Beeland Group, LLC

UIC PERMIT APPLICATION

Class I Non-Hazardous Injection Well

Beeland Group, LLC

Alba, Michigan Facility

Antrim County

T30N, R5W, Section 14, SE ¼ Section

EPA Permit # TBD

October 6, 2006

Prepared By:

Petrotek

Petrotek Engineering Corporation
9088 S. Ridgeline Boulevard, Suite 105
Littleton, Colorado 80129
Phone: (303) 290-9414
Fax: (303) 290-9580

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USEPA Permit Forms

1.0 PERMIT APPLICATION AND INTRODUCTION

Through the submittal of this application, Beeland Group, LLC, requests authorization from the US Environmental Protection Agency (USEPA) to install and operate a non-hazardous Class I disposal well located at their Alba, Michigan facility pursuant to the applicable Underground Injection Control (UIC) regulations. The well is to be located in Antrim County, Michigan within the limits of Star Township, approximately 495 feet from the south line and 1,320 feet from the east line of the southeast corner of Section 14, T30N, R5W. A map identifying the facility location is included as Figure 1. A completed copy of USEPA UIC 7520-6, "Underground Injection Control Permit Application" for the well is included in this Response, and required attachments to this form are included in this document.

The Beeland Group facility in Alba, Michigan intends to operate one Class I Non-Hazardous Disposal Well for underground injection of fluids from a groundwater remediation project. Fresh water aquifers in the vicinity of this well are to be protected by multiple strings of casing and cement. Injected fluids will be delivered to the Dundee Formation injection interval under gravity feed or positive pressure flow through tubing and a packer. The well is to have one cemented long string protective casing extending into the injection interval. The wellbore is to be an openhole completion within the injection interval. The annulus area between the protective casing and injection tubing string is to be filled with inhibited fresh water. Annulus pressure will be continuously monitored to detect any leaks in the tubing or casing and annulus pressure is maintained at levels of more than 100 psi above the tubing pressure.

Relevant administrative data regarding the permit are summarized as follows.

Applicant:	Beeland Group, LLC
State:	Michigan
County:	Antrim
Township:	Star
Facility Address:	10577 Alba Highway, Alba, Michigan 49611
Mailing Address:	One Energy Plaza, Jackson, Michigan 49201
Location of Well:	SE/4 of Section 14, T30N, R5W
USEPA ID Nos.:	Beeland Disposal Well No. 1, TBD
Michigan ID No.:	Beeland Disposal Well No. 1, TBD
Contact:	Mr. Joseph Tomasik, Vice-President

OMB No. 2040-0042 Approval Expires 1/31/05

United States Environmental Protection Agency

EPA

Underground Injection Control
Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number		T/A	C
U	MI-009-1I-0001		

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number
			Beeland Disposal No. 1	

II. Owner Name and Address

Owner Name	Street Address	Phone Number	City	State	ZIP CODE
Beeland Group, LLC	One Energy Plaza	(517) 788-9045	Jackson	MI	49201

III. Operator Name and Address

Owner Name	Street Address	Phone Number	City	State	ZIP CODE
Beeland Group, LLC	10577 Alba Highway	(517) 788-9045	Alba	MI	49611

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [x] Owner
- [ ] Operator

VII. SIC Codes

4953
injection of groundwater from remediation

VIII. Well Status *(Mark "x")*

A. Operating	Date Started mo day year	B. Modification/Conversion	C. Proposed
[ ]		[ ]	[x]

IX. Type of Permit Requested *(Mark "x" and specify if required)*

A. Individual	B. Area	Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
[x]	[ ]	0	1	Beeland Disposal No. 1

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
I	I	n/a	n/a

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						14	30N	5W	SE	495	S	1320	E

XII. Indian Lands *(Mark "x")*

- [ ] Yes
- [x] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

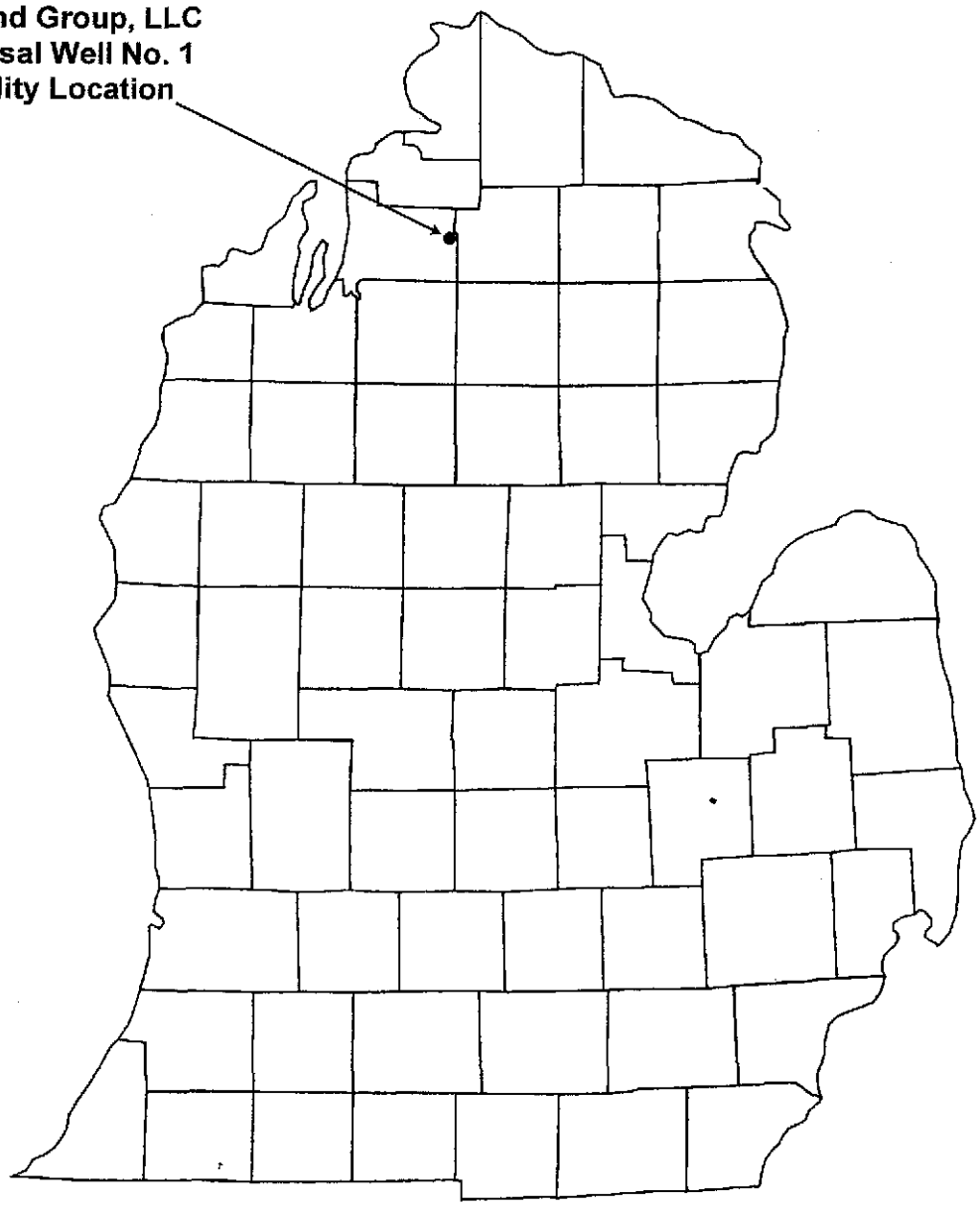
For Classes I, II, III, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

