. SPILL/LEAK PREVENTION

No free liquids will be disposed of in the landfill or landfarm cells. Berms will be of an adequate size and construction to prevent storm water from entering the landfill cells. The exterior berm of the facility is approximately five (5) feet high and fifteen (15) feet wide. A ditch is cut on the up-hill side, outside the facility, and is used to divert water around the facility. Equipment and machinery that could be used in the event of storm water runoff will be at the facility at all times.

Storm water that accumulates in the landfill cells will be removed within 72 hours. Upon removal, such accumulated water will be sampled for TPH, BTEX and chlorides and stored in tanks or spread on unsaturated areas of the landfill or landfarm cells. Records of such sampling will be maintained and available for OCD inspection.

The OCD Santa Fe and Hobbs offices will be immediately notified of any leak or spill, in accordance with OCD Rule 116. Major spills or leaks will be reported by giving both an immediate verbal notice (within 24 hours of discovery), followed by a timely written notice within 15 days by filing Form C-141. In the event of a spill or release, the procedures identified in the Spill/Release Checklist, attached hereto, will be followed.

III. EMERGENCY RESPONSE PROCEDURES

A. Emergency Coordinators

If an emergency situation occurs at the Gandy Marley facility, employees must contact the designated Emergency Coordinator(s). The Emergency Coordinator(s) assume responsibility in the order listed below.

Primary Emergency Coordinator

Name: Larry Gandy
Title: Vice President
Office Phone: 505-398-4960
Home Phone: 505-398-2858
Mobile: 505-369-5721
Address: 1109 East Broadway, Tatum, NM 88267

Assistant Emergency Coordinator

Name: Bill Marley
Title: Vice President
Office Phone: 505-347-0434
Home Phone: 505-347-5725
Mobile: 505-626-6513
Address: 45 Crossroads, Roswell, New Mexico 88203

The Emergency Response Telephone Numbers, attached hereto, will be posted at the facility.

B. Emergency Plan Implementation

The decision to implement the Contingency Plan at the Gandy Marley facility will depend upon whether or not a fire, explosion or hazardous situation could potentially threaten public health, welfare, or the environment. In the event of an emergency, the emergency response procedures identified in the checklist for the particular identified emergency will be followed.

Checklists for the following emergencies are attached to the Contingency Plan.

- Medical emergency
- Vehicle accident
- Fuel releases
- Fire
- Spills and Releases

A copy of the checklists will be kept in a readily accessible on-site location.

IV. SITE OPERATIONS

Conditions may be encountered at the site during normal facility operations that will require response actions that are not included as part of typical daily site operations.

A. Dust Control

During dry periods, fugitive dust may be a nuisance from the facility operation. The water truck kept on site is used to control dust whenever a potential problem exists. In the event of unusually dusty conditions, Gandy Marley will lease another water truck to assist in dust control.

B. Litter Control

No more than 10 uncovered acres will be used for landfill disposal at any given time. Debris that may blow will be placed in the landfill cells below ground level. By the end of each workday, any debris that may blow will be covered with sufficient soil to prevent blowing. Litter that may have blown out of the landfill will be controlled on a daily basis. Stray litter, including trapped litter in vegetation or fencing, will be picked up and returned to the landfill cell.

C. Noise Control

Since the facility operations are located in an area a significant distance from local residences, the noise generated from the facility will not have any off-site impact.

D. Fire Prevention and Control

The possibility of fire, whether in landfilled waste or within a piece of equipment, is a potential hazard associated with daily operations at landfills. Fire prevention included cleaning combustible materials from on-site equipment, particularly heat sources (e.g. radiators).

The use of cover material to cut off the oxygen supply is an effective and practical means of fire control. Water can be used to supplement the use of cover soil or serve as an alternative means of controlling fires. The Gandy Marley water truck is available for use during emergency situations. For larger or more serious outbreaks, the local fire department will be contacted. Additionally, portable fire extinguishers are kept as a precautionary measure.

E. Unusual Traffic Conditions

Traffic will not pose problems at the facility for the following reasons:

- The local traffic and regional roadways are more than adequate to manage facility related traffic
- Landfill personnel are available to direct incoming and outgoing traffic as needed
- Roadways are designed to manage the type of traffic that will use the facility at maximum daily volumes and during inclement weather.

F. Equipment Breakdown

The routine preventive maintenance program minimizes equipment down-time. When a piece of equipment is unavailable, other suitable pieces of equipment are used to perform the required task. In the event of multiple breakdowns, or for major earth-moving efforts, additional equipment can be leased from local contractors or suppliers.

G. Alternative Waste Disposal

The Gandy Marley facility accepts scheduled waste only. Therefore, in the event the facility is not in operation, waste will not be scheduled for acceptance.

V. EMERGENCY EQUIPMENT

As part of an effort to prevent emergencies, prevent personal injury, and efficiently respond to an emergency, the following equipment is utilized and available for utilization at the Gandy Marley facility.

A. Personal Protective Equipment

Personnel utilize the following equipment during daily operations:

H2s monitors
Hardhats
Safety glasses
Roll over protective systems on equipment
Gloves

B. Emergency Response Equipment

The following emergency response equipment is available to personnel to be used in the event of an emergency. Personnel are familiarized with the location of the equipment upon employment at the site.

Bull dozer
Water truck
Road grader
Front end loader
Tractor and disk
Fire extinguishers

EMERGENCY RESPONSE TELEPHONE NUMBERS

TATUM AMBULANCE, FIRE AND SHERIFF	505/398-5555 505/398-4444
LARRY GANDY	505/369-5721 Cell 505/398-5212 Home
BILL MARLEY	505/626-6513 Office 505/626-6513 Cell
JIM THOMPSON	505/623-8818 505/626-7045 Cell
CHAVES COUNTY SHERRIFF	505/624-6500
ROSWELL FIRE DEPARTMENT	505-624-6800
ROSWELL AMBULANCE	505-624-0113
NEW MEXICO STATE POLICE	505-622-7200

EMERGENCY PROCEDURES CHECKLISTS

The following checklists and procedures are to be used in the event of the identified emergency. The checklists include procedures for the following emergencies:

- Medical emergency
- Vehicle accident
- Fuel releases
- Fire
- Spills and Releases

MEDICAL EMERGENCY

Medical Emergency Checklist

1. Notify Emergency Coordinator as soon as possible.
2. Protect yourself first. Do not put yourself at risk!
3. Summon EMS to the scene. If trained, provide First Aid/CPR until EMS arrives.
4. Account for personnel.
5. Secure the scene to protect bystanders. If not life threatening nor is going to complicate the injury, the supervisor can transport the injured party to the medical clinic.
6. If fatality, leave body as it was discovered. Secure scene and shut down operations until released by authorities and Management
7. Notify (as appropriate) police, county sheriff, and coroner.
8. Follow appropriate notification procedures.
9. If an ambulance is transporting the body, have a company employee accompany body to destination.
10. Remove work place personal belongings in the presence of witnesses and inventory items. Have a witness co-sign inventory.
11. Follow medical emergency notification and reporting procedures.
12. Determine if Crisis Intervention is needed.
13. Determine if Blood borne pathogen protocols are needed.
14. Emergency Coordinator will protect evidence and begin investigation.

VEHICLE ACCIDENT

1. Report accident to Emergency Coordinator as soon as possible.
2. Notify law enforcement, ambulance, and fire personnel as needed.
3. Do not move vehicle unless instructed to do so by law enforcement personnel.
4. Provide first aid to injured parties until ambulance personnel arrive.
5. Instruct personnel in our vehicles to stand to side of road out of lane of traffic to avoid another collision and turn on emergency flashers on vehicle.
6. Send Emergency Coordinator to scene to document evidence through diagrams, photographs, and witness statements.
7. Notify Safety consultant as soon as possible.
8. Gather information from all parties involved including vehicle, occupant and insurance information.
9. Instruct personnel to cooperate with law enforcement, but do not provide written or verbal statements to any other parties.
10. If our personnel went to a local hospital by ambulance, send a supervisor to the hospital to assist.
11. If not a fatality, notify spouse and offer to drive them to the hospital. If a fatality follow procedure in Medical Emergency Checklist.

FUEL RELEASES

Fuel Release Checklist

Initial Response Steps

1. Notify Emergency Coordinator as soon as possible.
2. Ensure personnel safety.
3. Sound alarm if available. Call oil or gas company to report release.
4. Secure scene and cordon off and block traffic from the area.
5. Evacuate if necessary, upwind and away from the source.
6. Account for all personnel.
7. Call for medical assistance if necessary.
8. Assess incident and safety hazard: Consider size, rate, type, location, cause, movements, fire/explosion hazard, and health risk. Never attempt to handle an emergency situation without informing your supervisor and others of your whereabouts. No matter what time of the day, you must have a least one other person on-site with you when handling the emergency. Your backup is your lifeline should the situation change.
9. Eliminate ignition sources if safe to do so. (If applicable, shut off motors, electrical pumps, electrical power and open flames in release area. If safe, control source. Shut down pumps and close valves only when instructed to do so by oil company personnel.).
10. Use additional evacuation distances of hot zone for sour gas, high humidity, and no-wind situations.

FIRE
Fire and Explosion Checklist

1. Sound fire alarm if available and notify local fire department.
2. Evacuate affected area. Account for personnel. Keep unauthorized personnel from entering the area. Do not put yourself at risk if it is a large fire.
3. Notify Emergency Coordinator as soon as possible.
4. Determine whether fire fighting is possible and develop a plan of attack.
5. If fire is in a building, once evacuated, do not go back in. Wait for fire department to fight fire.
6. Drive to highway to escort fire department into location.
7. Conduct post-emergency evaluation and report.

Fire Fighting Tactics
Always consider your safety and the safety of people in the immediate area first. If fighting the fire puts you are risk, don't attempt to extinguish the fire.
SAFETY GUIDELINES

1. Personnel trained on available fire fighting equipment may attempt to fight incipient stage fires only with the correct class of extinguisher.
2. Wait for local fire department to handle fires that have spread beyond insipient stage.
3. Continually reassess the situation and modify the response accordingly.
4. Do not extinguish gas fires until gas source is shut-in.
5. Do not walk into or touch spilled materials.
6. Do not assume vapors or gases are harmless because of lack of a smell. Harmful gases or vapors may be odorless.

SPILLS AND RELEASES
Spill/Release Checklist

THESE ARE GUIDELINES FOR SPILL RESPONSE. THE ACTUAL ORDER THAT ITEMS ARE PERFORMED MAY VARY DEPENDING ON THE SITUATION.

1. Notify Emergency Coordinator as soon as possible.

2. CLEAR THE AREA – CHECK FOR INJURIES: Move all personnel a safe distance away and cordon off the area. Set up a command post. Do not allow re-entry to spill area until personnel are properly equipped or clean up is complete and the area is safe. Modify the cordoned area as the condition changes. Render first aid to injured persons and follow Medical Emergency guidelines. Do not treat a crude oil spill or a condensate spill lightly. Treat it as if were gasoline. It is very flammable and explosive.

3. IDENTIFY WHAT HAS HAPPENED: Size of Spill? Vapors? Odors? Mists? Smoke? Drums? Tank? Truck? Piping? Warning labels? Confined space or in open area?

4. INITIATE SAFETY/HAZARD CONTROLS: Eliminate all possible sources of ignition. Ventilate the areas as appropriate. Use high-level personal protective equipment. Put all possible safeguards in place and maintain all controls until hazardous conditions are eliminated. USE VENTILATION FANS IF INSIDE BUILDING. (Explosion proof for flammables.)

5. IDENTIFY ALL HAZARDS INVOLVED: Determine exactly what chemicals and conditions you are dealing with. Get MSDS. Note conditions that might affect responder's ability to attack spill. If personnel must enter spill area to determine this information, use the highest level of personal protective equipment and backup personnel present.

6. CONTAIN THE SPILL: Prime consideration should be to contain any spill at its source and stop the spread of material in the environment. Dirt, absorbent socks, booms on water, and absorbent pillows provide excellent means of both containment and clean-up. Use them quickly if you are not put at risk.

7. CALL FOR BACK-UP ASSISTANCE: If spill is medium to large, involving non-production fluids, call local HAZMAT squad. If a large flammable liquid spill, call the fire department to provide back-up assistance and stand-by fire protection. Even trained responders should not attempt spill response actions without back up of some kind.

8. PLAN OF ATTACK: Spill should be attacked according to a coordinated plan that spells out the actions and reactions of all response team members and

their back-up units. Make a plan of action and follow it! Modify the plan as needed.

9. CLEAN-UP SPILLED MATERIAL: Remove contained spill residues using vacuum trucks for oil field exempt wastes, or adsorbents for non-exempt wastes. Use of adsorbents does not reduce or significantly change the hazardous properties of a sorbed liquid. Handle spill clean-up materials with the same precautions as you would the liquid. Neutralize spill if necessary. Use remediation materials to remediate organic liquids such as crude oil or condensate. Maintain all safety/hazard controls until spill residues are removed or remediated and the area is declared safe.

10. PACKING-LABELING-DISPOSAL: Pack all hazardous waste non-exempt spill residues in containers which are DOT approved for the spilled liquid. Container labeling must be in accordance with DOT and EPA regulations applicable to the spilled liquid. Date the label. Disposal must be in accordance with all local, state, and federal regulations according to the RCRA status of the spilled liquid.

11. REPORTING-INCIDENT REVIEW: Chemical and oil spills and releases must be reported to local, state, or federal agencies. These reports must be timely and accurate. Each spill must be reviewed to determine what steps must be taken to prevent a recurrence. Fill out the spill report.

12. REORDERING SUPPLIES: All disposal supplies such as sorbents, gloves, coveralls, respirators, etc. should be reordered to be immediately available for future use.

ATTACHMENT 9
OF
FORM C-137

ROUTINE INSPECTION AND MAINTENANCE PLAN

ROUTINE INSPECTION AND MAINTENANCE PLAN

Gandy Marley's Routine Inspection and Maintenance Plan includes the following:

- Requirements for the Landfill Operation
- Requirements for Landfarm Operation
- Requirements for the Overall Facility Operation
- Waste Acceptance Criteria
- Tank Bottom Acceptance
- Reporting and Record Keeping

I. Requirements for Landfill Operation

1. No debris will be placed in a landfill cell in a way that would compromise the integrity of the clay liner. Large debris with potential to compromise the integrity of the landfill will be placed on sufficient soil to protect the liner.

2. As the cell fills, the contaminated material will be covered, progressively, with a 1 foot thick clay cap, which will be machine compacted, and a minimum of 2 feet of clean soil.

3. Non-virgin soils used as cover material will be sampled and analyzed for TPH, BTEX, and chlorides. A report of such sampling and analysis will be submitted to OCD prior to using such soil as landfill cover.

4. The top of the clean soil cover will be seeded with indigenous plants and watered to promote plant growth.

5. No materials will be placed in the landfill that are chemically incompatible with each other.

6. Any precipitation that accumulates in the landfill cell will be removed within 72 hours of discovery. Upon removal, such accumulated water will be sampled for TPH, BTEX and chlorides.

7. No more than 10 uncovered acres will be used for landfill disposal at any given time.

8. A leachate system will be installed and monitored as described in Attachment 7.

9. Landfarmed petroleum-contaminated soils may be used as daily cover within the landfill when a laboratory measurement of TPH is less than or equal to 1500 ppm, BTEX is less than or equal to 50 ppm, and benzene is less than or equal to 10 ppm. Comprehensive records of the laboratory analyses and the sampling locations must be maintained for OCD review.

10. Landfill cell inspection and maintenance will be conducted on at least a daily basis and immediately following each consequential rainstorm or windstorm. If any defect is

noted, repairs will be made as soon as possible. If the defect will jeopardize the integrity of the landfill, the OCD Santa Fe office will be notified within 24 hours and the landfill will not be operated until repairs have been completed.

11. Cover materials will be applied to the working face of the landfill, as necessary, to control odors, vectors, and blowing litter.

II. Requirements for Landfarm Operation

1. Treatment of petroleum-contaminated soils, exempt from RCRA Subtitle C regulations and that do not contain Naturally Occurring Radioactive Material regulated pursuant to 20 NMAC 3.1 Subpart 1403 (NORM), will be done inside the landfarm cells. Salt-contaminated wastes will not be placed in the landfarm cells.

2. All petroleum-contaminated soils received at the facility will be spread for treatment within 72 hours of receipt.

3. Soils will be spread on the surface in lifts of six inches or less.

4. Soils will be disked or turned a minimum of one time every two weeks (biweekly) to enhance biodegradation of contaminants.

5. The soil samples will be analyzed using EPA-approved methods.

6. Moisture may be added to landfarm cells to enhance biodegradation of contaminants and to control blowing dust.

7. No ponding, pooling or run-off of water will occur. Any ponding of precipitation will be removed within 72 hours of discovery.

8. The portion of the facility containing contaminated soils will be bermed to prevent run-off and run-on. A perimeter berm five feet in height has been constructed and will be maintained. The perimeter berm is capable of containing precipitation from a one hundred year flood for the specific region. In addition, a ditch has been constructed outside the facility for the purpose of drainage and surface water diversion.

9. Contaminated soils will not be placed within one hundred (100) feet of the boundary of the facility.

10. Contaminated soils will not be placed within twenty (20) feet of any pipelines crossing the landfarm. In addition, no equipment will be operated within ten (10) feet of a pipeline. All pipelines crossing the facility will have surface markers identifying the location of the pipelines.

11. The OCD Santa Fe and Hobbs offices will be notified within 24 hours of a discovery of a spill or leak.

12. Successive lifts of contaminated soils will not be spread until a laboratory measurement of total petroleum hydrocarbons (TPH) in the previous lift is less than 2500 parts per million (ppm), the sum of all aromatic hydrocarbons (BTEX) is less than 50 ppm, and benzene is less than 10 ppm. Comprehensive records of the laboratory analyses and the sampling locations will be maintained for OCD review. Authorization from the OCD will be obtained prior to application of successive lifts and/or removal of remediated soils.

13. Application of microbes or fertilizers to enhance bioremediation will only occur with prior approval from the OCD Santa Fe office. Requests for approval of such application must include the location of the area designated for the program, the composition of additives, and the method, amount and frequency of application.

14. Any design changes to the landfarm will be submitted to the OCD Santa Fe office for approval.

15. Landfarm inspection and maintenance will be conducted on at least a bi-weekly basis and immediately following each consequential rainstorm or windstorm. The OCD Santa Fe office will be notified within 48 hours if any defect is noted. Repairs will be made as soon as possible. If the defect will jeopardize the integrity of the landfarm, additional wastes will not be placed in the landfarm until repairs have been completed.

16. A treatment zone, not to exceed three (3) feet beneath the landfarm native ground surface, will be monitored. A minimum of two soil samples will be taken from each individual landfarm cell quarterly. The samples will be taken at two (2) to three (3) feet below the native ground surface.

    a. The soil samples will be analyzed quarterly using EPA-approved methods for total petroleum hydrocarbons (TPH) and volatile aromatic organics (BTEX). The soil samples will be analyzed annually for major cations and anions and Water Quality Control Commission (WQCC) metals.

    b. Gandy Marley shall take the required quarterly treatment zone samples during the last two weeks of each calendar quarter. Quarterly reports showing the results of these sample analyses shall be received in the OCD Santa Fe office no later than the 15th day of the second month following the end of each calendar quarter, as follows:

        First Calendar Quarter Report due on or before May 15
        Second Calendar Quarter Report due on or before August 15
        Third Calendar Quarter Report due on or before November 15
        Fourth Calendar Quarter Report due on or before February 15

    c. Gandy Marley shall take the required annual treatment zone samples during the last two weeks of the fourth calendar quarter. Gandy Marley shall submit its

annual reports showing the results of these sample analyses to the OCD Santa Fe office with its fourth calendar quarter report on or before the 15th day of February.

d. After the soil samples are obtained, the boreholes will be filled with an impermeable material such as a cement slurry containing 3% - 5% bentonite.

III. REQUIREMENTS FOR OVERALL FACILITY OPERATION

1. The facility will be maintained such that there will be no contaminated storm water runoff beyond the boundaries of the facility.

2. The OCD Santa Fe office will be notified prior to the construction of a new cell. Gandy Marley will submit the design and placement plan for the cell to the OCD Santa Fe office.

3. The OCD will be notified when a final closure of a cell has been attained.

4. Within 24 hours of receiving notification from the OCD that an objectionable odor has been detected or reported, the facility will implement the following response procedure:

   a. log date and approximate time of notice that an odor exists;

   b. log investigative steps taken, including date and time, and conclusions reached;

   c. log actions taken to alleviate the odor, which may include covering, landfarming, adjusting chemical treatment, air sparging or other similar responses.

   A copy of the log, signed and dated by the facility manager, must be maintained for OCD review.

5. Any design changes to the surface waste management facility will be submitted to the OCD Santa Fe office for approval.

6. The OCD will be notified prior to the installation of any pipelines or wells or other construction within the boundaries of the facility.

7. In the event that any contaminants leave the confines of the facility, the OCD Hobbs district office will be notified.

IV. WASTE ACCEPTANCE CRITERIA

1. The facility will only accept the following wastes:

   a. Oilfield wastes that are exempt from RCRA Subtitle C regulations and that do not contain Naturally Occurring Radioactive Material regulated pursuant to 20 NMAC 3.1 Subpart 1403 (NORM). All loads of these wastes other than wastes returned from the

well bore in the normal course of well operations, such as produced water and spent treating fluids, received at the facility shall be accompanied by a "Generator Certificate of Waste Status" signed by the generator.

b. "Non-hazardous" non-exempt oilfield wastes that do not contain NORM regulated pursuant to 20 NMAC 3.1 Subpart 1403. These wastes may be accepted on a case-by-case basis after a hazardous waste determination is made. Samples must be obtained from the wastes prior to removal from the generator's facility and without dilution in accordance with EPA SW-846 sampling procedures. All "non-hazardous" non-exempt wastes received at the facility must be accompanied by:

i. an approved OCD Form C-138 "Request for Approval to Accept Solid Waste;"

ii. a "Generator Certificate of Waste Status" signed by the generator;

iii. a verification of waste status issued by the appropriate agency, for wastes generated outside OCD jurisdiction. The agency verification is based on specific information on the subject waste submitted by the generator and demonstrating the exempt or non-hazardous classification of the waste.

c. Non-oilfield waste that are non-hazardous if ordered by the Department of Public Safety in a public health emergency. OCD approval must be obtained prior to accepting the wastes.

2. At no time may any OCD-permitted surface waste management facility accept waste that are hazardous either by listing or by characteristic testing.

3. Waste containing mercaptans (Thiols) must be treated to eliminate odor prior to receipt into the facility.

4. No free liquids will be accepted into the landfill. Materials that may be accepted into the landfill facility must pass a paint filter test by EPA Method 9095A prior to disposal.

5. Petroleum contaminated soils may be accepted for disposal or cover material without treatment by landfarming if the TPH is less than 1500 parts per million (ppm), the sum of all BTEX is less than 50 ppm, and benzene is less than 10 ppm. Materials received that are not conducive to landfarming because of physical properties that make it impractical to till, will be placed in the landfill cells.

6. The transporter of any wastes to the facility must supply a certificate that wastes delivered are those wastes received from the generator.

7. Sample manifest and waste acceptance forms are attached hereto.

V. TANK BOTTOM ACCEPTANCE

1. For worker protection all loads of tank bottoms must be pre-screened for Hydrogen Sulfide (H_2S) before they are unloaded from the truck. Records of H_2S screening will be maintained for OCD review.

2. All tank bottoms must be accepted into the receiving tank for settling prior to solidification and landfarm application.

3. The concrete mixture impoundment may be used for the solidification of tank bottoms received by the facility. Adequate freeboard must be maintained to prevent any overtopping or slop over of material. OCD-approved remediated soil may be mixed with the tank bottoms to stabilize the material. Material received at the impoundment must be mixed and stabilized immediately.

4. The concrete mixing impoundment must be inspected inside and outside bi-weekly for overall integrity. Records of such inspections must be made available to the OCD upon request.

5. Loads of tank bottoms that contain miscellaneous hydrocarbons exceeding 2/10 of 1% of the total volume of the tank bottoms must be accompanied by an OCD-approved Form C-117-A from the well operator. Accumulations of miscellaneous hydrocarbons must reported monthly on Form C-118.

VI. REPORTING AND RECORDKEEPING

1. Gandy Marley, Inc. will notify the OCD Santa Fe and Hobbs offices within 24 hours of any fire, break, leak, spill or any other circumstance that could constitute a hazard or contamination in accordance with OCD Rule 116.

2. Records of facility inspections and maintenance must be kept and maintained for OCD review.

3. Results of the worker safety H_2S screening must be recorded and maintained for OCD review.

4. Records of the landfarm soil laboratory analyses and the sampling locations must be maintained for OCD review.

5. Comprehensive records of all materials disposed of at the facility must be maintained for OCD review. The records for each load must include:
    1) generator;
    2) origin;
    3) date received;
    4) quantity;

5) certification of waste status as exempt or non-exempt with any necessary supporting documentation to certify non-hazardous status for non-exempt waste;
6) NORM status determination;
7) transporter;
8) location of disposal (i.e. cell number, landfill cell, etc.); and
9) any addition of microbes, moisture, fertilizer, etc.

6. All records of testing and monitoring must be retained for a period of five (5) years.

GANDY MARLEY, INC.
P. O. BOX 827
TATUM, NEW MEXICO 88267
TATUM, NEW MEXICO ROSWELL, NEW MEXICO

CERTIFICATE OF WASTE STATUS

OILFIELD EXEMPT WASTE MATERIAL

Originating Location: _____

_____

Source: _____

_____

Disposal Location: _____

_____

"As a condition of acceptance for disposal, I hereby certify that this waste is an exempt waste as defined by the Environmental Protection Agency's (EPA) July 1988 Regulatory Determination. To my knowledge, this waste will be analyzed persuant to the provisions of 40 CFR Part 261 to verify the nature as non-hazardous. I further certify that to my knowledge no "hazardous or listed waste" pursuant to the provisions of 40 CFR, Part 261, Subparts C and D, has been added or mixed with the waste so as to make the resultant mixture a "hazardous waste" pursuant to the provisions of 40 CFR, Section 261.3 (b)."

I, the undersigned as the agent for _____ concur with the status of the waste from the subject site.

Name _____

Title/Agency _____

_____

Address _____

_____

Signature _____

Date _____

GANDY-MARLEY, INC.

P. O. Box 1658
Roswell, NM 88202
Office (505) 347-0434
Fax (505) 347-0435

Nº 3631

LEASE OPERATOR/SHIPPER/COMPANY

LEASE NAME

TRANSPORTER COMPANY TIME AM/PM

DATE VEHICLE NO. DRIVER NO.

CHARGE TO

TYPE OF MATERIAL

OCD

[ ] Other Material [ ] Contaminated soil [ ] C-117 No. _____

[ ] BS&W content _____

Description _____

VOLUME OF MATERIAL [ ]: YARDS _____ : CELL# _____ : [ ] _____

AS A CONDITION TO GANDY-MARLEY, INC.'S ACCEPTANCE OF THE MATERIALS SHIPPED WITH THIS JOB TICKET, OPERATOR/SHIPPER REPRESENTS AND WARRANTS THAT THE WASTE MATERIAL SHIPPED HEREWITH IS MATERIAL EXEMPT FROM THE RESOURCE, CONSERVATION AND RECOVERY ACT OF 1976, AS AMENDED FROM TIME TO TIME, 40 U.S.C. §6901, et seq., THE NM HEALTH AND SAF. CODES, §361,001, et seq., AND REGULATIONS RELATED THERETO, BY VIRTUE OF THE EXEMPTION AFFORDED CONTAMINATED SOILS AND OTHER WASTE ASSOCIATED WITH THE EXPLORATION, DEVELOPMENT OR PRODUCTION OF CRUDE OIL OR NATURAL GAS OR GEOTHERMAL ENERGY.

ALSO AS A CONDITION TO GANDY-MARLEY, INC.'S ACCCEPTANCE OF THE MATERIALS SHIPPED WITH THIS JOB TICKET, TRANSPORTER REPRESENTS AND WARRANTS THAT ONLY THE MATERIAL DELIVERED BY OPERATOR/SHIPPER TO TRANSPORTER IS NOW DELIVERED BY TRANSPORTER TO GANDY-MARLEY, INC.'S FACILITY FOR DISPOSAL.

THIS WILL CERTIFY that the above Transporter loaded the material represented by this Transporter Statement at the above described location, and that it was tendered by the aboved described shipper. This will certify that no additional materials were added to this load, and that the material was delivered without incident.

DRIVER _____

FACILTY REPRESENTATIVE _____

White - GMI Canary - Shipper Pink - GMI Gold - Transporter

Superior Printing Service, Inc.

Contaminated Soils Shipment Manifest

1. Manifest Document No.	2. Page ___ of ___

3. Generator's Name and Mailing Address	4. Generator Phone No.
	5. Generator Contact
6. Transporter 1 Company Name	7. ID No.
8. Transporter 2 Company Name	9. ID No.
10. Designated Disposal Facility Name and Site Address **Gandy Marley, Inc. Contaminated Soils Landfarm** **7200 East Second Street** **PO Box 1658** **Roswell, NM 88201**	11. Facility Permit Number 12. Facility Phone No. **(505) 398 - 4960**

GENERATOR

13. Description of Waste	14. Containers No.	14. Containers Type	15. Total Quantity	16. Unit Wt/Vol
a.				
b.				
c.				

17. Special Handling Instructions and Additional Information

18. Generator's Certification: *I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable federal, state, and international laws.*

FURTHER, I represent and warrant that the waste material as described on this manifest is either exempt from the Resource Conservation and Recovery Act of 1976, OR has been characterized as non-hazardous material by virtue of appropriate laboratory analysis done in accordance with EPA-approved testing methods

Printed/Typed Name	Signature	Date

TRANSPORTER

19. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date

20. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date

GMI

21. Discrepancy Information

22. Facility Owner or Operator Certification of receipt of materials described on this manifest except as noted in item 21.

Printed/Typed Name	Signature	Date

Instructions for Proper Completion of Manifest

GENERATORS

Item 1 Enter the number assigned to the Manifest by the generator.

Item 2 Enter the page number and the total number of pages used to complete the Manifest, if any.

Item 3 Enter the name and mailing address of the generator. The address should be the location that will manage the returned Manifest forms.

Item 4 Enter a telephone number where an authorized agent of the generator may be reached in the event of an emergency.

Item 5 Enter the name of the authorized agent of the generator who is knowledgeable of the shipment and who should be contacted in the event of an emergency.

Item 6 Enter the company name of the first transporter who will transport the waste.

Item 7 Enter the appropriate identification number for the first transporter. (e.g., State Corporation Commission or EPA identification number.)

Item 8 If applicable, enter the company name of the second transporter who will transport the waste.

Item 9 If applicable, enter the appropriate identification number for the second transporter.

Item 10 Enter the company name and site address of the facility designated to receive the waste listed on the Manifest. The address must be the site address, which may differ from the company mailing address.

Item 11 Enter the appropriate permit number of the facility designated to receive the waste listed on the Manifest.

Item 12 Enter the phone number of the facility designated to receive the waste listed on the Manifest.

Item 13 Enter a brief description of each waste being shipped under the Manifest.

Item 14 Enter the number of containers for each waste and the appropriate abbreviation below for the type of container.

DM = Metal drums, barrels, kegs	TC = Tank cars
CW = Wooden boxes, cartons, cases	DW = Wooden drums, barrels, kegs
DT = Dump truck	CF = Fiber/plastic boxes, cartons, cases
DF = Fiberboard or plastic drums	CY = Cylinders
BA = Burlap, cloth, paper, plastic bags	TP = Tanks portable
CM = Metal boxes, cartons, cases	TT = Cargo tanks (tank trucks)

Item 15 Enter the total quantity of waste described on each line.

Item 16 Enter the appropriate abbreviation from below for the unit of measure.

G = Gallons	P = Pounds	T = Tons
Y = Cubic yards	L = Liters	K = Kilograms
M = Metric tons	N = Cubic meters	

Item 17 Generators may use this space to indicate special transportation, treatment, storage, or disposal information or Bill of Lading information.

Item 18 The generator must read, sign (by hand), and date the certification statement. If a mode *other than* highway is used, the word "highway" should be lined out and the appropriate mode (rail, water, or air) inserted in the space below. If another mode *in addition to* the highway mode is used, enter the appropriate additional mode (e.g., *and rail*) in the space below.

TRANSPORTERS

Item 19 Enter the name of the person accepting the waste on behalf of the first transporter. That person must acknowledge acceptance of the waste described on the Manifest by signing and entering the date of receipt.

Item 20 Enter, if applicable, the name of the person accepting the waste on behalf of the second transporter. That person must acknowledge acceptance of the waste described on the Manifest by signing and entering the date of receipt.

OWNERS AND OPERATORS OF DESIGNATED DISPOSAL FACILITIES

Item 21 The authorized representative of the designated facility's owner or operator must note in this space any significant discrepancy between the waste described on the Manifest and the waste actually received at the facility.

Item 22 Print or type the name of the person accepting the waste on behalf of the owner or operator of the facility. That person must acknowledge acceptance of the waste described on the Manifest by signing and entering the date of receipt.

ATTACHMENT 10
OF
FORM C-137

CLOSURE PLAN

MEMORANDUM

MWH

Date: September 27, 2005

To: Gandy Marley Inc.
1109 East Broadway
Tatum, NM 88267
(505) 398-4960

From: John Pellicer - MWH

Subject: **Gandy Marley Inc. OCD Surface Waste Management Facility Closure Plan**

CLOSURE AND POST-CLOSURE OF PERMITTED UNIT

This closure plan describes specific activities for the closure of the Gandy Marley commercial surface waste management facility. The closure activities are designed to minimize the need for further maintenance and any potential impacts to human health and the environment.

The OCD Santa Fe and Hobbs offices will be notified when operation of the facility is to be discontinued for a period in excess of six (6) months or when the facility is to be dismantled. Within six (6) months after discontinuing use or within 30 days of deciding to dismantle the facility, the operator will submit a closure plan to the OCD Santa Fe office for approval. The operator will complete cleanup of constructed facilities and restoration of the facility site within six (6) months of receiving the closure plan approval, unless the Director grants an extension of time.

When the facility is to be closed, no new materials will be accepted. The landfill cells will be closed according to an approved closure plan that includes a post closure care period of 20 years. The operator will establish institutional controls, including deed restrictions and signs that will be maintained after closure. The area will be contoured, seeded with a native seed mix and allowed to return to its natural state. If the landowner desires to keep existing structures, berms, and fences for future alternative uses, the structures may be left in place. Closure will be pursuant to all OCD requirements in effect at the time of closure and any other applicable local, state and/or federal regulations.

Landfarm cells will be remediated until they meet the OCD standards in effect at the time of closure. The soils beneath the landfarm cells will characterized as to total petroleum hydrocarbons (TPH) and volatile aromatic organics (BTEX) content in order to determine potential migration of contamination beneath the cell. Contaminated soils in the landfarm cells exceeding OCD closure standards for the site will be removed or remediated.

1.1 CLOSURE ACTIVITIES

At the end of the active life of the Facility, it will be closed in compliance with the Facility's approved closure plan. Liquids generated during closure (decontamination solutions and leachates) will be treated onsite (stabilization unit) unless it is determined that shipment offsite for treatment is more cost effective. The final open phase of the landfill will be capped with a final cover, and post-closure care will be initiated for the landfill. These closure activities are described in detail in the following sections.

1.1.1 Landfill

During operations, portions of this final cover will be placed when final grades are achieved. At closure of the landfill, a final cover will be constructed over the last open cell to minimize infiltration into the landfill. The final cover will consist of a three-layer cap design consisting of vegetation, a vegetative soil cover, and a low permeability clay cover,. The final cover will meet the following requirements:

- the vegetative soil cover will have a minimum thickness of 3.0 feet and anticipated final upper slopes of between 5 and 20 percent after settlement and subsidence of the waste. The cover soil will be tested to determine the need for soil amendments and/or fertilizers. Native grasses will be planted.

- the low permeability clay cover will have a minimum thickness of 1.0 feet and anticipated final upper slopes of between 5 and 20 percent after settlement and subsidence of the waste. The low permeability clay cover will be placed and machine compacted;

- the cover will be designed to function with minimum maintenance, including minimal erosion. The vegetative cover will be designed with a surface drainage system capable of conducting run-off across the cap without forming rills and gullies.

Any leachate from the landfill will be pumped from the collection system. The leachate will be collected, sampled, and managed in accordance with regulatory requirements. The leachate will be collected at a frequency appropriate to the rate at which it collects in the sump. The collection sump will be inspected monthly until the sump remains in a pumped down condition for six months. Thereafter, the sump will be inspected semi-annually.

The need for a capillary break in the cover section to reduce or eliminate wicking of salts to the surface was considered. It is proposed that a cover section as described above be constructed at the site with the locally available materials and monitored to determine if salt transport through the cover section is a concern. Details of the test section are presented in Section 1.2.9

1.2 POST-CLOSURE ACTIVITIES

Post-closure care involves long-term maintenance, monitoring, and reporting of activities that are carried out after closure is completed. The post-closure care period for the landfill will begin after completion of closure activities and continue for an anticipated 20 years. Inspection, maintenance, and repair activities to be conducted during post-closure are described in the following sections. The schedule for performing inspections is shown in Table 1-1, Post-Closure Inspection Schedule.

1.2.1 Security Systems

The Facility perimeter fence encloses the entire Facility. The fence and warning signs mounted on the fence will be inspected and maintained throughout the post-closure period. Monthly inspections will include checking the condition of fencing, locks, gates, and warning signs. Any signs of unauthorized entry will be reported to the local sheriff's office and OCD. Routine maintenance will be performed based on inspection findings to repair or replace damaged or deteriorating items.

TABLE 1-1
POST-CLOSURE INSPECTION SCHEDULE

INSPECTION ITEM – PROBLEM OR PROBLEM AREA	INSPECTION TIME
Facility	
Fence	monthly
Locks and gates	monthly
Warning signs	monthly
Landfill Cover	
Cracking, subsidence, ponding water, erosion, burrowing animals	quarterly
Diversion Ditch	
Sediment and debris accumulation,	quarterly
Leachate Collection System	
Sump	monthly until the sump remains in a pumped down condition for 6 months, then semi-annually
Pumps	quarterly
Riser pipes, grout seals, other visible portions of the system	quarterly

1.2.2 Landfill Final Cover

The integrity and effectiveness of the landfill final cover will be maintained, including making necessary repairs to correct the effects of settling, erosion, water damage, animal damage, or other events. The landfill cover will be inspected quarterly. Inspections will include checking for signs of cracking, subsidence, ponding water, or erosion. Repairs will be scheduled in a timely manner upon noting deficiencies in order to ensure that the final cover maintains its effectiveness.

General maintenance will include the following activities:

- re-establishing damaged or sparse vegetative cover, including seeding and fertilizing;
- conducting erosion damage repair, including soil excavation, transport and placement, seeding and fertilizing;
- regrading as needed to overcome the effects of subsidence or to repair areas where ponding is occurring; and,
- soil for erosion repair and regrading will be excavated from unused areas onsite and transported to the cap area for use in maintenance activities.

1.2.3 Diversion Ditch

The diversion ditch will be inspected and maintained throughout the post-closure period to ensure its designed functions to divert precipitation and run-on from the landfill area are met. Inspections will be conducted quarterly and will include checking for accumulated sediments and debris, and signs of erosion. Repairs will be scheduled in a timely manner, upon deficiencies being noted, to ensure that the diversion ditch maintains its effectiveness.

General maintenance activities will include diversion ditch cleaning to remove accumulated sediments and debris, and regrading, as needed, to repair the effects of erosion.

1.2.4 Leachate Management System

1.2.4.1 Leachate Collection System

The leachate collection system will be operated when necessary to ensure leachate depth over the liner does not exceed 30 cm (1 foot) outside the sump area until the completion of post-closure care. Leachate pumps will be operated at least quarterly. The site log will be kept on-site or at an approved location. The volume of leachate pumped will be recorded in a site log. After records indicate that the sump has remained below pumped down levels for six months, the frequency of inspection and operation of the sump pumps will be changed to semi-annually. Any leachate collected will be pumped to an above-ground storage tank.

The leachate collection system will be inspected quarterly or semi-annually as described in the preceding paragraph. Pumps will be inspected for proper operation. The riser pipes, grout seals, and other visible above-ground portions of the system will be inspected for integrity. The level of liquid in the sumps will be measured prior to pumping out accumulated leachate.

Routine maintenance will be conducted to ensure that the leachate collection system remains operable.

1.2.4.2 Management of Leachate

During the post-closure care period, leachate pumped from the collection system will be temporarily stored in an above-ground tank. The leachate will be sampled and managed at an off-site facility as appropriate. Details of the leachate sampling and analysis program will be specified in a sampling and analysis plan to be submitted to OCD.

1.2.5 Recordkeeping

A post-closure Facility record will be maintained. This record will include the dates and times of inspections, inspection findings, name of inspector, volumes of leachate pumped, disposition of leachate, sampling results of leachate and vadose zone samples, and dates and nature of any corrective actions taken.

1.2.6 Certification of Post-Closure

Within 60 days after completion of the established post-closure care period for the Facility, the permittee will submit to OCD a certification that the post-closure operations were performed in accordance with

this plan and that no further monitoring is required. The certification will be signed by the permittee and an independent New Mexico registered professional engineer.

1.2.7 Amendment of Plan

The permittee will submit a permit modification request for changes to the post-closure plan if changes in operating plans or Facility design, or events that occur during the active life of the Facility, affect the approved post-closure plan. The owner or operator may also request a modification to the post-closure plan at any time during the active life of the Facility or during the post-closure care period. Permit modification requests will be submitted at least 60 days prior to a proposed change in Facility design, or no later than 60 days after an unexpected event which affects the post-closure plan.

1.2.8 Facility Post-Closure Contact

During the post-closure care period, the Facility contact organization will be the following:

Gandy Marley, Inc.
P.O. Box 1658
Roswell, New Mexico 88202
(505) 347-0434

1.2.9 Cover Test Section

In order to evaluate if a capillary break is required in the cover section to eliminate the potential for wicking of salts to the surface of the cover, it is proposed to construct two test sections. One test section will be constructed over existing salt contaminated waste at the site and one test section will be constructed over the native soils at the site (non-waste material). The test sections should be constructed using the materials proposed for final cover construction (vegetative soil cover and low permeability clay cover) and should be constructed to the same dimensions (thickness) as shown on the drawings. The surface should be vegetated with seed as specified by the New Mexico SCS.

The surface of the cover test sections should be visually monitored to assess the accumulation of salt deposits and any associated impacts on vegetation growth. Differences between the two test sections should be noted on a quarterly basis in terms of vegetation density and diversity and surface staining and documented with a series of photographs. At the end of two years of monitoring an assessment will be made as to the effectiveness of the proposed cover section to prevent wicking of salts to the surface that could impact long term vegetation growth.

Additional construction details for the cover section will be prepared prior to actual construction once a site has been selected and material identified.

1.3 CLOSURE SCHEDULE

Closure of a the Facility will be initiated when the landfill nears its final capacity. Notification will be provided to the OCD in writing at least 30 days prior to beginning closure of the Facility.

1.4 CERTIFICATION OF CLOSURE

Within 60 days of the Facility closure, the Facility will submit to OCD, a certification that it has been closed in accordance with the approved closure plan. The closure certification will be signed by the owner/operator.

1.5 MODIFICATIONS TO THE CLOSURE PLAN

After this closure plan is approved, it will be amended whenever it is affected by changes in operating plans or Facility design. While conducting partial or final closure activities, unexpected events may be identified that also require amendment of the approved closure plan. Requests for modification will be made within 30 days of identifying an event that justifies plan modification.

1.6 CLOSURE COST ESTIMATES

Financial assurance in the amount of $82, 917 in the form of a cash bond is currently in place for the commercial surface waste management facility. The OCD will monitor the continuous closure of the landfill cells, during the operations phase of the facility, to ensure that no increase in the financial assurance will be necessary for the current operation. The post-closure monitoring of the landfill portion of the facility will be necessary for 20 years after closure of the site. The estimated annual cost of monitoring, sampling and testing during post-closure is approximately $1,000 per year. Gandy Marley is proposing to increase their financial assurance to $102,917.

ATTACHMENT 11
OF
FORM C-137

GEOLOGICAL/HYDROLOGICAL INFORMATION

Description of Site Geology and Hydrology

Soil Boring Data

Hydrologic Testing and Groundwater Monitoring

Laboratory Analysis of Groundwater

GEOLOGICAL/HYDROLOGICAL INFORMATION

1.0 Description of Site Geology and Hydrology

The Gandy Marley facility is located on Upper Dockum Triassic redbeds approximately 1-2 west of the Caprock escarpment. The Caprock escarpment, known also as the Llano Estacado (Stacked Plains), represents the easternmost outcropping of the Ogallala Formation, a major freshwater aquifer. The escarpment is situated approximately 400 feet topographically higher than the Upper Dockum units underlying the Gandy Marley facility. Potable groundwater produced from shallow wells on the Caprock has historically been piped westward and downslope to the Marley Ranch to support stock.

The Upper Dockum Group stratigraphy represents a thick sequence (over 500 feet) of Mesozoic Era (Upper Triassic) sediments consisting primarily of low permeability interlayered lacustirne and fluvial clays, mudstones, and siltstones with discontinuous sand lenses. These sediments are reported in the geologic literature as having a paucity of potable groundwater. Although local pockets of perched, discontinuous groundwater have been encountered in sand or silty-sand lenses, no groundwater volumes in usable quantities or quality are produced from the Upper Dockum Group in this area. Usable wells in the regional geographic area have historically produced groundwater from sands in the Lower Dockum Group situated greater than 500-600 feet below the Upper Dockum Group.

2.0 Soil Boring Data

Four soil borings (PB-1, PB-26, MW-1, MW-2) have been advanced within and immediately adjacent to the Gandy Marley facility. All of the borings reported similar subsurface lithologies that are consistent with several other area soil borings advanced in preparation for permitting the nearby (within 1 mile south) Triassic Park RCRA facility. All soil borings that have been drilled within and near the Gandy Marley facility report similar subsurface lithologies that are typical of the Upper Dockum Group stratigraphy.

Monitoring wells MW-1 and MW-2 are located immediately adjacent to the cells to be used for the landfill. Soil boring logs for these two monitoring wells are attached.

Surface soils consist of reddish-brown calichified sandy and salty clays overlain in most areas by recent eolian deposits derived from sand dunes located immediately west of the area. Calichified sediments persist to depths range 0-15 ft bgs.

Surface soils are directly underlain by poorly- to moderately-indutated sediments of the Upper Dockum Group. Below approximately 15 ft, sediments are dominantly clays and very-slightly silty clays that persist to about 30 ft bgs. These units are in turn underlain by a thick (~ 50 – 70 ft) interval of dark red fat, plastic clay. Sediments in the 0-15 ft interval report saturated hydraulic conductivities of $10^{-6} - 10^{-8}$ cm/s. The underlying thick clay layer reported a saturated hydraulic conductivity of 10^{-9} cm/s.

Upper Dockum Group stratigraphy underlying the Gandy Marley facility is sufficiently impervious to attenuate downward migration of any disposed fluids or any leachate from disposed oilfield waste materials. Potential impacts to limited groundwater beneath the site are almost non-existent. Local sediments underlying nonindurated eolian sands are also a resource for landfarm and landfill construction materials that may be required for disposal cell improvements.