XIV. Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

A. Name and Title *(Type or Print)*	B. Phone No. *(Area Code and No.)*
Joseph Tomasik, Vice President	(517) 788-9045
C. Signature Joseph P Tomasik	D. Date Signed 10/05/2006

EPA Form 7520-6 (Rev. 8-01)



Petrotek Engineering Corporation	
Figure 1	
Beeland Group, LLC. Alba, Michigan Facility	
SITE LOCATION MAP	
SCALE: NONE	DATE: 10/06

2.0 USEPA FORM 7520-6 PERMIT APPLICATION ATTACHMENTS

2.A AREA OF REVIEW METHODS

Give the methods and, if appropriate, the calculations used to determine the size of the area of review (fixed radius or equation). The area of review shall be a fixed radius of ¼-mile from the well bore unless the use of an equation is approved in advance by the Director.

RESPONSE

The radius of investigation used in this permit request has been based on standard practices applied historically in Region 5. Under Section 146.6 of the UIC regulations (40CFR), the area of review (AOR) for a non-hazardous Class I injection well is defined as either the calculated zone of endangering influence or a fixed radius of not less than one-fourth mile. USEPA, Region 5 has required a fixed two-mile radius AOR for the evaluation of all non-fresh water penetrations in the vicinity of a Class I non-hazardous well in Michigan.

Therefore, a fixed radius of two (2) miles for evaluation of non-fresh water artificial penetrations as specified by the USEPA, Region 5 has been investigated for Class I injection into the Beeland disposal well. This distance is substantially greater than the calculated cone-of-influence (COI) for operation of the proposed well as a Class I injector. A fixed radius of one-quarter mile for the circumscribing area around the disposal well is specified for the evaluation of fresh-water artificial penetrations. Area of review radii have been applied from the property boundaries for the well facility. Although water well investigation requirements have been waived by the USEPA, Region 5 in past submittals, fresh water well data for penetrations located within the area around a ¼-mile radius have been identified from state files and submitted. In addition, an updated map generated from Michigan Department of Environmental Quality (MDEQ) data has been submitted to summarize these data.

The cone-of-influence for injection is defined as that area around a well within which increased injection zone pressures caused by injection could be sufficient to drive fluids into an underground source of drinking water (USDW). The pathway for this theoretical fluid movement is assumed to be a hypothetical, open abandoned well which penetrates the confining zone for injection. Information used in the following calculations has been estimated from addition to logs and available neighboring well information summarized in this document.

Critical Pressure Rise

To calculate the COI, a value must first be assigned for the pressure increase in the injection interval that would be sufficient to cause injection zone brine to rise in an open pathway to the base of the lowermost USDW. This critical pressure rise, Pc, is assigned as indicated in Figure A-1.

The pressure required at the top of the injection interval to support injection zone brine in the configuration indicated is, in psi units:

$$P = 0.433\ [y_B D_B + y_w(D_w - L)]$$

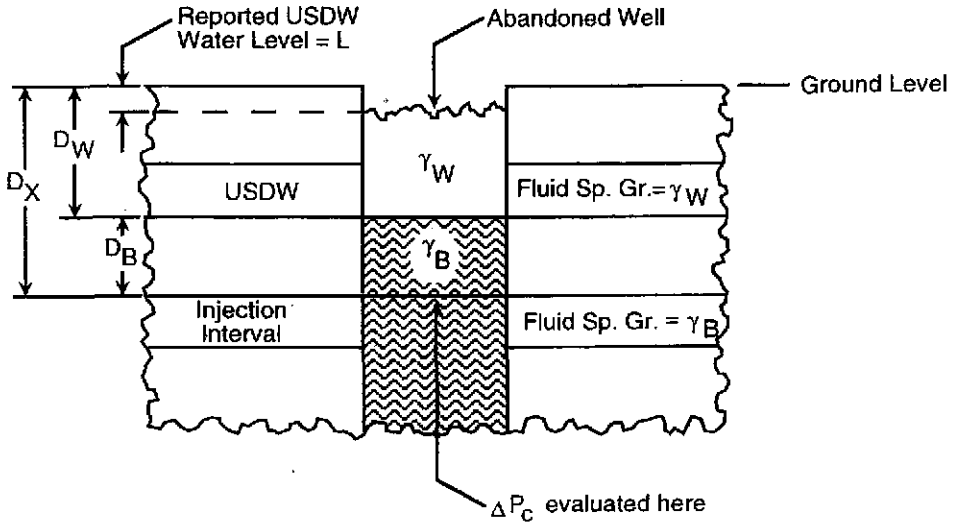
where: $D_B = D_x - D_w$

and the pressure rise is then:

$$Pc = 0.433\ [\ y_B D_B + y_w(D_w - L)] - Po$$

where Po is the original, pre-injection value for pressure at the top of the injection interval expressed in psi units.

FIGURE A-1 CRITICAL PRESSURE RISE



Original pressure in the Dundee has been estimated from typical fluid gradients found in northern Michigan for this formation. For the estimated top of the injection interval of 2,150 feet (See Response F), a gradient of 0.35 psi/ft yields a pressure of 752 psi at the top of the Dundee.

In assigning the critical pressure rise and calculating the cone-of-influence at this site, the base of the lowermost USDW is assigned as 900 feet, as discussed in Response 2.D of this document. The lowest potentiometric surface of the water table within 2 miles of the Beeland well is projected to be closer than 100 feet from ground level. In these calculations, it is assumed that the water table is at approximately 200 feet below ground level, which is larger than anticipated drawdown, and is deeper that the total depth of most water wells in the area.