3.0 Hydrologic Testing and Groundwater Monitoring

Upon completion of MW-1 and MW-2, each of the wells were hydrologically tested to include Monitoring Well Pump Tests and Fluid Recovery Tests. The attached CMB Environmental and Geological Services, Inc. report details the findings of these tests.

Initial static groundwater levels in MW-1 and MW-2, prior to testing were 133.72 ft bgs and 122-62 bgs, respectively. Since the top-of-casing wellheads are at similar elevations and located about 1000 feet apart, the difference in groundwater levels indicate the monitoring wells penetrate poorly-coordinated or discontinuous local perched groundwater zones.

Hydrologic tests results (see GMB Report, attached) for the two monitoring wells indicate that groundwater occurs in poorly-transmissive, confined, perched aquifers. The wells recover slowly and incompletely. MW-1 may produce an estimated sustained rate of 154 gpd (gallons per day). MW-2 could produce an estimated sustained rate of 206 gpd.

The facility's existing Surface Waste Management Facility Permit does not require groundwater monitoring. Gandy Marley will perform groundwater monitoring to standards and schedules required by OCD.

4.0 Laboratory Analysis of Groundwater

Groundwater quality beneath the Gandy Marley facility is poor (see GMB Report, attached). Groundwater is highly alkaline with high levels of chloride and sulfate. Water samples reported Total Dissolved Solids of 8,930 mg/l and 8,970 mg/l for MW-1 and MW-2, respectively. The only use of the perched water would be for livestock. The perched water beneath the facility is nonpotable and unfit as a stockwater resource. (See attached tables on use of water for livestock).

CMB

Environmental & Geological Services, Inc.

Clayton M. Barnhill
CMB
Environmental & Geological
P.O. Box 2304
Roswell, NM 88202-2304
Tel (505) 622-2012
Fax (505) 622-2012
E-mail: cmbenviro@dfn.com

MR. BILL MARLEY
GANDY MARLEY INC.
PO BOX 1658
ROSWELL, NM 88202-1658

MAY 18, 2005

RE: SUBMITTAL OF MONITOR WELL PUMP TEST / FLUID RECOVERY REPORT
MONITOR WELLS # 1 & 2
GANDY MARLEY COMMERCIAL LANDFARM
SW/4 SEC.4, SE/4 SEC.5., NE/4 SEC.8, NW/4 SEC.9
T.11 S. R. 31 E.
CHAVES COUNTY,NEW MEXICO

DEAR MR. MARLEY:

CLAYTON M. BARNHILL PG, DBA / CMB ENVIRONMENTAL AND GEOLOGICAL SERVICES, INC.ON BEHALF OF THE OWNER / OPWERATOR, GANDY MARLEY INC. SUBMITS THE ATTACHED MONITOR WELL PUMP TEST / FLUID RECOVERY TEST REPORT FOR THE ABOVE MENTIONED SITE.

IF YOU HAVE ANY QUESTIONS ABOUT THE CONTENTS OF THE REPORT, PLEASE DO NOT HESITATE TO CALL ME. THANK YOU.

SINCERELY,

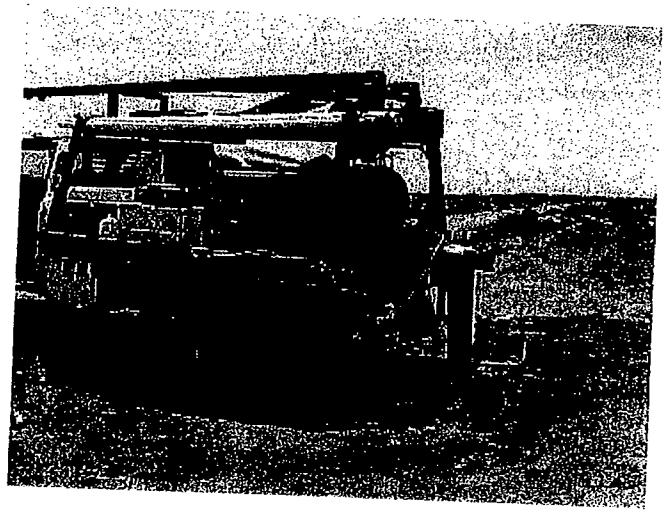
CLAYTON M. BARNHILL, PG
CMB ENVIRONMENTAL & GEOLOGICAL SERVICES. INC.
PO BOX 2304
ROSWELL, NEW MEXICO 88202-2304
(505) 622-2012 PHONE FAX: (505) 625-0538
CMBENVIRO@DFN.COM

CC: GANDY MARLEY, INC.

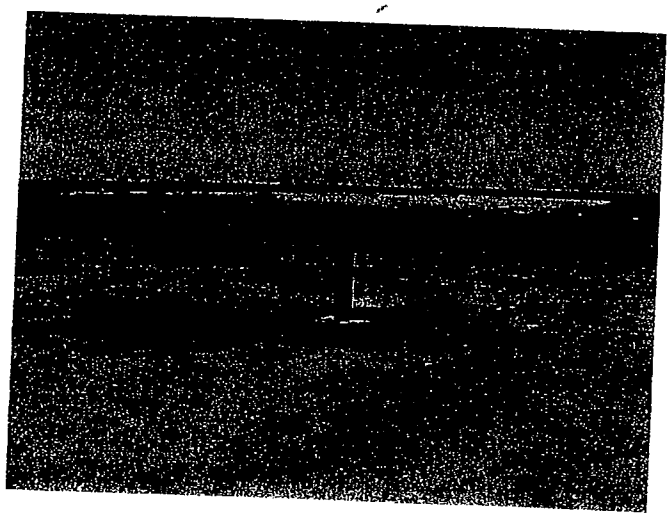
Site Information:

Gandy Marley Inc.
Commercial Landfarm
SW/4 Section 4, SE/4 Section 5, NE/4 Section 8, NW/4 Section 9
Township 11 South Range 31 E
Chaves County, New Mexico

Monitor Well # 1: **N 33°23' 11.7"**
W 103° 50' 20.7"



Monitor Well # 2: **N 33°23' 05.0"**
W 103° 50' 12.3"



Work Performed:

CMB Environmental and Geological Services, Inc. performed a pump test / fluid recovery test of Monitor Wells # 1 & 2, on 05/12/05,05/16/ 05 and 05/17/05 to evaluate the permeability (or hydraulic conductivity) of the confined perched aquifer underlying the Gandy Marley Inc. Landfarm located in Chaves Co., N.M.

In this pump test/ fluid recovery test, the pre-test water levels and total depths of the wells were measured and noted. The same water level reference measuring point (top of casing) was used throughout the testing. A Grundfos Redi-flo2 1.8 "inch submersible pump was submersed into the wells to rapidly lower the water levels. The pump was set at total depth in the monitor wells or near total depth, and the wells were pumped at a constant rate until dry. Field water parameters of pH, conductivity, dissolved oxygen, and temperature were measured at various gallon intervals while the wells were being pumped dry. The exact time the pump quit pumping was noted, and the pump quickly removed. Periodic water levels (rising head) were collected with a Solonist water level meter to track the rate of water level recovery. After the pump test, water samples were collected from both wells and sent to Trace Analysis Inc., laboratory located in Lubbock Texas for chemical analysis. The pump was de-contaminated between pump tests by pumping a solution of alconox soap and water through the pump and rinsing with potable water.

Results of the pump tests / fluid recovery tests are as follows:

On May 12, 2005 a pump test / fluid recovery test of monitor well # 1 was performed by CMB Environmental and Geological Services, inc.

Initial water level monitor well # 1 was 133.72' feet. The total depth of Monitor Well # 1 was 203.40' At sixty gallons purged from the well the water level in the well was 194.65' and after the 1.8" Grundfos submersible pump was removed the water level was 189.0' and the recovery test was begun.

Fluid recovery rates were recorded every minute for 41 minutes and then at 10-minute increments until 181 minutes of fluid recovery were completed. The initial gallon per minute recovery rate was 0.16 gpm(230 gallons per day) and the final fluid recovery rate was 0.08 gpm (115.20 gallons per day). A significant 50% drop in the fluid recovery rate at the end of the test.

All data was plotted graphically, with time in minutes on the x –axis of the graph and gallons of water recovered in the monitor well on the y-axis of the graphs.

On May 16th and 17th 2005, similar pump tests / fluid recovery tests were conducted on monitor well # 1.

On May 16th, 2005 the initial water level in MW-1 was 130.32' and the pump was removed at 70 gallons purged from the well. Fluid recovery rates were recorded every minute for 17 minutes and then at 10-minute increments until 78 minutes of fluid recovery were completed. The initial gallon per minute fluid recovery rate was 0.098 gpm(141 gallons per day) and the final per minute fluid recovery rate was 0.094 gpm (135.36 gallons per day).

May 17th 2005, the initial water level was 131.32' and the pump was removed at 80 gallons purged from the well. Fluid recovery rates were recorded every minute for 20 minutes and then at 10-minute increments until 80 minutes of fluid recovery were completed. The initial gallon per minute fluid recovery rate was 0.1306 gpm(188 gallons per day) and the final per minute fluid recovery rate was 0.1045 gpm (150.48 gallons per day).

On May 16th, 2005 the initial water level in MW-2 was 122.62' and the total depth was 180.0' The pump was removed at 95 gallons purged from the well. Fluid recovery rates were recorded every minute for 47 minutes and then at 10-minute increments until 107 minutes of fluid recovery were completed. The initial gallon per minute fluid recovery rate was 0.4310 gpm(620.64 gallons per day) and the final per minute fluid recovery rate was 0.1471 gpm (211.82 gallons per day). A significant 66 % drop in the fluid recovery rate.

On May 17th, 2005 the initial water level in MW-2 was 124.70' and the pump was removed at 80 gallons purged from the well. Fluid recovery rates were recorded every minute for 12 minutes and then at 10-minute increments until 72 minutes of fluid recovery were completed. The initial gallon per minute fluid recovery rate was 0.1306 gpm(188 gallons per day) and the final per minute fluid recovery rate was 0.1515 gpm (218.16 gallons per day)
All field notes and graphs are attached.

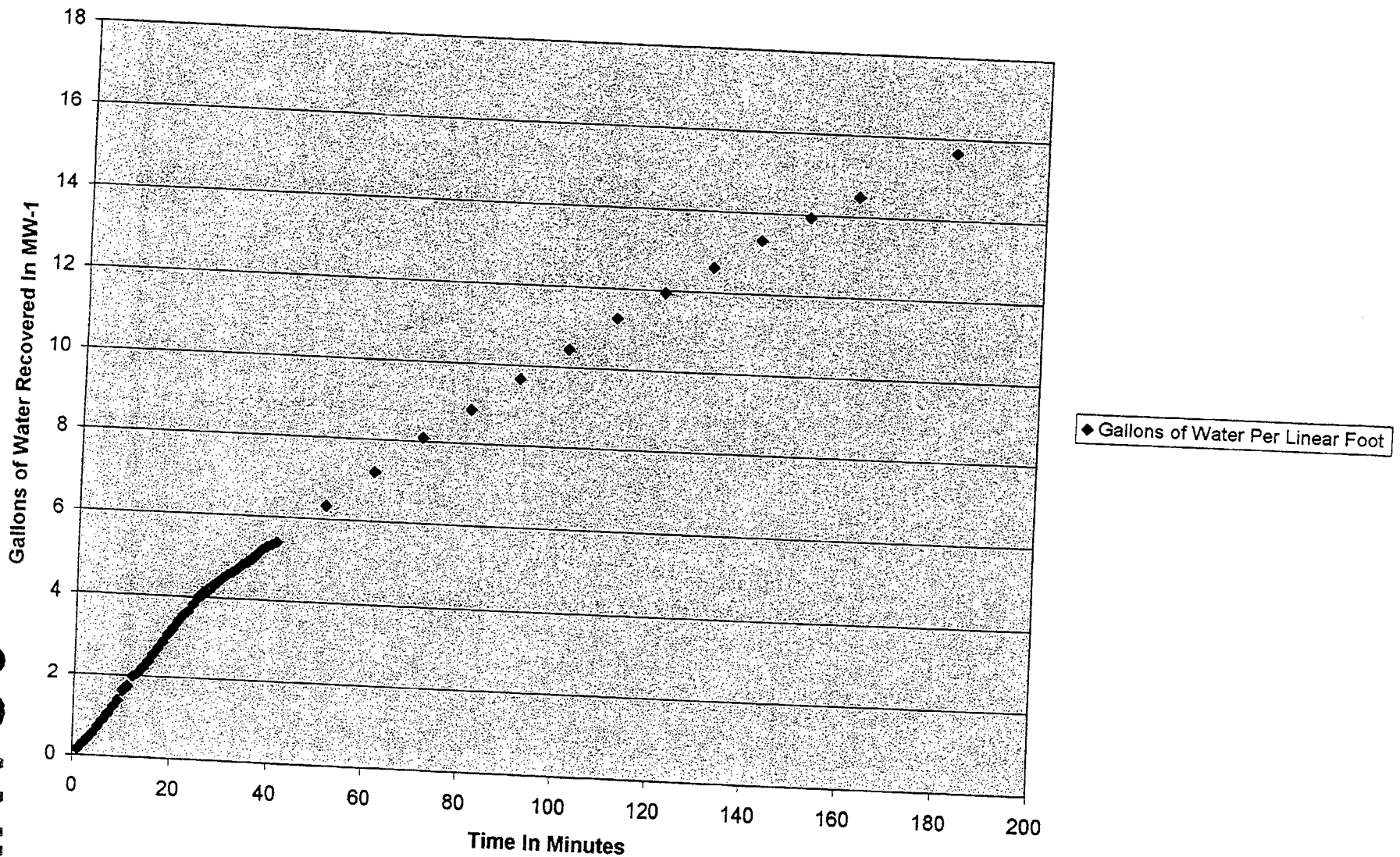
Conclusions:

- The aquifer appears to be poorly transmissive, confined, perched aquifer.
- Fluid recovery rates are slow and the monitor wells take many hours to recover. The wells quickly pump dry. The wells could never sustain domestic, livestock, or commercial usage, but will make excellent monitor wells. MW-1 may produce an estimated sustained rate on the average of 154 gallons per day. MW-2 could possibly produce an estimated sustained rate 206 gallons per day. The wells are properly screened across the water bearing formations.
- Fluid recovery trends in monitor wells were at least 75% of the full recovery of the initial water levels indicating that a good percentage of total fluid recovery was obtained during the test.
- Water quality in the area is poor and not suitable for domestic or livestock use.(See attached Trace Analysis Summary Report)

Landy Marley Landfarm
Chaves Co, NM
MW-1 Pump Test
05/12/05

Clayton M. Barnhill, PG
CMB Environmental Geological Services Inc.

Gallons of Water Recovered Vs. Time



Landy Marley Landfarm
Chaves, Co., NM
MW-1 Pump Test
05/12/05

Clayton M. Barnhill, PG
CMB Environmental Geological Services, Inc.

TIME:	DTW:	Delta t (minutes)	Delta DTW (feet)	Gallons of Water Per Linear Foot	Gallons per minute Well Recovery
13:49	189	0			
13:50	188.75	1	0.25	0.16325	0.1633
13:51	188.55	2	0.45	0.29385	0.1469
13:52	188.35	3	0.65	0.42445	0.1415
13:53	188.15	4	0.85	0.55505	0.1388
13:54	187.9	5	1.1	0.7183	0.1437
13:55	187.65	6	1.35	0.88155	0.1469
13:56	187.4	7	1.6	1.0448	0.1493
13:57	187.1	8	1.9	1.2407	0.1551
13:58	186.85	9	2.15	1.40395	0.1560
13:59	186.5	10	2.5	1.6325	0.1633
14:00	186.35	11	2.65	1.73045	0.1573
14:01	185.95	12	3.05	1.99165	0.1660
14:02	185.85	13	3.15	2.05695	0.1582
14:03	185.6	14	3.4	2.2202	0.1586
14:04	185.35	15	3.65	2.38345	0.1589
14:05	185.1	16	3.9	2.5467	0.1592
14:06	184.85	17	4.15	2.70995	0.1594
14:07	184.6	18	4.4	2.8732	0.1596
14:08	184.3	19	4.7	3.0691	0.1615
14:09	184.1	20	4.9	3.1997	0.1600
14:10	183.85	21	5.15	3.36295	0.1601
14:11	183.6	22	5.4	3.5262	0.1603
14:12	183.45	23	5.55	3.62415	0.1576
14:13	183.15	24	5.85	3.82005	0.1592
14:14	182.9	25	6.1	3.9833	0.1593
14:15	182.75	26	6.25	4.08125	0.1570
14:16	182.65	27	6.35	4.14655	0.1536
14:17	182.5	28	6.5	4.2445	0.1516
14:18	182.35	29	6.65	4.34245	0.1497
14:19	182.2	30	6.8	4.4404	0.1480
14:20	182.05	31	6.95	4.53835	0.1464
14:21	181.95	32	7.05	4.60365	0.1439
14:22	181.8	33	7.2	4.7016	0.1425
14:23	181.65	34	7.35	4.79955	0.1412
14:24	181.55	35	7.45	4.86485	0.1390
14:25	181.4	36	7.6	4.9628	0.1379
14:26	181.25	37	7.75	5.06075	0.1368
14:27	181.05	38	7.95	5.19135	0.1366
14:28	180.95	39	8.05	5.25665	0.1348
14:29	180.85	40	8.15	5.32195	0.1330
14:30	180.75	41	8.25	5.38725	0.1314
14:40	179.3	51	9.7	6.3341	0.1242
14:50	177.95	61	11.05	7.21565	0.1183
15:00	176.6	71	12.4	8.0972	0.1140
15:10	175.45	81	13.55	8.84815	0.1092
15:20	174.2	91	14.8	9.6644	0.1062
15:30	173	101	16	10.448	0.1034
15:40	171.75	111	17.25	11.26425	0.1015
15:50	170.7	121	18.3	11.9499	0.0988
16:00	169.67	131	19.33	12.62249	0.0964
16:10	168.6	141	20.4	13.3212	0.0945
16:20	167.65	151	21.35	13.94155	0.0923
16:30	166.82	161	22.18	14.48354	0.0900
16:50	165.05	181	23.95	15.63935	0.0864

Average Recovery Rate of 0.1392 Gallons per minute
Or 200 Hundred Gallons Per Day
Minimum 0.0864 gpm or 124.41 gallons per day
Maximum 0.1660 gpm or 239.04 gallons per day

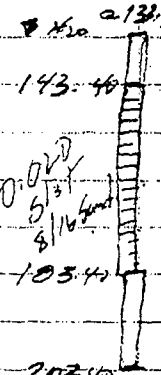
-114W. Chaves Co. NM.

MONITOR WELL Development and Pump Test. Page 1 of 3 By: Clayton Barnhill PG

MW-1: DTW = 133.72' (TOC) T.D. = 203.40' 69.68' x 0.653 (4" SCH 40 PVC MW) = 45.50 Gallons 3CV = ~~13.65~~ Gallons = 136.50 Gallons

Screened interval = 183.40' – 143.40'

203.40' – 183.40' = PVC Casing.



GPS COORDINATES OF MW-1:

N 33° 23' 11.7"

W 103° 50' 12.3"

Time	Gal. Q	DTW (TOC)	mg/L D.O.	T°C	pH	mS/cm Cond.	Remarks
12:23	Initial	131.72	6.5	20.2	8.86	10.4	TURBID BROWN SILTS
12:30	3	134.2	6.0	20.1	8.63	11.6	TURBID
12:40	6	142.10	5.8	19.8	8.48	12.0	TURBID
13:01	9	147.50	6.4	21.5	8.88	12.4	PUMP @ 2 GPM. TURBID
13:16	13.66	151.1	7.0	20.9	8.86	12.8	2 GPM
13:30	20	156.3	4.3	21.7	8.59	13.0	" " "
13:47	30	166.2	5.5	21.6	8.28	13.1	" " " 1.25 GPM

05/12/05 Landfarm – MW-1 Pump Test

Page 2 of 3 By: Clayton Barnhill PG

Time	Gal. Q	(TOC) DTW	mg/L D.O.	T°C	pH	mS/cm Cond.	Remarks
13:24	40	173.60	2.1.4		8.42	12.9	1.25 GPM.
13:32	50	184.10	6.0	21.8	8.28	12.5	1.25 GPM
13:41	60	194.65	4.7	22.5	8.01	13.5	1.25 GPM
		Stopped pump @ 13:43					
13:49		189.0			14:08	184.30	
13:50		188.75			14:09	184.10	
13:51		188.55			14:10	183.85	
13:52		188.35			14:11	183.60	
13:53		188.15			14:12	183.45	
13:54		187.9			14:13	183.15	
13:55		187.65			14:14	182.90	
13:56		187.40			14:15	182.75	
13:57		187.10			14:16	182.65	
13:58		186.85			14:17	182.50	
13:59		186.50			14:18	182.35	
14:00		186.35			14:19	182.20	
14:01		185.95			14:20	182.05	
14:02		185.85			14:21	181.95	
14:03		185.60			14:22	181.80	
14:04		185.35			14:23	181.65	
14:05		185.10			14:24	181.55	
14:06		184.85			14:25	181.40	
14:07		18460			14:26	181.25	

05/12/05 MW-1 Pump Test

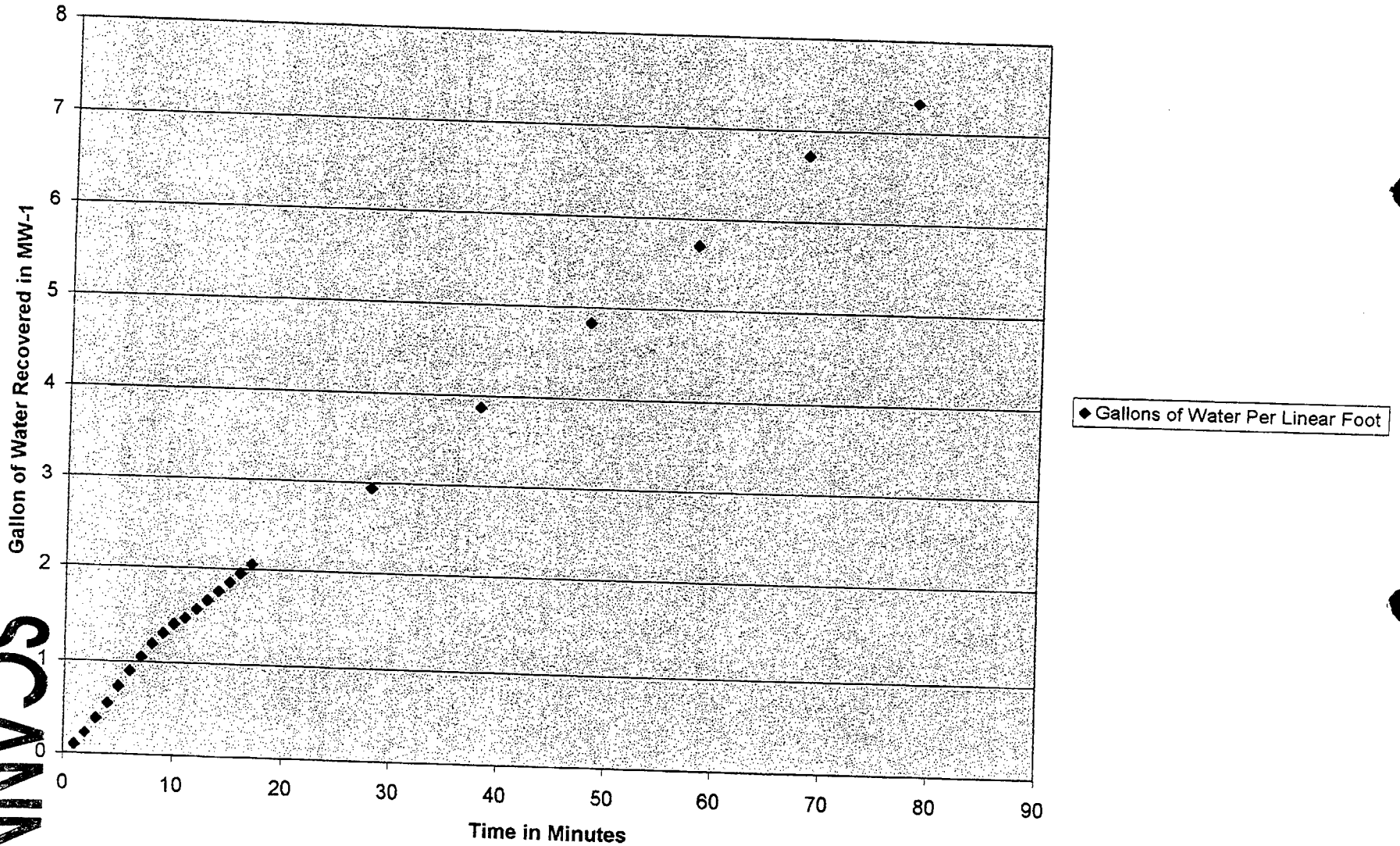
Page 3 of 3 By: CMB

Time	DTW	
14:27	181.05	
14:28	180.95	
14:29	180.85	
14:30	180.73	
14:40	179.30	
14:50	177.95	(1.35'/10min)
15:00	176.6	.135'/min
15:10	175.45	1.25'/10min
15:20	174.20	0.125/min
15:30	173.0	1.25'/10min
15:40	171.75	0.125/min
15:50	170.70	1.03'/10min
16:00	169.67	0.103/min
16:10	168.60	0.95'/10min
16:20	167.65	0.095/min
16:30	166.82	0.83/10min
		0.083'/min
16:50	165.05	0.08'/min

Sandy Marley Landfarm
Chaves Co, NM
MW-1 Pump Test
05/16/05

Clayton M. Barnhill PG
CMB Enviromental Geological Services Inc.

Gallons of Water Recovered Vs. Time



Sandy Marley Landfarm
Chaves, Co., NM
MW-1 Pump Test
05/16/05

Clayton M. Barnhill, PG
CMB Environmental Geological Services, Inc.

TIME:	DTW:	Delta t (minutes)	Delta DTW (feet)	Gallons of Water Per Linear Foot	Gallons per minute Well Recovery
15:23	184.75	0			
15:24	184.6	1	0.15	0.09795	0.0980
15:25	184.4	2	0.35	0.22855	0.1143
15:26	184.15	3	0.6	0.3918	0.1306
15:27	183.9	4	0.85	0.55505	0.1388
15:28	183.62	5	1.13	0.73789	0.1476
15:29	183.37	6	1.38	0.90114	0.1502
15:30	183.14	7	1.61	1.05133	0.1502
15:31	182.92	8	1.83	1.19499	0.1494
15:32	182.75	9	2	1.306	0.1451
15:33	182.6	10	2.15	1.40395	0.1404
15:34	182.5	11	2.25	1.46925	0.1336
15:35	182.35	12	2.4	1.5672	0.1306
15:36	182.2	13	2.55	1.66515	0.1281
15:37	182.05	14	2.7	1.7631	0.1259
15:38	181.9	15	2.85	1.86105	0.1241
15:39	181.75	16	3	1.959	0.1224
15:40	181.6	17	3.15	2.05695	0.1210
15:50	180.25	28	4.5	2.9385	0.1049
16:00	178.82	38	5.93	3.87229	0.1019
16:10	177.35	48	7.4	4.8322	0.1007
16:20	176	58	8.75	5.71375	0.0985
16:30	174.45	68	10.3	6.7259	0.0989
16:40	173.52	78	11.23	7.33319	0.0940

Average Recovery Rate of 0.1239 Gallons Per Minute
Or 178 Gallons per Day
Minimum 0.09 gpm or 135.36 gallons per day
Maximum 0.1502 gpm or 216.28 gallons per day

CMB ENVIRONMENTAL & GEOLOGICAL SERVICES, INC. WELL DATA FORM

Type Well	Type of Data	Well No. / Sheet
☒ MW ☐ Production ☐ Other _____	☒ Development ☒ Sampling ☒ Pump Test ☐ Other _____	MW-1 Sheet 1 of 2 Sheets

1. Project	2. Project Location	3. Date
Well Development Pump Test & GW Sampling	Gandy Marley Landfarm Chaves Co, NM Sec. 4, 5, 8, 9 T.11.S. R31E.	05/16/05
4. Technician		
CM Barnhill, PE.		

7. Method	8. Manufacturer's Designation of Rig	9. Location of Well (Site, Description)
Pumping Surging Air Lift Bailing Other	DSR-2001	MW-1: N33°25'11.7" W 104°52'12.3"

Water Levels

Initial	Final	Final + 24 Hours
Date: 05/16/05 Time: ~~PM~~ 13:55	Date: 05/16/05 Time: 16:40	Date: Time:
10. Total Depth of Well (from TOC) 203.20'	15. Total Depth of Well (from TOC) 203.20	20. Total Depth of Well (from TOC)
11. Water Level (from TOC) 130.32'	16. Water Level (from TOC) 173.52	21. Water Level (from TOC)

12. Water Column Height	Nom Dia	x = gal/ft Sch 40	Sch 80	17. 3 Well Volumes	22. Size and Type of Pump or Bailer
72.88'				146.48 Gallons	
13. Well Diameter	2"	0.16	0.1534	18. 5 Well Volumes	1.8" Submersible Redifloz 52 to T.D.
4" SCH 40 PVC MW	(4")	(0.67)	0.5972	244.10 Gallons	
	6"	1.47	1.3540		
14. Well Volume (gal) (s) w.e. height) 48.82 Gal	8"	2.61	2.3720	19. Purge Volume 70 Gallons	

Final Field Analysis

23. Total Amount of Water Removed	24. Was Well Pumped Dry?	25. Was water added to well?	26. Was the Groundwater Sampled (Yes) No
70 Gallons	Yes (No)	(No) Yes If yes, source:	If yes, what was the sample number & Date: Sampling Personnel? MW-1 05/16/05 CMBarnhill @ 12:45

27. Final Parameters

Time	Temp C	Conductivity (mS)	pH	NTUs	WL	Removed	Flow Rate	Photo Roll #, Observations
15:13	22.5	13.6	7.96	Turbid	189.45	70 Gal.	3.36 gpm	Turbid

IF PETROLEUM IS IN THE WELL, DO NOT TAKE pH AND CONDUCTIVITY PARAMETERS

28. Physical Appearance and Remarks: Clear initially Turbid @ 70 Gallons Purged.

29. Purgewater disposal method: On Ground Surface

Sampling / Development Parameters

Time	Temp C	Conductivity (mS)	pH	NTUs	WL (from TOC)	Volume (gallons)	Dissolved Oxygen	Flow Rate (gpm)	Photo #, Observ. (1)
14:17	20.2	13.5	8.13	Clear	130.32	Initial	4.4	2.5	Clear, Hose
14:19	20.4	13.8	8.09	Clear	145.20	10	3.9	3.6	Clear, Hose
14:24	20.6	14.0	8.07	Clear	151.70	20	4.0	2.5	Clear, Hose
14:29	20.7	13.9	8.01	Clear	157.20	30	4.2	2.5	Clear, Hose
14:37	21.0	13.8	8.00	Clear	167.0	40	3.1	1.15	Clear,
14:47	21.6	12.7	7.98	Slight Turbid	175.65	50	3.5	1.0	Slight Turbid
14:57	21.8	13.4	8.06	Slight Turbid	181.40	60	3.7	1.0	Slight Turbid
15:13	22.5	13.6	7.96	Turbid	189.45	70	3.3	3.36	Turbid

(1) Note volume and physical character of sediments removed. Removed pump with bailer

NTU = Nephelometric turbidity units

WL = Water Level from Top of PVC Casing

SCANNED

Checked By _____ Date 05/16/05

CMB CONSULTING GEOLOGIST
WELL DATA FORM

Well No. MW-1
Sheet 2 of ~~2~~ Sheets

1. Project Well Development Pump Test —
2. Project Location Sandy Marley Landfarm Chaves Co, NM
3. Date 05/16/05
4. Technician CM Bownhill, PG

Sampling / Development Parameters, Continued

Time	~~Temp C~~ DTW	Conductivity (umhos/cm)	pH / D.O.	NTUs	WL (from TOC)	Volume (gallons)	Flow Rate (gpm)	Photo #, Observations (1)
15:23	184.75							
15:24	184.60							
15:25	184.40							
15:26	184.15							
15:27	183.90							
15:28	183.62							
15:29	183.37							
15:30	183.14							
15:31	182.92							
15:32	182.75							
15:33	182.60							
15:34	182.50							
15:35	182.35							
15:36	182.20							
15:37	182.05							
15:38	181.90							
15:39	181.75							
15:40	181.60							
15:50	180.25							
16:00	178.82							
16:10	177.35							
16:20	176.0							
16:30	174.70							
16:40	173.52							

NTU = Nephelometric turbidity units

WL = Water Level from Top of PVC Casing

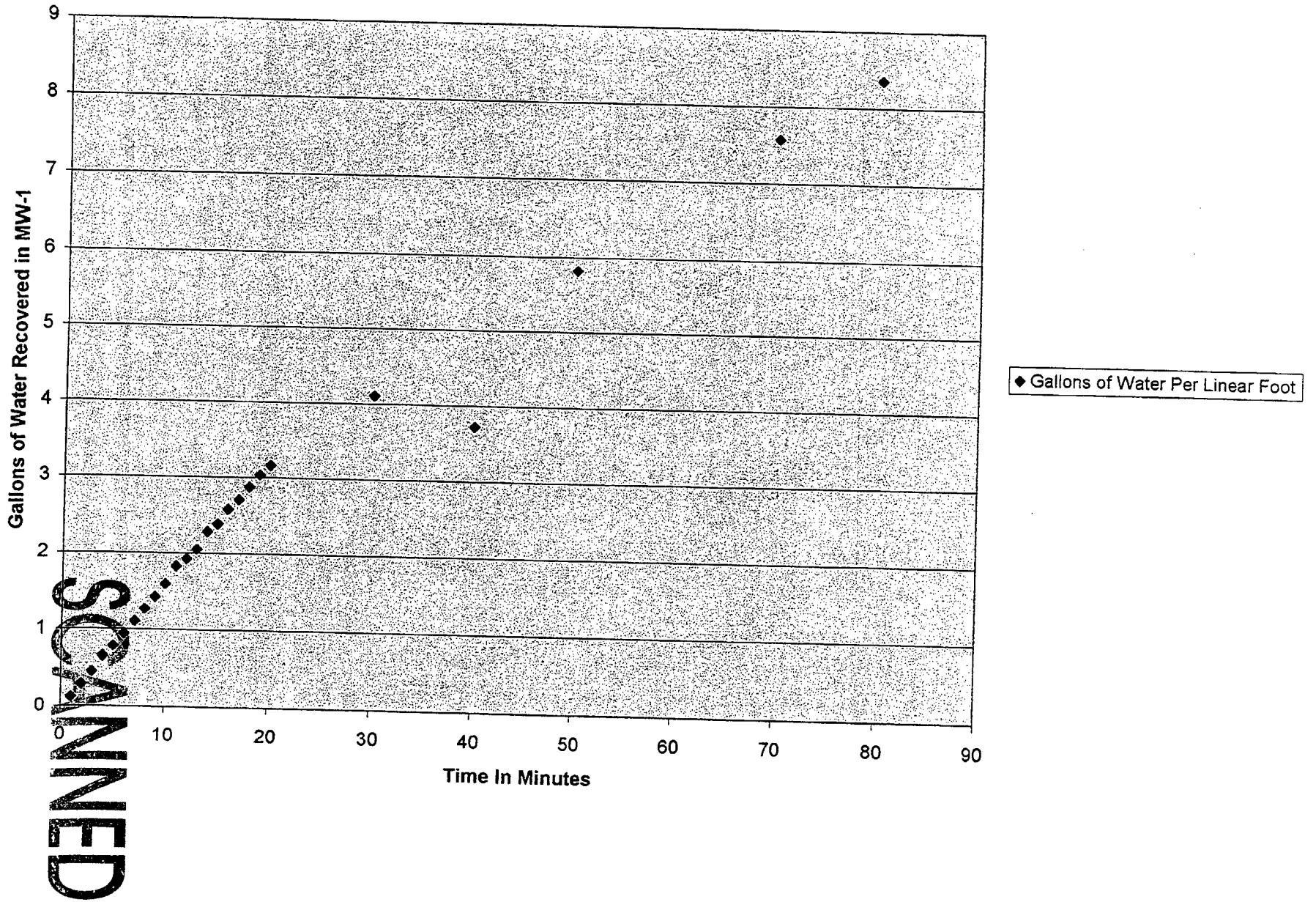
Checked By Christopher M Bownhill PG

Date 05/16/05

Gandy Marley Landfarm
Chaves Co., NM
MW-1 Pump Test
05/17/05

Clayton M. Barnhill
CMB Environmental Geological Services, Inc.

Gallons of Water Recovered Vs. Time



Gandy Marley Landfarm
Chaves, Co., NM
MW-1 Pump Test
05/17/05

Clayton M. Barnhill, PG
CMB Environmental Geological Services, Inc.

TIME:	DTW:	Delta t (minutes)	Delta DTW (feet)	Gallons of Water Per Linear Foot	Gallons per minute Well Recovery
14:40	187.8	0			
14:41	187.6	1	0.2	0.1306	0.1306
14:42	187.35	2	0.45	0.29385	0.1469
14:43	187.1	3	0.7	0.4571	0.1524
14:44	186.8	4	1	0.653	0.1633
14:45	186.6	5	1.2	0.7836	0.1567
14:46	186.35	6	1.45	0.94685	0.1578
14:47	186.1	7	1.7	1.1101	0.1586
14:48	185.85	8	1.95	1.27335	0.1592
14:49	185.6	9	2.2	1.4366	0.1596
14:50	185.35	10	2.45	1.59985	0.1600
14:51	185	11	2.8	1.8284	0.1662
14:52	184.85	12	2.95	1.92635	0.1605
14:53	184.65	13	3.15	2.05695	0.1582
14:54	184.3	14	3.5	2.2855	0.1633
14:55	184.15	15	3.65	2.38345	0.1589
14:56	183.85	16	3.95	2.57935	0.1612
14:57	183.65	17	4.15	2.70995	0.1594
14:58	183.4	18	4.4	2.8732	0.1596
14:59	183.15	19	4.65	3.03645	0.1598
15:00	182.95	20	4.85	3.16705	0.1584
15:10	181.5	30	6.3	4.1139	0.1371
15:20	180	40	7.8	3.72863	0.0932
15:30	178.9	50	8.9	5.8117	0.1162
15:50	176.2	70	11.6	7.5748	0.1082
16:00	175	80	12.8	8.3584	0.1045

Average Recovery Rate of 0.1484 Gallons per Minute
Or 213.69 Gallons per Day
Minimum 0.0932 or 134 gallons per day
Maximum 0.1662 gpm or 239.32 gallons per day

6701 Aberdeen Avenue, Ste. 9
Lubbock, Texas 79424
Tel (806) 794-1296
Fax (806) 794-1298
1 (800) 378-1296
email: lab@traceanalysis.com

TraceAnalysis, Inc.

155 McCutcheon, Suite H
El Paso, Texas 79932
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID #:

Company Name: Gandy Marley Inc.
Phone #: 505-347-0434
Address: (Street, City, Zip) PO Box 1658 Roswell NM 88202
Fax #: 505-347-0435
e-mail: gandy2@leaco.net
Contact Person: Mike Marley or Larry Gandy
Invoice to: (if different from above)
Project #: Quarterly Sampling (NM-711-1-0020)
Project Name: Gandy Marley Land farm
Project Location: Chaves Co, NM
Sampler Signature:
W/4 Sec. 4, SE/4 Sec. 5, NE/4 Sec 8 NW/4 Sec. 9 T.11.S. R31E.

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCl	HNO_3	H_2SO_4	NaOH	ICE	NONE	Hg/Cl2	SAMPLING: DATE	TIME
	OCD Cell #15	2	40z		X								X		05/16/05	10:10
	OCD Cell #16															10:25
	OCD Cell #17															11:00
	OCD Cell #18															11:10
	OCD Cell #19															11:25
	OCD Cell #20															17:15
	MW-2	10		X				6/6	1/0	1/0			1/0	1/6	05/16/05	12:10
	MW-1	10		X				6/6	1/0	1/0			1/0	1/6	05/16/05	12:45
	TRIP Blank	2		X									X		05/16/05	11:45

ANALYSIS REQUEST (Circle or Specify Method No.)	
MTBE 8021B/602	
BTEX 8021B/602	
TPH 418.1/TX1005	
TX 1005 Extended (C35)	
PAH 8270C	
Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	
TCLP Metals Ag As Ba Cd Cr Pb Se Hg	
TCLP Volatiles	
TCLP Semi Volatiles	
TCLP Pesticides	
RCI	
GC/MS Vol. 8260B/624	
GC/MS Semi. Vol. 8270C/625	
PCB's 8082/608	
Pesticides 8081A/608	
BOD, TSS, pH	
Moisture Content	
NO_3, NO_2	
Na, Ca, Mg, K, Conductivity, Alkalinity	
Cl, SAR, CO_3, HCO_3, OH	
Turn Around Time if different from standard	

CANCELLED

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
	05/16/05	13:00	Beth Marley	5/16/5	13:00 MST
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
	5/16/5	4:25 EST			
Relinquished by:	Date:	Time:	Received at Laboratory by:	Date:	Time:
				5-16-05	4:25

LAB USE ONLY
Intact Y / N
Headspace Y / N
Temp 4 °
Log-in Review

REMARKS: Send Copy of Results to: cmbenviro@dfn.com

- ☐ Dry Weight Basis Required
- ☐ TRRP Report Required
- ☐ Check If Special Reporting Limits Are Needed

Carrier #

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.O.C.

ORIGINAL COPY

CMB CONSULTING GEOLOGIST
WELL DATA FORM

Well No. MW-1
Sheet 1
of 1 Sheets

1. Project: Pump Test MW-1
2. Project Location: Gandy Marley Landfarm · Chaves Co, NM
3. Date: 05/17/05
4. Technician: CM Barnhill, PG

Sampling / Development Parameters, Continued

Time	Temp C	Conductivity (~~umhos/cm~~) mS/cm	pH / D.O	NTUs	WL (from TOC)	Volume (gallons)	Flow Rate (gpm)	Photo #, Observations (1)
13:30					131.32	Initial		
13:35	Set pump in well (1.8" Bed, Hz Submersible) @ T.D. = 203.10'							
13:36	Started pumping well				129.62	Initial	—	—
13:36	22.3	10.98	8.0/3.8	TURBID	129.62	Initial		TURBID @ 5:14
13:47	21.5	11.08	8.02/3.2	TURBID	153.80	20	1.8	TURBID
13:58	21.3	10.70	7.91/2.4	TURBID	163.95	40	1.8	TURBID
14:09	21.6	10.60	7.99/3.0	TURBID	177.40	60	1.8	TURBID
14:20	22.6	10.8	8.13/4.6	TURBID - DRY		80	0.95	TURBID
14:30	Pumped well DRY @ 80 Gallons Purged - Removed Pump							
Let well re-charge								
Time	DTW	Time	DTW					
14:43:40	187.90	14:58	183.40					
14:43:41	187.60	14:59	183.15					
14:43:42	187.35	15:00	182.95					
14:43:43	187.10	15:10	181.50					
14:43:44	186.80	15:20	180.0					
14:43:45	186.60	15:30	178.90					
14:43:46	186.35	15:50	176.20					
14:43:47	186.10	16:00	175.0					
14:43:48	185.85							
14:43:49	185.60							
14:43:50	185.35							
14:43:51	185.0							
14:43:52	184.85							
14:43:53	184.65							
14:43:54	184.30							
14:43:55	184.15							
14:43:56	183.85							
14:43:57	183.65							

NTU = Nephelometric turbidity units

WL = Water Level from Top of PVC Casing

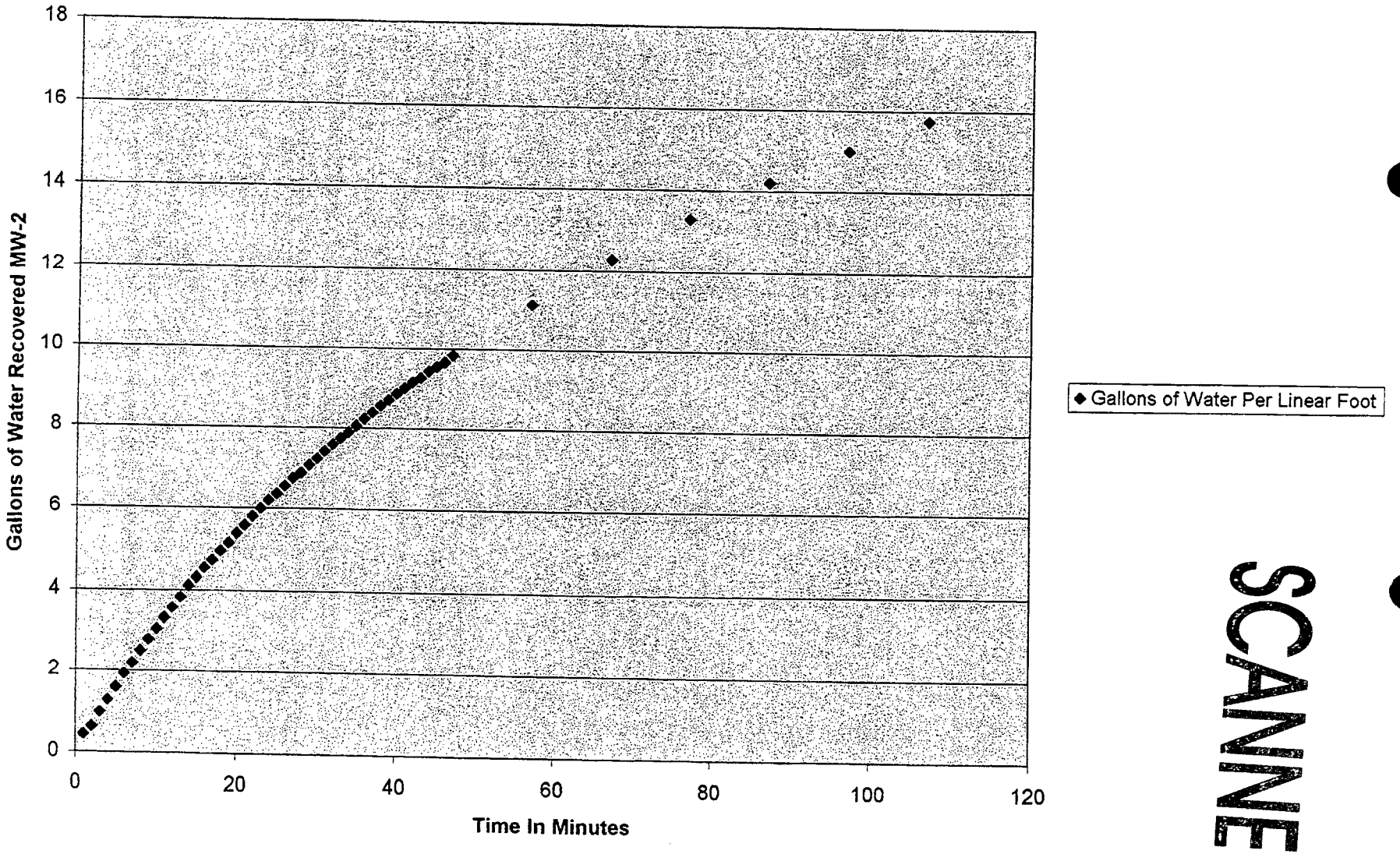
Checked By: PG

Date: 05/17/05

dy Marley Landfarm
Chaves Co., NM
MW-2 Pump Test
05/16/05

Clayton M. Barnhill, PG
CMB Environmental Geological Services Inc.

Gallons of Water Recovered Vs. Time



Marley Landfarm
es, Co., NM
MW-2 Pump Test
05/16/05

Clayton M. Barnhill, PG
CMB Environmental Geological Services, Inc.

TIME:	DTW:	Delta t (minutes)	Delta DTW (feet)	Gallons of Water Per Linear Foot	Gallons per minute Well Recovery
10:13	167.91	0			
10:14	167.25	1	0.66	0.43098	0.4310
10:15	166.95	2	0.96	0.62688	0.3134
10:16	166.42	3	1.49	0.97297	0.3243
10:17	165.95	4	1.96	1.27988	0.3200
10:18	165.47	5	2.44	1.59332	0.3187
10:19	164.95	6	2.96	1.93288	0.3221
10:20	164.55	7	3.36	2.19408	0.3134
10:21	164.1	8	3.81	2.48793	0.3110
10:22	163.66	9	4.25	2.77525	0.3084
10:23	163.25	10	4.66	3.04298	0.3043
10:24	162.85	11	5.06	3.30418	0.3004
10:25	162.47	12	5.44	3.55232	0.2960
10:26	162.05	13	5.86	3.82658	0.2944
10:27	161.62	14	6.29	4.10737	0.2934
10:28	161.32	15	6.59	4.30327	0.2869
10:29	160.95	16	6.96	4.54488	0.2841
10:30	160.65	17	7.26	4.74078	0.2789
10:31	160.3	18	7.61	4.96933	0.2761
10:32	160	19	7.91	5.16523	0.2719
10:33	159.65	20	8.26	5.39378	0.2697
10:34	159.35	21	8.56	5.58968	0.2662
10:35	159.02	22	8.89	5.80517	0.2639
10:36	158.72	23	9.19	6.00107	0.2609
10:37	158.4	24	9.51	6.21003	0.2588
10:38	158.15	25	9.76	6.37328	0.2549
10:39	157.85	26	10.06	6.56918	0.2527
10:40	157.55	27	10.36	6.76508	0.2506
10:41	157.35	28	10.56	6.89568	0.2463
10:42	157.05	29	10.86	7.09158	0.2445
10:43	156.8	30	11.11	7.25483	0.2418
10:44	156.52	31	11.39	7.43767	0.2399
10:45	156.27	32	11.64	7.60092	0.2375
10:46	156.02	33	11.89	7.76417	0.2353
10:47	155.8	34	12.11	7.90783	0.2326
10:48	155.55	35	12.36	8.07108	0.2306
10:49	155.3	36	12.61	8.23433	0.2287
10:50	155.05	37	12.86	8.39758	0.2270
10:51	154.8	38	13.11	8.56083	0.2253
10:52	154.56	39	13.35	8.71755	0.2235
10:53	154.33	40	13.58	8.86774	0.2217
10:54	154.1	41	13.81	9.01793	0.2199
10:55	153.87	42	14.04	9.16812	0.2183
10:56	153.7	43	14.21	9.27913	0.2158
10:57	153.45	44	14.46	9.44238	0.2146
10:58	153.27	45	14.64	9.55992	0.2124
10:59	153.05	46	14.86	9.6644	0.2101
11:00	152.85	47	15.06	9.83418	0.2092
11:10	150.87	57	17.04	11.12712	0.1952
11:20	149.11	67	18.8	12.2764	0.1832
11:30	147.55	77	20.36	13.29508	0.1727
11:40	146.15	87	21.76	14.20928	0.1633
11:50	144.95	97	22.96	14.99288	0.1546
12:00	143.8	107	24.11	15.74383	0.1471

Average Recovery Rate of 0.2543 Gallons per minute
Or 366.19 Hundred Gallons Per Day

Minimum 0.1471 gpm or 211.82 gallons per day
Maximum 0.4310 gpm or 620.64 gallons per day

CMB ENVIRONMENTAL & GEOLOGICAL SERVICES, INC. - WELL DATA FORM

Type Well: ☒ MW ☐ Production ☐ Other ____	Type of Data: ☒ Development ☒ Sampling ☒ Pump Test ☐ Other ____	Well No. MW-2, Sheet 1 of 2 Sheets
1. Project: Well Development Pump Test & GW Sampling	2. Project Location: Gandy Marley Landfarm	3. Date: 05/16/05
4. Technician: CM Barnhill, PG	Chaves Co. NM Sec. 4, 5, 8, 9, T. 11 S. R. 31 E.	
7. Method: (Pumping) Surging Air Lift Bailing Other	8. Manufacturer's Designation of Rig: DSR-2001	9. Location of Well (Site, Description): N 33° 23' 05.0" MW-2: W 103° 50' 20.7"

Water Levels

GPS Coordinates

Initial	Final	Final + 24 Hours
Date: 05/16/05 Time: 0856	Date: 05/16/05 Time: 13:15	Date: Time:
10. Total Depth of Well (from TOC): 180.0'	15. Total Depth of Well (from TOC): 180.60	20. Total Depth of Well (from TOC):
11. Water Level (from TOC): 122.62'	16. Water Level (from TOC): 137.30'	21. Water Level (from TOC):

12. Water Column Height: 57.38'	Nom Dia	x = gal/ft (Sch 40)	Sch 80	17. 3 Well Volumes: 115.33 Gallons
13. Well Diameter: 4" SCH 40 PVC MW	2"	0.16	0.1534	18. 5 Well Volumes: 192.22 Gallons
14. Well Volume (gal) (s) w.e. height): 38.44 Gallons	(4")	0.67	0.5972	19. Purge Volume: 95 Gallons
	6"	1.47	1.3540	
	8"	2.61	2.3720	

22. Size and Type of (Pump) or Bailer: 1.8" Submersible Redi-Flo2 Set @ 175' From TOC

Final Field Analysis

23. Total Amount of Water Removed: 95 Gallons	24. Was Well Pumped Dry? (Yes) No @ 95 Gallons purged	25. Was water added to well? (No) Yes If yes, source:	26. Was the Groundwater Sampled (Yes) No If yes, what was the sample number & Date: MW-2, 05/16/05 Sampling Personnel? CM Barnhill @ 12:10

27. Final Parameters (Conductivity: M/S)

Time	Temp C	Conductivity	pH	NTUs	WL	Removed	Flow Rate	Photo Roll #, Observations
10:06	20.5	11.92	8.13	Turbid	174.45	95 Gallons	2.5 GPM	Turbid Red Silt

IF PETROLEUM IS IN THE WELL, DO NOT TAKE pH AND CONDUCTIVITY PARAMETERS

28. Physical Appearance and Remarks: Turbid Red Silt - in H_2O

29. Purgewater disposal method: On Ground Surface.

Sampling / Development Parameters

(Conductivity: M/S)

Time	Temp C	Conductivity	pH	NTUs	WL (from TOC)	Volume (gallons)	Dissolved Oxygen	Flow Rate (gpm)	Photo #, Observ. (1)
0930	17.9°	11.12	7.90	Turbid	122.62'	initial	4.8	2.5	Red Silt
0932	19.1°	11.46	8.04	Turbid	129.65	5	4.4	2.5	Red Silt
0934	19.6	11.68	8.07	Turbid	133.10'	10	4.5	2.5	Red Silt
0936	19.6	11.64	8.11	Turbid	136.35'	15	4.6	2.5	Red Silt
0938	19.6	11.56	8.06	Turbid	140.10'	20	4.6	2.5	Red Silt
0940	19.6	11.59	8.14	Turbid	143.43'	25	4.9	2.5	Red Silt
0942	19.6	11.59	8.15	Turbid	146.35	30	4.6	2.5	Red Silt
0944	19.6	11.24	8.17	Turbid	148.47	35	5.4	2.5	Red Silt

(1) Note volume and physical character of sediments removed.
NTU = Nephelometric turbidity units
WL = Water Level from Top of PVC Casing

Checked By: Clayton M Barnhill PG — Date: 05/16/05

CMB CONSULTING GEOLOGIST
WELL DATA FORM

Well No. MW-2
Sheet 2
of Sheets 2

1. Project Well Development Pump Test & GW Sampling
2. Project Location Gandy Marley Landfarm Chaves Co, NM
3. Date 05/16/05
4. Technician CM Barnhill, PE

Sampling / Development Parameters, Continued

Time	Temp C	Conductivity (umhos/cm)	pH	NTUs	WL (from TOC)	Volume (gallons)	Flow Rate (gpm)	Photo #, Observations (1)
0946	19.7	10.99	8.16/4.9	TURBID	152.0	40	2.5	Red Silt
0948	19.8	11.11	8.15/5.4	TURBID	154.15	45	2.5	Red Silt
0950	19.9	11.32	8.15/5.1	TURBID	156.52	50	2.5	Red Silt
0952	19.9	11.68	8.17/4.7	TURBID	158.80'	55	2.5	Red Silt
0954	20.0	11.77	8.12/4.9	TURBID	160.95	60	2.5	Red Silt
0956	20.0	11.87	8.16/4.5	TURBID	163.45	65	2.5	Red Silt
0958	19.9	11.93	8.16/4.1	TURBID	165.24	70	2.5	Red Silt
1000	20.0	12.03	8.14/4.1	TURBID	168.05	75	2.5	Red Silt
1002	20.0	12.05	8.12/3.5	TURBID	170.05	80	2.5	Red Silt
10:04	20.0	12.19	8.09/2.9	TURB	172.35	85	2.5	Red Silt
10:06	20.5	11.92	8.13/3.4	TURBID	174.45	90	2.5	Red Silt
10:08	well	Pumped down to 5' off bottom				95	2.5	Red Silt
Removed pump - let well recharge								

Time	DTW	Time	DTW	Time	DTW	Time	DTW
10:13	167.91	10:27	161.62	1041	157.35	1055	153.87'
10:14	167.25'	10:28	161.32	1042	157.05	1056	153.70'
10:15	166.95'	10:29	160.95	1043	156.80'	1057	153.46
10:16	166.42	10:30	160.66	1044	156.52	1058	153.27
10:17	165.95	10:31	160.30'	1045	156.27	1059	153.05'
10:18	165.47	10:32	160.0	1046	156.02	1100	152.85
10:19	164.95'	10:33	159.65	1047	155.80	~~155.05~~'	
10:20	164.55'	10:34	159.35'	1048	155.55'		
10:21	164.10'	10:35	159.02'	1049	155.30'	11:10	150.87
10:22	163.66	10:36	158.72'	1050	155.05'	11:20	149.11
10:23	163.25	10:37	158.40'	1051	154.80'	11:30	147.55'
10:24	162.85	10:38	158.15'	1052	154.56'	11:41	146.16
10:25	162.47	10:39	157.85'	1053	154.33	11:50	144.95'
10:26	162.05	10:40	157.55'	1054	154.10'	12:00	143.80'

NTU = Nephelometric turbidity units

WL = Water Level from Top of PVC Casing

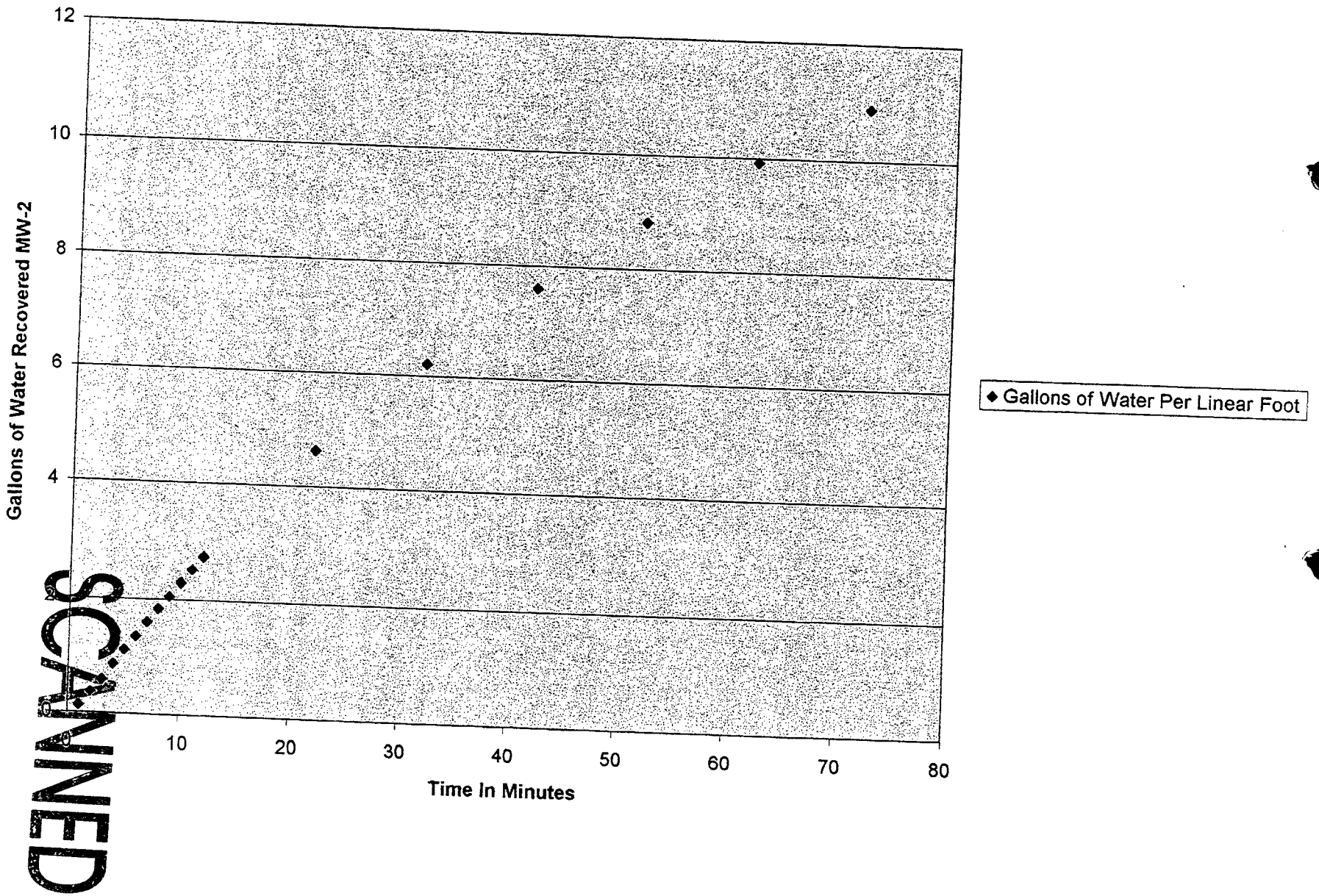
Checked By Clayton M Barnhill PE

Date 05/16/05

ndy Marley Landfarm
Chaves Co., NM
MW-2 Pump Test
05/17/05

Clayton M. Barnhill, PG
CMB Environmental Geological Services Inc.

Gallons of Water Recovered Vs. Time



dy Marley Landfarm
ves, Co., NM
MW-2 Pump Test
05/17/05

Clayton M. Barnhill, PG
CMB Environmental Geological Services, Inc.

TIME:	DTW:	Delta t (minutes)	Delta DTW (feet)	Gallons of Water Per Linear Foot	Gallons per minute Well Recovery
11:48	165.6	0			
11:49	165.4	1	0.2	0.1306	0.1306
11:50	165.1	2	0.5	0.36568	0.1828
11:51	164.7	3	0.9	0.5877	0.1959
11:52	164.3	4	1.3	0.8489	0.2122
11:53	163.9	5	1.7	1.1101	0.2220
11:54	163.55	6	2.05	1.33865	0.2231
11:55	163.15	7	2.45	1.59985	0.2286
11:56	162.8	8	2.8	1.8284	0.2286
11:57	162.45	9	3.15	2.05695	0.2286
11:58	162.1	10	3.5	2.2855	0.2286
11:59	161.75	11	3.85	2.51405	0.2286
12:00	161.4	12	4.2	2.7426	0.2286
12:10	158.5	22	7.1	4.6363	0.2107
12:20	156.1	32	9.5	6.2035	0.1939
12:30	153.95	42	11.65	7.60745	0.1811
12:40	152.1	52	13.5	8.8155	0.1695
12:50	150.4	62	15.2	9.9256	0.1601
13:00	148.9	72	16.7	10.9051	0.1515

0.2003
Average Recovery Rate of 0.2003 Gallons per minute
Or 288 Gallons per day

Minimum 0.1306 or 188 gallons per day
Maximum 0.2286 or 329 gallons/day

CMB CONSULTING GEOLOGIST
WELL DATA FORM

Well No. MW-2
Sheet 1
of 1 Sheets

1. Project: Pump Test MW-2
2. Project Location: Gandy Marley Landfarm, Chaves Co, NM
3. Date: 05/17/05
4. Technician: CM Barnhill, PE

Sampling / Development Parameters, ~~Continued~~

Time	Temp C	Conductivity (mS/cm)	pH / D.O.	NTUs	WL (from TOC)	Volume (gallons)	Flow Rate (gpm)	Photo #, Observations (1)
10:36					124.70'	Initial		
10:40	Set well pump in well (1.8" Redi-flo2 Submersible) @ T.D. 179.40'							
10:50	Started pumping well				123.0'	—	—	—
10:50	20.4	9.96	7.87/2.9	Turbid	123.0	Initial	1.81	Turbid Red Silt
11:01	20.4	10.53	8.08/3.1	Turbid	139.95'	20	1.81	Turbid Red Silt
11:10	20.7	10.48	8.0/3.5	Turbid	150.0	40	2.22	Turbid Red Silt
1:21 11:20	21.0	10.31	8.12/4.5	Turbid	159.82'	60	1.81	Turbid Red
11:38	21.3	10.20	8.03/3.6	Turbid	172.85'	80'	1.19	Turbid Red Silt
11:40 – Well pumped Dry @ 82 Gallons Purged – Removed pump Let well Recharge								
Time:	DTW							
11:48	165.60							
11:49	165.40							
11:50	165.10							
11:51	164.70							
11:52	164.30							
11:53	163.90							
11:54	163.55							
11:55	163.15							
11:56	162.80							
11:57	162.45							
11:58	162.10							
11:59	161.75							
12:00	161.40							
12:10	158.5							
12:20	156.10							
12:30	153.95							
12:40	152.10							
12:50	150.40							
13:00	148.90							

NTU = Nephelometric turbidity units

WL = Water Level from Top of PVC Casing

Checked By: [signature]

Date: 05/17/05

Summary Report

Larry Gandy
Gandy Marley Inc.
Box 1658
Roswell, NM 88202

Report Date: May 18, 2005

Work Order: 5051704

Project Location: Sec4,Sec5,Sec8,Sec9 T.11.SR.31E
Project Name: Gandy Marley Landfarm
Project Number: Quarterly Sampling (NM-711-1-0020)

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
62903	MW-2	water	2005-05-16	12:10	2005-05-16
62904	MW-1	water	2005-05-16	12:45	2005-05-16

Sample - Field Code	TPH DRO DRO (mg/L)
62903 - MW-2	<5.00
62904 - MW-1	<5.00

Sample: 62903 - MW-2

Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		**88.0**	mg/L as CaCo3	4.00
Total Alkalinity		**88.0**	mg/L as CaCo3	4.00
Chloride		**4790**	mg/L	0.500
Specific Conductance		**14200**	µMHOS/cm	0.00
Nitrite-N		<0.0100	mg/L	0.0100
Nitrate-N		<1.00	mg/L	0.200
pH		**8.15**	s.u.	0.00
Sulfate		**2180**	mg/L	0.500
Total Dissolved Solids		**8970**	mg/L	10.00

Sample: 62904 - MW-1

Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		**90.0**	mg/L as CaCo3	4.00
Total Alkalinity		**90.0**	mg/L as CaCo3	4.00
Chloride		**4840**	mg/L	0.500
Specific Conductance		**14500**	µMHOS/cm	0.00

continued ...

sample 62904 continued ...

Param	Flag	Result	Units	RL
Nitrite-N		<0.0100	mg/L	0.0100
Nitrate-N		<1.00	mg/L	0.200
pH		**8.14**	s.u.	0.00
Sulfate		**1760**	mg/L	0.500
Total Dissolved Solids		**8930**	mg/L	10.00

INEX Drilling Log

Project: GMI
Location: Caprock, NM
Date: 5/12/05
Rig: IR TH-60 AR
Logger: W.L. Mansker
DH#: MW-2

MW-2 GPS Location
33.38462 N LAT.
103.83858 W LONG.

Depth ft bgs		Description	Well Construction
			~3.5' High → ← 6" Mon Comple
0-5'		Red-brn, Alluvial/colluvial silty sand 0-3'. Caliche in sand 3-5'	
5-10'		-do- caliche 5-8', red silty sand 5-10'	
10-15'		-do- red, silty sand	
15-20'		red-brn, dry silty clay	
20-25'		-do- 20-23'. red, silty, micaceous clay @ 23-25'	
25-30'		-do- 100%, dry silty clay	
30-35'		red-brn, clay (no silt), tight, hard	
35-40'		Lt-tan - gray & brn variegated clay, tight, firm (no silt).	
40-45'		-do- 40-43'. tight, firm red clay 43-44' red-brn, tight clay (dry, no silt)	
45-50'		red-brn, tight clay 45-47'. Gray-brn clayey silt 47-50'	
50-55'		-do- gray-brn clayey silt.	
55-60'		gray-brn, firm, silty clay	
60-65'		Lt-gray, hard clay 60-63'. Lt-brn silty clay 63-64', Gray, silty sandy clay 64-65'	
65-70'		Gray, tight, hard clay	
70-75'		-do- gray hard clay 70-73'. change to red-brn tight clay 73-75'.	
75-80'		Dk-red-brn, v. tight, damp clay SSS taken 77-79'.	
80-85'		-do- dk-red-brn tight clay, damp	
85-90'		-do- dk-red-brn, v. tight, damp clay	Bentonite 2'
-95'		-do- clay 91-93'. dk-brn, damp silty clay 93-95'	92'

Well construction (vertical annotations): 4" dia. PVC BLANK 92' - surface (+3' ags); 8-10% Bentonite grout 90 - surface

SCANNED

W. Mansker

INEX Drilling Log

Project: GMI
Location: Caprock, NM
Date: 5/12/05
Rig: IR TH-60 AR
Logger: W.L. MANSker
DH#: MW-2

Depth ft bgs		Description	Well Construction
95-100'		damp-moist dk-brn silty clay	
100-105'		-do- damp-moist (25% silt) clay	
105-110'		-do- damp, tight (25% silty) clay	
110-115'		damp-moist silty clay & clayey silt	
115-120'		damp, (25% moist) clayey silt & silty clay	
120-125'		red-brn, dry, shaley clay (laminated)	
125-130'		-do- shaley clay. Silty clay 129-130'	
130-135'		red clay 133-134'. red-brn clay, hard, tight 134-135'	
135-140'		hard-, dry, brn clay 135-139', changes to brn-gray hard clay 139-140'. V. hard drilling	
140-145'		red-brn, dry clay 140-142', SH, silty, damp clay 142-145'	
145-150'		brn, damp, clayey silt	
150-155'		-do- clayey silt	
155-160'		-do- clayey silt 155-157' hard, damp, clayey, sandy silt 157-160'	
160-165'		-do- clayey, sandy silt 160-161' gray, clayey silt, damp-moist 161-165'	
165-170'		-do- clayey silt, with 4-6" clay stringers	
170-175'		-do- clayey silt w/ clay stringers	
175-180'		-do- clayey silt 175-178'. changes to red-brn clay 178-180'	
180-185'		-do- red-brn clay, tight, firm	
185-190'		-do- red-brn clay to TD @ 188'	TD ~ 188' bgs

Screened 182-92'
8-16 CSSI Filter Sand 182-90'
WB 182'

INEX Drilling Log

Project: GMI
Location: Cuba, NM
Date: 5/11/05
Rig: IR TH-60 AR
Logger: W.L. MANSKER
DH#: MW-1

MW-1 GPS Location
33.38649 N. Lat.
108.83627 W. Long.

Depth ft bgs		Description	Well Construction
			6" sch 40 3' Monument
0-5'		slt. silty red-brn clay w/ caliche	
5-10'		brn silty clay w/ caliche	
10-15'		v. slt. silty, brn clay (no caliche)	
15-20'		-do- brn clay	
20-25'		-do- brn clay, w/ silty clay stringers	
25-30'		-do- brn clay, v. slt silty	
30-35'		brn, clayey silt 30-32'. brn clay (no silt) 32-35'	
35-40'		brn, silty clay (± indurated - hard)	
40-45'		red-brn clayey silt	
45-50'		-do- clayey silt	
50-55'		-do- clayey silt	
55-60'		Lt. brn sandy silt (± indurated - hard)	
60-65'		-do- 60-61', red-brn clay 60-63'	
65-70'		-do- red-brn clay w/ gray clay stringers	
70-75'		-do- red clay to 70-73' (no silt), firm, tight	
75-80'		-do- dk red clay (no silt) firm, tight, damp.	
80-85'		silty, red-brn clay w/ clayey silt stringers	
85-90'		gray, clay & silty clay	
90-95'		-do- to 93', gray-brn damp, tight clay	

8-10% Bentonite Grout
136' to surface

EXHIBIT
GMI - 25

INEX Drilling Log

Project: GMI
Date: 5/11/05
Logger: W.L. Mansker
Location: Caprock, NM
Rig: IR TH-60 AR
DH#: MW-1

Depth ft bgs		Description
95-100'		-do- 95-97', red-brn clay, damp 97-100'
100-105'		-do- red-brn clay
105-110'		dk red-brn clay 105-108'. Lt. brn silty clay 108-110'
110-115'		-do- Lt. brn silty clay 110-114'. Gray, hard (indurated) clay 114-115'
115-120'		-do- 115-120', hard gray clay (± salty taste).
120-125'		brn, silty clay 120-124', Gray hard clay 124-125'
125-130'		-do- gray clay (no silt).
130-135'		-do- 130-131', Gray, silty clay 131-135'
135-140'		red-brn, silty clay 135-138'. [redacted] dk red-brn hard clay 130-140'
140-145'		-do- dk red-brn clay 140-145'
145-150'		-do- 145-146', brn, micaceous clay (± silty) 146-150'
150-155'		damp → moist, laminated micaceous clay (± silty) 2.4" SSS 153-155'
155-160'		damp - moist brn. clay (clay ball cuttings) 155-160'
160-165'		-do- 160-162', Gray clay (no silt) 162-165'
165-170'		-do- gray clay
170-175'		-do- damp, gray clay 170-172'. Gray, clayey sandy silt 172-175'
175-180'		-do- damp → moist gray sandy, clayey silt
180-185'		-do- 180-181', Gray, clayey silt, brn, 181-185'
85-190'		-do- Gray, clayey, brn silt

Well Construction:
8-10% Bentonite Grout 136'-surface
Bentonite 2'
Screened 180-140
8-16 CSSI Filter Sand 200'-138'
Blank casing 200-180' [illegible]

INEX Drilling Log

Project: GMI
Location: Caprock, NM
Date: 5/11/05
Rig: IR TH-60 AR
Logger: W.L. Monsee
DH#: MW-1

Depth ft bgs		Description	Well Construction
190-195'		dry-damp, silty clay	
195-200'		-do- saturated (caco3?), dry damp. silty clay. TD = 200' bgs	TD @ 200' bgs; Blank Casing 180-200'

May 23, 2005

Bill Marley
Gandy Marley, Inc.
P.O. Box 1658
Roswell, NM 88202

Re: GMI MW2 Saturated Hydraulic Conductivity Preliminary Results

Dear Mr. Marley:

Sample MW-2@77-79' was tested via ASTM D5084 for saturated hydraulic conductivity by Daniel B. Stephens & Associates, Inc. Hydrologic Testing Laboratory utilizing a Trautwein M100000 apparatus. The preliminary results indicate that the saturated hydraulic conductivity of the sample is approximately equal to or less than (slower than) 2.5×10^{-9} cm/s. The hydraulic conductivity of this sample is impossible to accurately measure utilizing this method and apparatus as the conductivity exceeds the lower limit of the apparatus.

Sincerely,
DANIEL B. STEPHENS & ASSOCIATES, INC.

Jolcen Hines
Lab Manager

Domestic

26,100 million gallons per day

Domestic water use during 1995 was an estimated 26,100 Mgal/d, or 3 percent more than during 1990. Domestic use represents about 8 percent of freshwater use for all offstream categories. Self-supplied domestic withdrawals were an estimated 3,390 Mgal/d (tables 11, 12). Ground water was the source for about 99 percent of self-supplied domestic withdrawals. Public suppliers delivered about 22,700 Mgal/d of water to domestic users; this accounted for 56 percent of total public-supply withdrawals.

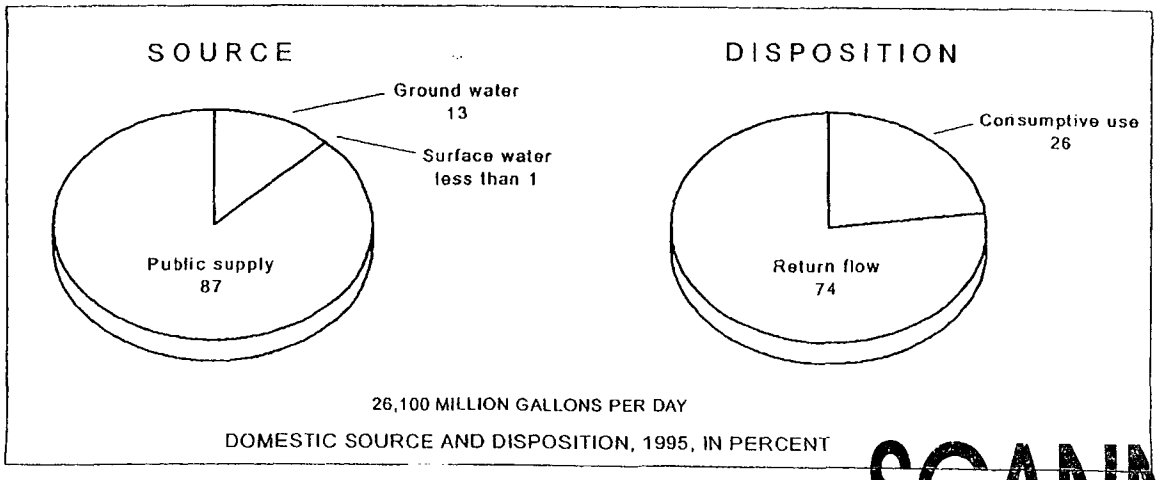
The source and disposition of water for domestic purposes for 1995 are shown in the chart below. Public supply is the dominant source of water (87 percent) for domestic use. The consumptive use of water for domestic purposes in 1995 was estimated at about 6,680 Mgal/d, or about 26 percent of withdrawals and deliveries.

Domestic water use includes water for normal household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens. Information from public suppliers about withdrawals and population served generally is reliable. Information on deliveries to various users is more difficult to obtain and generally is estimated from the population served.

The number of people served by their own water systems (self supplied) is determined by subtracting the number of people served by public suppliers from the total population as reported by the U.S. Bureau of the Census (1996). The difference between these totals indicates that 42.4 million people, or 16 percent of the Nation's total population, were served by their own water-supply systems in 1995, compared with 42.8 million people in 1990. Self-supplied domestic systems rarely are metered and few data exist. Self-supplied domestic withdrawals are estimated using per-capita use coefficients generally ranging from 60 to 120 gallons per person per day. Consumptive-use estimates are based on coefficients generally ranging from 10 to 50 percent of withdrawals and deliveries.

Withdrawals for the population served by their own water systems averaged about 80 gal/d for each person in 1995, about the same as 1990. Public-supply domestic deliveries averaged 101 gal/d for each person served in 1995, compared to 105 gal/d during 1990 and 1985. Per-capita use has remained about the same or declined in some areas for the last decade as the result of active conservation programs in many states that include the installation of additional meters and water-conserving plumbing fixtures.

In 1995, the South Atlantic-Gulf and Mid-Atlantic water-resources region had the largest self-supplied withdrawals for domestic purposes (figure 10), whereas the Mid-Atlantic, California, and South Atlantic-Gulf regions had a large total of domestic withdrawals and deliveries (table 11). Self-supplied withdrawals for domestic purposes are fairly evenly distributed among the States, led by Florida, Michigan, Pennsylvania, and North Carolina. (See figure 11; table 12.) California and Texas, along with New York, Florida, and Illinois, lead the Nation in total domestic use (withdrawals, deliveries) as shown in figure 12.



DOMESTIC SOURCE AND DISPOSITION, 1995, IN PERCENT

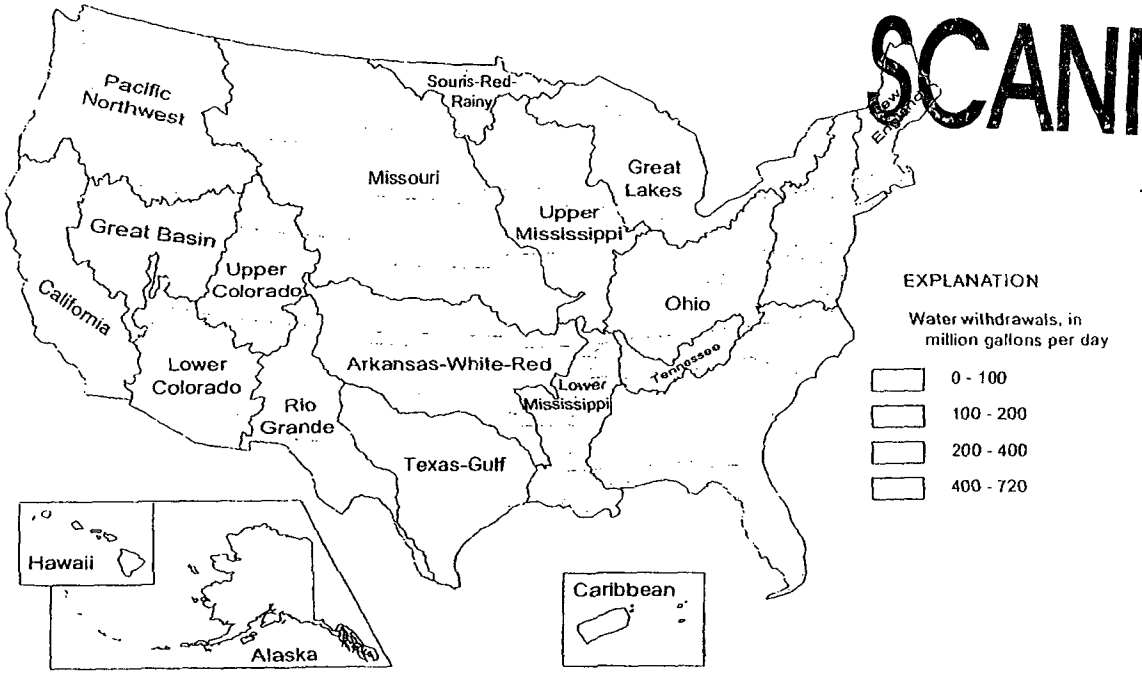


Figure 10. Domestic self-supplied withdrawals by water-resources region, 1995.

Table 11. Domestic freshwater use by water-resources region, 1995

[Figures may not add to totals because of independent rounding. Mgal/d = million gallons per day; gal/d = gallons per day]

REGION	SELF SUPPLIED					PUBLIC SUPPLY			TOTAL USE	
	Population, in thousands	Water withdrawals, in Mgal/d			Per capita use, in gal/d	Population served, in thousands	Water deliveries, in Mgal/d	Per capita use, in gal/d	Withdrawals and deliveries, in Mgal/d	Consumptive use, in Mgal/d
		Source		Total						
		Ground water	Surface water							
New England	2,420	168	0.5	169	70	10,400	717	69	886	139
Mid-Atlantic	6,730	485	.6	486	72	35,700	3,340	94	3,830	355
South Atlantic-Gulf	7,700	719	0	719	93	30,100	3,080	102	3,800	888
Great Lakes	4,870	354	1.0	355	73	17,000	1,400	83	1,760	248
Ohio	4,640	323	5.0	328	71	18,000	1,140	63	1,470	189
Tennessee	953	64	0	64	67	3,250	274	85	338	51
Upper Mississippi	4,290	311	0	311	72	18,000	1,450	81	1,760	329
Lower Mississippi	996	73	.1	73	74	6,330	703	111	776	529
Souris-Red-Rainy	248	17	0	17	67	446	26	59	43	17
Missouri Basin	1,690	137	1.2	138	82	8,980	966	108	1,100	423
Arkansas-White-Red	1,250	105	0	105	84	7,680	767	100	872	374
Texas-Gulf	1,070	115	0	115	108	15,700	2,160	138	2,270	958
Rio Grande	269	25	0	25	94	2,300	340	148	365	173
Upper Colorado	153	11	.4	12	76	561	86	154	98	36
Lower Colorado	367	44	.2	45	121	4,950	757	153	802	397
Great Basin	126	13	1.6	14	114	2,280	417	183	431	160
Pacific Northwest	2,470	253	7.3	260	105	7,480	1,020	136	1,280	190
California	1,620	112	12	124	76	30,400	3,700	122	3,830	1,060
Alaska	223	8.3	.4	8.7	39	381	38	99	46	4.5
Hawaii	65	2.4	1.3	3.7	57	1,120	131	117	134	76
Caribbean	274	6.4	6.9	13	49	3,580	173	48	186	83
Total	42,400	3,350	38	3,390	80	225,000	22,700	101	26,100	6,680

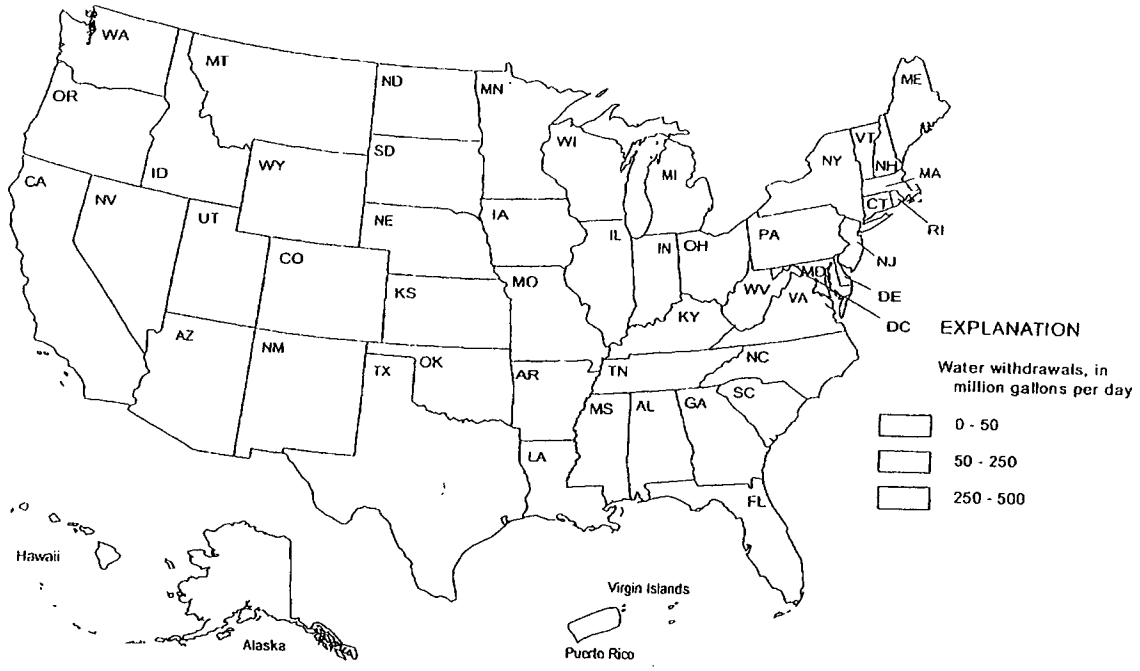


Figure 11. Domestic self-supplied withdrawals by State, 1995.

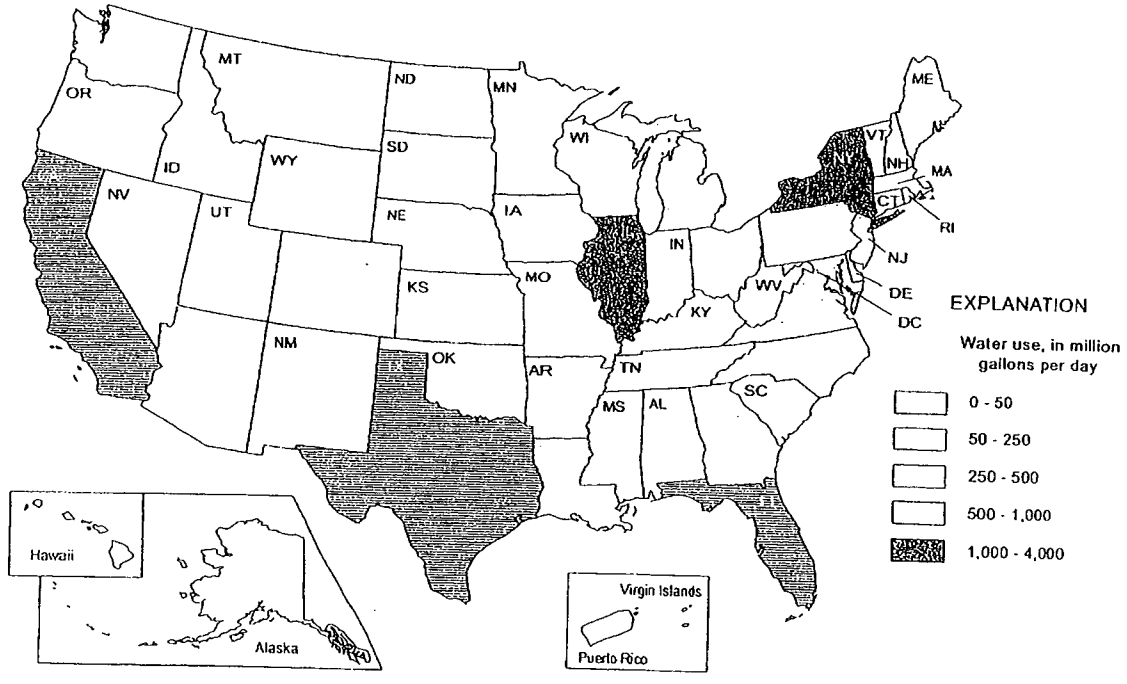


Figure 12. Domestic freshwater use (withdrawals, deliveries) by State, 1995.

Table 12. Domestic freshwater use by State, 1995

[Figures may not add to totals because of independent rounding. Mgal/d = million gallons per day; gal/d = gallons per day]

STATE	SELF SUPPLIED					PUBLIC SUPPLY			TOTAL USE	
	Population, in thousands	Water withdrawals, in Mgal/d			Per capita use, in gal/d	Population served, in thousands	Water deliveries, in Mgal/d	Per capita use, in gal/d	Withdrawals and deliveries, in Mgal/d	Consumptive use, in Mgal/d
		Source		Total						
		Ground water	Surface water							
Alabama	826	62	0	62	75	3,430	383	112	445	89
Alaska	223	8.3	.3	8.6	39	381	38	99	46	4.5
Arizona	301	39	0	39	131	3,920	526	134	565	283
Arkansas	488	38	0	38	78	2,000	193	97	231	100
California	1,600	108	12	120	75	30,500	3,710	122	3,830	1,060
Colorado	353	27	0	27	76	3,390	481	142	508	154
Connecticut	742	55	0	55	74	2,530	191	75	246	49
Delaware	153	12	0	12	80	564	43	76	55	5.5
D.C.	0	0	0	0	0	554	95	171	95	9.5
Florida	1,950	297	0	297	152	12,200	1,260	103	1,560	389
Georgia	1,300	99	0	99	76	5,900	629	107	728	131
Hawaii	65	2.4	1.3	3.7	57	1,120	131	117	134	76
Idaho	383	65	0	65	168	780	141	181	206	9.8
Illinois	1,430	129	0	129	90	10,400	936	90	1,060	107
Indiana	1,520	115	0	115	76	4,280	326	76	441	66
Iowa	689	45	0	45	65	2,150	139	65	184	73
Kansas	242	24	0	24	100	2,320	191	82	215	140
Kentucky	505	23	2.5	25	50	3,360	235	70	260	34
Louisiana	496	39	0	39	79	3,850	468	122	508	508
Maine	533	35	0	35	65	708	46	65	81	12
Maryland	875	73	0	73	83	4,170	433	104	506	51
Massachusetts	497	34	0	34	68	5,580	362	65	396	54
Michigan	2,650	194	.1	194	73	6,900	623	90	817	119
Minnesota	1,270	88	0	88	69	3,340	239	71	326	110
Mississippi	434	33	0	33	75	2,260	248	110	281	75
Missouri	995	58	0	58	59	4,330	374	86	433	108
Montana	225	17	1.0	18	78	645	77	119	94	46
Nebraska	346	42	0	42	121	1,290	155	120	197	100
Nevada	91	11	.2	11	120	1,440	306	213	317	158
New Hampshire	451	31	.5	32	70	697	57	82	89	13
New Jersey	1,010	86	0	86	85	6,930	538	78	624	122
New Mexico	306	26	0	26	86	1,380	188	136	215	118
New York	1,930	144	0	144	75	16,200	1,810	112	1,960	107
North Carolina	2,450	172	0	172	70	4,750	332	70	504	163
North Dakota	152	12	0	12	79	489	40	82	52	16
Ohio	1,870	138	2.8	140	75	9,280	497	54	637	96
Oklahoma	351	30	0	30	85	2,930	241	82	270	81
Oregon	995	61	7.2	68	68	2,150	292	136	360	83
Pennsylvania	3,020	181	0	181	60	9,050	559	62	740	74
Rhode Island	112	7.3	0	7.3	65	878	57	65	64	9.6
South Carolina	951	71	0	71	75	2,720	368	135	439	88
South Dakota	127	9.3	0	9.4	74	602	52	87	62	15
Tennessee	838	54	0	54	65	4,420	355	80	409	41
Texas	1,170	130	0	130	110	17,600	2,450	140	2,580	1,080
Utah	103	7.7	1.7	9.4	91	1,850	340	184	349	118
Vermont	270	18	.4	19	70	315	26	82	45	6.7
Virginia	1,660	125	0	125	75	4,960	424	86	548	55
Washington	1,000	125	0	125	125	4,430	565	128	691	83
West Virginia	509	40	.8	41	80	1,320	96	72	136	14
Wisconsin	1,540	92	0	92	60	3,560	189	53	281	56
Wyoming	136	9.7	.5	10	75	344	54	157	64	33
Puerto Rico	217	6.4	5.5	12	55	3,540	171	48	183	83
Virgin Islands	57	0	1.4	1.4	24	47	1.6	35	3.0	.7
Total	42,400	3,350	38	3,390	80	225,000	22,700	101	26,100	6,680

New Mexico QuickFacts

Chaves County, New Mexico

People QuickFacts	Chaves County	New Mexico
Population, 2003 estimate	60,591	1,874,614
Population, percent change, April 1, 2000 to July 1, 2003	-1.3%	3.1%
Population, 2000	61,382	1,819,046
Population, percent change, 1990 to 2000	6.1%	20.1%
Persons under 5 years old, percent, 2000	7.2%	7.2%
Persons under 18 years old, percent, 2000	29.1%	28.0%
Persons 65 years old and over, percent, 2000	14.7%	11.7%
Female persons, percent, 2000	51.0%	50.8%
White persons, percent, 2000 (a)	72.0%	66.8%
Black or African American persons, percent, 2000 (a)	2.0%	1.9%
American Indian and Alaska Native persons, percent, 2000 (a)	1.1%	9.5%
Asian persons, percent, 2000 (a)	0.5%	1.1%
Native Hawaiian and Other Pacific Islander, percent, 2000 (a)	0.1%	0.1%
Persons reporting some other race, percent, 2000 (a)	21.2%	17.0%
Persons reporting two or more races, percent, 2000	3.1%	3.6%
White persons, not of Hispanic/Latino origin, percent, 2000	52.1%	44.7%
Persons of Hispanic or Latino origin, percent, 2000 (b)	43.8%	42.1%
Living in same house in 1995 and 2000', pct age 5+, 2000	55.6%	54.4%
Foreign born persons, percent, 2000	11.2%	8.2%
Language other than English spoken at home, pct age 5+, 2000	33.4%	36.5%
High school graduates, percent of persons age 25+, 2000	72.6%	78.9%
Bachelor's degree or higher, pct of persons age 25+, 2000	16.2%	23.5%
Persons with a disability, age 5+, 2000	12,614	338,430
Mean travel time to work (minutes), workers age 16+, 2000	17.1	21.9
Housing units, 2002	25,948	805,293
Homeownership rate, 2000	70.9%	70.0%
Housing units in multi-unit structures, percent, 2000	10.6%	15.3%
Median value of owner-occupied housing units, 2000	$61,000	$108,100
Households, 2000	22,561	677,971
Persons per household, 2000	2.66	2.63
Median household income, 1999	$28,513	$34,133
Per capita money income, 1999	$14,990	$17,261

Persons below poverty, percent, 1999	21.3%	18.4%

Business QuickFacts	Chaves County	New Mexico
Private nonfarm establishments with paid employees, 2001	1,479	42,686
Private nonfarm employment, 2001	14,837	553,357
Private nonfarm employment, percent change 2000-2001	-2.2%	0.7%
Nonemployer establishments, 2000	2,381	81,398
Manufacturers shipments, 1997 ($1000)	D	17,906,091
Retail sales, 1997 ($1000)	411,020	14,984,454
Retail sales per capita, 1997	$6,569	$8,697
Minority-owned firms, percent of total, 1997	13.8%	28.5%
Women-owned firms, percent of total, 1997	23.0%	29.4%
Housing units authorized by building permits, 2002	29	12,066[1]
Federal funds and grants, 2002 ($1000)	336,561	17,477,521

Geography QuickFacts	Chaves County	New Mexico
Land area, 2000 (square miles)	6,071	121,356
Persons per square mile, 2000	10.1	15.0
Metropolitan Area	None	
FIPS Code	005	35

1: Includes data not distributed by county.