TABLE A-1 CRITICAL PRESSURE CALCULATION PARAMETERS

Parameter	Value
Original pressure, Po	752 psi @ 2150 feet
Depth to base of USDW, D_w	900 feet
Depth to top of injection zone, D_X	2150 feet
Depth to USDW fluid level, L	200 feet
Density of USDW fluids, y_w	1.0
Density of injectate or injection zone brine, y_B	1.05

These values were used in the above equation to compute the critical pressure rise as follows:

$$Pc = 0.433[1.05(2150-900) + 1.0(900-200)] - 752 \text{ psi}$$

or:

$$Pc = 119 \text{ psi}$$

Cone-of-Influence

Based on the calculated value for the critical pressure rise, the cone-of-influence can be calculated for the Beeland well over a twenty-year period of injection. At the proposed Beeland well, there is projected to be no cone-of-influence for continuous injection at a rate of *200 gpm (6,857* bwpd). This value can be confirmed by examination of the following calculation (oilfield units) of pressure rise in the reservoir at a distance of five feet from the injection well:

$$dP = -70.6\ Bq\mu\ /kh * \ln ([1{,}688\ \phi\ \mu c_t r^2\ /kt] - 2s)$$

where the values listed in Table A-2 have been assigned based on site-specific information.

The above calculation for pressure rise due to twenty years of injection at a rate of 200 gpm yields an increase of approximately 115 psi. This value is smaller than the conservatively calculated critical pressure, Pc, of 119 psi which would be necessary before there is potential for upward fluid movement to the base of a USDW if an open pathway were present. Therefore the cone-of-influence at this site is less than 5 feet, even under a conservative scenario. Due to the relatively high permeability and relatively low original pressure of the Dundee Limestone injection formation at this site, there exists no potential for contamination of USDW resources due to improperly completed or abandoned wells within the statutory minimum 2-mile radius area of review.

TABLE A-2 CONE-OF-INFLUENCE PARAMETERS

Parameter	Calculation	Value
Flow rate, q	200 gpm *1440 min/day* bbl/42 gal	6,857 bbl/d
Thickness, h		100 feet
Formation Volume Factor, B		1.015
Porosity, ϕ		0.10
Permeability, k		1,000 millidarcies
Viscosity, μ		1.05 centipoise @ 72 degrees F
Total Compressibility, C_t	$3.2x10^{-6}$ psi^{-1} + $4.8x10^{-6}$ psi^{-1}	$8x10^{-6}$ psi^{-1}
Radius, r		5 feet
Time, t	20 years x 365.25 days/yr * 24hr/day	175,320 hours

2.B MAPS OF WELLS IN AREA AND AREA OF REVIEW

Submit a topographic map, extending one mile beyond the property boundaries, showing the injection well(s) or project area for which a permit is sought and the applicable area of review. The map must show all intake and discharge structures and all hazardous waste, treatment, storage, or disposal facilities. If the application is for an area permit, the map should show the distribution manifold (if applicable) applying injection fluid to all wells in the area, including all system monitoring points. Within the area of review, the map must show the following:

Class I

The number, or name, and location of all producing well, injection well, abandoned well, dry holes, surface bodies of water, springs, mines (surface and subsurface), quarries, and other pertinent surface features, including residences and roads, and faults, if known or suspected. In addition, the map must identify those well, springs, other surface water bodies, and drinking water wells located within one-quarter mile of the facility property boundary. Only information of public record is required to be included on this map.

RESPONSE

Maps based on available public records have been prepared and submitted in this Response as summaries of the required data.

Topographic Map

A copy of the USGS Topographic map available from the area of review with the outline of the Region 5 minimum two-mile radius area of review and an injection well symbol representing the facility superimposed on the map is included as Figure B-1.

This topographic map extends in excess of 1 mile beyond the Beeland site in all directions. The Beeland property encompasses an irregular rectangular area of approximately 60 acres in the southeast quarter of Section 14. In addition, the map shows the location of all known surface bodies of water, springs, mines, quarries, residencies and roads. Separate additional maps submitted in this Response present water wells and deeper artificial penetrations. A listing of neighboring property owners within a ½ mile radius has been also been developed and submitted with this application for the well permit. No known hazardous waste treatment storage or disposal facilities are present within the AOR based on available state of Michigan permit information.

Artificial Penetrations

There are a number of artificial penetrations identified in the area of review conducted for a two-mile radius surrounding the proposed Beeland disposal well. However, a majority of the wells permitted and/or drilled in the vicinity of the Beeland well only penetrate the Antrim shale for the purpose of gas production. These wells are typically drilled to a depth of between 1,250 and 1,750 feet below ground level (BGL) and are not potential pathways for fluid migration out of the permitted injection zone, since they do not penetrate through the confining, arrestment or injection intervals. An examination of all available records at the Michigan Department of Environmental Quality (MDEQ) has been accomplished as of September 2006 to evaluate these wells. Data for all deep wells which have been drilled within a two-mile radius of the Beeland well are summarized in the following Response (Tables 2-1 and 2-2, Response 2.C) and copies of pertinent MDEQ completion or plugging records regarding wells which penetrate into the injection interval of the proposed Beeland well are also presented in Response 2.C.

Figure B-2, a map generated with the PETRA software program from data provided by the state of Michigan