(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, so also are included in applicable race categories.

FN: Footnote on this item for this area in place of data
NA: Not available
D: Suppressed to avoid disclosure of confidential information
X: Not applicable
S: Suppressed; does not meet publication standards
Z: Value greater than zero but less than half unit of measure shown
F: Fewer than 100 firms

Source U.S. Census Bureau: State and County QuickFacts. Data derived from Population Estimates, 2000 Census of Population and Housing, 1990 Census of Population and Housing, Small Area Income and Poverty Estimates, County Business Patterns, 1997 Economic Census, Minority- and Women-Owned Business, Building Permits, Consolidated Federal Funds Report, 1997 Census of Governments

Last Revised: Tuesday, 01-Feb-2005 15:49:28 EST

Census Bureau Links:

EPA WASTE CLASSIFICATION
O & G EXPLORATION AND PRODUCTION WASTES

WHAT IS EXEMPT

(Oil and natural gas exploration and production materials and wastes exempted by EPA from consideration as "Hazardous Wastes")

. Produced water;
. Drilling fluids & cuttings;
. Rigwash;
. Geothermal production fluids;
. Hydrogen sulfide abatement wastes;
. Well completion and workover wastes;
. BS&W and other tank bottoms facilities that hold exempt waste;
. Accumulated materials from production impoundments;
. Pit sludges and contaminated bottoms from treatment, storage or disposal of exempt wastes;
. Gas plant dehydration wastes;
. Gas plant sweetening wastes;
. Cooling tower blowdown;
. Spent filters, filter media, and backwash (assuming the filter itself is not hazardous and the residue in it is from an exempt waste steam);
. Packing fluids;
. Produced sand;
. Deposits removed from piping and equipment prior to transportation;
. Hydrocarbon-bearing soil contaminated from exempt streams;
. Pigging wastes from gathering lines;
. Wastes from subsurface gas storage and retrieval;
. Constituents removed from produced water;
. Liquid hydrocarbons & gases removed from the production stream but not from oil refining;
. Waste crude oil from primary field operations;
. Light organics volatilized from exempt wastes;
. Liquid and solid wastes generated by crude oil and crude tank bottom reclaimers,
. Stormwater runoff contaminated by exempt materials,
. Mixtures of exempt and non exempt wastes pursuant to OCD mixture policy (see reverse)

WHAT IS NOT EXEMPT

(Materials and wastes not exempted and may be a "hazardous waste" if tests or EPA listing define as "hazardous")

. Unused fracturing fluids or acids;
. Cooling tower cleaning wastes;
. Painting wastes;
. Oil and gas service company wastes;
. Vacuum truck and drum rinsate from trucks and drums transporting or containing non-exempt waste;
. Refinery wastes;
. Used lubrication oils;
. Waste compressor oil and filters;
. Used hydraulic fluids;
. Waste solvents;
. Transportation Waste;
. Caustic or acid cleaners;
. Boiler cleaning wastes;
. Incinerator ash;
. Laboratory wastes;
. Pesticide wastes;
. Radioactive tracer wastes;
. Drums, insulation, and miscellaneous solids;
. Industrial wastes from activities other than oil & gas exploration & production;
. Manufacturing wastes;
. Contamination from refined products.

NEW MEXICO OIL CONSERVATION DIVISION
1220 S. St. Francis Dr.
Santa Fe New Mexico 87505
(505) 476-3440
www.emnrd.state.nm.us/ocd/

(rev. 9/97)

NOTES:

1. As of September 1997 The OCD has adopted the following mixture policy:

A mixtures of exempt and nonexempt waste will be considered exempt **ONLY** if it meets all of the following conditions:

A. The nonexempt portion of the waste is nonhazardous through testing,
2. The total nonexempt portion of the waste constitutes no more than five (5) percent by volume of the final mixture unless an exception is granted by the director,
3. The mixture is the result of an incidental and unavoidable part of an OCD approved process ,
4. Both the exempt and nonexempt portion of the waste are generated as a result of exploration and production of oil and gas, processing of gas or the transportation of natural gas prior to processing.

If a waste which is classified as hazardous by testing or listing is mixed with any other waste, the entire resultant volume will be considered hazardous.

2. The following OCD regulated facilities may be subject to hazardous waste rules for disposal of wastes and contaminated soils containing benzene:

-- Oil and gas service companies having wastes such as vacuum truck, tank, and drum rinsate from trucks, tanks and drums transporting or containing non-exempt waste.
-- Transportation pipelines and mainline compressor stations generating waste, including waste deposited in transportation pipeline-related pits.

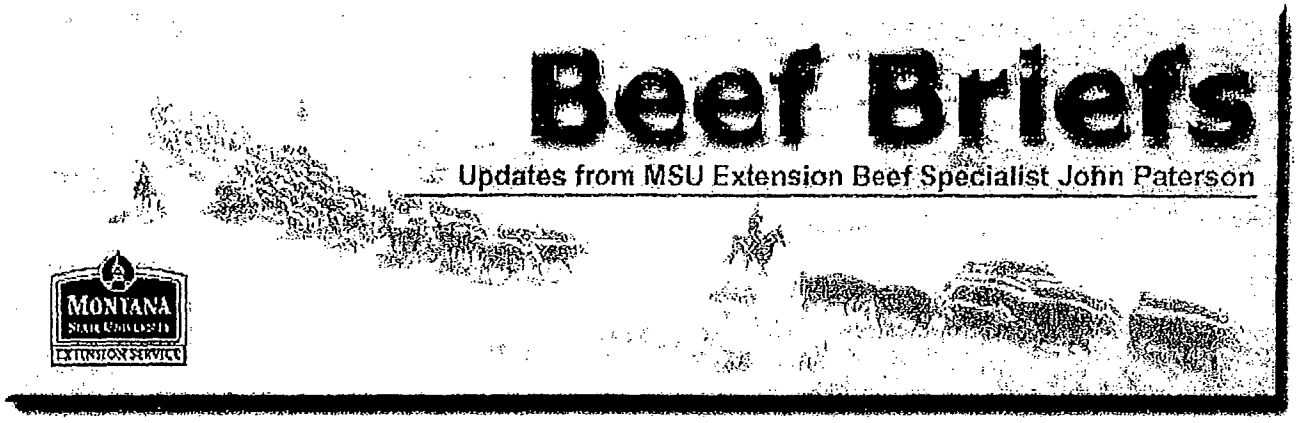
Source: Federal Register, Thursday, March 29, 1990, p.11,798 - 11,877.

3. In April, 1991, EPA clarified the status of oil and tank bottom reclamation facilities:

A Those wastes that are derived from the processing by reclaimers of only exempt wastes from primary oil and gas field operations are also exempt from the hazardous waste requirements. For example, wastes generated from the process of recovering crude oil from tank bottoms are exempt because the crude storage tanks are exempt.

B. Those reclaimer wastes derived from non-exempt wastes (e.g. reclamation of used motor oil, refined product tank bottoms), or that otherwise contain material which are not uniquely associated with or intrinsic to primary exploration and production field operations would not be exempt. An example of such non-exempt wastes would be waste solvent generated from the solvent cleaning of tank trucks that are used to transport oil field tank bottoms. The use of solvent is neither unique nor intrinsic to the production of crude oil.

Source: EPA Office of Solid Waste and Emergency Response letter opinion dated April 2, 1991, signed by Don R. Clay, Assistant Administrator.



Question of the Week: What are some guidelines that I can use to evaluate livestock water quality?

(This question comes from a Veterinarian in Central Iowa)

WATER QUALITY AND GUIDELINES

by Dr. Dave Hutcheson, PhD

Water is the most common molecule in the body, and makes up about 98 percent of all molecules in the body. Loss of 20 percent of body water is fatal. Water has the highest heat of vaporization, heat of fusion, heat capacity, dielectric constant, electrical conductivity and surface tension (Quinton, 1979). Water is needed for regulation of the body temperature, digestion, metabolism, excretion, hydrolysis of protein, fat, and carbohydrates, lubrication of joints, nervous system cushion, transporting sound and eye sight. Water distribution in the body is divided into two major compartments, extracellular (33 percent) and intracellular (67 percent). Most of the water is in the intracellular pool and the proportions vary with feeding practices and environmental conditions. The intracellular pool is made up of interstitial water, plasma and transcellular water. The interstitial water is the spaces surrounding cells in the body. The transcellular water is gastrointestinal water that can range from 15 percent of the body to 35 percent of the body. (Guyton, 1971).

The minimum requirement of cattle for water is a reflection of that needed for body growth; for fetal growth or lactation; and of that lost by excretion in the urine, feces, or sweat or by evaporation from the lungs or skin. Water requirements are affected by many factors, and it is impossible to list specific requirements with accuracy. Water intake equation for feedlot steers has been developed by (Hicks et al. 1988):

Water intake(gallons/day) = - 4.939 + (.1040xMT) + (.2923xDMI) - (2.5971xPP) - (1.1739xDS).

- MT is the weekly maximum temperature in degrees Fahrenheit
- DMI is dry matter intake in lbs fed daily

It is possible to program intake of corn based diets to meet requirements for gestation, lactation, or a level of growth desired for replacement heifers.

RELATED STORIES

Water Quality and Your Livestock Facilities

Drinking Water Quality for Beef Cattle

Can I Make My Cows More Efficient Through Modified Water Sources?

- PP is weekly mean precipitation inches
- DS is the percent of dietary salt in %.

The major influences on water intake in beef cattle fed typical rations are dry matter intake, environmental temperature, and stage and type of production. Water quality is important in maintaining water consumption of cattle. Physio-chemical (pH, total dissolved solids, hardness, and total dissolved oxygen), organoleptic (odor and taste), compounds present in excess (nitrates, iron, sodium, sulfates, and fluorine), toxic compounds (arsenic, cyanide, lead, mercury, hydrocarbons, organochlorides and organophosphates) and bacteria are criteria for evaluating drink water for humans and livestock.

Salinity
Salinity refers to the amount of dissolved salts in water and is measured by total dissolved solids. These dissolved salts are primarily sodium chloride but may include carbonates, nitrates, sulfates, calcium, magnesium and potassium Table 1 was adapted from Nutrients and toxic substances in water for livestock and poultry, NAS, 1974.

Table 1 - Guide to the Use of Saline Water

Total Dissolved Solids (TDS) mg/l or ppm	
Less than 1,000 ppm fresh water	Presents no serious burden to livestock
1,000 – 2,999 ppm slightly saline	Should not affect health or performance but may cause temporary mild diarrhea
3,000 – 4,999 ppm moderately saline	Generally satisfactory, but may cause diarrhea, especially on initial consumption
5,000 - 6,999 ppm saline	Can be used for reasonable safety for adult ruminants but should be avoided for pregnant cattle and baby calves.
7,000 - 10,000 ppm very saline	Should be avoided if possible. Pregnant, lactating, stressed or young animals can be affected.
Greater than 10,000 ppm brine	Unsafe, should not be used under any conditions

Salinity is part of the total dissolved solids but is not hardness. For and example high saline waters may contain high degree of salt and yet not be hard due to the lack of magnesium and calcium. Concentration of calcium and magnesium contributes to hardness. Hardness, calcium plus magnesium classification is defined in table 2 (Nutrients and toxic substances in water for livestock and poultry, NAS, 1974).

Table 2 - Calcium and Magnesium Concentrations and Hardness

Hardness	**Calcium plus Magnesium ppm**
Soft	0 - 60 ppm

Moderate	61 - 120 ppm
Hard	121 - 180 ppm
Very Hard	181 ppm and greater

Apparently, degree of hardness does not effect livestock production (Blosser and Soni, 1957). Laboratory analysis sometimes reports hardness as grains of hardness. One grain per gallon is equal to .0058 ppm.

Nitrates

Cattle performance and reproduction is effected by nitrates in the water.. Nitrate (NO_3) is reduced to nitrite (NO_2) which creates the toxicity. Nitrate levels in water in excess of .3 mg of nitrate nitrogen per liter contributes to excessive algae growth. Table 3 is a guide to levels of nitrate and nitrate nitrogen and precautions (Nutrients and toxic substances in water for livestock and poultry, NAS, 1974).

Table 3 - Nitrates in Water.

Nitrate (NO_3) ppm	Nitrate Nitrogen (NO_3 - N) ppm	Comments
0 - 44 ppm	0 - 10 ppm	No harmful effects
45 - 132 ppm	10 - 20 ppm	Safe if diet is low in nitrates and nutritionally balanced
133 - 220 ppm	20 - 40 ppm	Could be harmful if consumed over long periods of time
221 - 660 ppm	40 - 100 ppm	Cattle at risk; possible death losses
661 - 800 ppm	100 - 200 ppm	Unsafe; high probability of death losses
Over 800 ppm	Over 200 ppm	Unsafe; do not use

Water Quality Guidelines

Table 4 has been adapted from Mineral Tolerance Domestic Animals, NAS, 1980 and Nutrients and toxic substances in water for livestock and poultry, NAS, 1974 as a guide line for water quality for cattle.

Table 4 - Water Quality Guidelines

Substance	Desired Upper Limits ppm	Maximum Upper Limits ppm
Aluminum	5	10
Arsenic	0.2	0.2
Bicarbonate	Unknown	<1000

Boron	5	30
Cadmium	0.01	0.05
Calcium	100	150
Chloride	100	300
Chromium	1	1
Cobalt	1	1
Copper	0.2	0.5
Fluoride	2	2
Lead	0.05	0.1
Magnesium	50	100
Manganese	0.05	0.5
Mercury	0.01	0.01
Nickel	0.25	1
Selenium	0.05	0.10
Sodium	50	300
Sulfate (S from SO4)	20	100
Sulfate (SO4)	50	300
Vanadium	0	0.1
Zinc	25	50
Nitrate (NO3-N)N from NO3	10	20
Total Dissolved Solids (TDS)	960	5000

References

Blosser, T.H. and B. K. Soni. 1957. Comparative influence of hard and soft water on milk production of dairy cows. J. Dairy Sci. 40:1519.

Guyton, A. C. 1971. Textbook of medical physiology. 4th ed. W. B Saunders Co., Philadelphia, PA.

Hicks, R. B., F. N. Owens, D. R. Gill, J. J. Martin and C. A. Strasia. 1988. Water intake by feedlot steers. Animal Sci. Res. Rept. Oklahoma State University.

National Research Council. 1980. Mineral tolerance of domestic animals. National Academy of Sciences.

National Research Council. 1974. Nutrients and Toxic Substances in Water for Livestock and Poultry. Washington, D. C. National Academy of Sciences.

Quinton, P. M. 1979. Comparative water metabolism in animals: protozoa to man. Comp. Anim. Nutr. 3:100

Source of Information: http://www.cattleinfonet.com/emerge/site.home?p_site=CATTLEINFO

Livestock and Water

AS-954, July 1999

Greg Lardy, Beef Cattle Specialist
Charles Stoltenow, Extension Veterinarian

Water is an important but often overlooked nutrient for livestock.

Water makes up over 98 percent of all molecules in the body and is necessary for regulation of body temperature, growth, reproduction, lactation, digestion, lubrication of joints, eyesight, and as a cleansing agent.

Water Intake

Before discussing water quality, it is important to know how much water animals require. Water requirements are influenced by several factors, including rate of gain, pregnancy, lactation, activity, type of diet, feed intake, and environmental temperature. These requirements are met by water consumed from wells, ponds, fountains, etc., as well as moisture found in feedstuffs.

Table 1 lists estimated water intakes for lactating beef cows, dry beef cows, and bulls. Table 2 lists estimated water intakes for growing and finishing beef cattle. Water requirements of cattle can also be estimated based on ambient temperatures and feed intake (Table 3). Table 4 lists the water requirements for sheep. Table 5 lists recommended water intakes for dairy cattle. Table 6 lists the water requirements for swine. Table 7 lists the water requirements for horses.

Table 1. Estimated daily water intakes (gallons per head per day) for lactating beef cows, bred cows, dry cows, and bulls.

Month	Monthly Average Temp	Lactating Cows	Dry Cows, Bred Cows, and Heifers	Bulls
	(°F)	- - gallons per head per day - -		
January	36	11.0	6.0	7.0
February	40	11.5	6.0	8.0
March	50	12.5	6.5	8.6
April	64	15.5	8.0	10.5
May	73	17.0	9.0	12.0

June	78	17.5	10.0	13.0
July	90	16.5	14.5	19.0
August	88	16.5	14.0	18.0
September	78	17.5	10.0	13.0
October	68	16.5	8.5	11.5
November	52	13.0	6.5	9.0
December	38	11.0	6.0	7.5

Adapted from GPE-1400, Water Requirements for Beef Cattle.

Table 2. Water requirements of growing and finishing beef cattle (gallons per head per day).

		Growing Cattle			Finishing Cattle			
Month	Avg. Temp.	400 lb	600 lb	800 lb	600 lb	800 lb	1000 lb	1200 lb
	(°F)	gallons per head per day						
January	36	3.5	5.0	6.0	5.5	7.0	8.5	9.5
February	40	4.0	5.5	6.5	6.0	7.5	9.0	10.0
March	50	4.5	6.0	7.0	6.5	8.0	9.5	10.5
April	64	5.5	7.0	8.5	8.0	9.5	11.0	12.5
May	73	6.0	8.0	9.5	9.0	11.0	13.0	14.5
June	78	6.5	8.5	10.0	9.5	12.0	14.0	16.0
July	90	9.5	13.0	15.0	14.5	17.5	20.5	23.0
August	88	9.0	12.0	14.0	14.0	17.0	20.0	22.5
September	78	6.5	8.5	10.0	9.5	12.0	14.0	16.0
October	68	5.5	7.5	9.0	8.5	10.0	12.0	14.0
November	52	4.5	6.0	7.0	6.5	8.0	10.0	10.5
December	38	4.0	5.0	6.0	6.0	7.0	8.5	9.5

Adapted from GPE-1400, Water Requirements for Beef Cattle.

Table 3. Water consumption estimates for beef cattle based on thermal environment and dry matter intake.

Thermal Environment	Water Requirements
>95°F	8 to 15 pounds of water per pound of DM intake
77 to 95°F	4 to 10 pounds of water per pound of DM intake
59 to 77°F	3 to 5 pounds of water per pound of DM intake (young and lactating animals require 10 to 50% more water.)
29 to 59°F	2 to 4 pounds of water per pound of DM intake

Less than 29°F	2 to 3 pounds water per pound of DM intake (increases of 50 to 100% occur with a rise in ambient temperature following a period of very cold temperatures, e.g. a rise from -5° to 30°F.)

Adapted from Effect of Environment on Nutrient Requirements of Domestic Animals, 1981, NRC.

Table 4. Daily water requirements of sheep.

Class of Animal	Gallons/Day
Rams	2
Dry Ewes	2
Ewes with Lambs	3
5-20 pound Lambs	0.1 to 0.3
Feeder Lambs	1.5

Adapted from MWPS-3, Sheep Housing and Equipment Handbook.

Table 5. Water consumption of dairy cattle.[a]

Class of Cattle	Age or Condition	Gallons Per Day[b]
	- - - - - - - - Drinking Water Only - - - - - - - -	
Holstein Calves	1 month	1.3 to 2.0
Holstein Calves	2 months	1.5 to 2.4
Holstein Calves	3 months	2.1 to 2.8
Holstein Calves	4 months	3.0 to 3.5
Holstein Heifers	5 months	3.8 to 4.6
Holstein Heifers	15 to 18 months	5.9 to 7.1
Holstein Heifers	18 to 24 months	7.3 to 9.6
Jersey Cows	30 lbs milk/day	13.0 to 15.5
Guernsey Cows	30 lbs milk/day	13.8 to 16.0
Ayrshire, Brown Swiss, and Holstein Cows	30 lbs milk/day	14.5 to 17.0
Ayrshire, Brown Swiss, and Holstein Cows	50 lbs milk/day	24.0 to 27.0
Dry Cows	Pregnant, 6 to 9 months	9.0 to 13.0
	- - - Water Intake From Feed and Drinking Water - - -	
Milk Cows	4.5 to 5.0 lbs/lb milk produced daily	

[a] Adapted from Dairy Reference Manual, Pennsylvania State University.

[b] Consumption at air temperatures of 50 to 80°F, intake depends upon water content of the forage ration. Higher levels apply

to an all hay ration. One gallon of water weighs 8.34 pounds. A cubic foot of water weighs 62.4 pounds.

Table 6. Water intake for various classes of swine.

Class	Gallons/Day
25 lb Pig	0.5
60 lb Pig	1.5
100 lb Pig	1.75
200 lb Pig	2.5
Gestating Sows	4.5
Sow Plus Litter	6.0
Nonpregnant Gilts	3.2
Pregnant Gilts	5.5

Table 7. Water requirements of various classes of horses.

Class	Estimated Water Consumption
	(gal/day)
Maintenance, 1100 lbs, thermoneutral environment	6-8 gallons
Maintenance, 1100 lbs, warm environment	8-15 gallons
Lactating Mare, 1100 lbs	10-15 gallons
Working Horse, 1100 lbs, moderate work	10-12 gallons
Working Horse, 1100 lbs, moderate work, warm environment	12-18 gallons
Weanling, 650 lbs, thermoneutral environment	6-8 gallons

Adapted from Lawrence (1998).

Limiting water intake can depress animal performance more quickly and drastically than any other nutrient deficiency. Domesticated animals can live about 60 days without food, but only seven days without water. Hearing and sight are impaired without water.

Signs of dehydration

Signs of dehydration or lack of water are tightening of the skin, loss of weight, and drying of mucous membranes and eyes. In cattle, the eyes will appear sunken and dull. Dehydration in lactating dairy animals results in near cessation of milk production.

One way to check for dehydration in the horse is by skin folds. Pull the skin and hold a moment. Release and count the seconds until the fold disappears. On a dehydrated horse, the skin will stand for several seconds.

Weather conditions may affect water intake and lead to problems such as urinary calculi (waterbelly). Cold weather may reduce water intake, which reduces water flow through the bladder and kidneys. This reduced water flow allows kidney stones to form. When desirable weather returns, water intake increases and urinary calculi problems are seen, because the stones have become too big to pass through the urethra, primarily in males. Any factor that reduces water intake can be a contributing factor to urinary calculi. Hard water does not cause urinary calculi problems but may be a factor if the hardness effects water palatability.

Temperature

Avoid watering systems which allow the water to get too hot or to freeze. Drinkable water is usually between 40° and 65° F. Steers that have access to cool drinking water will gain .3 to .4 pounds more per day than those drinking warm water. Occasionally check waterers with heaters to detect a "runaway" (a heating element which is not working properly). Dip a thermometer into the water, but do not allow it to rest on the bottom. Touching the heated bottom of the pan can result in recording a higher temperature than the actual water temperature. Check the temperature over several cold days. Water temperatures of at least 40° F should minimize mechanical problems and maintain animal performance.

Insulate waterers to reduce problems with water freezing and keep electric costs down in North Dakota winters. Make sure the insulation inside the waterer is still in good condition. Conserve heat by caulking the base of the automatic waterer and seal the access door with weather proof tape. Reducing wind exposure on the waterer with a windbreak can also reduce electrical costs.

Extra external insulation may be added to some automatic waterers. Surround the external surface with 2 inches or more of Styrofoam. Place ½ -inch plywood over the Styrofoam. Put galvanized steel on the top part of the Styrofoam-plywood pieces and angle iron on the vertical edges. Wrap this external insulation with some -inch steel cable to keep it in place.

Stray voltage in a self-heating trough can reduce water consumption and thus reduce feed intake. Shut off the electricity to automatic waterers and check the inside for rodent nests or other malfunctions which may be causing the stray current. Make sure the connections are dry and there is a clean, tight ground. Remember to use caution when working with electrical connections.

Access

Cows given free access to water will produce more milk and more butterfat than cows allowed to drink only twice a day. The same animal will consume different levels of water at different physiological states. For example, a pregnant or lactating animal will consume more than an non-pregnant, non-lactating animal.

In some cases, it may be necessary to regulate access to water. Horses that are hot from strenuous exercise should not have free access to water. Unlimited access to water by hot horses can lead to colic,

laminitis, and/or exertional rhabdomyolysis (tying up). They should be allowed only a few sips every three to five minutes until they cool down.

If swine on a high energy diet are deprived of water (such as can occur during power outages), and then allowed free access to water (power is restored), they may die from salt poisoning. Salt poisoning is also known as cerebral edema. Swine should be given access to water sparingly until fully rehydrated. Prognosis for swine making a full recovery from salt poisoning is very guarded.

Nutrients in Diet

Increasing the salt concentration or the protein level of the diet stimulates increased water intake in all species because of the increase in urine volume necessary for excretion of salt and urea. Studies with poultry have shown an increase in water consumption due to increases in fat, protein, salt, or potassium in the diet. Feeds high in crude fiber, such as roughages, will require more water for ingestion than feeds low in crude fiber, like barley and corn.

Stress

Reduced water consumption can be a sign of sickness or other stressors. Special considerations may be needed for valuable animals. Newly arrived animals may refuse water at first due to differences in palatability, so water intake in newly received cattle should be carefully monitored to make sure there are no signs of dehydration. Allowing animals to become accustomed to the new water supply gradually by mixing water from old and new sources is often not practical or even possible. Mixing small amounts of molasses with water sources can hide differences in taste.

Have water available during low activity times during the day. Consumption of water and feed can be reduced when there is a lot of activity which diverts the animals' attention. Allowing waterers to run over for the first few days may help cattle acclimate to drinking from fountains or new water sources, since the sound of running water will draw animals to the waterer. In addition, waterers should be placed in the fence line, since newly received cattle tend to pace back and forth along the fence.

Composition of Water

Water quality and quantity may affect feed consumption and animal health. Low quality water will normally result in reduced water and feed consumption. Absolutely pure water is not found in nature. Actually, deionized-distilled (pure) water is undesirable for livestock. Certain salts and gases in solution make water more palatable if not present in excess.

Substances which may reduce palatability of water include various salts. Salts may be toxic at high levels. Substances which are toxic without much effect on palatability include nitrates and fluorine, as well as salts of various heavy metals. Other materials which may effect palatability or toxicity include pathogenic microorganisms, hydrocarbons, oily substances, pesticides, and many industrial chemicals which sometimes pollute water supplies.

Contamination of water sources can occur when a hose is placed where it can become submerged when filling an animal watering tank. If the tank fills over the outlet of the hose, and the hose or faucet has automatic back siphoning, the entire water system may then become contaminated by impurities or poisonous solutions with the loss of water pressure.

Cleanliness

All water troughs should be cleaned frequently. Livestock should never be forced to drink dirty or contaminated water. Stale water can cause reduced water consumption. Even when clean water is available, animals may continue to consume dirty water if it is available.

Dirty water is a host for disease organisms. Disease can spread rapidly if animals drink from the same trough, so sick animals should be isolated from the trough and the trough cleaned and disinfected. A good disinfectant is dilute bleach solution after the trough has been thoroughly cleaned. Sprinkling baking soda into the fountain periodically may reduce algae growth. Tip tanks are sometimes installed in larger dairy freestall barns to simplify cleaning.

Have an elevated base around automatic waterers. Make the base wide enough so animals can easily put their front legs on it when they are drinking, but not their hind legs. Animals will not normally place only their hind legs on this base and therefore will not defecate in the water. Placement and height of the base are the key to avoiding fecal contamination. Make the surface rough so animals will not slip.

Water Quality

If there is a question of water quality, it should be tested. The following chemical properties should be considered when evaluating the quality of water for livestock.

Salinity

Salinity refers to salt dissolved in water and is expressed as parts per million (ppm) or as milligrams per liter (mg/L). The State Health Laboratory (Bismarck) and the NDSU Veterinary Diagnostic Laboratory (Fargo) conduct salinity tests. The expression "total dissolved solids" (TDS) is often used to denote the level of water salinity.

Salts commonly present include carbonate, bicarbonates, sulfates, nitrates, chlorides, phosphates, and fluorides. Highly mineralized waters (high solids) do not have much effect on health as long as there are no objectionable effects from specific ions, such as sulfate, and as long as normal amounts of water are consumed. One gram of sulfate per liter (1000 ppm) may result in scours. High levels of sulfate in the water may also reduce copper availability in the diet. In North Dakota, well water high in TDS is often high in sulfates. The limiting health concern is often sulfate, because the acceptable sulfate level will be exceeded before TDS levels are high enough to be a concern.

Salts, such as sodium chloride, change the electrolyte balance and intracellular pressure in the body, producing a form of dehydration. Salts also place a strain on the kidneys. Excess fluoride causes degeneration of the teeth.

High salt concentrations that are less than toxic may actually cause an increase in water consumption. Animals may refuse to drink high saline water for many days, followed by a period when they drink a large amount. They may then become sick or die. The tolerance of animals to salts in water depends on factors such as water requirements, species, age, physiological condition, season of the year, and salt content of the total diet, as well as the water. Animals have the ability to adapt to saline water. However, abrupt changes from water with low salt to water with high salt concentrations may cause harm while gradual changes do not.

Table 8 gives the level of mineral content that either makes the water taste too bad to drink or causes a detrimental effect on health. It ap-pears to make little difference wheth-er the total quantity of dissolved salts or dissolved solids is made up of a single salt or a number of different salts. Table 9 shows recommendations for various animal species in relation to dissolved solids content.

Table 8. Recommendations for livestock water use based on Total Dissolved Solids (TDS).

TDS (ppm or mg/L)	Comments
Less than 3,000	Usually satisfactory for most livestock.
3,000-5,000	May not cause adverse effects to adult livestock. Growing/young livestock could be effected by looseness or poor feed conversion. At levels near 5,000 ppm the water is unacceptable for poultry.
5,000-7,000	Should not be used for pregnant or lactating females. Usually laxative and may result in reduced water intake.
7,000-10,000	Do not use for swine. Do not use for pregnant or lactating ruminants or horses.
10,000 or more	May cause brain damage or death.

Table 9. Recommended levels of Dissolved Solids for various animal species.

	Dissolved Solids (ppm)				
Species	Excellent	Good	Fair	Poor	Limit
Humans	0-800	800-1,600	1,600-2,500	2,500-4,000	5,000
Horses:					
- Working	0-1,000	1,000-2,000	2,000-3,000	3,000-5,000	6,000
- Others	0-1,000	1,000-2,000	2,000-4,000	4,000-6,000	10,000
Cattle	0-1,000	1,000-2,000	2,000-4,000	4,000-6,000	10,000
Sheep and	0-1,000	1,000-3,000	3,000-6,000	6,000-10,000	15,000
Poultry					
Chickens	0-1,000	1,000-2,000	2,000-3,000	3,000-5,000	6,000

Swine	(young pigs and market pigs appear to tolerate less than cattle)

Sulfates

Animals can become acclimated to the sulfates in water. Consider diluting high sulfate water with low sulfate water for newly arrived animals. Use the same procedure for pigs at weaning time. The sulfate recommendation for calves is for less than 500 ppm (167 ppm sulfur as sulfate). For adult cattle the recommendation is less than 1,000 ppm (333 ppm sulfur as sulfate). Caution is required in evaluating sulfate levels in water because of interactions with copper and molybdenum and the inhibiting effect compounds such as sodium fluoride have on sulfate absorption for the digestive tract. In addition, high levels of sulfates may also contribute to an increased incidence of polioencephelomalacia (PEM), a brain disorder found in cattle. If copper deficiency problems are suspected, water sources should be analyzed for sulfates to determine if high sulfate levels are contributing to the problem.

Other minerals

Water hardness is actually caused by calcium and magnesium. Softening the water through exchange of calcium and magnesium with sodium may cause problems if water is already high in salinity.

When there is a significant amount of calcium in water, it should be considered as a part of the total mineral intake. However, many mineral salts are relatively insoluble and pass through the body without being absorbed. Even in hard water, the amount of mineral ingested from the water is not likely to be substantial.

Nitrates

Water can also be contaminated with nitrates. For more information regarding nitrates and nitrate poisoning, please refer to Nitrate Poisoning of Livestock (V-839 Revised).

pH

Water pH denotes either alkalinity or acidity. High saline water is not the same as alkaline water. A pH of 7 would be neutral; over 7 indicates alkalinity; below 7 designates acidity. Most North Dakota waters are mildly alkaline with a pH value between 7 and 8. Acidic water (pH below 7) has not been found to occur in most of North Dakota; however, there are some reports of acidic water in the western part of the state in proximity to lignite veins. Various degrees of alkalinity have been reported in the state. High alkalinity may cause digestive upsets, laxative action, poor feed conversion, and reduced water and/or feed intake.

Microbiological properties

There are many microorganisms in our water supply. Most are quite harmless but some do cause animal health problems.

Coliform counts below 50 per milliliter of water are safe for all cattle. Other possible contaminants include coccidia, staph, strep, virus, lepto, etc.

Green scum that builds up in livestock drinking troughs and tanks is algae. It cannot grow without sunlight. Some blue-green algae are toxic. No good method exists to predict whether toxins will be produced. Livestock behavior should be monitored closely during periods of heavy algal blooms. Copper sulfate ($CuSO_4$) or other commercial copper-containing products, often called bluestone, will kill the algae for a period of several months. In troughs or small tanks, a safe dosage is one level teaspoon of copper sulfate per 1,500 gallons of water. One ounce will treat 8,000 gallons of water. One pound per acre-foot is a good estimate for larger bodies of water. Generally, treatment is done only when algae growth is heavy or if a toxicity prob-lem occurs. Hold livestock off the treated water source for at least 24 hours.

In treating large stock tanks or ponds, drag a sack containing the correct amount of copper sulfate behind a boat, pacing yourself to cover the heavily infested areas first. If the tank contains catfish (not scaled fish), treat half of the pond at a time and allow the fish to move to untreated water. Occasionally putting baking soda in water troughs will help prevent algae growth. Proper cleaning of automatic waterers can be quite effective in preventing algae growth. Consider the use of a disinfectant with poultry waterers. Table 10 lists the recommended treatment levels for adding copper sulfate to water to reduce algae growth. Management in the watersheds above stock ponds that reduces runoff and erosion will help reduce nutrient impacts needed for algal growth.

Table 10. Recommended levels of copper sulfate needed to treat water for algae.

Amount of CuSO4 Used	Water Volume for 1 ppm	Water Volume for ½ ppm
	- - - - gallons - - - -	
1 oz	7,800	15,000
8 oz	62,500	125,000
1 lb	125,000	250,000
8 lb	1,000,000	2,000,000

The desired level of CuSO4 is 0.2 to 0.4 ppm, which is equivalent to 0.65 to 1.3 oz per 10,000 gallons of water or 1.4 to 2.8 pounds per acre foot of water.

Signs of blue green algae poisoning are diarrhea, lack of coordination, labored breathing, and death.

During recovery, unpigmented skin may slough off. A suggested treatment for algae afflicted animals is large quantities of medical-grade charcoal and mineral oil, given orally. These are given to try to prevent any further absorption of the toxins by the affected animals. Contact your veterinarian for more information and assistance.

For additional information on algae poisoning please refer to NDSU Extension Service publication V-1136, Cyanobacteria (Blue-Green Algae) Poisoning.

Microorganisms can enter a well which has improper surface protection. A well is situated improperly if it receives drainage from livestock pens or a manure storage structure. Cracked well casings may also allow bacteria to enter the water supply. Cracks in cisterns can also allow access to microorganisms. Contamination might occur from a heavy spring rainfall. Protect the surface of wells from contamination by rodents.

Other chemicals

Many other chemicals may be found in water, some of which could be detrimental to livestock production. Safe levels of herbicides and pesticides in water for animals have not been determined. Table 11 gives guidelines for humans. These appear to be reasonable for livestock.

Table 11. Maximum tolerable levels of various pesticides in water for humans.

Pesticide	Maximum Concentration
	mg/L
Chlordane	0.002
Endrin	0.002
Hephtachlor epoxide	0.0002
Hephtachlor	0.0004
Lindane	0.0002
Methoxychlor	0.04
Toxaphene	0.003
2,4-D	0.07
2,4,5-T	0.07

Pesticides can enter a ground water or surface water supply from run-off, drift, and accidental spills. Provide adequate drainage around the water supply. Wells should be located on elevated ground to prevent surface run-off in to the well. Fish are much more sensitive to pesticides than other livestock.

Table 12 lists the safe levels of potentially toxic nutrients and contaminants in water for cattle. These should be analyzed only when there is good reason to suspect their presence at excessive levels.

Table 12. Safe levels of potentially toxic nutrients and contaminants in water for livestock.

Element	ppm
Aluminum	5.0
Arsenic	0.2
Boron	5.0
Cadmium	0.05
Chromium	1.0
Cobalt	1.0
Copper	0.5
Fluorine	2.0
Lead	0.05
Mercury	0.01
Nickel	1.0
Nitrate-Nitrogen	100.0
Nitrite-Nitrogen	10.0
Selenium	0.05
Sulfate	1,000.0
Vanadium	0.1
Zinc	25.0

Adapted from Shirley et al. (1974).

Water testing requirements for dairies

Water used for cleaning equipment in the milking barn and parlor must be tested annually. Contact the North Dakota Department of Agriculture-Dairy Division, regarding referrals on water quality and inspection requirements.

Water requirements are influenced by several factors, including
rate of gain
pregnancy
lactation
activity
type of diet
feed intake
environmental temperature

NDSU Extension Service, North Dakota State University of Agriculture and Applied Science, and U.S. Department of Agriculture cooperating. Sharon D. Anderson, Director, Fargo, North Dakota. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. We offer our programs and facilities to all persons regardless of race, color, national origin, religion, sex, disability, age, Vietnam era veterans status, or sexual orientation; and are an equal opportunity employer.
This publication will be made available in alternative formats for people with disabilities upon request, 701/231-7881.

ATTACHMENT 12
OF
FORM C-137

PROOF OF NOTICE REQUIREMENTS
OF
OCD RULE 711

PROPOSED PUBLIC NOTICE

The State of New Mexico through its Oil Conservation Commission hereby gives notice pursuant to law and the Rules and Regulations of the Division of the following meeting and public hearing to be held at _____ on _____, in the Oil Conservation Division Public Hearing Room at 1220 South St. Francis Drive, Santa Fe, New Mexico, before the Oil Conservation Commission. If you are an individual with a disability who is in need of a reader, amplifier, qualified sign language interpreter, or any other form of auxiliary aid or service to attend or participate in the hearing, please contact Division Administrator Florene Davidson at 505-476-3458 or through the New Mexico Relay Network (1-800-659-1779 as soon as possible. Public documents including agenda and minutes, can be provided in various forms. Please contact Florene Davidson if a summary or other type of accessible form is needed.

STATE OF NEW MEXICO TO:
All named parties and persons
Having any right, title, interest
Or claim in the following cases
And notice to the public.

CASE _____

Application of Gandy Marley, Inc. to modify their existing NMOCD Rule 711 Permit No. NM-01-020. Gandy Marley, Inc. has applied for a modification to their surface waste management facility permit to allow the facility to use landfill-type cells for the disposal of oilfield waste classified as non-hazardous by RCRA Subtitle C exemption or by characteristic testing including hydrocarbon and salt-contaminated debris, mud, soils, sludges, tankbottoms and filters associated with the drilling, operating and maintenance of oil and gas wells and related operations of the oil and gas industry. The facility will also accept produced water and drilling completion fluids that either pass a paint filter test by EPA method 9095A or that have been stabilized to pass the paint filter test. The facility is currently permitted to accept hydrocarbon-contaminated waste for disposal in the landfarm cells, tank bottoms and has a permitted stabilization process. Gandy Marley Inc.'s facility is located in Sections 4, 5, 8, and 9 of Township 11 South, Range 31 East, in Chaves County, New Mexico. Gandy Marley, Inc. has provided information describing the construction of the cells and conditions at the site, including geological/hydrological information, that make it suitable for the acceptance of such waste. The operator will keep salt-contaminated oilfield waste separate from hydrocarbon-contaminated oilfield waste. Gandy Marley, Inc. will also present evidence that there is no present or foreseeable beneficial use for the perched aquifer underlying the facility and will request a finding of the OCD that there is no present or foreseeable beneficial use for the perched aquifer underlying the Gandy Marley facility. The application and supporting documents may be viewed at the Oil Conservation Division offices, 1220 South St. Francis Drive, Santa Fe, New Mexico.

Given under the Seal of the State of New Mexico Oil Conservation Commission at Santa Fe, New Mexico on this _____day of _____.

DOMENICI LAW FIRM, P.C.
ATTORNEYS AT LAW
320 Gold Ave SW Suite 1000
Albuquerque, New Mexico 87102

(505) 883-6250 Telephone
(505) 884-3424 Facsimile

Pete V. Domenici, Jr.
pdomenici@domenicilaw.com

Jeanne Cameron Washburn
jwashburn@domenicilaw.com

Charles N. Lakins
clakins@domenicilaw.com

Lorraine Hollingsworth
lhollingsworth@domenicilaw.com

September 27, 2005

VIA CERTIFIED MAIL

Tim Kreager
Bureau of Land Management
2909 West 2nd Street
Roswell, New Mexico 88201-1287

Re: Gandy Marley Surface Waste Management Facility, OCD Permit No. NM-01-019

Dear Mr. Kreager:

This letter is to notify the United States Bureau of Land Management that Gandy Marley, Inc. is submitting an application for a modification to OCD Permit No. NM-01-019. The permit modification will allow Gandy Marley to accept salt-contaminated oilfield waste at its existing surface waste management facility. A copy of the permit modification application will be available at the OCD offices located at 1220 S. St. Francis Drive, Santa Fe, New Mexico.

Sincerely,

DOMENICI LAW FIRM, P.C.

Lorraine Hollingsworth, Esq.

cc: 1548

Sylvia Rudy, Administrative Assistant
srudy@domenicilaw.com

Glenna Bergeron, Administrative Assistant
gbergeron@domenicilaw.com

U.S. Postal Service
CERTIFIED MAIL RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

7001 1140 0001 0566 7957

OFFICIAL USE

Postage	$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here
4.42

Sent To
Tim Kreager, Bureau of Land Mgmt
Street, Apt. No.; or PO Box No. 2909 West 2nd St.
City, State, ZIP+4 Roswell NM 88201-1287

PS Form 3800, January 2001 See Reverse for Instructions

DOMENICI LAW FIRM, P.C.
ATTORNEYS AT LAW
320 Gold Ave SW Suite 1000
Albuquerque, New Mexico 87102

(505) 883-6250 Telephone
(505) 884-3424 Facsimile

Pete V. Domenici, Jr.
pdomenici@domenicilaw.com

Jeanne Cameron Washburn
jwashburn@domenicilaw.com

Charles N. Lakins
clakins@domenicilaw.com

Lorraine Hollingsworth
lhollingsworth@domenicilaw.com

September 27, 2005

VIA CERTIFIED MAIL

Patrick H. Lyons
Commissioner of Public Lands
New Mexico State Land Office
P.O. Box 1148
Santa Fe, New Mexico 87504-1148

Re: Gandy Marley Surface Waste Management Facility, OCD Permit No. NM-01-019

Dear Mr. Lyons:

This letter is to notify you that Gandy Marley, Inc. is submitting an application for a modification to OCD Permit No. NM-01-019. The permit modification will allow Gandy Marley to accept salt-contaminated oilfield waste at its existing surface waste management facility. A copy of the permit modification application will be available at the OCD offices located at 1220 S. St. Francis Drive, Santa Fe, New Mexico.

Sincerely,

DOMENICI LAW FIRM, P.C.

Lorraine Hollingsworth, Esq.

cc: 1548

Sylvia Rudy, Administrative Assistant
srudy@domenicilaw.com

Glenna Bergeron, Administrative Assistant
gbergeron@domenicilaw.com

U.S. Postal Service
CERTIFIED MAIL RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

OFFICIAL USE

Postage	$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

4.42
Postmark Here

7001 1140 0001 0566 7971

Sent To Land
Patrick Lyons, NM State ~~Parks~~ Office
Street, Apt. No.; or PO Box No. PO Box 1148
City, State, ZIP+4 Santa Fe NM 87504-1148

PS Form 3800, January 2001 See Reverse for Instructions

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Patrick Lyons
Comm. of Public Lands
NM State Land Office
P.O Box 1148
Santa Fe, NM 87504-1148

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

SAN
SEP 2

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number
(Transfer from service lab 7001 1140 0001 0566 7971

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

SCANNED

DOMENICI LAW FIRM, P.C.
ATTORNEYS AT LAW
320 Gold Ave SW Suite 1000
Albuquerque, New Mexico 87102

(505) 883-6250 Telephone
(505) 884-3424 Facsimile

Pete V. Domenici, Jr.
pdomenici@domenicilaw.com

Jeanne Cameron Washburn
jwashburn@domenicilaw.com

Charles N. Lakins
clakins@domenicilaw.com

Lorraine Hollingsworth
lhollingsworth@domenicilaw.com

September 27, 2005

VIA CERTIFIED MAIL

Chaves County Board of Commissioners
ATTN: Stanton L. Riggs, County Manager
#1 St. Mary's Place
Roswell, NM 88203

Re: Gandy Marley Surface Waste Management Facility, OCD Permit No. NM-01-019

Dear Mr. Riggs:

This letter is to notify the Chaves County Board of Commissioners that Gandy Marley, Inc. is submitting an application for a modification to OCD Permit No. NM-01-019. The permit modification will allow Gandy Marley to accept salt-contaminated oilfield waste at its existing surface waste management facility. A copy of the permit modification application will be available at the OCD offices located at 1220 S. St. Francis Drive, Santa Fe, New Mexico.