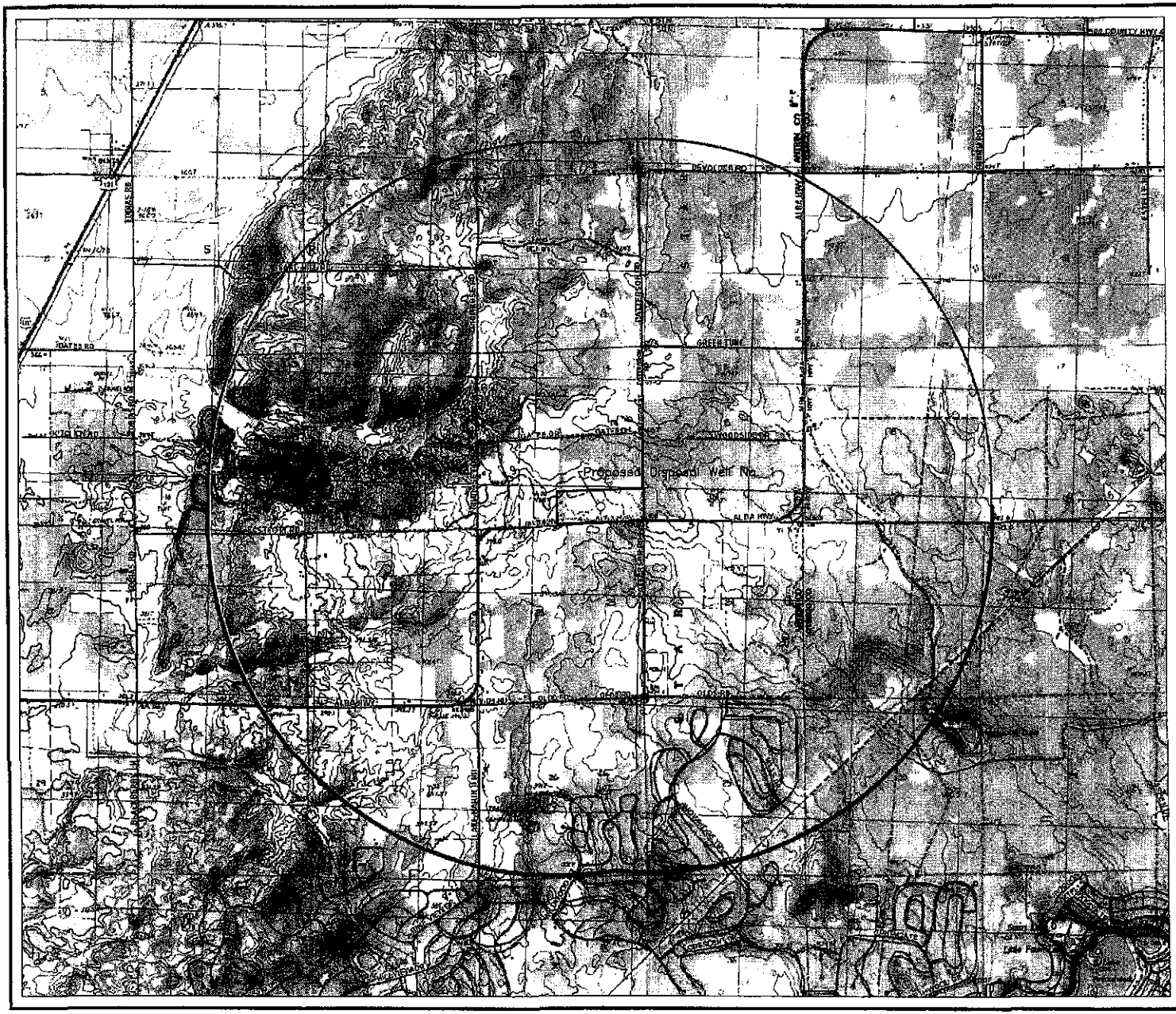
in September of 2006, shows the location of all non-fresh water artificial penetrations in the state oil and gas well database within the required two-mile AOR. Permit numbers are shown at each well symbol. The Proposed Beeland Well No. 1 is designated as an injection well (also labeled with the well name), and is located in the southeast quarter of Section 14. General geographic features and the outline of the required two-mile AOR are also shown on the map. Index lines showing cross sections presented in Response 2.F. are also shown, with summaries of relevant formation tops from the MDEQ database. The "legend" on this map contains pertinent information designating all other wells with the area of review.

Figure B-3, a map modified from data generated by the state of Michigan in September of 2006, presents the location of all local freshwater well penetrations in the state water well database. Note that fresh water penetrations in the area of review typically range from approximately 50 to 200 feet, and are not critical with regard to the fluid injection at the Proposed Well No. 1. Copies of selected water well records for freshwater penetrations are submitted in Response 2.C of this document.

According to the MDEQ records, there are 109 wells located within the two-mile AOR. Only four of these wells penetrated into the Bell Shale or the Dundee Limestone. Three of these penetrations are active Class II brine disposal wells (#41955, #42680, and #46244), and one well was plugged in 1969 as a dry hole (#27750). The remaining 105 wells only penetrate to the Antrim or Traverse Group, and do not penetrate the arrestment or injection interval for the proposed Beeland well. There have been no Class I wells drilled within the area of review.

Well #27750 in Section 26 of T30N-R5W, which had been listed as a dry Niagaran exploratory well with a TD of 6,550 feet, was plugged according to applicable state standards and a plugging record is available for this well (see Response 2.C). The Dundee is isolated from deeper formations by cement plugs, and is isolated from shallower formations by multiple cement plugs and cemented casing that was left in the well. Class II brine disposal wells (#41955, #42680, and #46244), are each completed according to current state and federal regulatory requirements and have long-string casing cemented to isolate the Dundee injection interval from overlying formations and fresh water resources. Records for Permit #56773 in Section 10 of T30N R5W are presented showing that the formation at TD is the Traverse Limestone despite a total depth of 2,200' reported in the MDEQ database.

Due to the small pressure rise associated with projected injection activities and the corresponding non-existent cone-of-influence (see Response 2.A), it is noted that none of the wells within the regulatory minimum two-mile AOR could have the potential for causing any endangerment to USDW resources in the vicinity.