Please ensure that each of the five County Commissioners are informed of this matter.

Sincerely,

DOMENICI LAW FIRM, P.C.

Lorraine Hollingsworth, Esq.

cc: 1548

Sylvia Rudy, Administrative Assistant
srudy@domenicilaw.com

Glenna Bergeron, Administrative Assistant
gbergeron@domenicilaw.com

U.S. Postal Service
CERTIFIED MAIL RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

7001 1140 0001 0566 7964

Postage	$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here: 4.42

Sent To: Stanton Riggs, Chaves Co Bd of Comm
Street, Apt. No.; or PO Box No.: 1 St. Marys Place
City, State, ZIP+ 4: Roswell, NM 88203

PS Form 3800 January 2001 — See Reverse for Instructions

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Chaves Co. Bd of Comm.
Attn: Stanton L. Riggs
County Manager
1 St Marys Place
Roswell, NM 88203

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Sandra Stewart ☒ Agent ☐ Addressee

B. Received by *(Printed Name)*: Sandra Stewart
C. Date of Delivery: 9/30/05

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☒ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Transfer from service label)*: 7001 1140 0001 0566 7964

PS Form 3811, February 2004 — Domestic Return Receipt — 102595-02-M-1540

SCANNED

ATTACHMENT 13
OF
FORM C-137

H_2S CONTINGENCY PLAN

H_2S CONTINGENCY PLAN FOR GANDY/MARLEY LAND FARMS

The potential for H2S exposure at the Gandy/Marley Land Farm is very remote. However, the facility does receive loads of liquids that contain various amounts of Hydrogen Sulfide. The two places where a person may be exposed to H_2S are:

- The tank battery while loading or unloading liquids, while gauging the tanks, or during a clean-out of the tanks.
- The stabilization unit.

Hydrogen sulfide is one of the most potentially lethal hazards found in the oil and gas industry. Gandy/Marley intends to make every effort to provide adequate safeguards against harm to persons both on location and in the immediate vicinity from the effects of H_2S released to the atmosphere. In those areas where H_2S is common, the following safety procedures/policies shall be in effect.

I. TRAINING

1. All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, shall be H_2S trained and certified. They shall be instructed in the hazards of H_2S, the use of personal safety equipment, and informed of H_2S detectors and alarms. They shall be trained and made familiar with the ventilation equipment, prevailing winds, briefing areas, warning systems, and evacuations procedures where appropriate. All personnel working around the tank battery and transport shall be issued an H_2S monitor and it shall be worn.

2. All personnel shall be indoctrinated in basic first-aid procedures applicable to victims of H_2S exposure. During subsequent on-site training sessions and drills, emphasis shall be placed upon non-entry rescue and first aid for H_2S victims.

3. The training consists of the following:

A. Introduction

- Definition
- Danger of H_2S
- Properties of H_2S
- Physical Effects
- Sources of H_2S

B. Hydrogen Sulfide Detection

- Types of Equipment
- Detector use in the field

C. Respiratory Equipment

- Types of Equipment, fit test and use

- Practical exercise in the use of company owned equipment

D. Safety Precautions To Be Used

E. Emergency Procedure

II. SAFETY PRECAUTIONS TO BE USED AROUND H2S

1. Stay upwind of any escaping gas. Be alert to any wind direction changes.

2. Use fresh air breathing equipment where H_2S gas concentration is above 10 ppm and during any confined space entries where H_2S is known or suspected.

3. OBSERVE AND OBEY all warning sings on location.

4. Use extreme caution when gauging all tanks. Stay on the upwind side of the hatch. Hold your breath and turn your body away from the hatch when opening.

5. Produced water contains H_2S. Use the same precautions as with crude oil.

6. Smoking, open flames, etc., is prohibited where gas is present or in a NO SMOKING AREA.

7. If at any time a job is considered to be hazardous, shut down operations and contact the company supervisor in charge of the job or a supervisor.

8. Do not enter any tank or enclosed vessel without using breathing air respirator and a confined space entry permit. A supervisor MUST be on location at all times and a confined space entry permit shall be used.

9. If it does become necessary to enter any tank or enclosed vessel the following conditions must be met:

    A. The individual entering the tank must have in his possession a card stating that he has been trained in Hydrogen Sulfide Procedure and Safety and in Confined Space Entry.

    B. The tank can be entered only if the employee is wearing a "breathing air" work unit. Personnel working in Hydrogen Sulfide concentration will be properly equipped. The minimum equipment required is; a self contained emergency fresh air bottle, a harness, and a non-sparking lifeline and a signed Confined Space Entry permit. The lifeline must be adequate to remove them from the area in the event of failure of their breathing equipment or any other accident that could incapacitate them.

C. An individual entering vessels must not have any physical impairment that would prevent obtaining a proper face mask seal.

D. Breathing equipment must be inspected and face mask seal must be tested before entry.

E. Backup and attendant personnel with proper equipment must be stationed at the entrance of the tank or enclosed vessel. They will man the safety lifeline and keep the individual inside under observation in case of an accident or emergency.

F. A designated supervisor must be on location to monitor conditions of air bottles, regulators and hoses. They must be available to switch bottles on the fresh air manifold as each bottle in use is depleted. The supervisor will designate the briefing and safe smoking area. He/she is responsible for safety conditions on the job location. He/she will be responsible for the cleaning and disinfection of the breathing apparatus after each use and before storage.

10. All respiratory equipment will be inspected on use and monthly by the person assigned the equipment. A record of the inspections will be maintained. Any equipment found to be unserviceable shall be tagged "OUT OF SERVICE" and turned into the Safety Department for repairs.

In the event of escaping gas or a hydrogen sulfide emergency, these procedures should be used:

A. Immediately go to the upwind briefing area and determine if all crew members and other personnel working on the location are safe and accounted for.

B. Notify the supervisor and emergency response personnel as soon as possible.

C. Under no circumstances attempt to rescue anyone that has been overcome by gas unless wearing air supplied breathing equipment while making the rescue and after you have called for assistance. The company SCBA shall be stored at the office and access shall be available to all personnel.

D. After protective breathing equipment is in use, move victim to a safe location upwind for the H_2S source and remove any liquid contained clothing above the waste and wipe them down before removing your respirator.

E. If the victim is unconscious and not breathing, immediately apply mouth-to-mouth artificial respiration and continue it until normal breathing is

restored. If the victim is covered in H_2S producing liquids, remove above the waist clothing and quickly wipe off potential H_2S bearing liquids.

F. After a victim is revived, do not leave him alone. Transport by ambulance. H_2S victims can be irrational or suffer other complications from H_2S exposure.

G. All H_2S victims shall receive medical attention and shall not be allowed to drive a vehicle until released by a doctor. Keep victims under observation until examined by a doctor.

H. Keep everyone away from the scene of the H_2S danger until supervisory personnel or emergency personnel can take charge of the location.

III. EQUIPMENT REQUIRED FOR TANK CLEANING

1. Self-Contained Breathing Apparatus, hose line masks with escape bottle, and a breathing air trailer are available 24 hours a day.
2. First aid kit.
3. Warning signs/flags, wind directions indicator(s).
4. H_2S monitors and quad meters.
5. a Confined Space, Permit Required sign
6. a fire extinguisher
7. Hot work and CSE permit book
8. Bonding cable

IV. PERSONAL/HEALTH:

PERSONNEL ASSINGED TO WORK IN H_2S AREAS SHALL NOT HAVE:

1. Perforated ear drums.
2. Claustrophobia or other psychological impairments.
3. Any inflammatory condition of the eyes
4. Respiratory disease/condition.

5. Obstructions to the proper fit of a face piece/respirator
   - Facial Hair.
   - Unique bone structure of face
     Example: (false teeth)

V. PRACTICES

1. Be thoroughly familiar with H2S dangers and safe practices.

2. Be fit-tested for safe respirator usage.

3. Know first aid/CPR.

4. Always use the buddy system. Watch each other for danger or signs of danger.

CONFINED SPACE ENTRY SAFETY

No one shall "open" any type of vessel (such as tanks or heaters) without a supervisor AND fresh air on location. All personnel entering the confined space must be in possession of a card showing that they received CSE training within the past 3 years.

1. A permit, properly executed, shall be required for an entry.

2. All personnel concerned with the entry shall be properly trained and familiar with their assigned tasks.

3. The "Hot Work" section of a permit is to be properly filled in if the task requires welding/burning or any other ignition source.

4. A pre-job safety meeting shall be conducted for all concerned.

5. All equipment associated with the operation shall be safe and in good working order. Test BEFORE you bet your life.

6. Atmospheric testing will be performed by properly trained personnel using properly calibrated equipment, at the proper intervals. Continuous monitoring shall be performed while any personnel are in the confined space.

7. All personnel entering the area and their back-ups shall wear appropriate respiratory protection equipment in good working order.

8. When opening a vessel that contains H_2S or inert gas, a supplied air respirator shall be worn when removing the bolts of the opening to the vessel.

9. Possible hazards associated with work done inside a vessel (welding, cutting, fiberglass, painting, blasting, electrical, falls, etc.) shall be considered before the job is started.

10. No one on the job site shall have smoking materials (lighters, matches, cigarettes, etc.) on their persons at the job site.

11. All members of the team shall establish and maintain proper communications.

12. A person trained as an attendant in Confined Space Entry and first aid and CPR shall perform the attendant functions.

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Mark E. Fesmire, P.E.
Director
Oil Conservation Division

November 22, 2005

Mr. Pete Domenici, Jr., Esq.
Domenici Law Firm, P.C.
320 Gold Ave. SW
Suite 1000
Albuquerque, NM 87102

RE: Gandy Marley Surface Waste Management Facility
OCD Permit No. NM-01-019

Dear Mr. Domenici:

The New Mexico Oil Conservation Division (NMOCD) has received and reviewed your request, submitted on behalf of Gandy Marley, Inc., for approval of the temporary staging of salt-contaminated waste at the Gandy Marley facility covered by the above permit.

We regret to inform you that this request cannot be approved.

If you have any questions, please contact Ed Martin at (505) 476-3492 or ed.martin@state.nm.us

NEW MEXICO OIL CONSERVATION DIVISION

Roger C. Anderson
Environmental Bureau Chief

Copy: Gandy Marley, Inc.

DOMENICI LAW FIRM, P.C.
ATTORNEYS AT LAW
320 Gold Ave SW Suite 1000
Albuquerque, New Mexico 87102

(505) 883-6250 Telephone
(505) 884-3424 Facsimile

Pete V. Domenici, Jr.
pdomenici@domenicilaw.com

Jeanne Cameron Washburn
jwashburn@domenicilaw.com

Charles N. Lakins
clakins@domenicilaw.com

Lorraine Hollingsworth
lhollingsworth@domenicilaw.com

November 11, 2005

Ed Martin
Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

Re: Gandy Marley Surface Waste Management Facility, OCD Permit No. NM-01-019

Dear Mr. Martin:

The purpose of this letter is to request Division approval for the temporary staging of salt contaminated waste at the Gandy Marley facility. On October 12, 2005, the Commission granted Gandy Marley permission to accept salt contaminated waste at the facility during the time that Gandy Marley's application for a permit modification is pending before the Commission. Pursuant to the Order, Gandy Marley is required to segregate all salt contaminated waste received at the facility and to dispose of the salt contaminated waste in a landfill cell constructed in accordance with the engineering drawings submitted as part of Gandy Marley's permit modification request, including the addition of a 40 mil synthetic liner. Gandy Marley is in the process of constructing the landfill cells. Some of Gandy Marley's clients have contacted Gandy Marley to request that salt contaminated materials, which could impact fresh water sources and need to be moved off of their sites, be temporarily staged at the Gandy Marley facility pending completion of the landfill cell. Gandy Marley proposes to stage the materials at the Gandy Marley facility for no more than 90 days from the date of receipt of the materials. The materials will be staged on a poly liner and will be disposed of in the landfill cell as soon as construction is completed.

Please let me know, as soon as possible, if the Division approves of the above proposal.

Sincerely,

DOMENICI LAW FIRM, P.C.

Pete Domenici, Jr., Esq.

Cc: Gandy Marley

Sylvia Rudy, Administrative Assistant
srudy@domenicilaw.com

Glenna Bergeron, Administrative Assistant
gbergeron@domenicilaw.com

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONVERSATION DIVISION

APPLICATION OF GANDY MARLEY, INC. TO MODIFY THEIR EXISTING NMOCD RULE 711 PERMIT NO. NM-01-019 **CASE NO. 13480**

PRE-HEARING STATEMENT

COMES NOW Gandy Marley Inc., by and through undersigned counsel of record, and submit the following Pre-Hearing Statement in the above-captioned matter

I. Name of the Party and Party's Attorney

Gandy Marley, Inc.
Operator of Record
PO Box 1658
Roswell, NM 88203

Pete V. Domenici, Jr., Esq.
Attorney for Gandy Marley Inc.
Domenici Law Firm, P.C.
6100 Seagull Street NE, Suite 205
Albuquerque, NM 87109
(505) 883-6250
Fax 884-3424

II. GANDY MARLEY INC.'S STATEMENT OF THE CASE

Gandy Marley Inc. (GMI) is the operator of record and surface owner of a commercial landfarm located in Sections 4, 5, 8, and 9, Township 11 South, Range 31 East, in Chaves County, New Mexico. This landfarm is permitted pursuant to 19.15.9.711 NMAC (§711) under permit number NM-01-0019. GMI has requested that its landfarm permit be modified to allow it to use landfill-type cells for the disposal of oilfield waste classified as non-hazardous by RCRA Subtitle C exemption or by characteristic testing including petroleum and chloride impacted

debris, mud, soils, sludges, tankbottoms and filters associated with the drilling, operating and maintenance of oil and gas wells and related operations of the oil and gas industry.

Pursuant to §711.B(7), a permit may be issued "upon a finding that an acceptable application has been filed" and that the provisions for public notice and financial assurance have been met. GMI will present evidence that each of the requirements for the issuance of a permit modification have been met. GMI will also be prepared to offer testimony on the implementation of additional or modified requirements that may be imposed by the Oil Conservation Division (the Division). Based on the evidence presented, GMI requests that the permit modification be granted.

A. Procedural History

On March 4, 2005, Division Director Mark Fesmire notified GMI that the Division had determined that it was necessary to modify GMI's landfarm permit to add the following conditions: "Effective immediately, the NMOCD permitted landfarm...is prohibited from accepting oilfield waste contaminated with salts." (Order of the Division, Case No. 13454, Order NO. 12306-A, ¶9.g). The modification was based on the Division's determination that, because salt contamination decreases the biodegradation capacity of the landfarms and that salts leach more easily than hydrocarbons, a landfarm accepting salt-contaminated oilfield waste could pose a threat to groundwater. (*Id.* at ¶9.e). The March 4, 2005 letter stated that for a landfarm to accept salts, the operator was required to apply for a modification of the permit pursuant to §711(B)(1) and follow the notice requirements of §711(B)(2). (*Id.* at ¶9.g).

Following receipt of the March 4, 2004 letter, GMI submitted a permit modification application. By letter dated March 29, 2005, the Division requested additional information from GMI. On April 8, 2005, GMI submitted a revised Application for Waste Management Facility

and a hearing was set for May 19, 2005. The hearing date was subsequently changed to May 23, 2005.

On March 10, 2005, GMI applied for an emergency order allowing it to accept salt-contaminated oilfield waste pending a decision on its application for a permit modification. By Emergency Order R-12306, issued March 11, 2005, the Division granted GMI temporary authorization to accept salt contaminated oilfield waste pending a decision on the requested permit modification. The Emergency Order expired on March 26, 2005. A hearing was held on March 25, 2005 and, following the hearing, the Division issued Order No. 12306-A, extending the Emergency Order R-12306 to allow GMI to continue to operate under its current permit without being subject to the Division's March 4, 2005 letter until a determination is made by the Division on GMI's permit modification request.

B. Public Notice

Testimony will be offered demonstrating that public notice has been given as required by §711(B)(2). The Division gave notice of the May 19, 2005 hearing to GMI and other interested parties. Notice of the hearing was published in the Roswell Daily Record on April 15, 2005 and in the Lovington Daily Leader on April 14, 2005. GMI provided notice to the Chaves County Board of Commissioners, the New Mexico Commissioner of Public Lands and the United States Bureau of Land Management on April 25, 2005 and provided a correction of public notice to the same entities on May 6, 2005.

C. Financial Assurance

Testimony offered concerning financial assurance will show that, as required by Permit NM-01-0019, GMI has provided financial assurance in the form of a cash bond in the amount of $82,917.00 for closure of the existing landfarm. The current financial assurance is the estimated

cost of closure of the facility excluding the landfill within the current landfarm boundaries. GMI will present testimony on the estimated costs of the proposed closure of the landfill. The current bond and any required increases will be based on a third party estimate of closure costs.

D. GMI has submitted an acceptable permit modification application

Mr. Patrick Corser and Mr. William Mansker will testify that GMI's request for a permit modification, as presented in the Application for Waste Management Facility (the Application) and supplemented by this Pre-hearing Statement, submittals and exhibits, and the testimony to be presented at the hearing in this matter, meets the requirements of §711(B)(1) and is consistent with the OCD "Guidelines for Permit Application, Design, and Construction of Surface Waste Management (Revised 7-97)." Mr. Corser's and Mr. Mansker's testimony will be based on the applicable OCD regulations and guidance, a review of OCD files for other permitted surface waste management facilities and the information submitted by GMI in support of the permit modification request.

Mr. Robert W. (Bill) Marley and Mr. Larry Gandy will testify that, as required by §711(B)(1), GMI filed Form C-137. The Application provided the name and address of the applicant and the name and address of the surface owners of the real property on which the facility is sited. As stated in the Application, the land immediately adjacent to the facility is owned by Bill Marley. As indicated on Exhibit 1, attached hereto, the United States owns land in Section 35 and the State of New Mexico owns land in Section 31, both of which are within a mile of the facility. As stated above, both the United States and the State of New Mexico have been provided notice of these proceedings. A plat and topographic map showing the location of the facility is attached to the Application. GMI has met the requirements of §711(B)(1)(a), (b) and (c).

Mr. Marley and Mr. Gandy will offer testimony concerning the description and operation of the facility. The landfarm was originally permitted in January, 1995, and has been in operation for over ten years. Mr. Marley and Mr. Gandy are familiar with the operation and operating history of the landfarm. In addition to the maps attached to the Application, Exhibit 2, attached hereto, provides additional information about the facility, including the location of roads, fences, boundaries, berms, the proposed cells, and buildings. The current location of facility boundaries, buffer zone, exterior berms, cattlegaurds, office and shop will not change and are shown on the attached diagram. There are no pipelines crossing the facility. The only pipeline near the facility is a water line used for livestock that runs along the southern edge of the landfarm. The pipeline is 1 1/4" in diameter and is owned by Mr. Bill Marley and located on property owned by Mr. Marley. There are no chemical storage areas and no on-site storage/disposal facilities for wastes other than those that will be placed in the disposal cells. The stabilization and tank area, approved by OCD on June 14, 1996, is used for the stabilization and absorption of liquids and sludges and will not be changed.

Mr. Corser will offer technical testimony on the proposed construction and installation of the landfill disposal cells. The facility currently operates as a commercial landfarm. GMI is requesting permission to use the existing cells for landfill disposal operations. Portions of the facility may still be used as a landfarm and, in those areas, waste will continue to be landfarmed in compliance with the current permit requirements. No salt contaminated waste will be landfarmed. The requested permit modification would allow the disposal of oilfield waste including petroleum and chloride impacted debris, mud, soil, sludges, tankbottoms and filters associated with the drilling, operations and maintenance of oil and gas wells and related operations of the oil and gas industry.

The landfill cells will be constructed in the same location as existing, remediated landfarm cells. The first landfill cell will be located in Cell 15, shown on Exhibit 2. Additional cells will be used as needed. A diagram of the cell design, a soil report, and a permeability report for the proposed clay liner are attached to the Application. As stated in the Application, the cells will be constructed of a berm no more than 10 feet and no less than 5 feet in height and no less than 8 feet in width at the top with a caliche cap to prevent wind and rain erosion. A minimum one foot clay liner will be installed on the inside of each cell with a 3 to 1 slope on the sidewalls. The clay liner will be compacted to a dry density and moisture content that would achieve a permeability equal to or less than 1×10^{-7} cm/sec. at the time of installation. One foot of remediated soil from the landfarm cells or clean soil from excavation will be placed on top of the clay liner to protect the integrity of the clay liner. Finished grade will be no more than 20 feet below ground level. Debris that may blow will be placed below ground level and, by the end of each workday, will be covered with sufficient soil to prevent blowing.

Solids, semi-solids and sludges, after stabilization, will be disposed of in landfill cells. Solids will be stacked starting at the back of each cell to the finish grade of waste prior to covering. Semi-solids and sludges will be stabilized by mixing with remediated or excavated soils prior to placement in a cell and will be stacked to the same levels as solids. As a cell fills at one end, 2 feet of soil will be placed on top with a slight slope to prevent pooling of rainwater, but not steep enough to promote erosion and will be seeded.

GMI has completed two test wells that may be used for monitoring wells. Testimony will be offered as to the location and construction of the wells. The monitoring wells will be sampled and analyzed quarterly if sufficient water is available.

The testimony to be offered by Mr. Marley, Mr. Gandy and Mr. Corser will show that the Application, as supplemented by this Pre-hearing statement and testimony to be offered at the hearing, provides a description of the facility and technical data on the design elements of the proposed landfill cells, as required by §711(B)(1)(d).

Testimony will be offered demonstrating that, as required by §711(B)(1)(e), the current permit contains a plan for management of approved waste. Except for the changes identified above, general facility management practices will remain unchanged.

Testimony will be offered demonstrating that the Application contains a contingency plan for spill/leak prevention and reporting, as required by §711(B)(1)(f). The proposed contingency plan is the same as in the existing permit. No free liquids will be disposed of in the landfill cells. Storm water that ponds will be removed within 72 hours and stored in tanks or spread on unsaturated areas of the landfill cells. Berms will be of an adequate size and construction to prevent storm water from entering the landfill cells. Equipment and machinery that could be used in the event of storm water runoff will be at the facility at all times. OCD will be immediately notified of any leak or spill, in accordance with OCD Rule 116.

The inspection, maintenance and reporting requirements set forth in the Application are the same as those in the current permit and meet the requirements of §711(B)(1)(g).

The Application includes an H2S contingency plan, as required by §711(B)(1)(h). Testimony will be presented demonstrating that the proposed H2S contingency plan meets the requirements of OCD Rule 118.

Mr. Corser will offer testimony concerning the facility closure plan. The current permit includes a facility closure plan. The Application includes additional closure requirements for the

landfill cells. Each landfill cell will be closed as it is filled. The proposed closure plan meets the requirements of §711(B)(1)(i).

Mr. Mansker and Mr. Corser will offer testimony concerning the geological and hydrological conditions at the facility. The Application includes geological/hydrological information, as required by §711(B)(1)(j). In the March 25, 2005 Order, the Division found that the records of the Division confirmed GMI's description of the geological/hydrological conditions at the facility. (Order of the Division, Case No. 13454, Order NO. 12306-A, ¶9.k). The Division concluded that "[p]reliminary evidence indicates that the hydrological and geologic characteristics associated with the Gandy Marley...disposal site[] are sufficient to prevent water contamination and to protect human health and the environment." (*Id.* at ¶11).

Evidence to be presented at the hearing will include geological and hydrological studies, data and reports submitted to the New Mexico Environment Department as part of the RCRA permit hearing for the Triassic Park facility, which is located in close proximity to the GMI landfarm. The studies, data and reports were reviewed by NMED and the Hearing Officer as part of the Triassic Park hearing. A permit was issued by NMED for Triassic Park and GMI may present portions of the administrative record and the permit as evidence at the hearing in this matter.

The geological and hydrological testimony and evidence will show that the proposed landfill operations will be protective of groundwater and that the disposal of oilfield waste at the facility will not adversely impact fresh water, as required by §711(B)(1)(j).

As set forth above, the notice requirements of §711 have been met, as required by §711(B)(1)(k). Form C-137 includes the certification that the information is true, accurate and complete to the best of GMI's knowledge, as required by §711(B)(1)(l).

GMI will also show that the facility will be beneficial to the industry and will present testimony on the need for the proposed landfill facility.

III. WITNESSES TO TESTIFY AT THE HEARING

GMI will or may call the following witnesses to testify at the hearing in this matter:

1. William L. Mansker, Ph.D. (Curriculum Vitae attached)
2. Patrick Corser, P.E. (Curriculum Vitae will be provided)
3. Robert W. (Bill) Marley, GMI
4. Larry Gandy, GMI
5. Ed Martin, Oil Conservation Division

IV. APPROXIMATE TIME NEEDED TO PRESENT GANDY MARLEY INC.'S CASE

GMI will need approximately four (4) hours to present its case.

V. PROCEDURAL MATTERS TO BE RESOLVED PRIOR TO THE HEARING

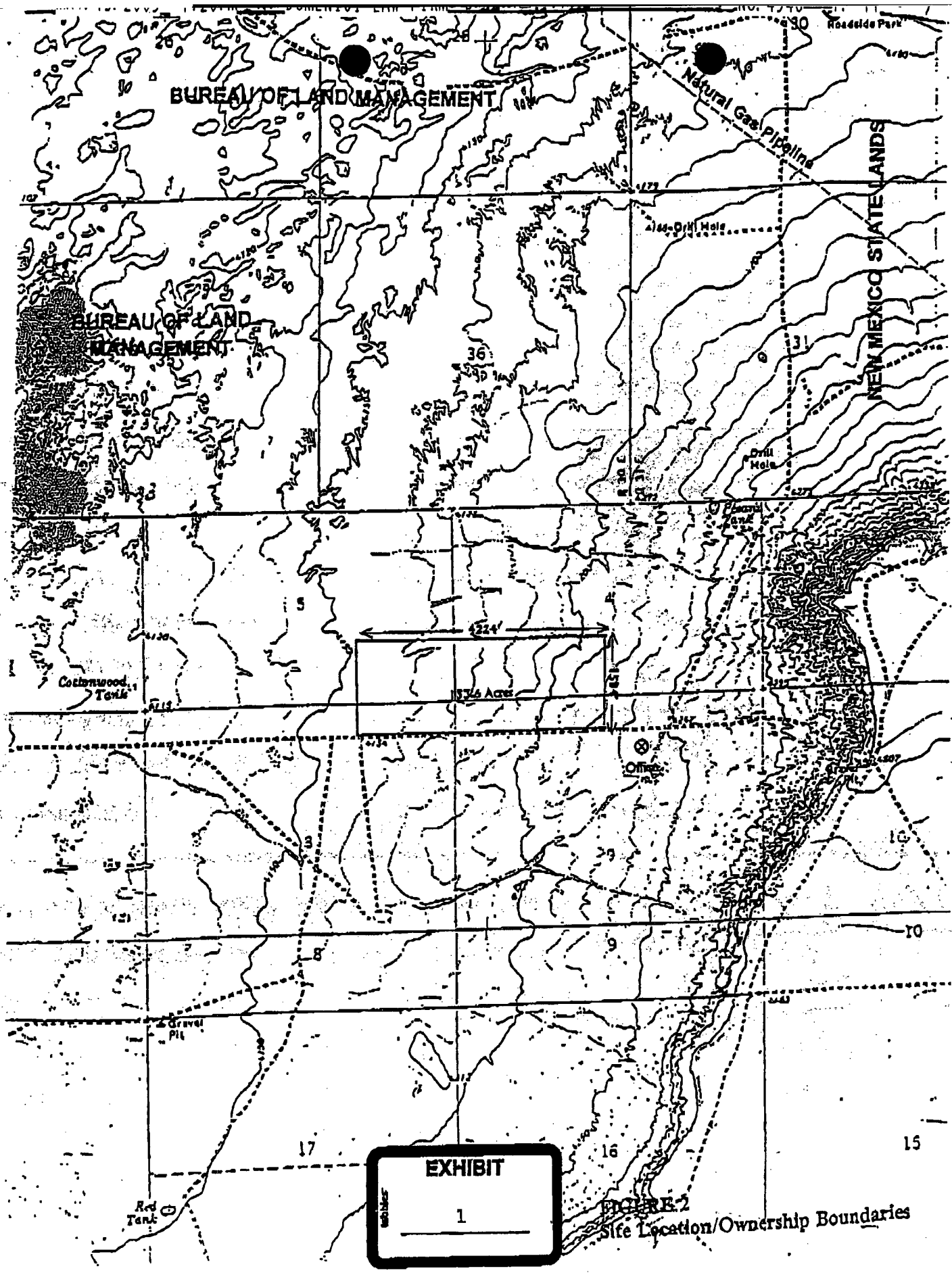
None at this time.

Respectfully Submitted,

Pete V. Domenici, Jr. Esq.
Attorney for Gandy Marley Inc.
6100 Seagull Street NE, Suite 205
Albuquerque, NM 87109
(505) 883-6250

I hereby certify that a true and correct copy of the foregoing was sent via facsimile and U.S. mail to parties of record 5/13/05

Pete V. Domenici, Jr., Esq.

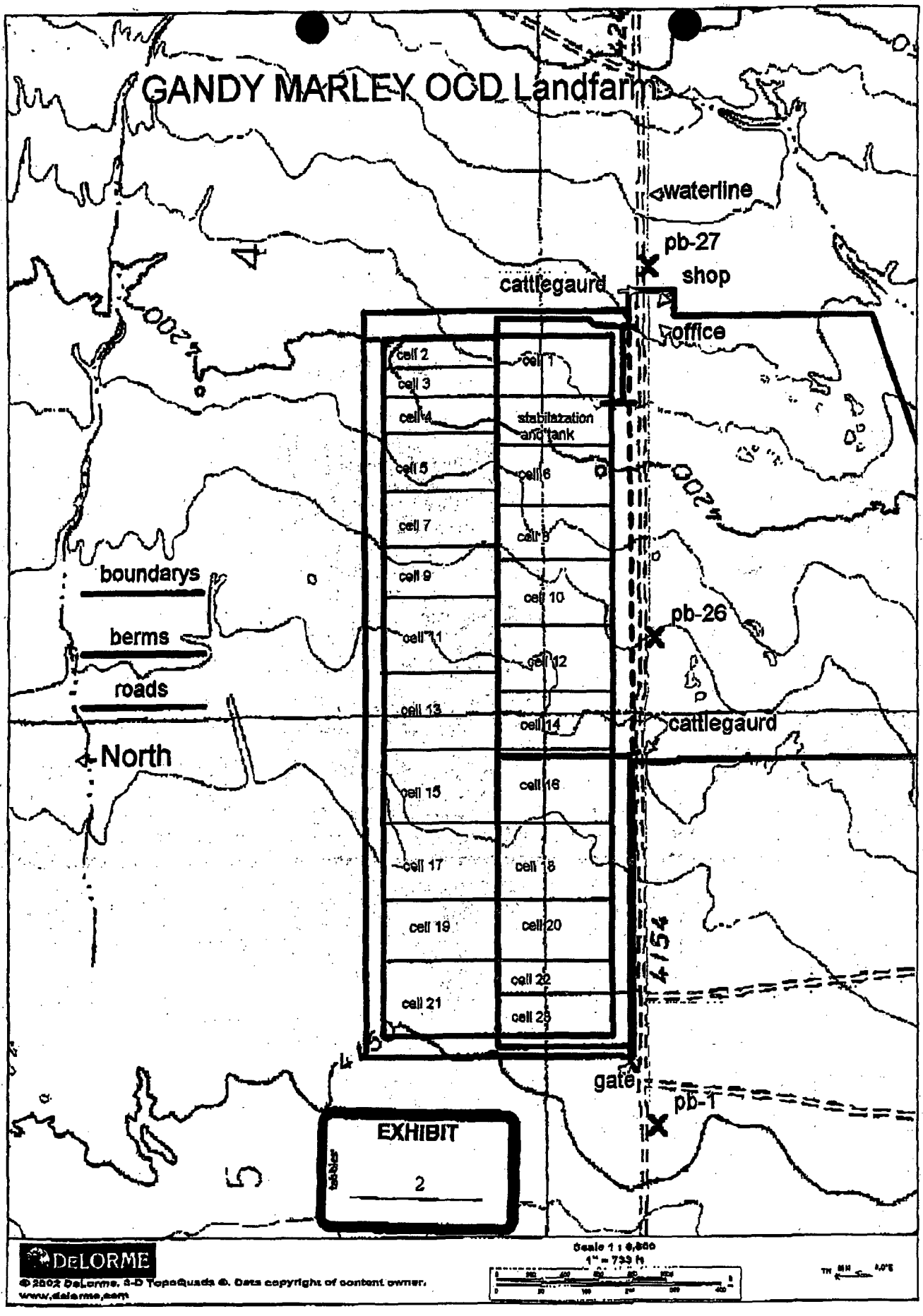


EXHIBIT

1

FIGURE 2

Site Location/Ownership Boundaries


GANDY MARLEY OCD Landfarm
waterline
pb-27
shop
cattlegaurd
office
cell 1
cell 2
cell 3
cell 4
cell 5
cell 6
cell 7
cell 8
cell 9
cell 10
cell 11
cell 12
cell 13
cell 14
cell 15
cell 16
cell 17
cell 18
cell 19
cell 20
cell 21
cell 22
cell 23
stabilazation and tank
boundarys
berms
roads
North
pb-26
cattlegaurd
gate
pb-1
EXHIBIT
2
DeLORME
Scale 1 : 9,600
1" = 733 ft
© 2002 DeLorme. 3-D TopoQuads ®. Data copyright of content owner.
www.delorme.com

CURRICULUM VITAE
William L. Mansker, Ph.D.

Summary

Bill Mansker was born on December 11, 1944 in Tulsa, Oklahoma; the second of 7 children. He was raised through high school in a rural setting and contributed to the livelihood of the Mansker family farm in south central Missouri. At Plato High School, he was active in basketball and baseball and focused his academic interests in the sciences. Upon graduating third in his senior class, he received a University of Missouri Curators' Scholarship to attend the University of Missouri (UMC-Columbia).

After graduating (B.S. Geology) in 1968, he entered the University of Missouri Master's program. He enlisted in the U.S. Army in January 1969. Upon completing his 2 year enlistment he was honorably discharged, having achieved a Specialist 5th Class rank (MOS: 12B30 Combat Demolition Specialist) in an overseas Engineering Unit. He then resumed the UMC Master's program. He earned an M.A. in Geology in 1973 upon completing a field/microprobe research thesis studying the petrology of a kimberlite occurrence in southeast Missouri.

In September 1973 he entered the Ph.D. Program of the Geology Department, University of New Mexico and was a Research Assistant in the Institute of Meteoritics. He accepted an Assistant Professor position at Clemson University (SC) in 1979 while completing preparation of his UNM dissertation. He completed his dissertation on the petrology of late-stage Hawaiian volcanics and received his Doctorate from UNM in December 1979. In 1980 he returned to Albuquerque and taught in a part-time capacity in the UNM Geology Department. In 1981 he was offered a project geologist position with a major mining company.

During the period 1981-84 he conducted exploration for kimberlites in the U.S. and pursued research on kimberlite mineralogy. In 1984 he established INEX (INnovative EXplorations) as an independent contract geologist in Albuquerque and he conducted various applied geology and exploration related research activities through 1989. He also focused on environmental geology and hydrology and worked with two environmental consulting firms through 1992. Since March 1993 he has worked as an independent geologist providing technical and management services for environmental projects and research support for diamond exploration efforts in the U.S. and Canada.

He maintains active participation in the academic and applied geologic community through public educational interactions, research endeavors, scientific publications, and continued professional development.

Career Development

University of Missouri; Columbia, Mo. 1963-1973

Undergraduate B.S. degree (Geology) conferred in August 1968.
Graduate M.A. degree (Geology) conferred in May 1973 upon completion of graduate studies and a field mapping and microprobe research Master's thesis entitled "Petrology of a Southeast Missouri Ultramafic Pipe". Thesis advisor: Dr. Glen R. Himmelberg.

Lab instructor for graduate ore deposits petrology course. As a Graduate Teaching Assistant, received the UMC Outstanding Teaching Award.

University of New Mexico; Albuquerque, NM. 1973-1979

Graduate Ph. D. degree (Geology) conferred 1979

Presented UMC master's thesis work at the 1973 GSA National Meeting (Dallas,TX). Research Assistant with Institute of Meteoritics (IOM, Dr. Klaus Keil). Conducted research on kimberlites with Dr. Douglas Brookins; meteorites, returned lunar samples, and Hawaiian volcanics with Dr. Klaus Keil, IOM staff, and University of Hawaii staff. Presented kimberlite research with at 1976 AGU meeting (Ann Arbor, MI); melilite nephelinite (Hawaiian volcanics) pre-dissertation research at 1976 RM Regional GSA meeting (Albuquerque, NM). As president of Beta Chapter, SGE assisted in establishing the Jemez Mountains Volcanic Rock Suite and the Rodney C. Rhodes Memorial Scholarship Fund. Co-authored IOM Special Publications and published in American Mineralogist, Proceedings 9th Lunar Science Conference. Performed departmental and IOM technical photography. Dissertation advisor Dr. Klaus Keil

Clemson University; Clemson, SC. 1979-1980

Assistant Professor, Geology, Mineralogy, and Geochemistry

Taught introductory geology, oceanography, petrology, mineralogy, geochemistry, and supervised student research. Completed UNM doctoral dissertation entitled Petrogenesis of Pukele Valley Olivine Melilite Nephelinites" (Dissertation advisor: Dr. Klaus Keil). Conducted funded research on regional ultramafics as the source of diamond occurrences in the southeastern United States.

University of New Mexico; Albuquerque, NM 1980-1981

Departmental Instructor, Geology and Oceanography.

Conducted petrologic and microprobe research (with Drs. Klaus Keil and Allen Lapin (SNL) of the Belted Range Tuff (Yucca Mountain, Nevada) as a potential high level radioactive waste repository. Conducted kimberlite and radon/radionuclide research with Dr. Douglas Brookins.

Cominco American Resources International, Spokane, WA 1981-1984
Project Geologist

Proposed and implemented exploration budgets in the range $50,000 - $250,000 and managed successful exploration programs for kimberlites and diamonds, precious metals, and base metals throughout the U.S. Applied various exploration techniques to include airborne and ground-based geophysics, LANDSAT, NHAP, low altitude IR photography, and alluvial heavy mineral indicator and geochemical sampling. Developed innovative exploration and geochemical sampling equipment. Discovered the first two diamonds to be found in Kansas kimberlites. Conducted public and professional presentations on kimberlites and mantle petrology. Published (with UNM/SNL co-authors) a report on the Yucca Mountain, NV research conducted at UNM. Conducted part-time (Cominco-funded) microprobe research at UNM on kimberlite mineral chemistry.

INEX (Innovative Explorations), Albuquerque, NM (1984-1989)

Geologic and Environmental Consultant

Managed projects involving radionuclide subsurface migration and modeling in oil field and hydrothermal environments. Conducted contract kimberlite/diamond exploration and research. Provided precious metals (epithermal gold), rare earths, and industrial minerals (garnets/zeolites) exploration support services. Collaborated with UNM (Dr. Douglas Brookins) in research regarding geologic sources for radon and related radionuclide migration modeling. Published abstracts and several refereed papers concerning kimberlite occurrences, kimberlitic garnet mineral chemistry, geologic causes of radionuclide anomalies, and potential environmental risk in abandoned mining areas. Developed an innovative optical mineralogic technique to qualitatively determine garnet primary sources in the field. Collaborated with Los Alamos National Laboratory in a field and microprobe study of diamond potential in Navajo kimberlites. Accumulated over 7,500 pounds of U.S. kimberlite samples and kimberlite/lamproite mineral concentrates and donated as research collections to the Smithsonian Institution and American Museum of Natural History.

Performed Preliminary Assessments/Site Inspections (PA/SI) and Hazard Ranking System (HRS) scoring (CERCLA). Designed and implemented site Worker Health and Safety Plans (WHSP), Site Characterization Sampling Plans, and Quality Assurance Project Plans. Performed property audits, resource evaluations, and environmental assessments for property lease submittals. Assisted the State of New Mexico (NMED) and US EPA in a state-wide residential radon survey. Developed innovative equipment designs for contaminated groundwater and soil reclamation.

Geoscience Consultants, Ltd., Albuquerque, NM. 1989-1991

Senior Program Manager

Designed and managed Remedial Investigation (RI) tasks, involving soil-vapor geochemical surveys, soil borings and monitor well installations related to environmental projects. Prepared Quality Assurance Project Plans (QAPjPs) and performed quality assurance/data validation (QA/QC) reporting. Managed a proprietary PCB litigation investigation for Sandia National laboratories. Defined project scopes and developed work plans and cost estimates for projects involving:

NPDES storm water permits, spill prevention contingency plans, groundwater discharge plans, mining permits, environmental assessments and environmental impact statements (NEPA), waste minimization, solid waste disposal siting, environmental site audits and assessments, hazard ranking system (HRS), mercury meter contamination, and above-ground and underground storage tanks (USTs). Contributed to corporate strategic planning, business development proposal generation for private and governmental sectors. Published (in NMGS, with co-authors) a paper concerning environmental risk in mining areas.

Western Technologies Inc., Albuquerque, NM 1991-1993

Director of Environmental Services

Responsible for the operational performance, technical direction, and profitability of the environmental and geotechnical departments for the Albuquerque division. Served as project director and principal-in-charge for major UST and hazardous waste characterization and remediation projects. Performed QA/QC functions for client deliverables and interfaced with clients and regulatory agencies. Managed immediate response and abatement projects involving surface hydrocarbon spills. Prepared closure and post-closure monitoring plans for solid waste (non-hazardous landfill) facilities. Developed investigation and reclamation plans for numerous UST sites in accordance with NMED-USTB, NM Groundwater Protection Act (GWPA), and US EPA RCRA regulations. Provided technical input to NMED and NM Oil Conservation Division (NMOCD) for development of contractor proficiency/evaluation criteria (NMED) and O&G production pit investigations, reclamation, and closure guidelines (NMOCD). Conducted Federal NEPA Environmental Assessments and UST Site Investigations and developed and implemented Corrective Action plans for projects on the Navajo Nation. Prepared site Health and Safety Plans (HASPs) for hazardous waste and mixed-waste projects. Developed innovative drilling, sampling, and field analytical techniques for rapid evaluation of soils and groundwater contamination.

Consultant, Albuquerque, NM 1993 Current

Proprietor, INnovative Explorations

Provides contract geologic, hydrogeologic, and hydrogeochemical management and expert services for hazardous waste, solid waste, underground storage tank and radon mitigation projects in New Mexico; and provides program design and technical project support for various kimberlite/diamond projects in the U.S. and Canada. Presents workshops in kimberlite geology and diamond exploration methodologies. Is currently conducting research for publication concerning the Archean and Proterozic evolution of North America based on subcrustal mantle petrology and kimberlite mineral chemistry, and is preparing (for publication) a layman's

kimberlite/diamond prospecting guide.

Current and Past Professional Affiliations

Sigma Gamma Epsilon (National Earth Science Honorary) (Past President)
Mineralogical Society of America
American Association of Radon Scientists and Technologists
Albuquerque Geological Society (Past Treasurer, Secretary, Vice President, President)
Northwest Mining Association
Prospectors and Developers Association (Canada)
New Mexico Hazardous Waste Management Society
New Mexico Microbeam Users Group

Publications

MANSKER, W.L., 1973, Petrology of a southeast Missouri kimberlite (Abstract) Proc. Geol. Soc. Amer. Annual Meeting, Dallas, Texas

MANSKER, W.L., K. Keil J. Husler and G. Bauer, 1976, Petrologic investigation of the Pukele Valley olivine-melilite nephelinite (Abstract), Proc. Geol. Soc. Amer. Regional Meeting (Rocky Mountain), Albuquerque, New Mexico

MANSKER, W.L., D. Brookins, G. Landis and J. Husler, 1976, Post -Devonian diatremes in southeast Missouri; Investigation of the Avon kimberlite and some emplacement parameters (Abstract EOS, Vol. 57, No. 10, p. 761.

Warner, R.D. R. Warren, W. MANSKER, J. Berkley and K. Keil, 1976, Electron microprobe analyses of olivine, pyroxene and plagioclase from Apollo 17 rake sample mare basalts, Spec., Publ. No. 15, UNM Institute of Meteoritics, 158 p.

Warner, R.D., J. Berkley, W. MANSKER, R. Warren and K. Keil, 1976, Electron microprobe analyses of spinel, Fe-Ti oxides and metal from Apollo 17 rake sample mare basalts, Spec. Publ. No. 16, UNM Institute of Meteoritics, 114 p.

Warner, R.D., J. Taylor W. MANSKER and K. Keil, 1978, Clast assemblages of possible deep-seated (77517) and immiscible-melt (77539) origins in Apollo 17 breccias, Proc. 9th Lunar Sci Conf.

MANSKER, W.L. R. Ewing and K. Keil, 1979, Barium-titanium biotites in nephelinites from Oahu, Hawaii, Amer. Mineral, Vol. 64, Nos. 1 and 2, p. 156-159

MANSKER, W.L., K. Keil and G. Bauer, 1979, Xenolith disaggregation and nephelinite petrochemistry in the Honolulu Volcanic Series, Oahu, Hawaii (Abstract), Hawaiian Symposium on Intraplate Volcanism and Submarine Volcanism, Hilo, Hawaii.

Connolly, J.R., W. MANSKER, R. Hicks, C. Allen, J. Husler, K. Keil and A. Lapin, 1983, Petrology and geochemistry of the Grouse Canyon Member of the Belted Range Tuff, Rock-mechanics drift, U12g Tunnel, Nevada Test Site, Sandia National Laboratories, Sandia Report SAND81-1970-UC70, p.72

Berendsen, P., R. Cullers and W. MANSKER, 1985, Late-Cretaceous kimberlite and lamproite intrusions of Kansas (Abstract), Proc. Geol, Soc. Amer. Regional Meeting (south-central), Fayetteville, Arkansas

MANSKER W.L., B. Richards, and G. Cole, 1985, A note on newly -discovered kimberlites in Kansas (Abstract), Symposium on Alkalic and Related Rocks, Proc. Geol. Soc. Amer. Regional Meeting(south-central), Fayetteville, Arkansas and Geol. Soc. Amer. Sec. Paper No. 215

Springfield, J.T., W. MANSKER and K. Keil, 1985, Factors affecting garnet metamerism -applications in kimberlite evaluation/exploration (Abstract) Proc. Geol. Soc. Amer. Regional Meeting (south-central), Fayetteville, Arkansas

Brookins, D.G. and W. MANSKER, 1985, Upper mantle and crustal rocks in north-central Kansas; Evidence from kimberlites (Abstract), 6th International Conference on Basement Tectonics, Vol. 6, International Basement Tectonics Association, Santa Fe, New Mexico

MANSKER, W.L., J. Springfield and K. Keil, 1986, Kimberlitic garnets; Metamerism related to composition in Microbeam Analysis - 1986, Proceedings of the 21st Annual Conference of the Microbeam Analysis Society, A.D. Romig and W.F. Chambers, eds., San Francisco Press, Inc., p. 670-673

MANSKER, W.L., 1986 Garnet suites in U.S. kimberlites and lamproites in Microbeam Analysis -- 1986, Proceedings of the 21st Annual Conference of the Microbeam Analysis Society, A.D. Romig and W.F. Chambers, eds., San Francisco Press, Inc. p. 669

MANSKER W.L., B. Richards, and G. Cole, 1987, A note on newly -discovered kimberlites in Kansas, Geol. Soc. Amer. Sec. Spec. Paper No. 215, p. 197-204.

MANSKER, W.L., 1987, Radionuclide anomalies in geologic exploration (Abstract, Poster Session and panel participant), Geologic Causes of Radionuclide Anomalies (GEORAD) Conference, Mo. Dept. of NaturalResources and U.S. Geological Survey, St. Louis, Mo.

MANSKER, W.L. and D.G. Brookins, 1989, Geologic factors

affecting radionuclide disequilibrium in alpha-gamma measurements (Abstract), Second Annual Hazardous Waste Management Conference and Exhibition, Albuquerque, New Mexico

MANSKER, W.L., 1989, Applied radon geochemistry in oil and gas exploration (Abstract and Poster Session), AAPG-SEPM-EMD Rocky Mountain Section Meeting, Albuquerque, New Mexico

Rogers, M.A., W.L. MANSKER, and D.W. Peters, 1991, Potential environmental threats in old mining areas - the High Rolls (Sacramento) Mining District, 1991 New Mexico Geological Society Guidebook

MANSKER, W. L., D. Cortese, and B. Hovda, 1995, Ex-situ air sparging and bioenhanced remediation of gasoline-contaminated ground water, (Abstract), New Mexico Environment Department Bioremediation Conference, June 22-23, 1995, Santa Fe, New Mexico

Patents

Mansker, W. L., November 12, 1985, Sample Concentrating Cable Jig, 7 Claims, 6 Drawing Figures, United States Patent No. 4,553,654.

Mansker, W. L., September 21, 1989, Sample Concentrating Cable Jig, Canadian Patent No. 1,250,253.

Certifications

OSHA 40-hr Hazardous Waste Training (current annual refresher)
OSHA 8-hr Supervisor's Training
OSHA 8-hr Excavation Supervisor's Training
New Mexico Certified Scientist No. 067

Court Testimony (Expert Witness)

1990 (Expert witness for Sandia National Laboratories)
Pagano Salvage vs Sandia National Laboratories (Client)
Court No. VA 87-287
13th Judicial Court
Valencia Co., NM
Re: Defendant expert witness; PCB contaminated soils, aerial photo interpretation of historic site activities

1995 (Expert witness for Aragon et. Al))
Aragon, et al. (Client) vs Department of the Air Force, ex rel.
United States of America
Court No. CIV 94-592 SC/WWD
United States District Court
District of New Mexico
Re: Trichlorethylene (TCE) contaminated soils/ground water; PRP identification; plaintiff expert witness

1995 Expert witness for Biron Bay Resources)
Wm. R. Davis and Thomas N. Fox etux v. Biron Bay Resources, Ltd
(Client)
Court No. CIV 95 0105 B1
United States District Court
District of New Mexico
Re: Regulation of Solid Waste; Solid Waste operations; Site worker health and safety; Defendant expert witness

1995-96 (Expert witness for Challenge Mining Co.)
Challenge Mining Co. (Client) v. US Forest Service. ex rel. United States of America
Court No. CIV 95-0019 BB/LCS
United States District Court
District of New Mexico
Re: USFS trespass and rights; operating plan validity; plaintiff expert witness; environmental compliance

1997-98 (Expert witness for Vantol)
New Mexico Environment Department v. N. Vantol D/B/A Vantol Dairy (Client)
Court No. SF 96-243(C)
First Judicial District Court
State of New Mexico
County of Santa Fe
Re: Environmental compliance; expert witness for defendant; groundwater discharge plan; analytical data validity

1997-98 (Expert witness for Holt)
Holt (Client) v. Amoco Oil Company (Negotiated settlement)
North Cowden Field, Goldsmith, Texas
Re: Oilfield produced fluids contamination; plaintiff expert witness; soil and groundwater contamination; interpretation of aerial photos, reclamation cost estimates

1997-98 (Expert witness for Henderson)
Henderson (Client) v. Shell Oil Company (Negotiated settlement)
TXL Field, Notrees, Texas
Re: Oilfield produced fluids contamination; plaintiff expert witness; define magnitude and extents of subsurface contamination; hydrogeology; interpretation of aerial photos, reclamation cost estimates.

Professional References

Dr. Lee A. Woodward
Dr. Rodney C. Ewing
Mr. John Husler
Department of Earth and Planetary Sciences
University of New Mexico
Albuquerque, New Mexico 87131
(505) 277-4204

Mr. Pete Domenici, Jr. Attorney at Law
Domenici Law Firm, P.C.
5801 Osuna N.E., Suite 205
Albuquerque, New Mexico 87109
(505) 883-6250

Dr. Richard S. Della Valle
Division Chairman
Science, Mathematics & Engineering
Napa Valley College
2277 Napa-Vallejo Highway
Napa, California 94558
(707) 253-3161

Mr. Stan R. Hafenfeld, President
NEVEX Services, Inc.
1813 Shirlane N.E.
Albuquerque, New Mexico 87112
(505) 292-3234

Mr. Dirk Van Hart
GRAM, Inc.
3033 Palo Alto Dr. N.E.
Albuquerque, New Mexico 87112
(505) 293-2073

Mr. Taylor Sharpe (6EN-WG)
Regional Stormwater Enforcement
US EPA, Region 6
1445 Ross Avenue
Dallas, Texas 75202
(214) 665-7112

For Further Information or Additional References, Please Contact:

William L. Mansker, Ph.D.
8704 Gutierrez N.E.
Albuquerque, New Mexico 87111
Ph/Msg: (505) 239-9951 Cell Fax: (505) 292-0805

E-mail: wlminex@nmia.com
Webpage URL: http://www.flash.net/~wlminex/
Webpage Title: Inex#.two

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONVERSATION DIVISION

APPLICATION OF GANDY MARLEY, INC.
TO MODIFY THEIR EXISTING NMOCD
RULE 711 PERMIT NO. NM-01-019 **CASE NO. 13480**

NOTICE OF FILING

COMES NOW the Applicant, Gandy Marley Inc. (GMI), by and through undersigned counsel of record, and respectfully provides Notice of Filing the attached documents as a comment to the record.

Respectfully Submitted,

Pete V. Domenici, Jr. Esq.
Attorney for Gandy Marley Inc.
6100 Seagull Street NE, Suite 205
Albuquerque, NM 87109
(505) 883-6250

I hereby certify that a true and correct copy of the foregoing was sent via facsimile and U.S. mail to parties and Hearing Clerk of record on the 18 day of May, 2005.

Pete V. Domenici, Jr., Esq.

INEX Drilling Log

Project: GMI
Date: 5/12/05
Logger: W.L. MANSKER
Location: Cap Rock, NM
Rig: IR TH-60 AR
DH#: MW-2

MW-2 GPS Location
33.38462 N LAT.
103.83858 W LONG.

Depth ft bgs		Description	Well Construction
			~3.5' high; 6" monument completion
0-5'		Red-brn, Alluvial/colluvial silty sand 0-3'. Caliche is same 3-5'	
5-10'		-do- caliche 5-8', Red silty sand 5-10'	
10-15'		-do- red, silty sand	
15-20'		red-brn, dry silty clay	
20-25'		-do- 20-23', red, silty, Micaceous clay e 23-25'	
25-30'		-do- loose, dry silty clay	
30-35'		red-brn, clay (no silt), tight, hard	
35-40'		Lt-tan - gray & brn variegated clay, tight, firm (no silt).	
40-45'		-do- 40-43', tight, firm red clay 43-44' red-brn, tight clay (dry, no silt)	
45-50'		red-brn, tight clay 45-47', Gray-brn clayey silt 47-50'	
50-55'		-do- gray-brn clayey silt.	
55-60'		gray-brn, firm, silty clay	
60-65'		Lt-gray, hard clay 60-63', Lt-brn silty clay 63-64', Gray, silty sandy clay 64-65'	
65-70'		Gray, tight, hard clay	
70-75'		-do- gray hard clay 70-73', change to red-brn tight clay 73-75'	
75-80'		Dk-red-brn, v. tight, damp clay SSS taken 77-79'	
80-85'		-do- dk-red-brn tight clay, damp	
85-90'		-do- dk-red-brn, v. tight, damp clay	
			Bentonite 2'
90-95'		-do- clay 91-93', dk-brn, damp silty clay 93-95'	92'

4" dia. PVC BLANK 92'-Surface (+3' AGS)

3-10% Bentonite grout 90'-Surface

INEX Drilling Log

Project: GMI
Location: Caprock, NM
Date: 5/12/05
Rig: IR TH-60 AR
Logger: W.L. Marsker
DH#: MW-2

Depth ft bgs		Description	Well Construction
95-100'		damp-moist dk-brn silty clay	
100-105'		-do- damp-moist (25ilt) clay	
105-110'		-do- damp, tight (25ilty) clay	
110-115'		damp-moist silty clay + clayey silt	
115-120'		damp, (25moist) clayey silt + silty clay	
120-125'		red-brn, dry, shaley clay (Elaminated)	
125-130'		-do- shaley clay. Silty clay 129-130'	
130-135'		red clay 133-134'. red-brn clay, hard, tight 134-135'	
135-140'		hard, dry, brn clay 135-139', changes to strong gray hard clay 139-140'. v. hard drilling	
140-145'		red-brn, dry clay 140-142'. SH. silty, damp clay 142-145'	
145-150'		brn, damp, clayey silt	
150-155'		-do- clayey silt	
155-160'		-do- clayey silt 155-157' hard, damp, clayey, sandy silt 157-160'	
160-165'		-do- clayey, sandy silt 160-161' gray, clayey silt, damp-moist 161-165'	
165-170'		-do- clayey silt, with 4-6" clay stringers	
170-175'		-do- clayey silt w/ clay stringers	
175-180'		-do- clayey silt 175-178'. changes to red-brn clay 178-180'	
180-185'		-do- red-brn clay, tight, firm	
185-190'		-do- red-brn clay to TD @ 188'	TD ~ 188' bgs

Screened 182-92'
8-16 CSSI Filter sand 182-90'
WB 182'

INEX Drilling Log

Project: GMI Location: Caprock, NM
Date: 5/16/05 Rig: IR TH-60 AR MW-1 GPS Location 33.38649 N. Lat. 104.23622 W. Long.
Logger: W.L. Masker DH#: MW-1

Depth ft bgs		Description	Well Construction
			6" Sch 40 PVC Casing
0-5'		slt. silty red-brn clay w/caliche	
5-10'		brn silty clay w/caliche	
10-15'		V. slt. silty, brn clay (no caliche)	
15-20'		-do- brn clay	
20-25'		-do- brn clay, w/silty clay stringers	
25-30'		-do- brn clay, v. slt silty	
30-35'		brn, clayey silt 30-32'. brn clay (no silt) 32-35'	
35-40'		brn, silty clay (± indurated - hard)	
40-45'		red-brn clayey silt	
45-50'		-do- clayey silt	
50-55'		-do- clayey silt	
55-60'		Lt. brn sandy silt (± indurated - hard)	
60-65'		-do- 60-61', red-brn clay 61-63'	
65-70'		-do- red-brn clay w/ gray clay stringers	
70-75'		-do- red clay to 70-73' (no silt), firm, tight	
75-80'		-do- dk red clay (no silt) firm, tight, damp.	
80-85'		silty, red-brn clay w/clayey silt stringers	
85-90'		gray, clay & silty clay	
90-95'		-do- to 93', gray-brn damp, tight clay	

8-10% Bentonite Grout 136' to Surface

INEX Drilling Log

Project: GMI
Location: Caprock, NM
Date: 5/11/05
Rig: IR TH-60 AR
Logger: W.L. Mansker
DH#: MW-1

Depth ft bgs		Description	Well Construction
95-100'		-do- 95-97', red-brn clay, damp 97-100'	
100-105'		-do- red-brn clay	8-10% Bentonite Grout 136'–surface
105-110'		dk red-brn clay 105-108'. Lt. brn silty clay 108-110'	
110-115'		-do- Lt. brn silty clay 110-114'. Gray, hard (indurated) clay 114-115'	
115-120'		-do- 115-120', hard gray clay (± salty taste),	
120-125'		brn, silty clay 120-124', Gray hard clay 124-125'	
125-130'		-do- gray clay (no silt).	
130-135'		-do- 130-131', Gray, silty clay 131-135'	
135-140'		red-brn, silty clay 135-138'. dk red-brn hard clay 130-140'	Bentonite 2'
140-145'		-do- dk red-brn clay 140-145'	Screened 180-140; 8-16 CSSI Filter Sand 200'-138'
145-150'		-do- 145-146'; brn, micaceous clay (± silty) 146-150'	
150-155'		damp → moist, laminated micaceous clay (± silty) 24" SSS 153-155'	
155-160'		damp – moist brn clay (clay ball cuttings) 155-160'	
160-165'		-do- 160-162', Gray clay (no silt) 162-165'	
165-170'		-do- gray clay	
170-175'		-do- damp, gray clay 170-172'. Gray, clayey sandy SILT 172-175'	
175-180'		-do- damp → moist gray sandy, clayey SILT	
180-185'		-do- 180-181', Dry, clayey SILT, brn. 181-185'	Blank casing 200-180
185-190'		-do- Dry, clayey, brn SILT	

INEX Drilling Log

Project: GMI
Location: Caprock, NM
Date: 5/11/05
Rig: IR TH-60 AR
Logger: W.L. Monsher
DH#: MW-1

Depth ft bgs		Description	Well Construction
190-195'		dry-damp, silty clay	
195-200'		-do- indurated ($CaCO_3$?), dry damp. silty clay. TD = 200' bgs	TD @ 200' bgs; Blank Casing 160-200' bgs

United States
Environmental Protection
Agency

Office of Solid Waste and
Emergency Response
(5102G)

EPA 542-F-01-024
December 2001
www.epa.gov/superfund/sites
www.cluin.org

EPA

A Citizen's Guide to Solidification/Stabilization

The Citizen's Guide Series

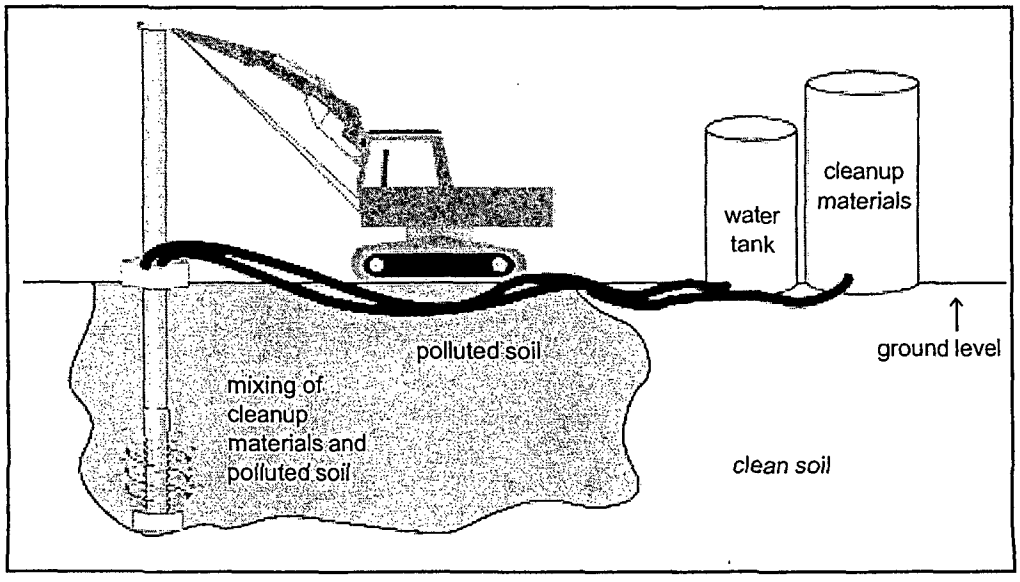
EPA uses many methods to clean up pollution at Superfund sites. If you live, work, or go to school near a Superfund site, you may want to learn more about these methods. Perhaps they are being used or are proposed for use at your site. How do they work? Are they safe? This Citizen's Guide is one in a series to help answer your questions.

What is solidification/stabilization?

Solidification/stabilization refers to a group of cleanup methods that prevent or slow the release of harmful chemicals from polluted soil or sludge. These methods usually do not destroy the chemicals—they protect human health and the environment by preventing the chemicals from moving into the environment. Solidification refers to a process that binds the polluted soil or sludge and cements it into a solid form. Stabilization refers to changing the chemicals so they become less harmful or less mobile. These two methods are often used together to prevent exposure to harmful chemicals.

How do they work?

Solidification involves mixing polluted soil or sludge with a substance, like cement, that causes the soil to harden. The mixture forms a solid that can be left in place or removed to another location. The solidification process prevents chemicals from spreading into the surrounding environment. Rain or other water cannot pick up or dissolve the chemicals as it



moves through the treated soil or sludge. Solidification does not get rid of the harmful chemicals, it simply traps them in place.

Stabilization changes harmful chemicals into substances that are less harmful or less mobile. For example, soil polluted with metals can be mixed with lime or cement. These cleanup materials react with metals to form less soluble metal compounds. These metal compounds do not move through or out of the soil as easily.

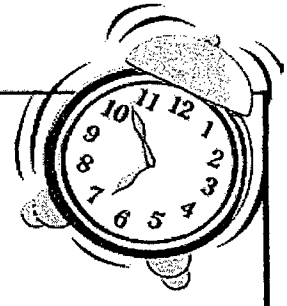
Solidification/stabilization methods may or may not require the soil to be removed. Sometimes the polluted soil or sludge is dug up and placed in large mixers above ground. The mixer blends the soil or sludge with cleanup materials, such as cement and lime. The treated soil or sludge may then be returned to the ground at the site or placed in a landfill.

At other sites, instead of digging up the soil or sludge, cleanup materials can be mixed directly into the soil or sludge while it remains in place. The mixing is done using large augers or rototillers. Treated soil or sludge left at the site is then covered with clean soil or pavement. After solidification/stabilization is complete, EPA tests the surrounding soil to make sure no pollution was missed.

Is solidification/stabilization safe?

In order ensure the safety of the cleanup, EPA tests the final mixture to confirm proper sealing of the harmful chemicals and for strength and durability of the solidified or stabilized materials. Sometimes EPA will restrict the use of areas that have been solidified or stabilized. These land use restrictions can prevent future damage to the treated area.

How long will it take?



Solidification/stabilization may take weeks or months to complete, depending on several factors that vary from site to site:

- types and amounts of chemicals present
- size and depth of the polluted area
- types of soil and geologic conditions
- whether the mixing occurs in place or in mixing tanks

Why use solidification/stabilization?

Solidification/stabilization provides a relatively quick and low cost way to protect human health and the environment from the threat posed by harmful chemicals, especially metals. Solidification/stabilization has been chosen as part of the remedy at over 180 Superfund sites across the country.

For more information

write the Technology Innovation Office at:

U.S. EPA (5102G)
1200 Pennsylvania Ave., NW
Washington, DC 20460

or call them at
(703) 603-9910.

Further information also can be obtained at **www.cluin.org** or **www.epa.gov/superfund/sites.**

Land Disposal Permitting Requirements

Permit Requirements	OCD 711	Guidelines OCD (7/97)[3]	Water Quality GWCC 20.6.2	Solid Waste 20 NMAC 9.1	GMI (04/08/05)	GMI Supp
1.0 Administrative						
711 B.(1) Form C-137.	B.(1)	1-5, 6	3106/3108		✓	✓
(a) Names, etc	B.(1).(a)	2	3106/3108	201.B.10.a	✓	✓
(b) Plat and Topo showing highways, roads, access roads, watercourses, water sources and dwellings within one mile.	B.(1)(b)	3	3106/3108	202.A.5	Topo, No Plat	Topo, No Plat
(c) Names and Addresses of surface owners within one mile.	B.(1)(c)	5	3106/3108	201.C	✓	✓
711(B)2 & (1)(K), Proof of Notice	B.1.(K), B(2)	12	3106/3108	201.C		
Guidelines at 12. WQCC 20.6.2.3108			3108			
2.0 Siting	B.(1)m		3106(C)		NTA	NTA
2.1 Floodplain	(1)	11.A.1.a	3106(C)	302.A.1	NTA	NTA
2.2 Wetlands	(1)	11.A.1.a	3106(C)	302.A.1	NTA	NTA
2.3 Watercourses	(1)	11.A.1.a	3106(C)	302.A.1	NTA	NTA
2.4 Depth to Groundwater (stratigraphy)	B(1)(j)[1]	11.A.1.a	3106(C)	302.A.2	NTA	NTA
2.5 Subsurface Mines	(1)			302.A.3	✓	✓
2.6 Holocene Faults	(1)		3106(C)	302.A.4		
2.7 Historically or Archeologically Significant Sites	(1)			302.A.5		
2.8 Well Setbacks	(1)		3106(C)	302.A.6&7	✓	✓
2.9 Land Use Setbacks	(1)			302.A.9	✓	✓
2.10 Active Alluvial Fans	(1)		3106(C)	302.A.10		
2.11 Threatened and Endangered Species	(1)			302.A.11		
2.12 Seismic impact zones	(1)		3106(C)	302.A.12		
3.0 Hydrogeology	(B)(1)(j)		20.6.2.3106(C)		NTA	NTA
3.1 Depth to Water	(B)(1)(j)	11.A.1	20.6.2.3106(C)	302.A.1	NTA	✓
3.2 Water Quality	(B)(1)(j)	11.A.1	20.6.2.3106(C)	801.A	NTA	✓
3.3 Production Rate / Flow		11.A.1	20.6.2.3106(C)	302.A.6&7		
3.4 Soils Characterization	(B)(1)(j)	11.A.1	20.6.2.3106(C)	202.7	NTA	NTA
3.5 Unstable Conditions		11.A.2	20.6.2.3106(C)	302.A.8		
4.0 Description of Facility and Engineering Design	B(1)(d)	7.A.(2)	3106(C)(5)		NTA	NTA
4.1 Engineering Drawings / Diagrams	B(1)(d)	7.A.(2)	3106(C)(5)	201.B.3	NTA	NTA
4.2 Liners	B(1)(d)	7.A.(2)	3106(C)(5)	306.A-B	NTA	NTA
4.3 Leachate Collection	B(1)(d)		3106(C)(5)	308.A-C	NTA	NTA
4.4 Stormwater Controls	B(1)(d)	11.3	3106(C)(5)	402.E	NTA	NTA
4.5 Gas Management	B(1)(d)			309.A	NTA	NTA
4.6 Geotechnical	B(1)(d)	11.A.2, 11.B		202.A.7.b	NTA	NTA
4.7 P.E. Certification / Applicant	B(1)(l)	✓		201.B.3		
5.0 Construction	B(1)(d)	7.(A)	3106(C)(5)			NTA
5.1 Technical Specifications		7.(A)		201.B.3		
5.2 Construction Plans		7.(A)	3106(C)(5)	201.B.3	NTA	NTA
5.3 Materials Testing		7.(A)		307.B		
5.4 Construction Quality Assurance		7.(A)		307.B		
6.0 Operations / Plan for Mgmt. of Approved Wastes	B(1)(e)	6(A)(B), 7(C)(D) & 9	3106(C)			NTA
6.1 Operating Plan	B(1)(e)	6(A)(B), 7(C)(D) & 9	3106(C)	Subpart IV		NTA
6.2 Waste Acceptance / Testing	B(1)(e)	6(A)(B), 7(C)(D) & 9	3106(C)	704		NTA
6.3 Waste Volumes / Recordkeeping	B(1)(e)	6(A)(B), 7(C)(D) & 9	3106(C)	109.B		NTA
6.4 Groundwater Monitoring	(1)		20.6.2.3107	801		NTA
6.5 Stormwater Compliance	(1)		3106(C)4	402.E		NTA
6.6 Contingency Plans	B(1)(f)	8	3107(A)10	811.A-D		NTA
6.7 B(1)h, H_2S Prevention & Contingency Plan Guidelines @ 13.	B(1)(h)	13			NTA	
7.0 Closure / Post-Closure	B(1)(i)	10.	3107(A)11		NTA	NTA
7.1 Closure design	B(1)(i)	10.	3107(A)11	502	NTA	NTA
7.2 Closure plan	B(1)(i)	10.	3107(A)11	501.A	NTA	NTA
7.3 Post-Closure care (implied in B(1)(i))	B(1)(i)		3107(A)11	501		
7.4 Post-closure monitoring (implied in B(1)(i))	B(1)(i)		3107(A)11	501		
7.5 Financial Assurance / Cost Estimates	B(3)	10	3107(A)11	PART IX	NTA	NTA

NOTES:

(1) Requirements are implied in 711.B.1.m

(2) Requirements are implied in Guidelines at 6(B) and 7(A)

(3) "The applicant shall submit an 'Application for Surface Waste Management Facility' accompanied by the information necessary to evaluate the application." (Preface: Guidelines fo Permit Application, Design and Construction of Surface Waste Management Facilities (7/97) OCD

NTA = Not Technically Adequate

(505) 867-6990
(505) 867-6991 Fax
GORDON ENVIRONMENTAL, INC.
Consulting Engineers
213 S. Camino del Pueblo
Bernalillo, New Mexico 87004

June 2, 2005

Mr. Edwin E. Martin
Environmental Engineer
Oil Conservation Division
Environmental Bureau
1220 S. St. Francis Dr.
Santa Fe, NM 87505

2005 JUN 3 AM 10 16

Re: Gandy Marley, Inc. Landfill [139.01.01]
Application for Permit Modification

Dear Mr. Martin;

On behalf of CRI, we appreciate your participation and testimony at the above-captioned hearing. Gordon Environmental, Inc. (GEI) would like to offer the following recommendations for your consideration in reviewing the Application for Permit Modification. We would like to stress that the engineering technologies for land disposal of materials like the exploration and production wastes are well established and have a successful track record.

Despite the focus of the hearing on the inapplicability of other regulatory programs, the design standards for land disposal have been developed based on studies and 25 years of documented performance. It is the engineering and the current technology that drive the design of containment systems for permanent land disposal, as opposed to minimal regulatory standards. The evolution of landfill technology has advanced significantly since the promulgation of federal (USEPA) standards more than 10 years ago that are based on sound technology and research results.

The focus of our comments are on the environmental control systems that ensure that contaminants remain isolated within the lined footprint:

1.0 Landfill Liner

2.0 Leachate Management

3.0 Stormwater Controls

4.0 Environmental Monitoring and Reporting

5.0 Closure/Post-closure Care

6.0 Gandy Marley, Inc. – Application for Permit Modification

1.0 Landfill Liner

The liners systems engineered for land disposal facilities are dependent on:

- The characteristics of the wastes and compatibility with the liner material.
- Pressure head (leachate depth) on the liner.
- Slopes and subgrade conditions.
- Degree of protection required.
- Testing of the liner material, subgrade, and protective soil layer (PSL).
- Construction Quality Assurance (field) and Profession Engineer's Certification.
- Operational techniques to protect the liner from damage and to limit head.
- Closure/post-closure implementation, maintenance, and monitoring.

1.1 Liner Design

Primary liners, or single liner systems, are typically specified as:

- Flexible membrane liners (FML's), with 60 mil HDPE as the standard.
- Geocomposite clay liners (GCL's), essentially bentonite embedded in geotextile fabric.
- Compacted clay, min. 2' thickness, permeability $< 1.0 \times 10^{-7}$ cm/sec, PI > 15.
- Protective Soil Layer (PSL), minimum 2' thickness of free-draining soil.

Figure 1 shows the application of these different liner technologies for waste containment. **Table 1** lists the liner technologies used for waste containment at permitted land disposal facilities in Southeast New Mexico. The following technical rationale is used by liner design engineers in specifying systems for each location and waste type:

- **Single liners** (FML's, GCL's, or clays) are typically used to contain homogeneous non-hazardous solid wastes and are equipped with leachate collection systems. The material specified is dependent on site conditions and waste compatibility. The WIPP site uses 60 mil HDPE as a liner and final cover material for mined salt. Clays and GCL's can be susceptible to degradation by certain waste types (e.g., salts, petrochemicals) and are most often used as secondary liners.
- **Composite liners** are typically comprised of 60 mil HDPE primary liners placed over a GCL or a minimum 2' thickness of compacted clay. These systems are equipped with leachate collection piping and a sloping cell floor (min 1%) with at least two feet of sandy PSL. Composite liners are specified for household wastes that may contain some hazardous waste (typically < 0.1%); and assume that the waste stream is actively screened. Having two different liner materials allows for minor imperfections in the primary liner, and addresses the compatibility issue (e.g., if one layer is susceptible to waste type, the other is not).
- **Double liners** with leak detection systems are for disposal of hazardous waste; and for cells that will have fluids stored to a depth > 1'. Examples of contaminated fluid containment include leachate and brine evaporation basins. Again the primary liner is typically HPDE, and a highly transmissive geonet serves to collect leakage in the "witness zone." The secondary liner can be comprised of any of the 3 liner options.

For hazardous waste, the secondary liner below the witness zone is a composite liner (described above) to contain hazardous contaminants that may breach the primary HDPE. A minimum 2' thick sand blanket is installed above the primary liner to protect the liner system from damage; and to promote flow in the leachate collection system.

1.2 Liner Construction

It is essential to have a comprehensive Construction Quality Assurance (CQA) Plan in place for liner installation. The purpose of the Plan is to ensure that liner construction is performed in compliance with the technical specifications and performance standards. For FML's and other geosynthetics (e.g., GCL's) the Plan specifies the number of laboratory tests on the material, destructive tests on the seams, weather constraints, etc. For clay liners and subgrades, the Plan establishes field testing frequency, pass/fail values, and soil laboratory standards (e.g., $k \leq 1 \times 10^{-7}$ for installed clay). Compaction and moisture content in the field are critical to a successful soil liner component.

The CQA Plan also establishes project responsibilities, level of experience necessary, and recordkeeping/reporting requirements. It is common to have both the design and CQA certified by a Professional Engineer. These same CQA standards are applied in the construction of the landfill cover and other environmental control systems.

2.0 Leachate Management

The liner designs discussed previously are all predicated on limiting the fluid head via a leachate collection and removal system (LCRS) to a prescribed depth (typically 12"). The drainage blanket and a network of perforated pipes direct leachate to sumps, where it is typically pumped regularly to minimize head. Dependent upon leachate characteristics and testing, it may be sent to an evaporation basin (double-lined) or other treatment/disposal option. Failing to provide a leachate collection system in the landfill design virtually ensures that leachate depths will be well above design assumptions, promoting lateral and vertical migration well beyond closure.

3.0 Stormwater Controls

Controlling stormwater drainage is essential in preventing the migration of contaminants from the disposal units. "Run-on" to the site from upstream areas must be controlled to prevent inundation; and "run-off" from the active and closed areas most be managed to avoid

off-site contamination. A series of drainageways, berms, structures, etc. are engineered to meet the demands of the "design storm." Drainage calculations are often based on the "25-year, 24-hour" design storm, although we typically model the short-term extreme events (i.e., "gully washers") as well because they are so common in New Mexico. Without calibrating the stormwater control systems to a specified event, both during operations and following closure, it is not possible to confirm their potential for failure.

4.0 Environmental Monitoring and Reporting

Routine sampling and testing of the upper-most water-bearing unit beneath the landfill is standard approach for detecting contamination that has migrated. The minimum number of wells to determine groundwater flow direction is three; and the minimum for monitoring a small land disposal unit is 3 (1 upgradient; 2 downgradient). The Groundwater Monitoring Plan also specifies the monitoring frequency, monitoring protocol, constituents to be analyzed, compliance levels, statistical evaluation, and regulatory reporting. Groundwater monitoring is typically continued through the post-closure care period (e.g., 30 years) to ensure the continued integrity of the containments systems. For most landfill projects, environmental monitoring also includes stormwater quality (i.e., NPDES) and air quality (i.e., USEPA Title V) as well. Monitoring may also be conducted in the vadose (unsaturated) zone beneath the landfill, although some of the technologies are unproven. The most effective vadose zone monitoring technology is the use of leak detection between double liners, as it envelopes the entire waste footprint.

5.0 Closure/Post-closure Care

Landfills are "closed" at the completion of their effective capacity in a manner that will reduce the potential for contamination in the future. This includes the installation of the final cover, drainage devices, etc. in accordance with the site-specific C/PC Plan, construction plans, and technical specifications. The final cover may consist of an impermeable barrier or and "evapotranspiration" (ET) cap sloped to prevent ponding and resist erosion (e.g., min. slope 2%/max. slope 25%). While ET caps are applicable at arid sites, thicknesses of at least 36" are typically required to prevent infiltration. Modeling is conducted for the final cover to predict its performance for the post-closure care period. In arid climates, it is essential to

establish a vegetative layer, seed mix, erosion controls, etc. in the C/PC Plan to stabilize the site.

Following closure, landfills are subject to routine maintenance and monitoring to maintain their environmental control systems (e.g., liners, caps, and drainage). Continued inspection and monitoring are essential in confirming that the control systems are functioning as designed, and the contamination is not migrating.

In order to establish financial assurance for a landfill, the projected closure and post-closure costs are calculated and secured by an approved financial instrument. The closure cost is based on the assumption of operator default; and third-party contractor services necessary to close the landfill at the most inopportune time in its operational sequence. The C/PC costs would include estimates for long-term care and monitoring through the post-closure phase (e.g., 30 years). The average C/PC costs for financial assurance for solid waste landfills in new Mexico is more than $2,000,000.

6.0 Gandy Marley, Inc. – Application for Permit Modification

The GMI Application for Permit Modification, including updates up to the close of the Hearing, does not provide sufficient information to demonstrate protection of the public health and environment. We respectfully request that the Division deny the Application until an adequate level of technical detail is submitted for a proper evaluation. The proposed change from remediation to disposal in a major modification in permitting, design, operations, monitoring, and post-closure care. The engineering standards for land disposal of similar wastes are well established through the design and performance of lined containment units for over 15 years. The Application is specifically deficient in the following major technical elements:

6.1 There is groundwater beneath the site worthy of protection.

6.2 The proposed 1' thick clay liner is difficult to build and harder to protect than the 2' standard.

6.3 The only soil test result provided for liner material fails the stated (and industry standard) permeability criterion of 1×10^{-7} by a factor of 1.7 (see **Attachment 3**).

6.4 The soil sampling location for the single test is not identified as to depth or location. Based on the record, excavated soil from cell construction will be

within the surface alluvium (i.e., 20' below grade) not producing clays for the liner construction.

6.5 Placing the floor of the liner into the dry alluvium near the ground surface will promote migration of fluids via differential permabilities.

6.6 The Application lacks the necessary Plans to ensure the proper construction, operations, monitoring, closure, post-closure, etc. of the land disposal facility.

6.7 Any liner system will be compromised by the lack of an adequate leachate collection system.

6.8 The protective soil layer should be a minimum 24" thickness of permeable soils (not 12" of remediated soils).

6.9 There is insufficient data or calculations to evaluate off-site run-on from extensive upland areas to the east; or run-off from active areas.

6.10 There is no site-specific topographic information provided to show contours and slopes for drainage, cell construction, final cover, etc.

6.11 Procedures for waste evaluation and screening are not defined. Disposal of "concrete and pipe debris" (as described in Hearings) could seriously compromise the liner; and salts and petrochemical can damage certain types of liners (i.e., clay).

6.12 The existing groundwater monitoring network is inadequate to address flow direction and is not appropriately positioned for upgradient/downgradient analysis.

6.13 The proposed 24" final cover (ET cap) is not documented to prevent infiltration.

6.14 Proposals to "vacuum" stormwater during operations will not address leachate accumulation during subsequent filling or post-closure.

6.15 The concept of an "open-ended cell" (described at Hearings) would allow escape of fluids into unlined areas if not outfitted with leachate collection.

6.16 The C/PC costs used for financial assurance of the landfarm are not proportionate to a landfill footprint.

6.17 Post-closure care and monitoring are not addressed, and not included in the financial assurance cost estimate.

6.18 There is insufficient data to determine waste characteristics vs. liner compatibility. Salts and petrochemicals can degrade certain liners.

In summary, we request that the Oil Conservation Division deny the Permit Modification until sufficient technical data is provided to meet the 711 Requirements and Guidelines. At a minimum, we are requesting that the Division consider the standards discussed herein and presented at the Hearing as a baseline for the permitting of land disposal facilities for oil-field wastes. Absent waste-specific data to downgrade the level of concern, we would consider the waste stream to qualify for protection under the hazardous waste protocol for design, construction, operations, and C/PC care. At a minimum, the proposed environmental control systems are not adequately described; and do not meet industry standards when specified (e.g., liner and PSL).

We appreciate the opportunity of providing our input to the Division, and would be pleased to clarify the information at your convenience.

Respectfully submitted,

Gordon Environmental, Inc.

I. Keith Gordon, P.E.
Principal

Attachments:

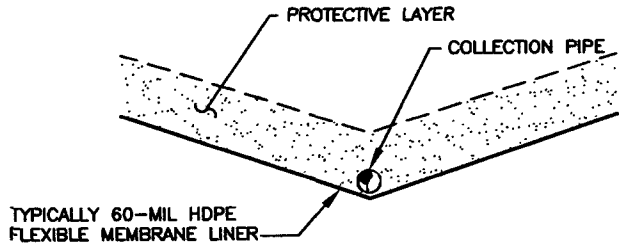
Figure 1 – Land Disposal Liner Systems

Table 1 – NMED Land Disposal Facilities Environmental Protection Systems

Clay Soil Test Results

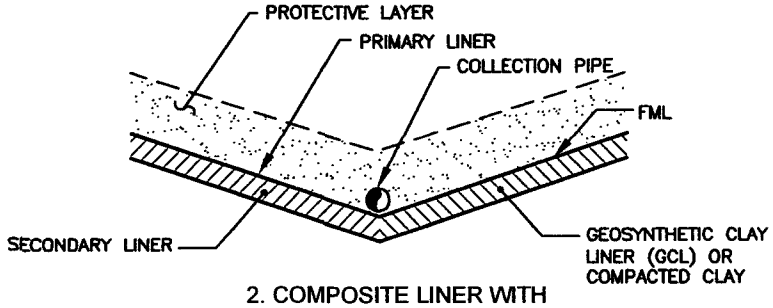
cc: Ken Marsh, CRI
Mark Turnbough, PhD.
Mike Feldewert, Esq., Holland & Hart LLP
Pete Domenici Jr., Esq., Domenici Law Firm
Will Jones, OCD Hearing Examiner
Ted Apodaca, Esq., NM Energy, Minerals and Natural Resources Dept.
Donald Neeper,PhD., NM Citizens for Clean Air & Water
Gail MacQuesten, Esq., OCD Attorney
Ned Farquhar, State of New Mexico Office of the Governor

TYPICAL APPLICATIONS:



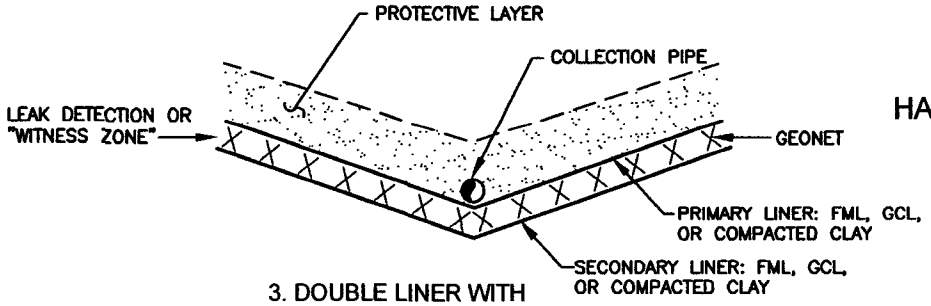
1. SINGLE LINER WITH LEACHATE COLLECTION

MINING WASTE



2. COMPOSITE LINER WITH LEACHATE COLLECTION

SOLID WASTE
SPECIAL WASTE



3. DOUBLE LINER WITH LEACHATE COLLECTION AND LEAK DETECTION

HAZARDOUS WASTE

LAND DISPOSAL LINER SYSTEMS

Gordon Environmental, Inc.
Consulting Engineers
213 S. Camino del Pueblo
Bernalillo, New Mexico, USA
Phone: 505-867-6990
Fax: 505-867-6991

DATE: 05/19/05	CAD: LAND DISP.dwg	PROJECT #: 000.00.05
DRAWN BY: WBM/JP	REVIEWED BY: MRH	FIGURE 1
APPROVED BY: IKG	gei@gordonenvironmental.com	

NOT TO SCALE
Drawing:P:\acad 2003\139.01.01\LAND DISP.dwg
Date/Time:May. 31, 2005-11:11:51

Table 1
Southeast New Mexico
NMED Land Disposal Facilities
Environmental Protection Systems

Description	Waste Type	NMED Regulatory Bureau	Liner Design	Leachate Collection	Groundwater Monitoring
Lea County Landfill	MSW	Solid Waste	HDPE/GCL composite	Yes	2 wells *
	Leachate		double HDPE w/ leak detection		
Sand Point Landfill	MSW	Solid Waste	HDPE/GCL composite	Yes	4 wells
	Leachate		double HDPE w/ leak detection		
Roswell Landfill	MSW	Solid Waste	HDPE/GCL composite	Yes	10 wells
	Leachate		double HDPE w/ leak detection		
WIPP	Mined Salt	Ground Water	HDPE	Yes	3 wells
	Leachate		double HDPE w/ leak detection		
Triassic Park	Hazardous	Hazardous Waste	Primary - HDPE	Yes	20 wells
			Secondary - HDPE/composite w/ leak detection		
Lea Land	Special MSW	Solid Waste (Special)	HDPE/GCL composite	Yes	4 wells

NOTES: MSW = Municipal Solid Waste
HDPE = High-density polyethylene
GCL = Geosynthetic Clay Liner
* = Vadose Zone Wells

Quality Control Engineering, Inc.

1136 W. Hobbs Roswell, NM 88203
505-625-0005 Fax: 625-0555

700 E. First #725C, Alamogordo, NM 88310
505-439-1285 Fax: 439-1283

SOIL REPORT

ASTM D75, D698/1557, C127, C136, C117, D854, D2216, D2487, D4318, D4718

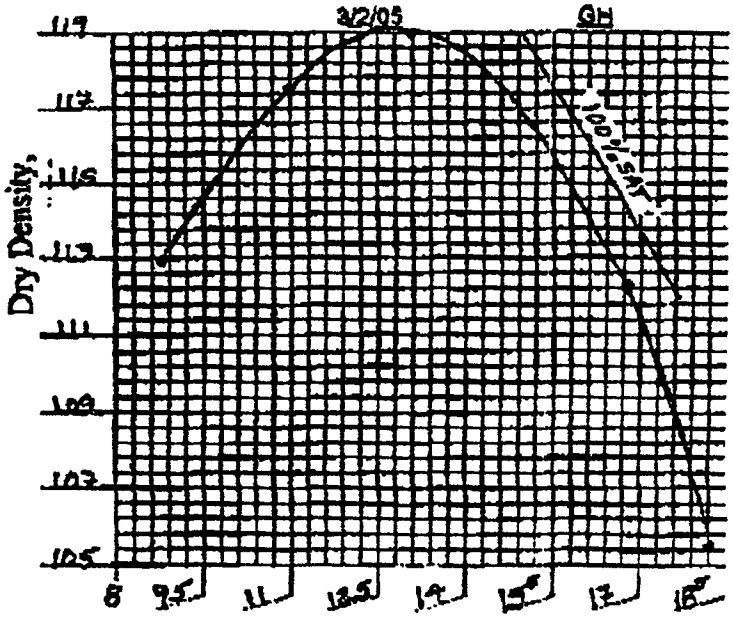
Project Marley Ranch, clay **Job #** 322 **Lab #** A19 **Sample #** 1

Client name & address Gandy Marley, Inc., P.O. Box 827, Tatum, NM 88267 Phone: 505 398-4960 Fax: 398-8387

Material source Marley Ranch, clay **Contractor** NA

Date sampled 2/15/05 **By** JT (client) **Rec'd** 2/15/05 **Tested** 2/16-18/05 **By** GH

U.S. Standard Sieve No.	Cumulative % Retained	Cumulative % Passing	Specs
3"	0%	100%	
1 1/2"	0%	100%	
1"	0%	100%	
3/4"	0%	100%	
3/8"	0%	100%	
#4	0%	100%	
#10	9%	91%	
#40	19%	81%	
#200	44.7%	55.3%	



Material Classification (field) Sandy Clay

0% Gravel
45% Sand
55% Fines

LL=30 PI=15

Coefficient of Permeability=1.7X10-7
(@ 89.5% compaction of D698A)
See attached

Submitted by: K. Byrd-Humphreys 3/2/05

Test Method ASTM Manual	Max. Dry Density	Optimum Moisture
D698 Method A	118.4 pcf uncorrected	13.3% uncorrected
Nat'l moist 11%		G_s= 2.659

Precision Engineering, Inc.
P.O. Box 422
Las Cruces, NM 88004
505-523-7674

Flexible Wall Hydraulic Conductivity
Falling Head

ATTN: Ms. Katy Byrd-Humphreys, PE
Quality Control Engineering, Inc.
1136 W. Hobbs St.
Roswell, NM 88203

Project: QCE Contract Testing — File No.: 05-022
Soil Type: Clay — Date: March 1, 2005 — Lab No.: 46894
Sampled From: Marley Ranch; Job# 322, Lab# A19, Sample# 1 — Performed By: GWG

TEST SPECIMEN CONDITIONS AT BEGINING OF TEST:

Wet Unit Weight: 122.1 pcf
Dry Unit Weight: 106.3 pcf

% Moisture: 14.9
% Compaction: 89.5
% Compaction Requested: 90.0

PROCTOR INFORMATION:

Proctor Method: ASTM D-698-A
Maximum Dry Density: 118.8 pcf
Optimum Moisture Content: 13.1 %

Coefficient of Permeability, k_{20}: 1.7×10^{-7} cm/sec.

Remarks: Sample compacted at 2.0% above optimum moisture content.

Reviewed By:

Reviewed By:

Compiled By:

C:\Documents and Settings\Owner\My Documents\MPE\Files\Form Masters\Excel Test Reports Master\46894 Permeability.xls]Report

CRI

CONTROLLED RECOVERY INC.

P.O. BOX 388, HOBBS, NM 88241
(505) 393-1079 • FAX (505) 393-3615

June 6, 2005

Mr. Will Jones
Hearing Examiner
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505

2005 JUN 7 PM 1 58

RE: Gandy-Marley Permit application.

Dear Mr. Jones,

Enclosed please find additional information about EPA guidance to solid waste disposal.

Respectfully submitted,

Ken Marsh

cc:
Ed Martin

PROPOSED REGULATORY FRAMEWORK
FOR PERMITTING OIL AND GAS WASTE DISPOSAL FACILITIES

In October 2002, the U.S. EPA published an update to guidance regarding the exemption of oil and gas exploration and production wastes from federal hazardous waste regulations. The document indicates that many otherwise hazardous constituents generated by E&P activities are exempt from RCRA Subtitle C regulations on the basis of their origin but not their hazardous or toxic characteristics. In describing the scope of the exemption, EPA indicates that although for practical purposes E&P wastes are exempt from Subtitle C, the wastes still require careful management in order to protect the public health and environment. To that end the document states, "The RCRA Subtitle C exemption, however, did not preclude these wastes from control under state regulations, under the less stringent RCRA Subtitle D Solid Waste Regulations, or under other federal regulations."