N
W — E

LEGEND

- Proposed Disposal Well No. 1
- 2-Mile Area of Review
- Site Property Boundary

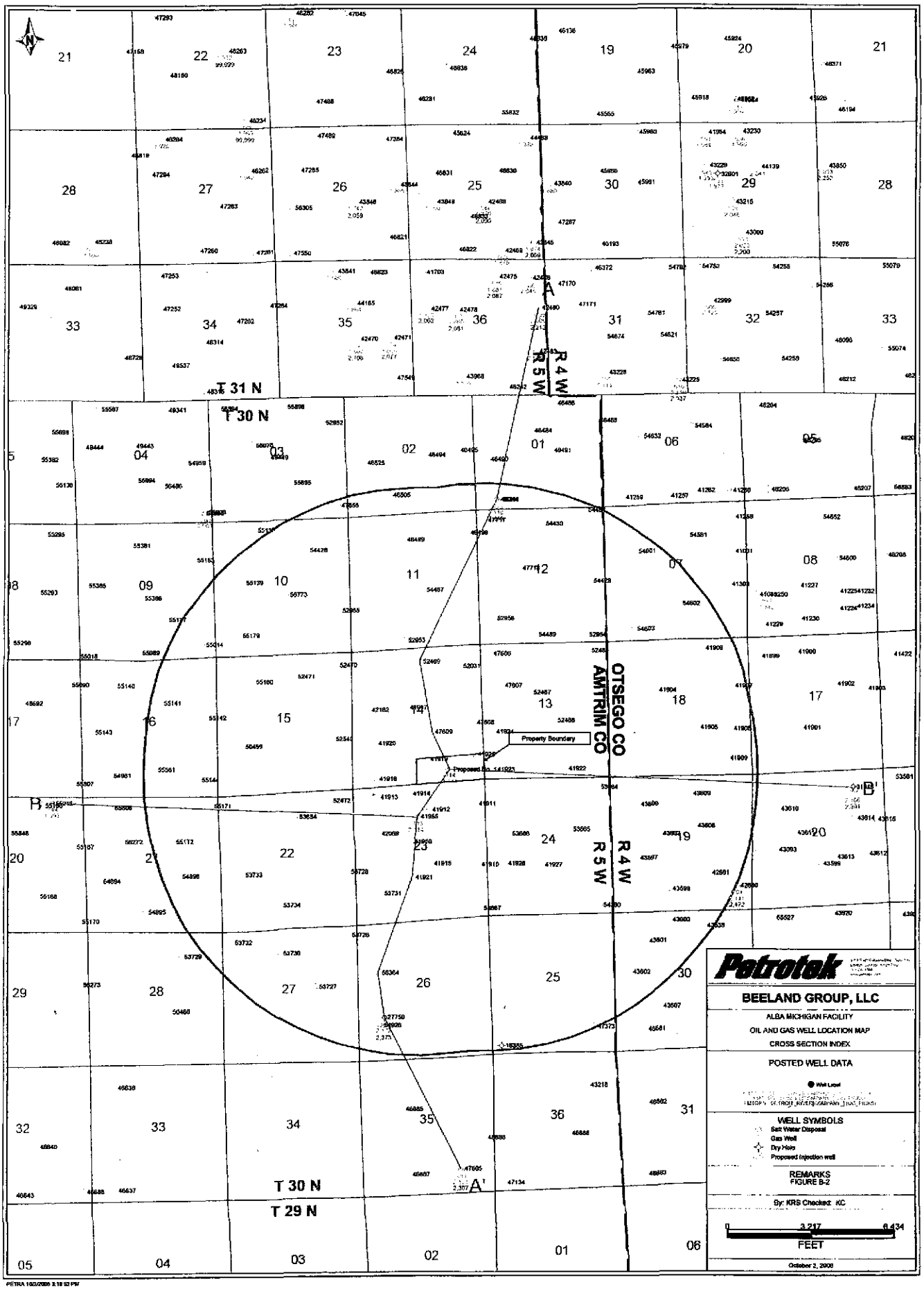
0 0.25 0.5 1.0
Scale in Miles

BEELAND GROUP, LLC
ALBA, MICHIGAN FACILITY

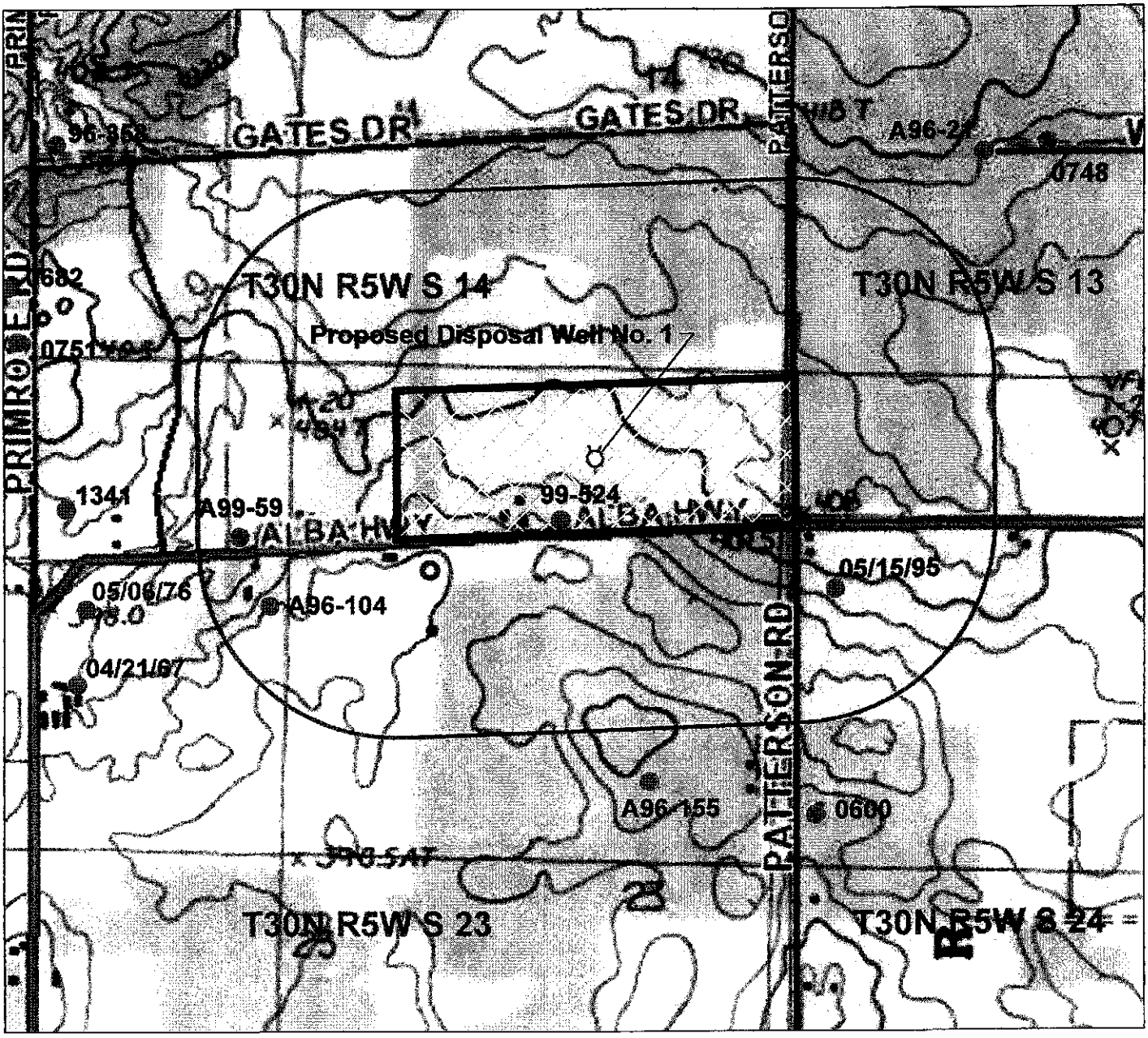
FIGURE B-1
TOPOGRAPHIC MAP SHOWING PROPOSED WELL LOCATION AND AREA OF REVIEW

PROJECT: 309-1	DATE: SEPTEMBER 2006	
Beeland No.1.dwg	BY: KS	CHECKED: KC

Petrotek
9088 S. Ridgeline Blvd. Ste 105
Littleton, Colorado 80228
303-290-9414
www.petrotek.com



PETRA 10/2/2008 3:18:52 PM



LEGEND

- Site Property Boundary
- Proposed Disposal Well No. 1
- 0.25-Mile Area of Review
- Water Well Location
- Water Well Location identified during Gates 1-23 Class II Permit Application. Well has not been field verified, and did not exist in http://wellviewer.rsgis.msu.edu database.

N
W — E

0 500 1000 2000
SCALE IN FEET

Water well data source: http://wellviewer.rsgis.msu.edu/ http://www.deq.state.mi.us

BEELAND GROUP, LLC ALBA, MICHIGAN FACILITY		
FIGURE B-3 FRESH WATER PENETRATION WELL LOCATION MAP		
PROJECT: 309-1	DATE: SEPTEMBER 2006	
Beeland No.1.dwg	BY: KS	CHECKED: KC

Petrotek
9088 S. Ridgeline Blvd, Ste 105
Littleton, Colorado 80129
303-290-9414
www.petrotek.com

2.C CORRECTIVE ACTION PLAN AND WELL DATA

Submit a tabulation of data reasonably available from public records or otherwise known to the applicant on all well within the area of review, including those on the map required in Attachment B, which penetrate the proposed injection zone. Such data shall include the following:

Class I

A description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require. In the case of new injection well, include the corrective action proposed to be taken by the applicant under 40 CFR 144.55.

RESPONSE

Corrective Action

A corrective action plan is not required for any of the artificial penetrations within the proposed Beeland well AOR because, based on calculations, there is no cone-of-influence and there are no artificial penetrations to the injection zone within the area of review that have the potential for allowing injection activities to have an impact on the USDW. If a corrective action plan for any neighboring well becomes necessary in the future, it will be developed according to appropriate regulatory standards and guidelines.

The corrective action plan which would be proposed by Beeland, should the potential for fluid migration to occur through the confining layer develop via any future well, will include the following:

1. Beeland Group, LLC injection well will be shut-in.
2. The USEPA, Region 5 UIC Section and the MDEQ will be notified.
3. Following well shut-in, waste will be shipped to alternative permitted facilities for off-site treatment and/or disposal as necessary.
4. A contingency plan will be prepared as follows:
    a. Locate well and identify present operator or owner, if any.
    b. Identify mode of failure.
    c. Prepare remedial plan outlining course of action.
    d. The remedial plan will be submitted to the USEPA, Region 5 and MDEQ for approval.
    e. Upon authorization, the remediation plan will be implemented.

Area of Review Oil and Gas Well Data

Data regarding artificial penetrations collected for wells within the area of review have been categorized and are listed by well type. Oil and gas industry (non-fresh water) well locations are shown on Figure B-2, provided as a portion of Response B in this document. Oil and gas permitted wells drilled into or deeper than the injection zone and subsequently abandoned, wells drilled through the injection zone that are still active producers, and temporarily abandoned wells that penetrate to the injection zone are listed in Table C-1. Wells are labeled with MDEQ permit numbers. Following this table is a listing of oil and gas wells permitted

by the MDEQ that have been drilled to depths, which do not penetrate the injection zone (Table C-2). Typically, these wells are Antrim gas wells that reached a total depth within the Antrim Shale or the top of the Traverse Limestone. Data presented in this table regarding wells within the area of review include MDEQ permit number, location, total depth, status, construction, and completion or plugging date. Figures C-1 through C-4 present summaries of the wellbore configurations for each of the wells that penetrate to the proposed injection interval.

Copies of well records are presented at the end of this Response for all non-freshwater penetrations that reached the top of the arrestment interval (Bell Shale) within the area of review.

TABLE C-1 ARTIFICIAL PENETRATIONS: MDEQ OIL & GAS PERMITS WELLS PENETRATING TO INJECTION ZONE IN AOR

MDEQ Permit #	Location (T-R)	Section	Well Status	Formation at TD	Total Depth (ft. BGL)	Date of Completion or Plugging
27750	30N-5W	26	Dry	CABOT HEAD	6550	08-Oct-69
41955	30N-5W	23	SWD	DUNDEE	2114	16-May-89
42680	30N-4W	19	SWD & Gas	DETROIT RIVER	2472	14-Dec-00
46244	30N-5W	1	SWD	DETROIT RIVER ANHY	2315	10-Nov-92

Notes:
Date Completion or plugging
dry Dry hole, plugged
swd Class II brine disposal well
& Gas Dual completion to also produce Antrim gas

TABLE C-2 ARTIFICIAL PENETRATIONS: MDEQ OIL & GAS PERMITS SHALLOW AND ANTRIM WELLS IN AOR

MDEQ Permit #	Location (T-R)	Section	Well Status	Formation at TD	Total Depth (ft. BGL)
18385	30N-5W	25	Dry Hole	TRAVERSE LIMESTONE	1442
41904	30N-4W	18	Natural Gas Well	ANTRIM	1167
41906	30N-4W	18	Natural Gas Well	ANTRIM	1251
41907	30N-4W	18	Natural Gas Well	ANTRIM	1182
41908	30N-4W	18	Natural Gas Well	ANTRIM	1183
41909	30N-4W	18	Natural Gas Well	ANTRIM	1185
41910	30N-5W	23	Natural Gas Well	ANTRIM DARK	1241
41911	30N-5W	23	Natural Gas Well	ANTRIM DARK	1207
41912	30N-5W	23	Natural Gas Well	ANTRIM	1185
41913	30N-5W	23	Natural Gas Well	ANTRIM DARK	1195
41914	30N-5W	23	Natural Gas Well	TRAVERSE LIMESTONE	1376
41915	30N-5W	23	Natural Gas Well	ANTRIM DARK	1193
41916	30N-5W	23	Natural Gas Well	ANTRIM DARK	1205
41917	30N-5W	14	Natural Gas Well	TRAVERSE LIMESTONE	1432
41918	30N-5W	14	Natural Gas Well	TRAVERSE LIMESTONE	1389
41919	30N-5W	14	Natural Gas Well	ANTRIM DARK	1193
41920	30N-5W	14	Natural Gas Well	ANTRIM DARK	1218
41921	30N-5W	23	Natural Gas Well	TRAVERSE LIMESTONE	1394
41922	30N-5W	13	Natural Gas Well	TRAVERSE LIMESTONE	1368
41923	30N-5W	13	Natural Gas Well	ANTRIM DARK	1190
41924	30N-5W	13	Natural Gas Well	ANTRIM DARK	2101
41925	30N-5W	14	Natural Gas Well	TRAVERSE LIMESTONE	1390
41926	30N-5W	24	Natural Gas Well	ANTRIM DARK	1188
41927	30N-5W	24	Natural Gas Well	ANTRIM DARK	1172
42069	30N-5W	23	Natural Gas Well	ANTRIM	1187
42162	30N-5W	14	Natural Gas Well	ANTRIM DARK	1214
42681	30N-4W	19	Natural Gas Well	TRAVERSE FORMATION	1341
43538	30N-4W	30	Natural Gas Well	TRAVERSE LIMESTONE	1384
43539	30N-4W	30	Natural Gas Well	ANTRIM	1222
43597	30N-4W	19	Natural Gas Well	TRAVERSE LIMESTONE	1397