Examination of the OCD interpretation of its own rule (711) and the Water Quality Control Commissions Regulations indicates that the agency does not fully appreciate the implications of EPA's guidance regarding E&P solid waste disposal activities. Given the obvious similarities between the requirements to properly dispose of large volumes of ordinary solid wastes under Subtitle D, and the disposal of large volumes of "special wastes" generated in the E&P operations, it is only logical to conclude that future E&P disposal in New Mexico should be treated in exactly the same manner that NMED currently handles solid waste facility permit applications under 20 NMAC 9.1.

See attached: EPA Scope of the Exemption Summary

EPA

Exemption of Oil and Gas Exploration and Production Wastes from Federal Hazardous Waste Regulations

Scope of the Exemption

In December 1978, EPA proposed hazardous waste management standards that included reduced requirements for several types of large volume wastes. Generally, EPA believed these large volume "special wastes" are lower in toxicity than other wastes being regulated as hazardous waste under RCRA. Subsequently, Congress exempted these wastes from the RCRA Subtitle C hazardous waste regulations pending a study and regulatory determination by EPA. In 1988, EPA issued a regulatory determination stating that control of E&P wastes under RCRA Subtitle C regulations is not warranted. Hence, E&P wastes have remained exempt from Subtitle C regulations. The RCRA Subtitle C exemption, however, did not preclude these wastes from control under state regulations, under the less stringent RCRA Subtitle D solid waste regulations, or under other federal regulations. In addition, although they are relieved from regulation as hazardous wastes, the exemption does not mean these wastes could not present a hazard to human health and the environment if improperly managed.

NEW MEXICO OIL CONSERVATION DIVISION
GROUND WATER DISCHARGE PERMIT AMENDMENT / MODIFICATION

I. Type of operation

The facility operates as a soil remediation, recycling and landfarm facility.

II. Operator

Gandy Marley, Inc.
Attn: Larry Gandy
1109 East Broadway
P.O. Box 827
Tatum, New Mexico 88267
(505) 398-4960

III. Location of Landfarm

The facility is located in Southeastern New Mexico, southeast of Roswell. The facility is situated on privately owned land in Chaves County, New Mexico, in sections 4, 5, 8 and 9 of T11S, R31E.

This location is approximately 39 miles east of Roswell and approximately 33 miles northwest of Tatum. The site is approximately 2.5 miles south of US 380 and 4 miles west of state highway 172.

IV. Modification Request

This permit modification request proposes to use landfill-type cells for the disposal of oilfield waste including petroleum and chloride impacted debris, mud, soils, sludges, tankbottoms and filters associated with the drilling, operating and maintenance of oil and gas wells and related operations of the oil and gas industry. Cells will be constructed with a berm of no more than 10 feet and no less than 5 feet in height and no less than 8 feet in width at the top with a clay liner on the inside with a 3 to 1 slope. Excavation will be no more than 20 feet below ground level. Debris that may blow will be placed below ground level and be covered with sufficient soil to prevent blowing by the end of each workday. As a cell fills at one end, 2 feet of soil will be placed on top with a slight slope to prevent pooling of rainwater, but not steep enough to promote erosion.

We propose to build these cells in the same location as existing landfarm cells that have been remediated to the requirements of our existing permit to minimize surface disturbance.

V. Land and Ownership

The facility is situated on privately-owned land all other adjacent lands are owned by Robert W. (Bill) Marley, one of the owners of this facility.

VI. Facility Description and Design

Proposed cell construction design is attached.

VIII. Spill/Leak Prevention and REPORTING (Contingency Plans)

The proposed cells are contained within the perimeter of the existing landfarm. Additionally each cell will be surrounded with a berm having minimum height of 5 feet above ground level. Equipment and machinery which could be used in the event of any storm water runoff will be at the facility at all times. Should a leak or spill occur at the OCD facility, notification to the OCD would be made immediately in accordance with OCD Rule 116 and WQCC Section 120.

IX. Inspecting, Maintenance and Reporting

The facility will be inspected on a regular basis and immediately following significant precipitation and/ or wind. Inspections will include examination of berms, fences and the remediation area. Perimeter and interior berms will be maintained to prevent erosion. General maintenance will be routinely performed. Any necessary repairs will be made immediately.

X. Closure Plan

Upon closure, and following notification to the OCD that operations have ceased, fresh soils will be used to cover the cells to a minimum depth of 2 feet and sloped in a manner that promotes drainage. Any additional requirements or conditions of the OCD will be met.

XI. Site Characteristics&Fresh Water Protection Demonstration

There are no drainages or water wells within one mile of the facility boundary. Approximately ¾ mile southeast of the site there is a seep at the base of the Mescalero Rim. This seep is located topographically higher (200 feet) than the facility and is a result of seepage from an overlying aquifer (Ogallala Fm.) the water is collected by the rancher and distributed through underground pipes to stock tanks on the ranch property. There are three such stock tanks within one mile of the outside perimeter fence of the facility.

While there are no water wells within one mile of the facility, subsurface drilling has encountered groundwater saturation within Upper Triassic sediments. The depth to this groundwater is 150 feet. A sample of the groundwater was obtained from three drill holes. The samples were analyzed at Assaigai Analytical Laboratories in Albuquerque New Mexico. A copy of the analytical results is presented within this submittal. This groundwater flows eastward and is controlled by stratigraphic and structural features within the Triassic sediments.

This information was obtained from geologic data from a sub-surface drilling program conducted in the region in July 1994.

The surface geology consists entirely of Quaternary age alluvial deposits. This alluvium consists of fine yellow-brown sand and clays and contains abundant granitic and chert cobbles. This material was derived from the Tertiary age Ogallala Fm. Which is located topographically higher and east of the site. Thickness of the alluvial material varies from 5 to 25 feet thick.

Immediately underlying the alluvial deposits are Upper Triassic sediments. These sediments were deposited in a fluvial environment and consist of fine to very fine-grained sandstones, interbedded with siltstones and mudstones. The Upper Triassic sediments underlying the proposed site dip approximately one degree to the east. The thickness of these sediments varies from 25 to 150 feet. Groundwater saturation was encountered in sandstone lenses below depths of 150 feet.

The aquifer material consists of thin (10 – 30 feet), lenticular fine to very fine-grained sandstones. Due to the fluvial nature of these sands, individual sandstones lenses are discontinuous and difficult to correlate. The site consists of two soil types including Alma Loam and Franklin-Roswell Complex. These soils are typically well-drained with slopes of 0 to 15 percent.

Vegetation consists primarily of Tabossa, Bufffalo Grass, Vine-Mesquite, Cactus, Sand Dropseed, Little Bluestem, Sand Bluestem, Sandur, Three-Awn, Shinery Oak, Yucca and Sand Sagebrush. No rare or endangered plant species are located near the site or in the surrounding area.

The facility lies outside any 100-year floodplain boundary. The proposed site is in an area found on Federal Insurance Rate Map (FIRM) #3501250850. This map has not been printed because the National Flood Insurance Program has established that this is in an area of minimum flood hazards.

The perimeter berms have been designed to alleviate stormwater run-on and run-off during a 100 year stormwater event. Should such a storm event occur, the OCD will be notified immediately of any flooding or washout.

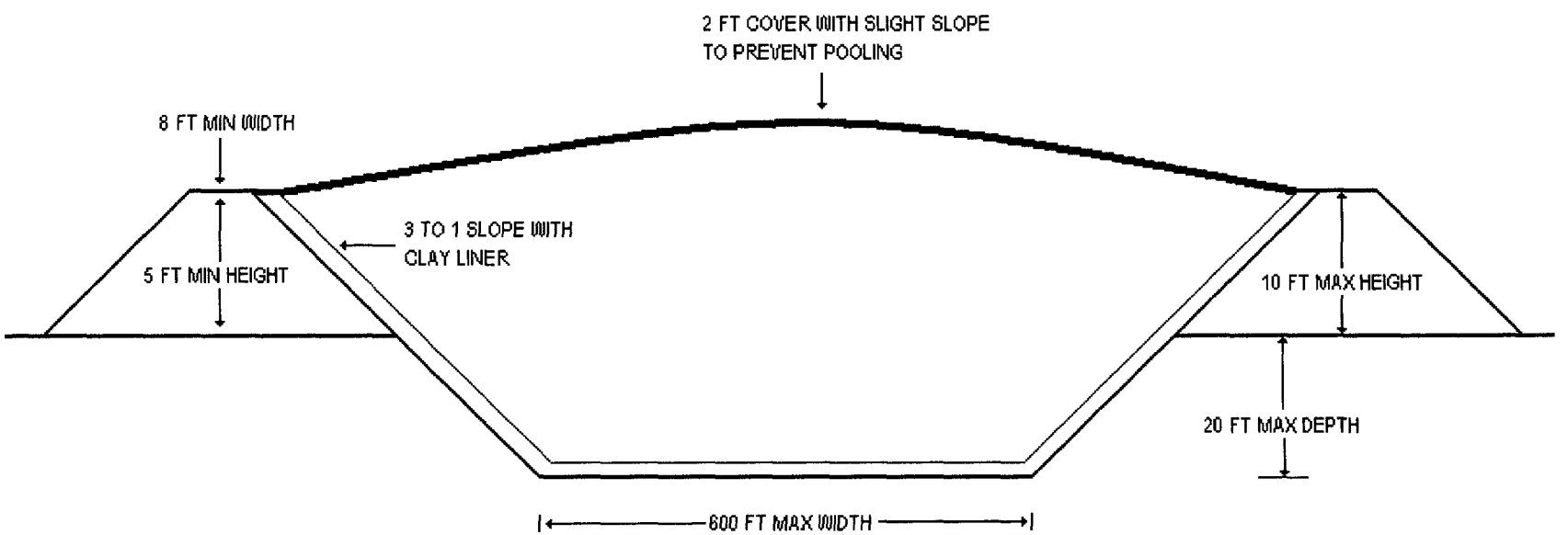
XII. H2S Contingency Plan

Hydrogen Sulfide can be expected at a solidification unit. Appropriate signs will be and H2S training will be provided to all personnel and all provisions set forth in OCD Rule 118 will be met.

XIII. Additional Information

All WQCC regulatory requirements applicable to this facility and OCD rules applicable to the OCD facility will be fully complied with.

GMI CELL DESIGN



NOT TO SCALE

Lovington AOV 3/15
Roswell "

EMAILED - Yes

4/26
AOV ~~5/19~~

NOTICE OF PUBLICATION

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
SANTA FE, NEW MEXICO

~~4/26~~ 5/19

8:15

The State of New Mexico through its Oil Conservation Division hereby gives notice pursuant to law and the Rules and Regulations of the Division of the following meeting and public hearing to be held at ~~10:00~~ A.M. on ~~March 25, 2005~~, in Porter Hall at 1220 South St. Francis Drive, Santa Fe, New Mexico, before an examiner duly appointed for the hearing. If you are an individual with a disability who is in need of a reader, amplifier, qualified sign language interpreter, or any other form of auxiliary aid or service to attend or participate in the hearing, please contact Division Administrator Florene Davidson at 505-476-3458 or through the New Mexico Relay Network (1-800-659-1779) as soon as possible. Public documents including the agenda and minutes, can be provided in various accessible forms. Please contact Florene Davidson if a summary or other type of accessible form is needed.

STATE OF NEW MEXICO TO:
All named parties and persons
Having any right, title, interest
Or claim in the following cases
And notice to the public.

Case

Application of Artesia Aeration, LLC to modify their NMOCD Rule 711 Permit so that they would be allowed to accept drill cuttings and salt water-contaminated oilfield waste at their landfarm. Artesia Aeration, LLC seeks a modification to their NMOCD Permit Number NM-1-0030 to allow Artesia Aeration, LLC's landfarm located in the N/2 of Section 7, Township 17 South, Range 32 East, in Lea County, New Mexico, to accept drill cuttings and salt water-contaminated oilfield waste. On September 17, 2004, Artesia Aeration, LLC applied for a modification to its permit allowing it to accept drill cuttings and salt water-contaminated oilfield waste and provided support for its request. Oil Conservation Division staff has determined that conditions at the site of the landfarm are such that the landfarm may accept drill cuttings and salt water-contaminated oilfield wastes without posing a hazard to groundwater and has confirmed that the operator will keep salt-contaminated oilfield waste separate from hydrocarbon-contaminated oilfield waste.

Case

Application of Gandy Marley, Inc. to modify their NMOCD Rule 711 Permit so that they would be allowed to accept drill cuttings and salt water-contaminated oilfield waste at their landfarm. Gandy Marley, Inc. seeks a modification to their NMOCD Permit Number NM-1-0019 to allow Gandy Marley, Inc.'s landfarm located in Sections

4,5,8, and 9 of Township 11 South, Range 31 East, in Chaves County, New Mexico to accept drill cuttings and salt water-contaminated oilfield waste. On March 10, 2005, Gandy Marley, Inc. applied for a modification to its permit allowing it to accept drill cuttings and salt water-contaminated oilfield waste and provided support for its request. Oil Conservation Division staff has determined that conditions at the site of the landfarm are such that the landfarm may accept salt-contaminated oilfield wastes without posing a hazard to groundwater and has confirmed that the operator will keep salt-contaminated oilfield waste separate from hydrocarbon-contaminated oilfield waste.

Given under the Seal of the State of New Mexico Oil Conservation Division at Santa Fe, New Mexico on this 14 day of March 2005.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

Mark E. Fesmire
Division Director

S E A L

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

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-137
Revised June 10, 2003

Submit Original Plus 1
Copy to Santa Fe
1 Copy Appropriate
District Office

APPLICATION FOR WASTE MANAGEMENT FACILITY

(Refer to the OCD Guidelines for assistance in completing the application)

NOT APPROVED

☑ Commercial ☐ Centralized

1. Type: ☐ Evaporation ☐ Injection ☐ Other
   ☑ Solids/Landfarm / Land Fill ☐ Treating Plant
2. Operator: Gandy Marley Inc
   Address: PO Box 1658 Roswell N Mex. 88203
   Contact Person: Bill Marley or Larry Gandy Phone: 505-347-0434
3. Location: ____/4 ____/4 Section 4,5,8,9 Township 11S Range 31E
   Submit large scale topographic map showing exact location
4. Is this a modification of an existing facility? ☑ Yes ☐ No
5. Attach the name and address of the landowner of the facility site and landowners of record within one mile of the site.
6. Attach description of the facility with a diagram indicating location of fences, pits, dikes, and tanks on the facility.
7. Attach designs prepared in accordance with Division guidelines for the construction/installation of the following: pits or ponds, leak-detection systems, aerations systems, enhanced evaporation (spray) systems, waste treating systems, security systems, and landfarm facilities.
8. Attach a contingency plan for reporting and clean-up for spills or releases.
9. Attach a routine inspection and maintenance plan to ensure permit compliance.
10. Attach a closure plan.
11. Attach geological/hydrological evidence demonstrating that disposal of oil field wastes will not adversely impact groundwater. Depth to and quality of ground water must be included.
12. Attach proof that the notice requirements of OCD Rule 711 have been met.
13. Attach a contingency plan in the event of a release of H_2S.
14. Attach such other information as necessary to demonstrate compliance with any other OCD rules, regulations and orders.
15. CERTIFICATION
    I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

Name: Bill Marley Title: VP

Signature: Bill Marley Date: 4-8-5

E-mail Address: ____

NEW MEXICO OIL CONSERVATION DIVISION
GROUND WATER DISCHARGE PERMIT AMENDMENT / MODIFICATION

I. Type of operation

The facility operates as a soil remediation, recycling and landfarm facility.

II. Operator

Gandy Marley, Inc.
Attn: Larry Gandy
1109 East Broadway
P.O. Box 827
Tatum, New Mexico 88267
(505) 398-4960

III. Location of Landfarm

The facility is located in Southeastern New Mexico, southeast of Roswell. The facility is situated on privately owned land in Chaves County, New Mexico, in sections 4, 5, 8 and 9 of T11S, R31E.

This location is approximately 39 miles east of Roswell and approximately 33 miles northwest of Tatum. The site is approximately 2.5 miles south of US 380 and 4 miles west of state highway 172.

IV. Modification Request

This permit modification request proposes to use landfill-type cells for the disposal of oilfield waste classified as non-hazardous by RCRA Subtitle C exemption or by characteristic testing including petroleum and chloride impacted debris, mud, soils, sludges, tankbottoms and filters associated with the drilling, operating and maintenance of oil and gas wells and related operations of the oil and gas industry. Cells will be constructed with a berm of no more than 10 feet and no less than 5 feet in height and no less than 8 feet in width at the top with a 1 ft. clay liner compacted to 90% standard density on the inside with a 3 to 1 slope. Excavation will be no more than 20 feet below ground level. Debris that may blow will be placed below ground level and be covered with sufficient soil to prevent blowing by the end of each workday. As a cell fills at one end, 2 feet of soil will be placed on top with a slight slope to prevent pooling of rainwater, but not steep enough to promote erosion.

We propose to build these cells in the same location as existing landfarm cells that have been remediated to the requirements of our existing permit to minimize surface disturbance. We also propose to place at least two 100 ft monitor wells on the east (down gradient) side of our facility that will be checked every 3 months for contamination.

V. Land and Ownership

The facility is situated on privately owned land. All other adjacent lands are owned by Robert W. (Bill) Marley, one of the owners of this facility.

VI. Facility Description

The facility currently operates as a commercial landfarm. The proposed landfill facility will be to contain oilfield waste including petroleum and chloride impacted debris, mud, soil, sludges, tankbottoms and filters associated with the drilling, operations and maintenance of oil and gas wells and related operations of the oil and gas industry.

VIII. Spill/Leak Prevention and Reporting (Contingency Plans)

The proposed cells are contained within the perimeter of the existing landfarm. Additionally each cell will be surrounded with a berm having minimum height of 5 feet above ground level. Equipment and machinery which could be used in the event of any storm water runoff will be at the facility at all times. Should a leak or spill occur at the OCD facility, notification to the OCD would be made immediately in accordance with OCD Rule 116 and WQCC Section 120.

IX. Inspecting, Maintenance and Reporting

The facility will be inspected on a regular basis and immediately following significant precipitation and/ or wind. Inspections will include examination of berms, fences, landfill, monitoring wells and the remediation area. Perimeter and interior berms will be maintained to prevent erosion. General maintenance will be routinely performed. Any necessary repairs will be made immediately.

X. Closure Plan

As each landfill cell fills from one end a minimum of 2 ft of clean soil will be placed on top for cover and sloped in a manner that promotes drainage but not erosion. Reseeding with indigenous grasses will done at the same time. Upon closure, and following notification to the OCD that operations have ceased the cells will already have been closed during ongoing operations therefore closure cost will be minimal. The new cells will be built were existing cells are that have been remediated to NMOCD guidelines and already have closure bonds in place for closure expenses. Any additional requirements or conditions of the OCD will be met.

XI. Site Characteristics and Fresh Water Protection Demonstration

There are no drainages or water wells within one mile of the facility boundary. Approximately ¾ mile southeast of the site there is a seep at the base of the Mescalero Rim. This seep is located topographically higher (200 feet) than the facility and is a result of seepage from an overlying aquifer (Ogallala Fm.). The water is collected by the rancher and distributed through underground pipes to

stock tanks on the ranch property. There are three such stock tanks within one mile of the outside perimeter fence of the facility.

While there are no water wells within one mile of the facility, subsurface drilling has encountered groundwater saturation within Upper Triassic sediments. The depth to this groundwater is 150 feet. A sample of the groundwater was obtained from three drill holes. The samples were analyzed at Assaigai Analytical Laboratories in Albuquerque New Mexico. A copy of the analytical results is presented within this submittal. This groundwater flows eastward and is controlled by stratigraphic and structural features within the Triassic sediments.

This information was obtained from geologic data from a sub-surface drilling program conducted in the region in July 1994.

The surface geology consists entirely of Quaternary age alluvial deposits. This alluvium consists of fine yellow-brown sand and clays and contains abundant granitic and chert cobbles. This material was derived from the Tertiary age Ogallala Fm. Which is located topographically higher and east of the site. Thickness of the alluvial material varies from 5 to 25 feet thick.

Immediately underlying the alluvial deposits are Upper Triassic sediments. These sediments were deposited in a fluvial environment and consist of fine to very fine-grained sandstones, interbedded with siltstones and mudstones. The Upper Triassic sediments underlying the proposed site dip approximately one degree to the east. The thickness of these sediments varies from 25 to 150 feet. Groundwater saturation was encountered in sandstone lenses below depths of 150 feet.

The aquifer material consists of thin (10 – 30 feet), lenticular fine to very fine-grained sandstones. Due to the fluvial nature of these sands, individual sandstones lenses are discontinuous and difficult to correlate. The site consists of two soil types including Alma Loam and Franklin-Roswell Complex. These soils are typically well-drained with slopes of 0 to 15 percent.

Vegetation consists primarily of Tabossa, Bufffalo Grass, Vine-Mesquite, Cactus, Sand Dropseed, Little Bluestem, Sand Bluestem, Sandur, Three-Awn, Shinery Oak, Yucca and Sand Sagebrush. No rare or endangered plant species are located near the site or in the surrounding area.

The facility lies outside any 100-year floodplain boundary. The proposed site is in an area found on Federal Insurance Rate Map (FIRM) #3501250850. This map has not been printed because the National Flood Insurance Program has established that this is in an area of minimum flood hazards.

The perimeter berms have been designed to alleviate stormwater run-on and run-off during a 100 year stormwater event. Should such a storm event occur, the OCD will be notified immediately of any flooding or washout.

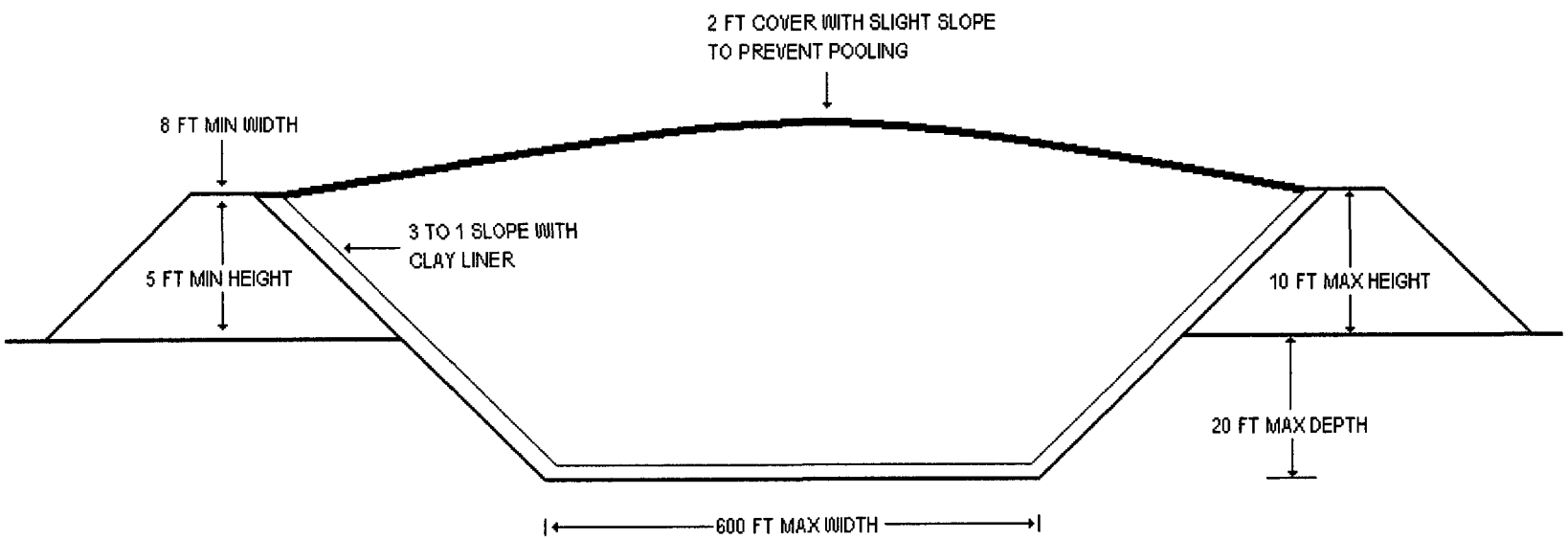
XII. H2S Contingency Plan

Hydrogen Sulfide can be expected at a solidification unit. Appropriate signs will be and H2S training will be provided to all personnel and all provisions set forth in OCD Rule 118 will be met.

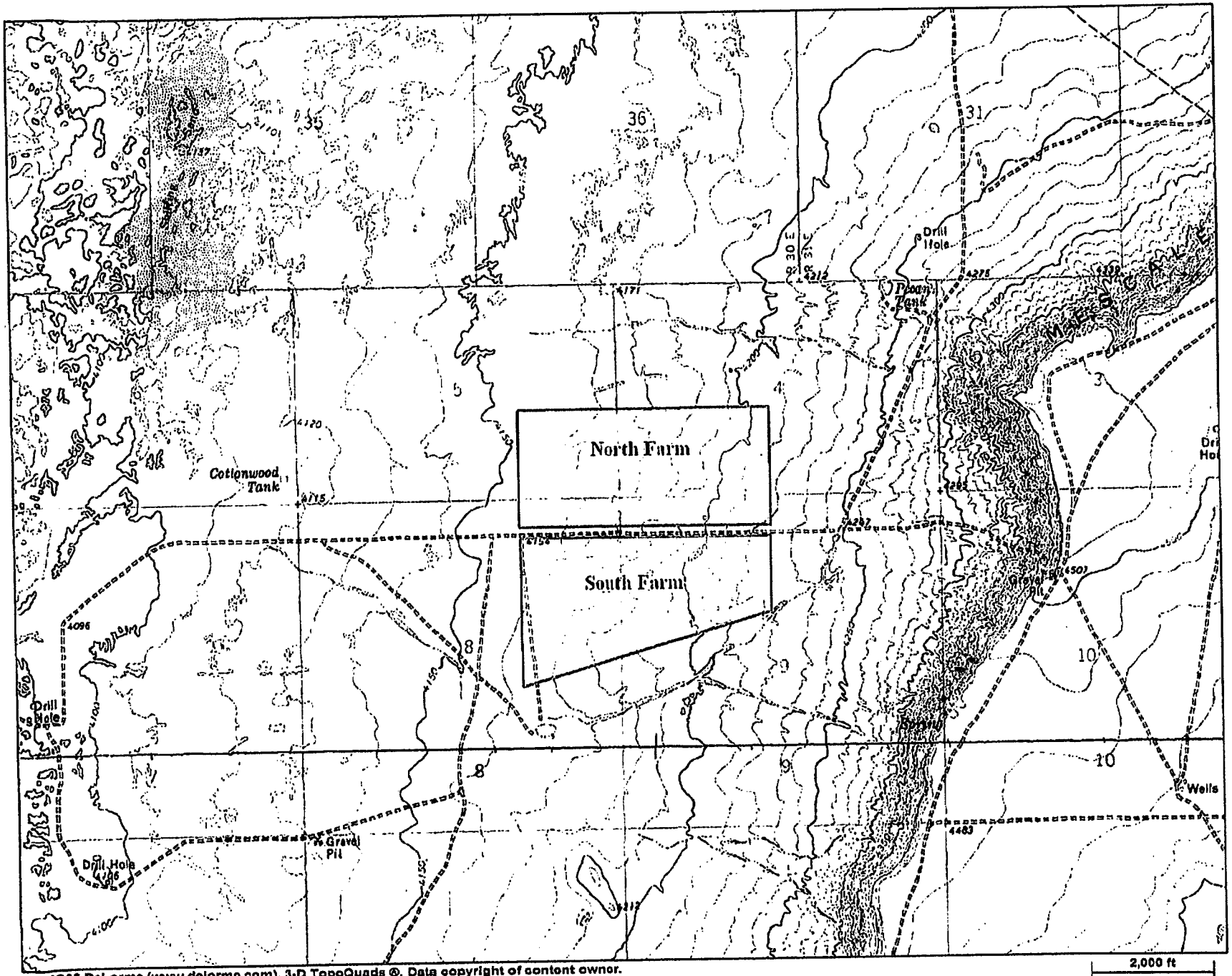
XIII. Additional Information

All WQCC regulatory requirements applicable to this facility and OCD rules applicable to the OCD facility will be fully complied with.

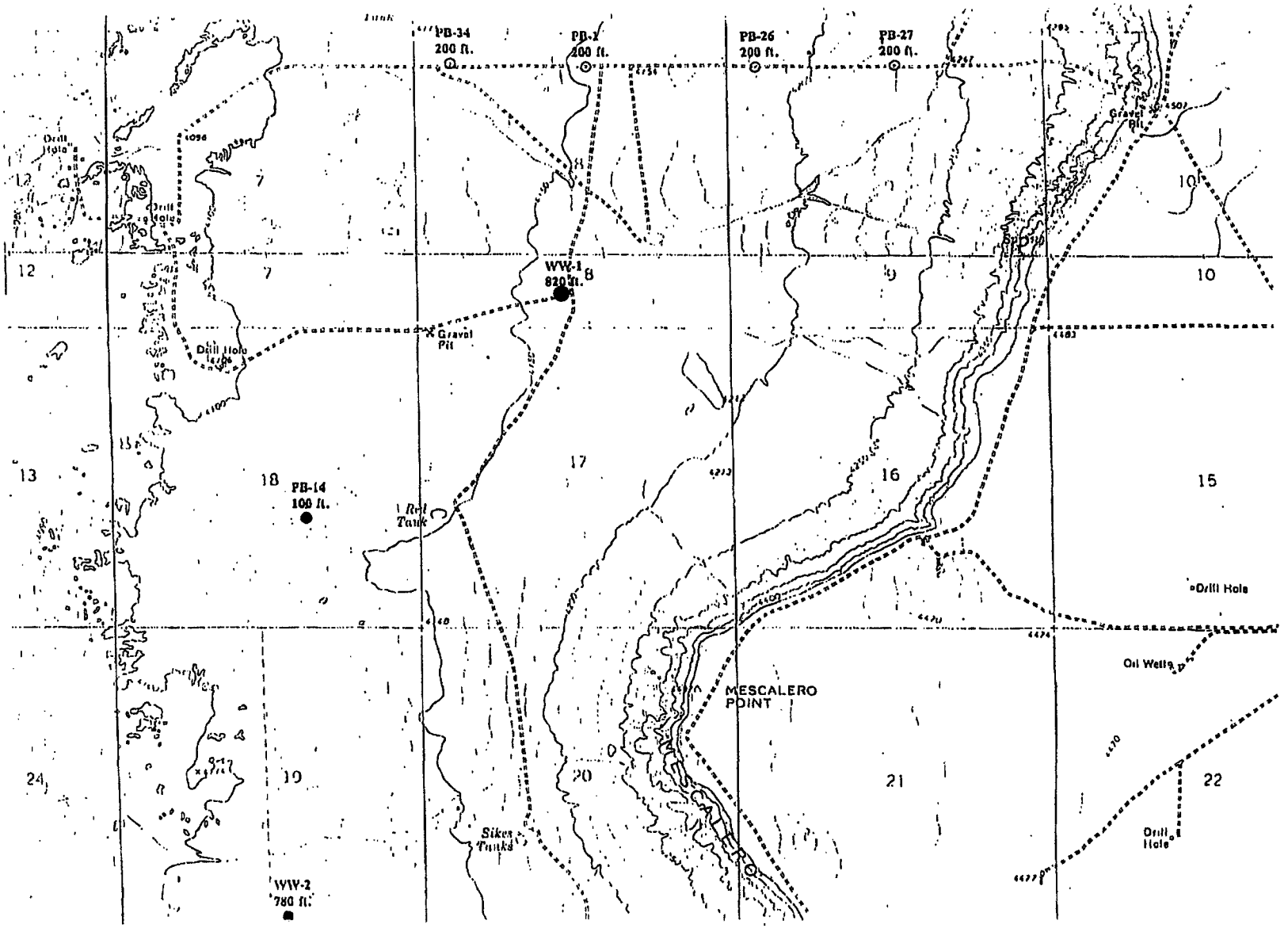
GMI CELL DESIGN



NOT TO SCALE



Scale: 1 : 25,000 Map Rotation: 0° Magnetic Declination: 9.0°E


PB-34
200 ft.
PB-2
200 ft.
PB-26
200 ft.
PB-27
200 ft.
Drill Hole
Drill Hole
Gravel Pit
WW-1
820 ft.
Gravel Pit
Drill Hole
PB-14
100 ft.
Red Tank
Drill Hole
Oil Wells
MESCALERO POINT
Sikes Tanks
WW-2
780 ft.
Drill Hole
12
7
8
9
10
13
18
17
16
15
24
19
20
21
22

Quality Control Engineering, Inc.

1136 W. Hobbs Roswell, NM 88203 505-625-0005 Fax: 625-0555

700 E. First #725C, Alamogordo, NM 88310 505-439-1285 Fax: 439-1283

SOIL REPORT

ASTM D75, D698/1557, C127, C136, C117, D854, D2216, D2487, D4318, D4718

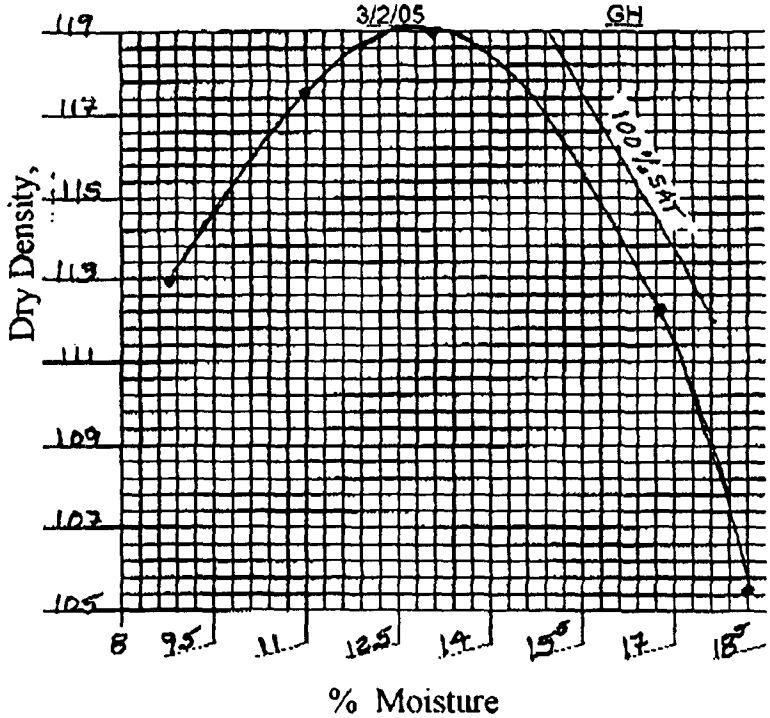
Project Marley Ranch, clay **Job #** 322 **Lab #** A19 **Sample #** 1

Client name & address Gandy Marley, Inc., P.O. Box 827, Tatum, NM 88267 Phone: 505-398-4960 Fax: 396-6887

Material source Marley Ranch, clay **Contractor** NA

Date sampled 2/15/05 **By** JT (client) **Rec'd** 2/15/05 **Tested** 2/16-18/05 **By** GH

U.S. Standard Sieve No.	Cumulative % Retained	Cumulative % Passing	Specs
3"	0%	100%	
1 1/2"	0%	100%	
1"	0%	100%	
3/4"	0%	100%	
3/8"	0%	100%	
#4	0%	100%	
#10	9%	91%	
#40	19%	81%	
#200	44.7%	55.3%	



Material Classification (field) Sandy Clay

0% Gravel
45% Sand
55% Fines

LL=30 PI=15

Coefficient of Permeability=1.7X10-7 (@ 89.5% compaction of D698A) (see attached)

Submitted by: K. Byrd-Humphreys 3/2/05

Test Method ASTM Manual	Max. Dry Density	Optimum Moisture
D698 Method A	118.4 pcf uncorrected	13.3% uncorrected
Nat'l moist 11%		G_S= 2.659

Precision Engineering, Inc.
P.O. Box 422
Las Cruces, NM 88004
505-523-7674

Flexible Wall Hydraulic Conductivity
Falling Head

ATTN: **Ms. Katy Byrd-Humphreys, PE**
Quality Control Engineering, Inc.
1136 W. Hobbs St.
Roswell, NM 88203

Project: QCE Contract Testing — File No.: 05-022
Soil Type: Clay — Date: March 1, 2005 — Lab No.: 46894
Sampled From: Marley Ranch; Job# 322, Lab# A19, Sample# 1 — Performed By: GWG

TEST SPECIMEN CONDITIONS AT BEGINING OF TEST:

Wet Unit Weight: 122.1 pcf
Dry Unit Weight: 106.3 pcf

% Moisture: 14.9
% Compaction: 89.5
% Compaction Requested: 90.0

PROCTOR INFORMATION:

Proctor Method: ASTM D-698-A
Maximum Dry Density: 118.8 pcf
Optimum Moisture Content: 13.1 %

Coefficient of Permeability, k_{20}: 1.7×10^{-7} cm/sec.

Remarks: Sample compacted at 2.0% above optimum moisture content.

Reviewed By:

Reviewed By:

Certified By:

C:\Documents and Settings\Owner\My Documents\APE\Files\Form Masters\Excel Test Reports Master\[46894 Permeability.xls]Report

ASSAIGAI ANALYTICAL LABORATORIES
7300 Jefferson, N.E. • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259
3332 Wedgewood, E-5 • El Paso, Texas 79925 1910 N. Big Springs • Midland, Texas 79705

STOLLER CORPORATION
1717 LOUISIANA BLVD.
ABQ., NM 87110

Attn: JIM BONNER
Invoice Number:

Order #: 94-08-072
Date: 08/19/94 16:28
Work ID: GANDY
Date Received: 08/05/94
Date Completed: 08/19/94
Client Code: STO01

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	WELL #1	03	WELL #3
02	WELL #2		

ND = None Detected D_F = Dilution Factor NT = Not Tested
B = Analyte was present in the blank
E = Estimated Value or Result exceeds calibration range
MULTIPLY THE LIMIT(= AAL'S DETECTION LIMIT) BY DILUTION FACTOR

Certified By

ATTACHMENT A

Received: 08/05/94 Results by Sample

SAMPLE ID WELL #3 FRACTION 03B TEST CODE WFAANA NAME SODIUM (FAA)/EPA 273.1
Date & Time Collected 07/20/94 Category WATER

PARAMETER	RESULT	LIMIT	D_F	DATE_EXT	DATE_ANAL
Sodium, Na	1,640	1.0	200	08/09/94	08/19/94

Notes and Definitions for this Report:

ANALYST KH
UNITS mg/L
BATCH_ID WFAA-181
COMMENTS RESULTS REFLECT TOTAL METALS ANALYSIS

Received: 08/05/94 Results by Sample

SAMPLE ID WELL #3 FRACTION 03B TEST CODE WFAAMG NAME MAGNESIUM (FAA)/EPA 242.1
Date & Time Collected 07/20/94 Category WATER

PARAMETER	RESULT	LIMIT	D_F	DATE_EXT	DATE_ANAL
Magnesium, Mg	103	1.0	20	08/09/94	08/19/94

Notes and Definitions for this Report:

ANALYST KH
UNITS mg/L
BATCH_ID WFAA-181
COMMENTS RESULTS REFLECT TOTAL METALS ANALYSIS

Received. 08/05/94 *Results by Sample*

SAMPLE ID WELL #3 FRACTION 03A TEST CODE WALK NAME ALKALINITY/EPA 310.1

Date & Time Collected 07/20/94 Category WATER

PARAMETER	RESULT	LIMIT	D_F	DATE_ANAL
Alkalinity	396	2.0	1.0	08/09/94

Notes and Definitions for this Report:

EXTRACTED

ANALYST DES

UNITS mg/L

BATCH_ID WALK-66

COMMENTS N/A

Received: 08/05/94 Results by Sample

SAMPLE ID WELL #3 FRACTION 03A TEST CODE TDS NAME TDS/EPA 160.1

Date & Time Collected 07/20/94 Category WATER

PARAMETER	RESULT	LIMIT	D_F	DATE_ANAL
Total Dissolved Solids	4920	1.0	1.0	08/09/94

Notes and Definitions for this Report:

EXTRACTED

ANALYST JCB

UNITS mg/L

BATCH_ID WTDS-140

COMMENTS N/A

REPORT

Work Order # 94-08-072

Received: 08/05/94

Results by Sample

SAMPLE ID WELL #1 FRACTION 01A TEST CODE WALK NAME ALKALINITY/EPA 310.1

Date & Time Collected 07/20/94 Category WATER

PARAMETER	RESULT	LIMIT	D_F	DATE_ANAL
Alkalinity	3.8	2.0	1.0	08/09/94

Notes and Definitions for this Report:

EXTRACTED

ANALYST DES

UNITS mg/L

BATCH_ID WALK-66

COMMENTS N/A

Received: 08/05/94 Results by Sample

SAMPLE ID WELL #1 FRACTION 01B TEST CODE WFAAMG NAME MAGNESIUM (FAA)/EPA 242.1

Date & Time Collected 07/20/94 Category WATER

PARAMETER	RESULT	LIMIT	D_F	DATE_EXT	DATE_ANAL
Magnesium, Mg	51.4	1.0	10	08/09/94	08/19/94

Notes and Definitions for this Report:

ANALYST KH

UNITS mg/L

BATCH_ID WFAA-181

COMMENTS RESULTS REFLECT TOTAL METALS ANALYSIS

Received: 08/05/94

REPORT

Work Order # 94-08-072

Results by Sample

SAMPLE ID WELL #1 FRACTION 01B TEST CODE WFAANA NAME SODIUM (FAA)/EPA 273.1

Date & Time Collected 07/20/94 Category WATER

PARAMETER	RESULT	LIMIT	D_F	DATE_EXT	DATE_ANAL
Sodium, Na	4,600	1.0	500	08/09/94	08/19/94

Notes and Definitions for this Report:

ANALYST KH

UNITS mg/L

BATCH_ID WFAA-181

COMMENTS RESULTS REFLECT TOTAL METALS ANALYSIS

Received: 08/05/94

REPORT

Work Order # 94-08-072

Results by Sample

SAMPLE ID WELL #2 FRACTION 02A TEST CODE TDS NAME TDS/EPA 160.1

Date & Time Collected 07/20/94 Category WATER

PARAMETER	RESULT	LIMIT	D_F	DATE_ANAL
Total Dissolved Solids	18800	1.0	1.0	08/09/94

Notes and Definitions for this Report:

EXTRACTED

ANALYST JCB

UNITS mg/L

BATCH_ID WTDS-140

COMMENTS N/A

Received: 08/05/94

REPORT

Work Order # 94-08-072

Results by Sample

SAMPLE ID WELL #2 FRACTION 02A TEST CODE WALK NAME ALKALINITY/EPA 310.1

Date & Time Collected 07/20/94 Category WATER

PARAMETER	RESULT	LIMIT	D_F	DATE_ANAL
Alkalinity	83.0	2.0	1.0	08/09/94

Notes and Definitions for this Report:

EXTRACTED

ANALYST DES

UNITS mg/L

BATCH_ID WALK-66

COMMENTS N/A

Received: 08/05/94 Results by Sample

SAMPLE ID WELL #2 FRACTION 02B TEST CODE WFAAMG NAME MAGNESIUM (FAA)/EPA 242.1

Date & Time Collected 07/20/94 Category WATER

PARAMETER	RESULT	LIMIT	D_F	DATE_EXT	DATE_ANAL
Magnesium, Mg	67.8	1.0	15	08/09/94	08/19/94

Notes and Definitions for this Report:

ANALYST KH

UNITS mg/L

BATCH_ID WFAA-181

COMMENTS RESULTS REFLECT TOTAL METALS ANALYSIS

Received: 08/05/94 Results by Sample

SAMPLE ID WELL #2 FRACTION 02B TEST CODE WFAANA NAME SODIUM (FAA)/EPA 273.1
Date & Time Collected 07/20/94 Category WATER

PARAMETER	RESULT	LIMIT	D_F	DATE_EXT	DATE_ANAL
Sodium, Na	7,030	1.0	1,000	08/09/94	08/19/94

Notes and Definitions for this Report:

ANALYST KH
UNITS mg/L
BATCH_ID WFAA-181
COMMENTS RESULTS REFLECT TOTAL METALS ANALYSIS

Received: 08/05/94 Results by Sample

SAMPLE ID WELL #1 FRACTION 01A TEST CODE TDS NAME TDS/EPA 160.1
Date & Time Collected 07/20/94 Category WATER

PARAMETER	RESULT	LIMIT	D_F	DATE_ANAL
Total Dissolved Solids	11900	1.0	1.0	08/09/94

Notes and Definitions for this Report:

EXTRACTED
ANALYST JCB
UNITS mg/L
BATCH_ID WTDS-140
COMMENTS N/A

VEGETATION AND SEEDING

MATERIALS

A. Seed mixture for planting shall be as specified by the New Mexico SCS.

B.

SITE PREPARATION

A. Remove all weeds from areas to be planted. Roughen seed bed to a depth of 2 to 4 inches by scarifying, disking, harrowing, or equivalent methods.

PLANTING

A. Plant seed using equipment and procedures appropriate for seed type at recommended by the seed supplier.

VEGETATIVE COVER

MATERIALS

A. Vegetative cover material shall be obtained from the landfill or from on-site or off-site borrow sources.

B. Vegetative cover material shall classify as CL, ML, SC, GC, SM, or GM according to the Unified Soil Classification System (ASTM D 2487) and shall have a maximum particle size not exceeding 3 inches.

PLACEMENT AND COMPACTION

A. Vegetative cover material shall be placed above the cover system at the locations and to the thicknesses shown on the Construction Drawings.

B. The final in-place thickness of the vegetative cover layer shall be not less than 24 inches.

C. Vegetative cover material shall be compacted by two passes of tracked equipment such as a Caterpillar D6H-LGP or other equipment approved by the Owner.

CLAY LINER

MATERIALS

A. Clay liner material shall be obtained from borrow areas or stockpiles identified by the Owner.

B. Clay liner material for landfill or surface impoundment construction shall:

1. Be classified according to the Unified Soil Classification System (USCS) as CL or CH (ASTM D 2487) and exhibit a minimum liquid limit of 30 and a minimum plasticity index of 11.

2. Have a percentage of gravel (i.e., dry weight retained on a U.S. No. 4 sieve) of less than 15 percent.

3. Have particles no larger than 2 inches (in largest dimension) after processing but prior to placement and no larger than 1 inch (in largest dimension) after placement and compaction.

4. Have a hydraulic conductivity of not more than 1 x 10^{-7} cm/sec when compacted in accordance with these General Specifications and tested in the laboratory in accordance with ASTM D 5084 at an average effective confining pressure of 5 psi.

CLAY LINER COMPACTION

A. Clay liner be compacted to a minimum of 95% of the materails maximum dry density as determined by ASTM D698.

B. Compaction of the clay liner for the landfill or surface impoundment shall be performed using a Caterpillar 825 compactor or equal.

C. The daily work area shall extend a sufficient distance so as to maintain soil moisture conditions within an acceptable range to allow continuous operations. Desiccation and crusting of the lift surface shall be avoided as much as possible.