MDEQ Permit #	Location (T-R)	Section	Well Status	Formation at TD	Total Depth (ft. BGL)
43598	30N-4W	19	Natural Gas Well	TRAVERSE LIMESTONE	1368
43600	30N-4W	30	Natural Gas Well	TRAVERSE LIMESTONE	1367
43601	30N-4W	30	Natural Gas Well	TRAVERSE LIMESTONE	1395
43602	30N-4W	30	Natural Gas Well	TRAVERSE LIMESTONE	1415
43603	30N-4W	19	Natural Gas Well	TRAVERSE FORMATION	1344
43606	30N-4W	19	Natural Gas Well	TRAVERSE FORMATION	1332
43608	30N-4W	19	Natural Gas Well	TRAVERSE LIMESTONE	1402
43609	30N-4W	19	Natural Gas Well	TRAVERSE FORMATION	1353
46241	30N-5W	1	Natural Gas Well	TRAVERSE LIMESTONE	1385
46496	30N-5W	2	Natural Gas Well	TRAVERSE LIMESTONE	1360
46498	30N-5W	11	Natural Gas Well	TRAVERSE LIMESTONE	1368
46499	30N-5W	11	Natural Gas Well	TRAVERSE LIMESTONE	1405
46505	30N-5W	2	Natural Gas Well	TRAVERSE LIMESTONE	1429
47373	30N-5W	25	Natural Gas Well	TRAVERSE LIMESTONE	1469
47606	30N-5W	13	Natural Gas Well	TRAVERSE LIMESTONE	1408
47607	30N-5W	13	Natural Gas Well	TRAVERSE LIMESTONE	1398
47608	30N-5W	14	Natural Gas Well	TRAVERSE LIMESTONE	1399
47609	30N-5W	14	Natural Gas Well	TRAVERSE LIMESTONE	1411
47655	30N-5W	3	Natural Gas Well	TRAVERSE LIMESTONE	1411
47717	30N-5W	12	Natural Gas Well	TRAVERSE LIMESTONE	1329
47718	30N-5W	12	Natural Gas Well	TRAVERSE LIMESTONE	1358
50459	30N-5W	15	Natural Gas Well	TRAVERSE LIMESTONE	1324
52031	30N-5W	14	Natural Gas Well	TRAVERSE LIMESTONE	1407
52467	30N-5W	13	Natural Gas Well	TRAVERSE LIMESTONE	1385
52468	30N-5W	13	Natural Gas Well	TRAVERSE LIMESTONE	1387
52469	30N-5W	14	Natural Gas Well	TRAVERSE LIMESTONE	1422
52470	30N-5W	15	Natural Gas Well	TRAVERSE LIMESTONE	1405
52471	30N-5W	15	Natural Gas Well	TRAVERSE LIMESTONE	1398
52472	30N-5W	22	Natural Gas Well	TRAVERSE LIMESTONE	1366
52480	30N-5W	13	Natural Gas Well	TRAVERSE LIMESTONE	1354
52540	30N-5W	15	Natural Gas Well	TRAVERSE LIMESTONE	1400
52953	30N-5W	11	Natural Gas Well	TRAVERSE LIMESTONE	1410
52954	30N-5W	12	Natural Gas Well	TRAVERSE LIMESTONE	1357
52955	30N-5W	10	Natural Gas Well	TRAVERSE LIMESTONE	1419
52956	30N-5W	12	Natural Gas Well	TRAVERSE LIMESTONE	1370

MDEQ Permit #	Location (T-R)	Section	Well Status	Formation at TD	Total Depth (ft. BGL)
53654	30N-5W	22	Natural Gas Well	TRAVERSE LIMESTONE	1403
53664	30N-5W	24	Natural Gas Well	TRAVERSE LIMESTONE	1376
53665	30N-5W	24	Natural Gas Well	TRAVERSE LIMESTONE	1378
53666	30N-5W	24	Natural Gas Well	TRAVERSE LIMESTONE	1379
53667	30N-5W	23	Natural Gas Well	TRAVERSE LIMESTONE	1418
53726	30N-5W	27	Natural Gas Well	TRAVERSE LIMESTONE	1397
53727	30N-5W	27	Natural Gas Well	TRAVERSE LIMESTONE	1411
53728	30N-5W	22	Natural Gas Well	TRAVERSE LIMESTONE	1389
53729	30N-5W	28	Natural Gas Well	TRAVERSE LIMESTONE	1382
53730	30N-5W	27	Natural Gas Well	TRAVERSE LIMESTONE	1395
53731	30N-5W	23	Natural Gas Well	TRAVERSE LIMESTONE	1388
53732	30N-5W	27	Natural Gas Well	TRAVERSE LIMESTONE	1395
53733	30N-5W	22	Natural Gas Well	TRAVERSE LIMESTONE	1417
53734	30N-5W	22	Natural Gas Well	TRAVERSE LIMESTONE	1403
54380	30N-5W	24	Natural Gas Well	TRAVERSE LIMESTONE	1397
54428	30N-5W	10	Natural Gas Well	TRAVERSE LIMESTONE	1404
54429	30N-5W	12	Natural Gas Well	TRAVERSE LIMESTONE	1371
54430	30N-5W	12	Natural Gas Well	TRAVERSE LIMESTONE	1354
54487	30N-5W	11	Natural Gas Well	TRAVERSE LIMESTONE	1407
54488	30N-5W	12	Natural Gas Well	TRAVERSE LIMESTONE	1351
54489	30N-5W	12	Natural Gas Well	TRAVERSE LIMESTONE	1378
54601	30N-4W	7	Natural Gas Well	TRAVERSE LIMESTONE	1379
54602	30N-4W	7	Natural Gas Well	TRAVERSE LIMESTONE	1371
54603	30N-4W	7	Natural Gas Well	TRAVERSE LIMESTONE	1359
54896	30N-5W	21	Natural Gas Well	TRAVERSE LIMESTONE	1376
54926	30N-5W	26	Natural Gas Well	TRAVERSE LIMESTONE	1423
55014	30N-5W	9	Natural Gas Well	TRAVERSE LIMESTONE	1367
55138	30N-5W	10	Natural Gas Well	TRAVERSE LIMESTONE	1428
55139	30N-5W	10	Natural Gas Well	TRAVERSE LIMESTONE	1449
55141	30N-5W	16	Natural Gas Well	TRAVERSE LIMESTONE	1286
55142	30N-5W	16	Natural Gas Well	TRAVERSE LIMESTONE	1295
55144	30N-5W	16	Natural Gas Well	TRAVERSE LIMESTONE	1406
55171	30N-5W	21	Natural Gas Well	TRAVERSE LIMESTONE	1437
55172	30N-5W	21	Natural Gas Well	TRAVERSE LIMESTONE	1407
55179	30N-5W	10	Natural Gas Well	TRAVERSE LIMESTONE	1429