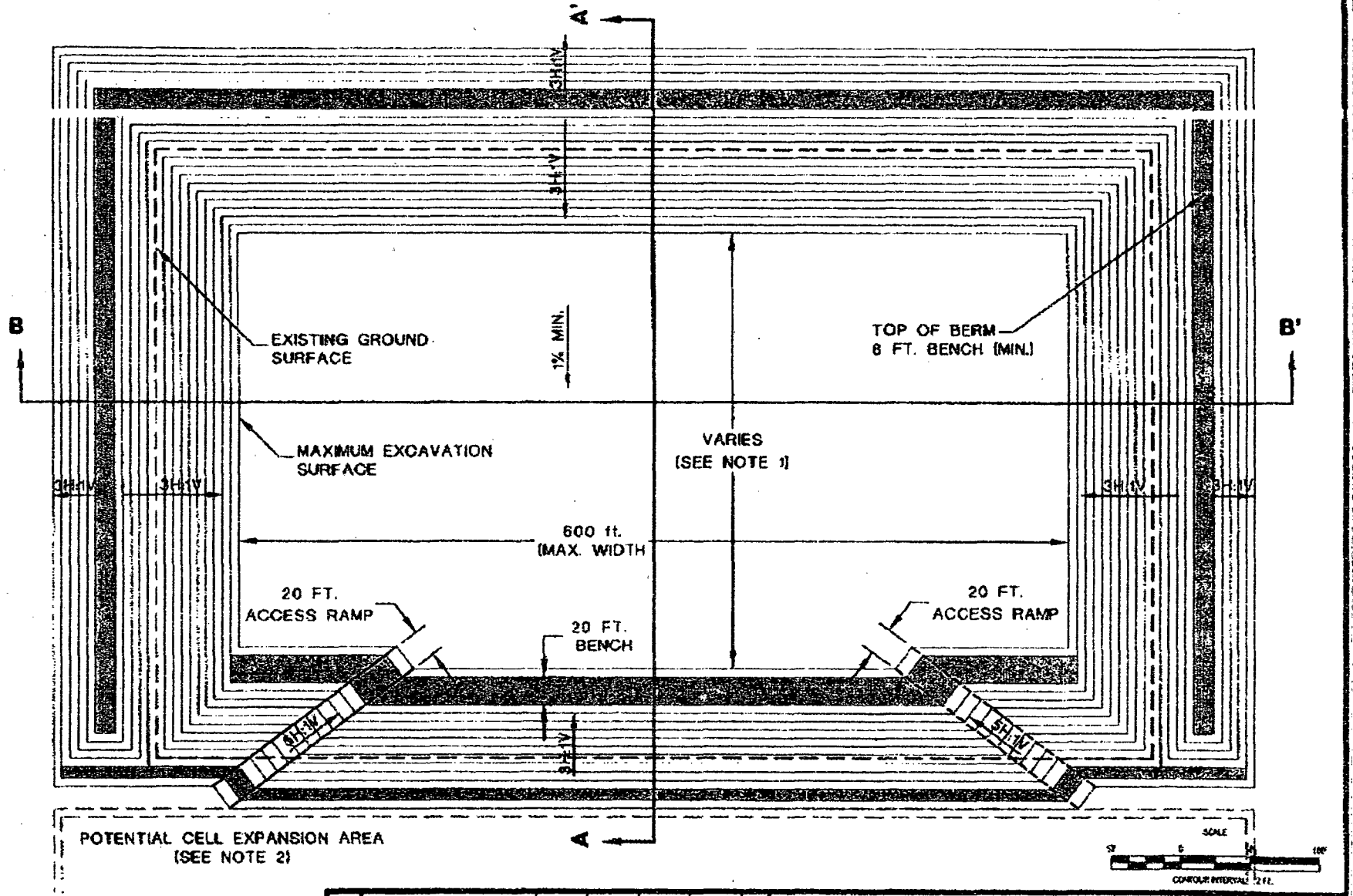
D. The CQA Engineer will identify any areas of significant desiccation and crusting of a lift surface. The Contractor shall scarify the surface of such areas to a nominal depth of 1 to 2 inches or to the depth of desiccation identified by the CQA Engineer, and then water condition, disc or mix as necessary, and recompact the area.

PERFORATIONS

A. Perforations in the clay liner resulting from construction activities shall be filled. Such perforations may include, but are not limited to, the following:

1. Nuclear density test probe locations;

2. Shelby tube sample locations;
3. Sand-cone or rubber-balloon test locations; and,
4. Survey stake locations.



NOTES:
1. CELL LENGTH TO BE DTERMINED PRIOR TO CONSTRUCTION.
2. INITIAL CELL WILL BE EXPANDED IN THE FUTURE.

REV. NO.	REVISIONS	DATE	DESIGN BY	DRAWN BY	RESPONSIBLE ARCHITECT BY
0	For Review	05/05	J.Pelliccia	D.Gallery	J.Pelliccia

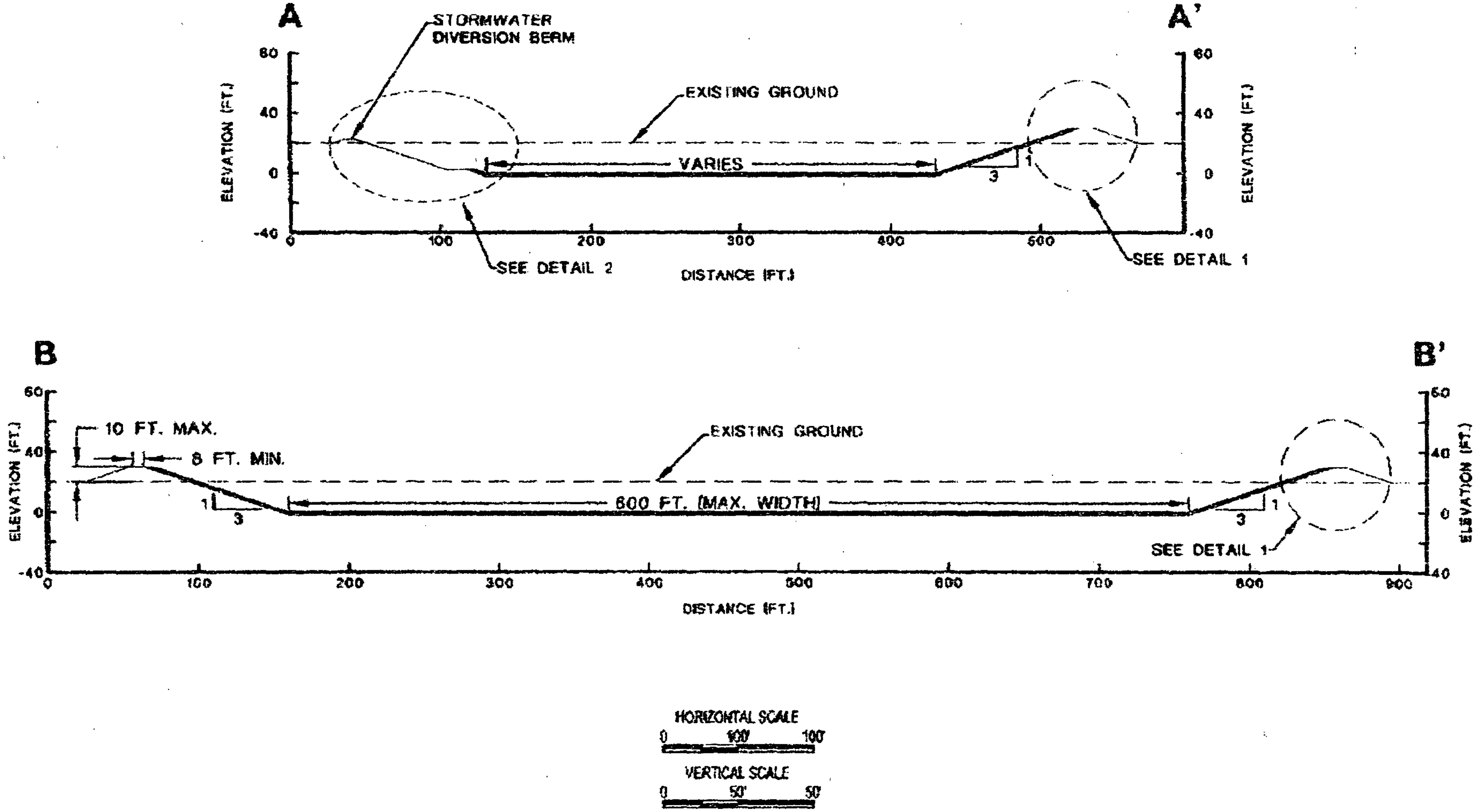
MWH

PROJECT No:

SCALE: As Shown

DRAWING No: 1

TYPICAL CELL PLAN VIEW



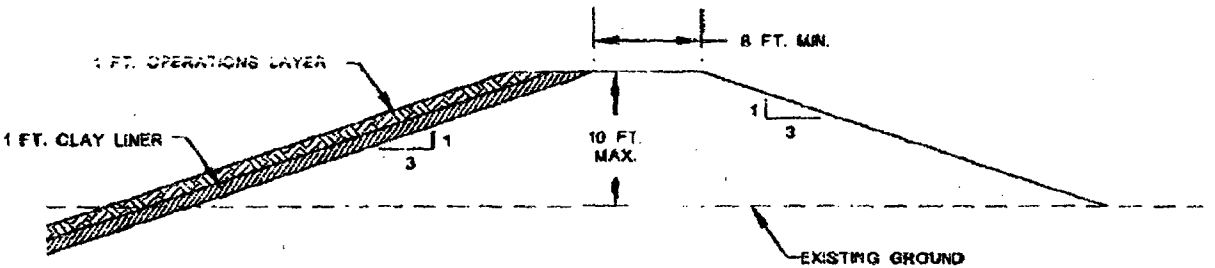
REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
0	For Review	05/05	J.Pellicer	D.Cullen	J.Pellicer

MWH

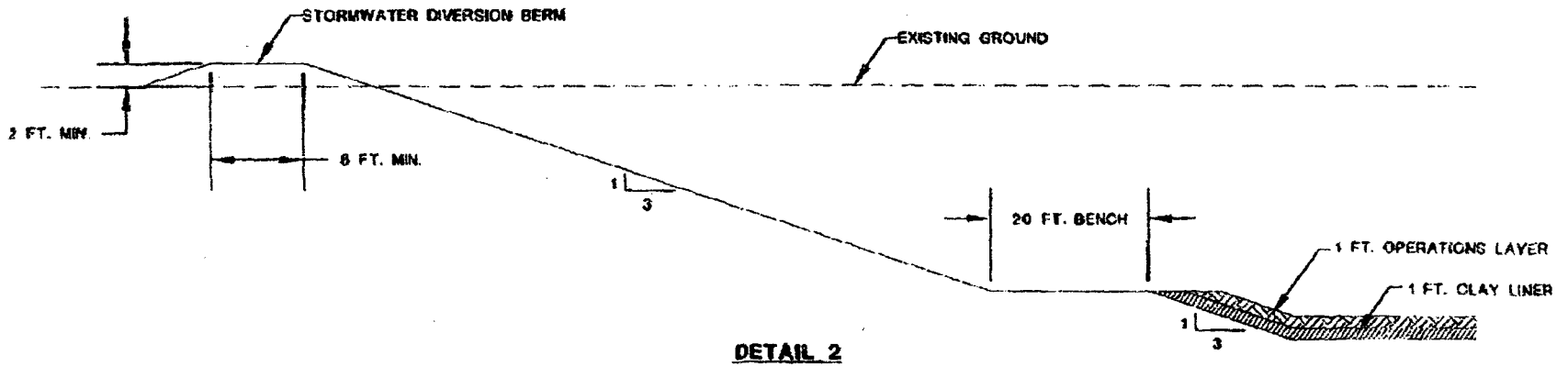
PROJECT No.
AutoCAD FILE: Cell Layout
SCALE: As Shown
FIGURE No. 2

TYPICAL CELL CROSS-SECTIONS

05-12-05 15:09



DETAIL 1
N.T.S.



DETAIL 2
N.T.S.

REV. NO.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND APPROVED BY
0	For Review	05/05	J.Pelliser	D.Gallery	J.Pelliser

MWH

PROJECT No.:
AutoCAD FILE: Cell Layout.dwt
SCALE: As Shown
FIGURE No.: 3

TYPICAL CELL DETAILS

PROTECTIVE SOIL

MATERIALS

A. Soil material shall be obtained from the landfill excavation or off-site borrow sources.

B. Soil layer material shall classify as CL, ML, SC, GC, SM, or GM according to the Unified Soil Classification System (ASTM D 2487) and shall have a maximum particle size not exceeding 6 inches.

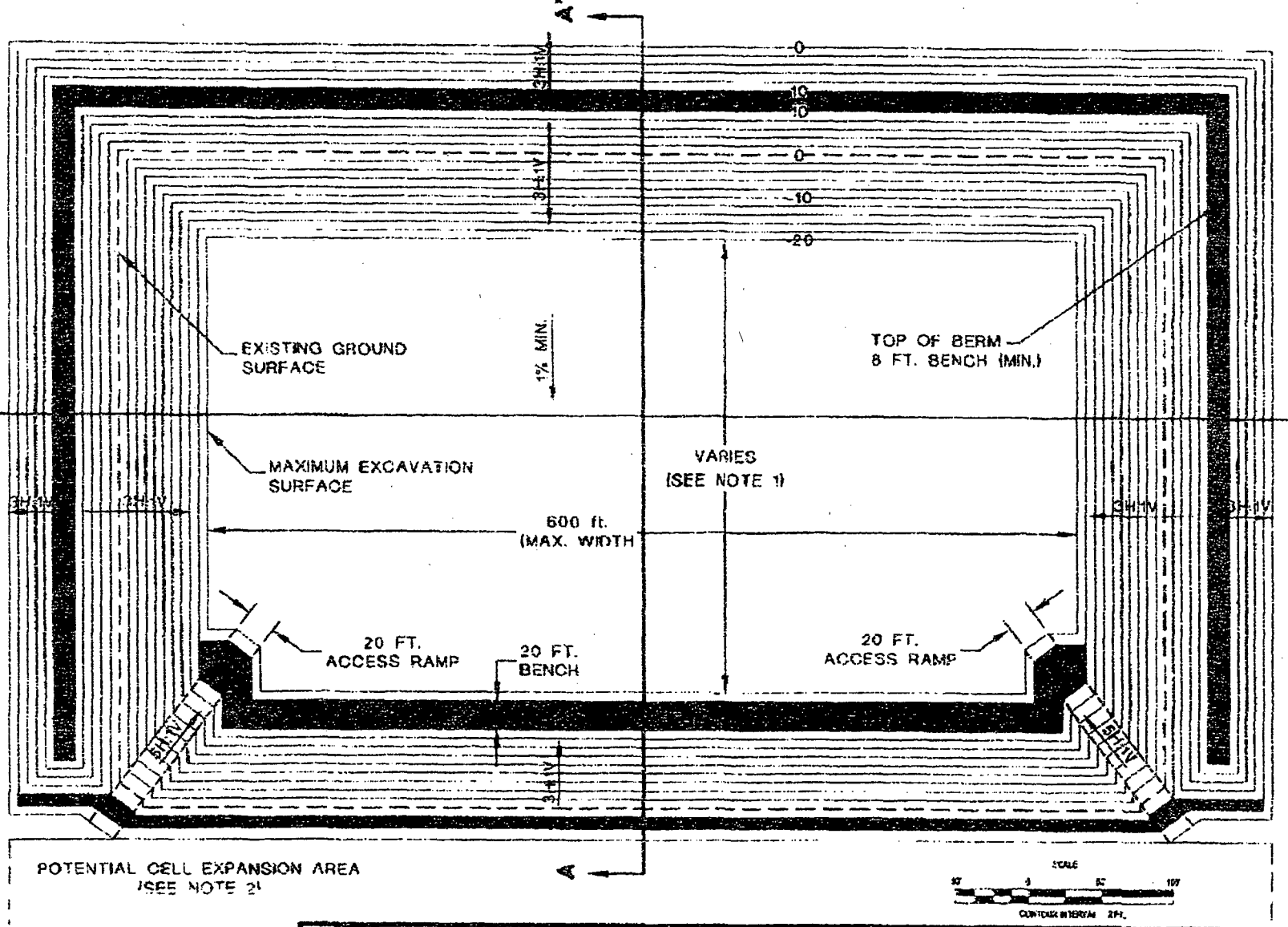
PLACEMENT AND COMPACTION

A. Soil material shall be placed above the waste material at the locations and to the thicknesses shown on the Construction Drawings.

B. The Contractor shall not place the soil layer until the CQA Engineer confirms that the constructed grades and elevations of the waste meet the requirements of the Construction Drawings, all field testing is complete, and approved in accordance with the requirements of the CQA Plan.

C. The final in-place thickness of the soil layer shall be not less than 12 inches.

D. The soil material shall be spread in 1 lift.



NOTES:
1. CELL LENGTH TO BE DETERMINED PRIOR TO CONSTRUCTION.
2. INITIAL CELL WILL BE EXPANDED IN THE FUTURE.

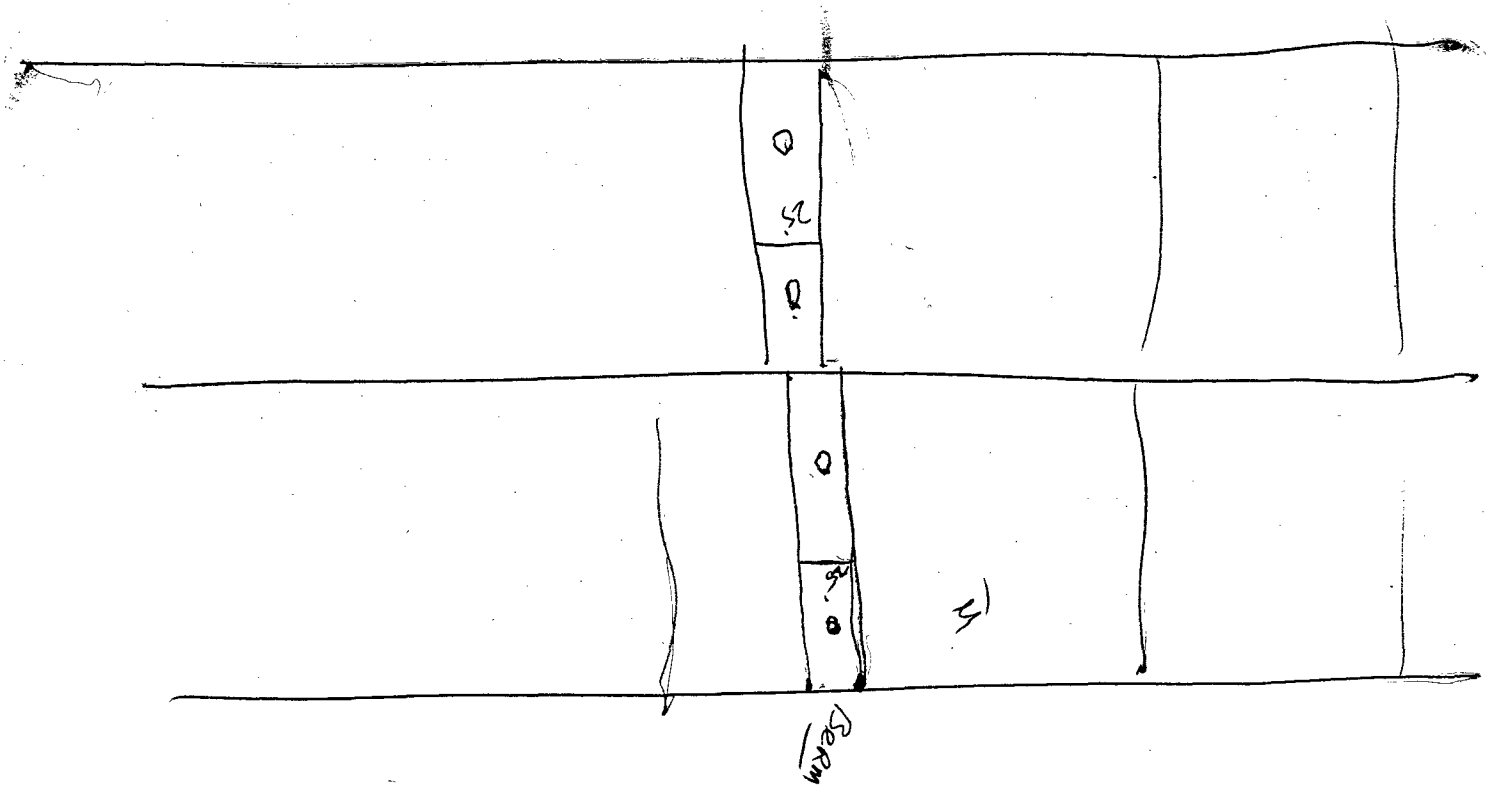
REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
0	For Review	05/99	J.Pelton	D.Gallery	J.Pelton

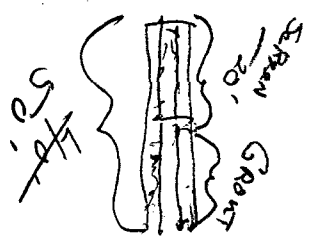
MWH

PROJECT No.
AutoCAD FILE: CM / [illegible].dwg
SCALE: As Shown
FIGURE No. 3

GANDY MARLEY, INC.

TYPICAL CELL PLAN VIEW





Request for a temporary emergency order allowing a landfarm to accept salt-contaminated oilfield waste.

Name of Facility: GANDY MARLEY,INC

Address: PO BOX 1658

City, State, Zip: ROSWELL, NM 88202

Location of landfarm
Qtr/Qtr, Section, Township, Range SEC.4,5,8,9, T11SR31E NMPM

Depth to groundwater at landfarm: 150 FOOT TO WATER, TDS IN EXCESS OF 15,000PPM

Fresh water wells within 1,000 feet? No X

Watercourses (wet or dry) within 1,000 feet? No X

Conditions at the landfarm site which would make it acceptable for the disposal of salt-contaminated oilfield waste. Such conditions could include an impermeable barrier such as clay (red bed) between the landfarm and the groundwater, lack of groundwater at the site, etc.

Facility has a impermeable redbed clay barrier of approximately 150 feet between surface and groundwater. groundwater at site is nonproduceable in both volume and quality (approx. TDS 15,000ppm). Please see original permit application for a complete description of site charateristics.

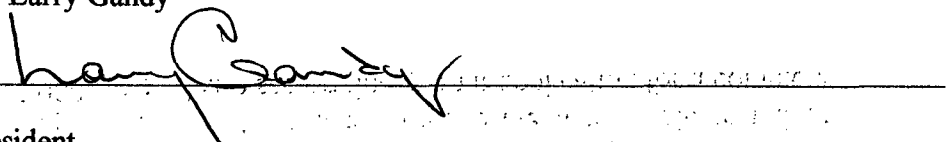
Why do you consider this an emergency? Extensive drilling programs and cleanup of salt contaminated materials in our area by OCD regulation are required to be removed from location because of their threat to the fresh water, human health and the environment.With the administrative modification of landfarm permits there is a critical need for a facility in this area to be able to accept this material. The unique location of this facility ensures future protection to the groundwater, human health, and the environment.

Check one: I have already submitted an application to accept salt-contaminated waste X

I will submit an application for modification in the next two weeks

Signed by:

Printed Name: Larry Gandy

Signature 

Title: Vice president

Date: March 10, 2005.

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

7001 1940 0004 7923 4993

March 4, 2005

Mark E. Fesmire, P.E.
Director
Oil Conservation Division

Gandy Marley, Inc.
P.O. Box 1658
Roswell, NM 88202

Permit Number: NM-1-0019

Re: Administrative Modification of Landfarm Permits

The Oil Conservation Division (OCD) issued the landfarm permit identified above under OCD Rule 711. As explained in the public notice given prior to the issuance of the permit, the permit was for landfarming to remediate hydrocarbon-contaminated soils. The language of the permit, however, is broader, allowing the facility to accept oilfield contaminated solids which are either exempt from the Federal RCRA Subtitle C (hazardous waste) regulations or are "nonhazardous" by characteristic testing. If this language were interpreted to allow the landfarm to accept oilfield waste contaminated with salts, the salts could compromise the biodegradation capacity of the landfarm. And because salts leach more easily than hydrocarbons, the landfarm may pose a greater threat to groundwater.

According to the terms of the permit identified above, the OCD may change the permit conditions administratively for good cause shown as necessary to protect fresh water, human health and the environment. The OCD has determined that it is necessary to protect fresh water, human health and the environment to modify the permit as follows:

> **Effective immediately, the NMOCD permitted landfarm identified above is prohibited from accepting oilfield waste contaminated with salts.**

If the landfarm identified above wishes to accept oilfield waste contaminated with salts, you will need to file an application to modify the permit pursuant to OCD Rule 711.B(1) and follow the notice requirements of OCD Rule 711.B(2). If you have already filed a complete application for permit modification with this office and complied with the notice requirements, the OCD will process the application promptly.

Landfarms that wish to accept oilfield wastes contaminated with salts while their application for permit modification is pending may apply to the Division Director for an emergency order under OCD Rule 1202. Applications for emergency orders will be considered on a case-by-case basis.

This notice is being sent to all entities operating landfarm facilities in New Mexico permitted pursuant to OCD Rule 711, as shown on the attached list.

If you have any questions, please contact Ed Martin at (505) 476-3492 or emartin@state.nm.us.

Very truly yours,

Mark E. Fesmire, P.E

Larry D. Gandy

From: "Larry D. Gandy" <gandy2@leaco.net>
To: "Price, Wayne" <WPrice@state.nm.us>
Sent: Wednesday, March 02, 2005 7:40 AM
Subject: Fw: Tatum Brine

—— Original Message ——
From: Price, Wayne
To: 'Larry D. Gandy' ; Price, Wayne
Sent: Monday, August 23, 2004 1:30 PM
Subject: RE: Tatum Brine

Dear Larry:

As discussed during your last visit, you permit allows you to except oilfield exempt material.

-----Original Message-----
From: Larry D. Gandy [mailto:gandy2@leaco.net]
Sent: Saturday, August 21, 2004 7:34 AM
To: Price, Wayne
Subject: Tatum Brine

Wayne,

Yes, Billy Pritchard Witnessed the MIT on tues. aug. 17, he also signed the chart.

Also on the landfarm, could we have documentation that our facility is able to accept drilling muds and chloride impacted soils, there are numerous new drilling pits and swd leaks in the area that the producers would like to clean up.
thanks, larry

—— Original Message ——
From: Price, Wayne
To: Price, Wayne ; 'Larry D. Gandy'
Cc: Gonzales, Elidio ; Johnson, Larry
Sent: Friday, August 20, 2004 11:14 AM
Subject: RE: Tatum brine station

Larry did you run your MIT yet?

-----Original Message-----
From: Price, Wayne
Sent: Tuesday, August 10, 2004 1:05 PM
To: 'Larry D. Gandy'
Cc: Gonzales, Elidio; Johnson, Larry
Subject: RE: Tatum brine station

Larry after you pull the tubing you will be required to set a Packard and run an MIT. 30 min's at 300 psig. Get OCD to witness the test.

3/25/05
Case 13454
GMI 1

-----Original Message-----
From: Larry D. Gandy [mailto:gandy2@leaco.net]
Sent: Tuesday, August 10, 2004 11:52 AM

Larry D. Gandy

From: "Price, Wayne" <WPrice@state.nm.us>
To: "Fesmire, Mark" <MFesmire@state.nm.us>; "Anderson, Roger" <RCANDERSON@state.nm.us>; "Martin, Ed" <EMARTIN@state.nm.us>; "MacQuesten, Gail" <GMacQuesten@state.nm.us>
Cc: "Gum, Tim" <TGum@state.nm.us>; "Williams, Chris" <CWilliams@state.nm.us>
Sent: Tuesday, March 01, 2005 1:45 PM
Subject: Gandy-Marley Landfarm

Approximately 6-7 months ago Roger Anderson and I met with the owners of Gandy-Marley Landfarm. I issued them an approval to take drilling material that was laden with salts. This landfarm has no groundwater under it, sets on top of 600-2000 feet of indurated red bed clay. Gandy-Marley has a very large area and they presently do not mix the salts with any other material. Their future plans at the time was to apply for a landfill due to the high demand for this type of facility. Roger and I both made a decision that they could stage this material on site. They also are permitted by the NMED for a landfill and for a Hazardous waste permit. This site is probably the most ideal site in the state.

Several companies in this area have extensive drilling programs and the need to properly dispose of this material is paramount. This approval was not considered a modification because the cells were already constructed and part of the original permit. Also, part of the permit included taking oilfield liquids and a solidification unit. These type of material were permitted knowing that they can contain salts and these materials would be placed where as not to interfere with the bio-remediation of the other cells. So in essence, OCD has already permitted this facility.

If we require this company to stop taking salt laden material or liquids, I think it will be an enormous short term burden on the industry. I recommend that we allow this company to continue taking drilling material in this area. This way it will allow the drilling programs to continue to take place in the northern part of District I and II.

There will be no environmental impact as a result of OCD's decision.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

From: Price, Wayne
Sent: Tuesday, March 01, 2005 1:46 PM
To: Fesmire, Mark; Anderson, Roger; Martin, Ed; MacQuesten, Gail
Cc: Gum, Tim; Williams, Chris
Subject: Gandy-Marley Landfarm

Approximately 6-7 months ago Roger Anderson and I met with the owners of Gandy-Marley Landfarm. I issued them an approval to take drilling material that was laden with salts. This landfarm has no groundwater under it, sets on top of 600-2000 feet of indurated red bed clay. Gandy-Marley has a very large area and they presently do not mix the salts with any other material. Their future plans at the time was to apply for a landfill due to the high demand for this type of facility. Roger and I both made a decision that they could stage this material on site. They also are permitted by the NMED for a landfill and for a Hazardous waste permit. This site is probably the most ideal site in the state.

Several companies in this area have extensive drilling programs and the need to properly dispose of this material is paramount. This approval was not considered a modification because the cells were already constructed and part of the original permit. Also, part of the permit included taking oilfield liquids and a solidification unit. These type of material were permitted knowing that they can contain salts and these materials would be placed where as not to interfere with the bio-remediation of the other cells. So in essence, OCD has already permitted this facility.

If we require this company to stop taking salt laden material or liquids, I think it will be an enormous short term burden on the industry. I recommend that we allow this company to continue taking drilling material in this area. This way it will allow the drilling programs to continue to take place in the northern part of District I and II.

There will be no environmental impact as a result of OCD's decision.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

COMMERCIAL LAND FARMS

A New Mexico Enterprise
Serving New Mexico's Needs

February 18, 2005

New Mexico Oil Conservation Division
Attn: Mr. Ed Martin
1220 South St. Francis Drive
Santa Fe, NM 87505

Dear Mr. Martin,

Gandy - Marley Inc. is requesting authority to accept brine impacted soils, drilling mud, mud, and liquids from oil and gas operations. Previously submitted documents state that the groundwater at the facility is 150' feet below ground suface. Laboratory anlalysis of this groundwater revealed a TDS concentration range five to 18 times the NMWQCC published health standards.

Gandy - Marley Inc. has taken additional precautions to prevent either surface spread or deep seepage of brine contaminated soils by constructing individual cells for all brine contaminated soils. These cells will be closed and compacted upon being filled.

Thank you in advance for your earliest consideration of this matter. if you need to get in touch, please do not hesitate to call me at (505) 347-0434 or on my cellular phone at (505) 626 6513. Thank you.

Sincerely,

Bill Marley
Vice President Gandy-Marley Inc.

Gandy Marley, Inc. • Box 1658 • Roswell, NM 88201 • (505) 398-4960 • FAX (505) 398-6887

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

September 17, 2004

Mark E. Fesmire, P.E.
Director
Oil Conservation Division

Mr. Larry Gandy
Gandy Marley, Inc.
P.O. Box 1658
Roswell, NM 88202

Dear Mr. Gandy:

Since the New Mexico Oil Conservation Division (NMOCD) promulgated Rule 50 covering pits and below-grade tanks, there has arisen a need, in certain circumstances, for operators to transport their drill cuttings off-site and dispose of them.

NMOCD Rule 711, as it pertains to landfarms, does not specifically address the issue of exempt oilfield wastes that may be contaminated with salts. Your landfarm application and permit were written with only hydrocarbon-contaminated soils in mind. Salt-contaminated wastes cause the following problems:

1. Lessening the effectiveness of the biodegradation capacity of your landfarm
2. Rapid leachability causing adverse effects on groundwater

If you want to accept salt-contaminated cuttings or any other salt-contaminated wastes, your 711 permit must be modified to ensure that your acceptance of those wastes will not adversely affect public health or the environment.

Please check one of the following:

☐ I have accepted or intend to accept salt-contaminated wastes in my landfarm. An OCD form C-137, applying for a modification to my 711 permit is attached. Included, as an attachment, is a demonstration that the accepted salt-contaminated soils will not adversely affect groundwater in the foreseeable future. (Closure requirements will also require modification to ensure the protection of groundwater. Should your acceptance of salt-contaminated wastes prove detrimental to groundwater, future liability for such damage rests with the landfarm operator).

☐ I do not intend to accept salt-contaminated wastes in my landfarm. Should this condition change, I will submit an OCD Form C-137 for a modification to my 711 permit at that time.

New Mexico Oil Conservation Division
Attn: Ed Martin
1220 S. St. Francis
Santa Fe, NM 87505

This letter must be returned to the above address no later than October 31, 2004. An extension of time may be granted if you contact this office no later than that date.

If you have any questions, contact Ed Martin (505) 476-3492 or emartin@state.nm.us

Signed _____ Date _____

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Lori Wrotenbery
Director
Oil Conservation Division

Memorandum of Meeting or Conversation

Telephone ____
Personal ___X___
E-Mail _____

Time: **10:00 am**
Date: Aug 04, 2004

Originating Party: **Larry Gandy, Bill Marley**

Other Parties: **Wprice, Emartin, RCAnderson**

Subject: **Permit NM-01-0019**

Discussion: **Withdraw of submitted application for permit modification.**

Conclusions or Agreements:

Returned the Application.

Signed:____ _____

CC:

COMMERCIAL LAND FARMS

A New Mexico Enterprise
Serving New Mexico's Needs

June 5, 2000

Martyne J. Kieling
New Mexico Energy, Minerals & Natural Resources Dep.
2040 South Pacheco Street
Santa Fe, New Mexico

RE: Response to Inspection Report dated April 19, 2000

Dear Mrs.Kieling

Thank you for the favorable inspection report on our landfarm. The following deals with the deficiencies found in Attachment 1.

6. Trash and Potentially Hazardous Materials:
Plastic in the landfarm cells has already been picked up.

9. Concrete Mixing Impoundment:
Contaminated soils surrounding the impoundment has already been removed and placed within the landfarm.

16. H 2 S Screeing:
The H 2 S screening has been corrected so that it is documented on each trip ticket that pertains to tank bottoms.

If you have any questions please don't hesitate to call me at (505) 398-4960.

Sincerely,

Larry Gandy

Gandy Marley, Inc. • Box 1658 • Roswell, NM 88201 • (505) 398-4960 • FAX (505) 398-6887

2000

CELL Summary Report for OCD material.

4/10/00

Gandy Marley, Inc.
P.O. Box 1658 Roswell, NM 88202
Phone 505-625-9206 Fax 505-625-9706

CELL

Generator ID:	Origin:	Discription:	Units
EXEMPT OCD			
Dasco	MC ALISTER STATE #1 Total Units	OCD EXEMPT LIQUIDS	220 BBLS
		DASCO Total Units	220
Dynegy	SAUDERS PLANT Total Units	OCD EXEMPT LIQUIDS	130 BBLS
		Dynegy Midstream Services Total Units	130
El Paso	ROSWELL STATION Total Units	OCD EXEMPT LIQUIDS	10 BBLS
		El Paso Natural Gas Total Units	10
Fagadau	COY LOWE SWD 31 E Total Units	OCD LIQUIDS	130 BBLS
		Fagadau Total Units	130
GANDY	DAKOTA RESOURCES- STATE #1 Total Units	OCD LIQUIDS	30 BBLS
GANDY	DAKOTA RESOURCES- TOBAC SWD Total Units	OCD LIQUIDS	45 BBLS
GANDY	TOCO- MORSE #1 Total Units	OCD LIQUIDS	110 BBLS
		Gandy Corp. Total Units	185
Julian	ACME 2 Total Units	OCD EXEMPT LIQUIDS	100 BBLS
		Julian Ard Total Units	100
Ocean	TOWNSEND #1 Total Units	OCD EXEPMT LIQUIDS	240 BBLS
		Ocean Energy Corporation Total Units	240
Purvis	GLADIOLA SWD Total Units	OCD EXEMPT LIQUIDS	120 BBLS
Purvis	LOWE 1-A Total Units	OCD EXEMPT LIQUIDS	110 BBLS
		Purvis Operating Total Units	230
Redhorn	SFRRR #15 Total Units	OCD EXEMPT LIQUIDS	45 BBLS
		Redhorn Total Units	45
		EXEMPT OCD Total Units.	**1290**
		Cell Total Units	**1290**

CELL 11

Generator ID:	Origin:	Discription:	Units

GM inc.
Gandy Marley, Inc.
P.O. Box 1658 Roswell, NM 88202
Phone 505-625-9206 Fax 505-625-9706

CELL Summary Report for OCD material.

4/10/00

NON EXEMPT OCD

Dynegy	Total Units	OCD NON EXEMOT SILS	12 YARDS
		Dynegy Midstream Services Total Units	12
		NON EXEMPT OCD Total Units.	**12**

EXEMPT OCD

Bonneville	LOTTIE YORK #3 Total Units	OCD EXEMPT SOILS	20 YARD
Bonneville	NORRIS #4 Total Units	OCD EXEMPT SOILS	40 YARD
		Bonneville Fuels Total Units	60
Chesapeake	CSW 17 #1 Total Units	OCD EXEMPT SOILS	99 YARDS
		Chesapeake Operating Total Units	99
Dynegy	CLAVENE COMP. STATION Total Units	OCD SOILS	10 YARDS
		Dynegy Midstream Services Total Units	10
El Paso	ROSWELL STATION Total Units	OCD NON EXEMPT SOILS	33 YARDS
		El Paso Natural Gas Total Units	33
Faskin	FELBONT COLLIER Total Units	OCD EXEMPT SOILS	958 YARDS
		Faskin Oil & Cattle Co. C/O Gandy Corp. Tota	958
Gillespie	STATE D #3 Total Units	OCD SOILS	80 YARDS
Gillespie	TRUSTEE STATE D Total Units	OCD EXEMPT SOILS	260 YARDS
		Charles B. Gillespie Total Units	340
Lynx	AZTEC DOS STATE #1 Total Units	OCD SOILS	5 YARDS
Lynx	JONES & AZTEC DOS BATT. Total Units	OCD SOILS	10 YARDS
		Lynx Petroleum Consultants Total Units	15
NMSWD	HUMBLE STATE #1 Total Units	OCD EXEMPT SOILS	15 YARDS
		New Mexico SWD, Inc. Total Units	15
		EXEMPT OCD Total Units.	**1530**
		Cell 11 Total Units	**1542**
		OCD Material Total Units	**2832**

GM inc.

CELL Summary Report for OCD material. 1999

4/10/00

Gandy Marley, Inc.
P.O. Box 1658 Roswell, NM 88202
Phone 505-625-9206 Fax 505-625-9706

CELL

Generator ID:	Origin:	Discription:	Units
NON EXEMPT OCD			
El Paso	CAPROCK STATION Total Units	OCD NON EXEMPT LIQUIDS	70 BBLS
El Paso	CORD UNAS STATION Total Units	OCD NON EXEMPT LIQUIDS	100 BBLS
		El Paso Natural Gas Total Units	170
		NON EXEMPT OCD Total Units.	**170**
EXEMPT OCD			
Chaparral	WHITE STATE A#1 Total Units	FILL SAND	348 YARDS
		Chaparral Energy Total Units	348
Dynegy	BLUITT PLANT Total Units	OCD NON EXEMPT LIQUIDS	310 BBLS
Dynegy	LEHMAN BOOSTER Total Units	OCD EXEMPT LIQUIDS	100 BBLS
Dynegy	SANDERS PLANT 146 Total Units	OCD LIQUIDS	125 BBLS
DYNEGY	TOWNSEND BOOSTER Total Units	OCD EXEMPT LIQUIDS	104 BBLS
		Dynegy Midstream Services Total Units	639
El Paso	CAPROCK STATION Total Units	OCD NON EXEMPT LIQUIDS	123 BBLS
El Paso	PLAINS COMPRESSOR STATION Total Units	OCD NON EXEMPT LIQUIDS	175 BBLS
		El Paso Natural Gas Total Units	298
Energen	ENERGEN B# SWD Total Units	OCD DRILLING MUD	120 BBLS
		Energen Resources Total Units	120
GANDY	WISER Total Units	OCD LIQUIDS	40 BBLS
		Gandy Corp. Total Units	40
KN	LAMESA COMPRESSOR STATION Total Units	OCD TANK BOTTOMS	60 BBLS
		KN Energy Total Units	60
Midland	BUTTON UP Total Units	OCD LIQUIDS	50 BBLS
		Midland Operating Total Units	50
Ocean	TOWNSEND STATE #8 Total Units	OCD EXEPT LIQUIDS	3330 BBLS
		Ocean Energy Corporation Total Units	3330

GM inc.
Gandy Marley, Inc.
P.O. Box 1658 Roswell, NM 88202
Phone 505-625-9206 Fax 505-625-9706

CELL Summary Report for OCD material.

4/10/00

PEDCO	TP #1 Total Units	OCD EXEMPT DRILLING MUD	1240 BBLS
Pedco	TP STATE #1 Total Units	OCD LIQUIDS	220 BBLS
Pedco	TP STATE #2 Total Units	OCD LIQUIDS	600 BBLS
		PEDCO Total Units	2060
Saga	U.D. SAWYER Total Units	OCD EXEMPT LIQUIDS	30 BBLS
		Saga Total Units	30
Transwestern	TRANSWESTERN PIPELINE Total Units	OCD EXEMPT LIQUIDS	30 BBLS
		Transwestern Pipeline Co. Total Units	30
Xeric	MESA QUEEN Total Units	OCD LIQUIDS	70 BBLS
		Xeric Oil & Gas Total Units	70
Yates	CHALUPA SWD Total Units	OCD LIQUIDS	45 BBLS
		Yates Petro. Total Units	45
		EXEMPT OCD Total Units.	**7120**
		Cell Total Units	**7290**

CELL 10

Generator ID:	Origin:	Discription:	Units
NON EXEMPT OCD			
EOTT	TITAN Total Units	OCD NON EXEMPT SOILS	14 YARDS
		Eott Energy Operating Total Units	14
Nabors	HOBBS YARD Total Units	OCD NON EXEMPT SOILS	1246 YARDS
		Nabors Drilling Total Units	1246
		NON EXEMPT OCD Total Units.	**1260**
EXEMPT OCD			
BLM	CARSBAD Total Units	OCD EXEMPT SOILS	337 YARDS
		Bureau of Land Management Total Units	337
Chaparral	WHITE STATE A #1 Total Units	OCD EXEMPT SOILS	774 YARDS
		Chaparral Energy Total Units	774
Dynegy	DEAN COMPRESSOR Total Units	OCD EXEMPT SOILS	6 YARDS

GM inc.
Gandy Marley, Inc.
P.O. Box 1658 Roswell, NM 88202
Phone 505-625-9206 Fax 505-625-9706

CELL Summary Report for OCD material.

4/10/00

		Dynegy Midstream Services Total Units	6
Kaiser	MURPHY A #1 Total Units	OCD EXEMPT SOILS	10 YARDS
		Kaiser Francis Total Units	10
Penroc	STATE23 #2 Total Units	OCD EXEMPT SOILS	20 YARDS
		Penroc Total Units	20
Transwestern	EUNICE PLANT Total Units	OCD NONEXEMPT SOILS	6 BBLS
		Transwestern Pipeline Co. Total Units	6
Yates	CHAMPLIN AQD ST#1 Total Units	OCD EXEMPT SOILS	35 BBLS
		Yates Petro. Total Units	35
		EXEMPT OCD Total Units.	**1188**
		Cell 10 Total Units	**2448**

CELL 11

Generator ID:	Origin:	Discription:	Units
NON EXEMPT OCD			
Baker	STATE T Total Units	OCD SOILS	2 YARDS
		Baker Petrolite Total Units	2
		NON EXEMPT OCD Total Units.	**2**
EXEMPT OCD			
Bonneville	YORK Total Units	OCD EXEMPT SOILS	370 YARDS
		Bonneville Fuels Total Units	370
Devon	WINSTON GAS COM 32 Total Units	OCD SOILS	24 YARDS
		Devon Energy Corp. Total Units	24
Eott	CAPROCK STATION Total Units	OCD SOILS	5 YARDS
		Eott Energy Operating Total Units	5
Frisco	STATE P Total Units	OCD EXEMPT SOILS	129 YARDS
		Frisco Energy Total Units	129
Pedco	TP A STATE Total Units	OCD EXEMPT SOILS	250 YARDS

GM inc.
Gandy Marley, Inc.
P.O. Box 1658 Roswell, NM 88202
Phone 505-625-9206 Fax 505-625-9706

CELL Summary Report for OCD material.

4/10/00

		PEDCO Total Units	250
Yates	CHALUPA SWD Total Units	OCD SOILS	46 YARDS
		Yates Petro. Total Units	46
		EXEMPT OCD Total Units.	**824**
		Cell 11 Total Units	**826**

CELL 9

Generator ID:	Origin:	Discription:	Units
NON EXEMPT OCD			
Transwestern	TWPL EUNICE PLANT Total Units	OCD NON EXEMPT SOILS	34 YARD
		Transwestern Pipeline Co. Total Units	34
		NON EXEMPT OCD Total Units.	**34**
		Cell 9 Total Units	**34**
		OCD Material Total Units	**10598**

Public Regulation Commission

3/6/2000

GANDY MARLEY, INC.

MAILING ADDRESS
PO BOX 1658 ROSWELL NEW MEXICO 88202

SCC Number: **1690171** *Tax & Revenue Number:* **02281466003**

INCORPORATED ON SEPTEMBER 29, 1994 , IN NEW MEXICO.

CORPORATION IS A DOMESTIC PROFIT

CORPORATION IS ACTIVE
GOOD STANDING THROUGH: 3/15/2000

PURPOSE OF THE CORPORATION
SOIL REMEDIATION

CORPORATION DATES
Taxable Year End Date: 12/31/99 Filing Date: //
Corporate Existence Expiration Date:

SUPPLEMENTAL POST MARK DATES
Supplemental: Name Change: Purpose Change:

PRINCIPAL ADDRESS
PO BOX 1658 ROSWELL NEW MEXICO 88202

PRINCIPAL ADDRESS(Outside New Mexico)

REGISTERED AGENT
H. DALE GANDY
1109 E. BROADWAY TATUM NEW MEXICO 88267

Designation date: 03/12/98 Agent Post Mark Date: Resignation date:

COOP LICENSE INFORMATION
Number: Type: Expiration Year:

GANDY, H. DALE *President*
GANDY, LARRY *Vice President*
MARLEY, ROBERT C. *Secretary*

MARLEY, ROBERT C. ***Treasurer***

DIRECTORS

Date Election of Directors: 01/02/99

GANDY , ALTA
PO BOX 1658 ROSWELL , NM 88202
GANDY , H. DALE
PO BOX 1658 ROSWELL , NM 88202
GANDY , JOHN
PO BOX 1658 ROSWELL , NM 88202
GANDY , LARRY
PO BOX 1658 ROSWELL , NM 88202
MARLEY , MARK
PO BOX 1658 ROSWELL , NM 88202
MARLEY , MICHAEL
PO BOX 1658 ROSWELL , NM 88202
MARLEY , ROBERT C
PO BOX 1658 ROSWELL , NM 88202
MARLEY , ROBERT W
PO BOX 1658 ROSWELL , NM 88202

New Search Inquiry Page