MDEQ Permit #	Location (T-R)	Section	Well Status	Formation at TD	Total Depth (ft. BGL)
55180	30N-5W	15	Natural Gas Well	TRAVERSE LIMESTONE	1367
55581	30N-5W	16	Natural Gas Well	TRAVERSE LIMESTONE	1274
56364	30N-5W	26	Natural Gas Well	TRAVERSE LIMESTONE	1430
56773	30N-5W	10	Natural Gas Well	TRAVERSE LIMESTONE	2200

Water Wells Within ¼ Mile AOR

As shown on Figure B-3, there are four water wells located inside the ¼ mile AOR radius in the available MDEQ databases. Another well may exist within ¼ mile of the property boundary based on unconfirmed data presented in a previous Class II permit application. No public data is available regarding this well. As an attachment to Response 2.D, a copy of data from fresh-water wells in the vicinity of the proposed well are presented as part of the characterization of the USDW in the vicinity of the proposed well.

Property Ownership Data and Public Notice

Data regarding the ownership of property within a ½ mile radius of the proposed Beeland Disposal Well No. 1 property boundary is also provided as an attachment to Response 2.C. Figure C-5 presents a copy of the plat map showing parcel locations. In addition to a printed listing of names, addresses and parcel numbers obtained from the Antrim County records, an electronic copy of the data and copies of the assessor's maps are also presented to document the ownership of neighboring properties.

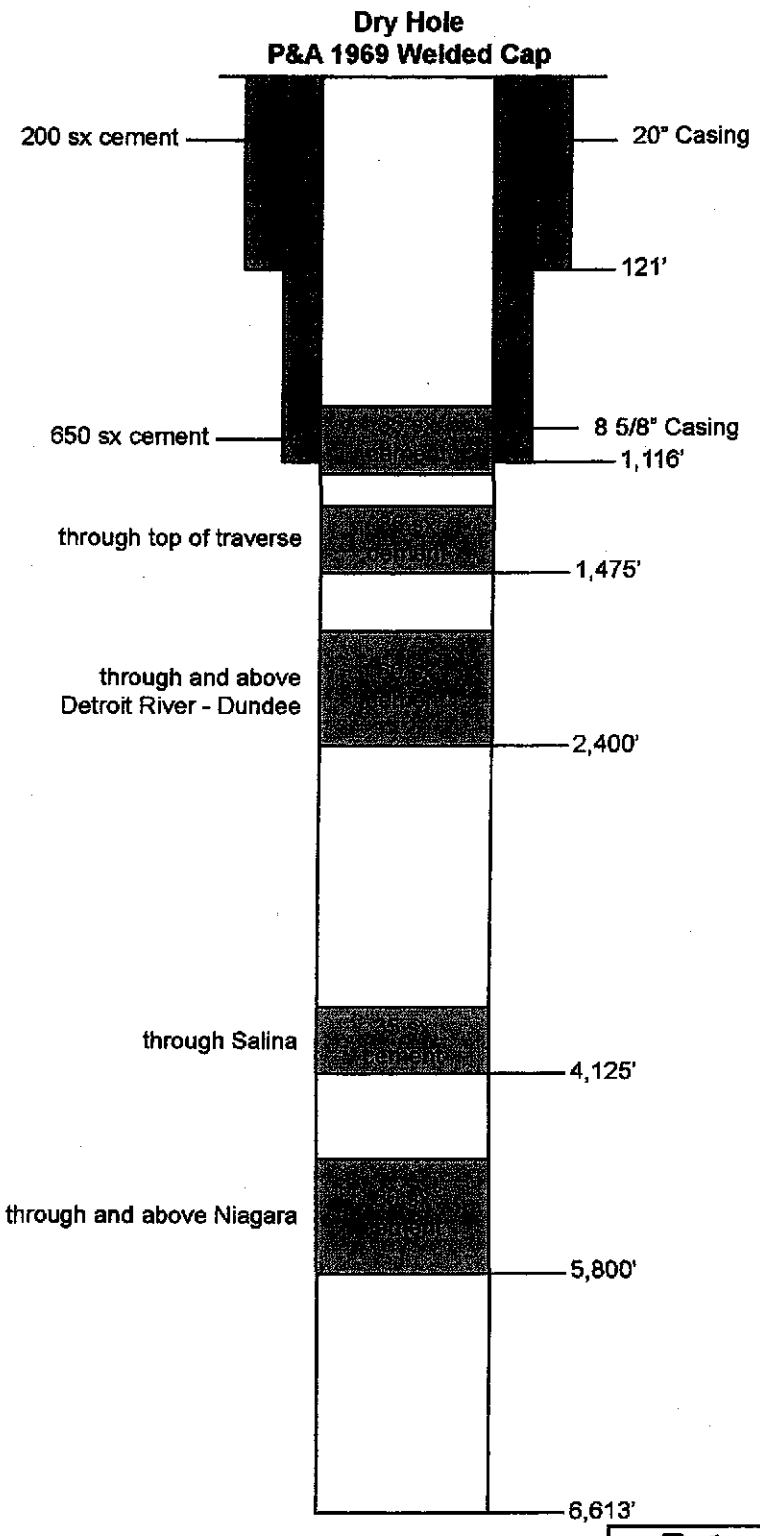
For the purpose of public notice, newspaper service is available from several publishers in the area including the closest paper to the proposed facility: the Antrim County News 206 North Bridge Street, Bellaire, MI 49615 (231) 533- 8523 in addition to the closest daily paper: the Gaylord Herald Times, P.O. Box 598 Gaylord, MI 49734 989-732-1111.

TABLE C-3 PROPERTY OWNERS WITHIN ½ MILE RADIUS OF PROPOSED BEELAND GROUP, LLC WELL NO. 1 PROPERTY

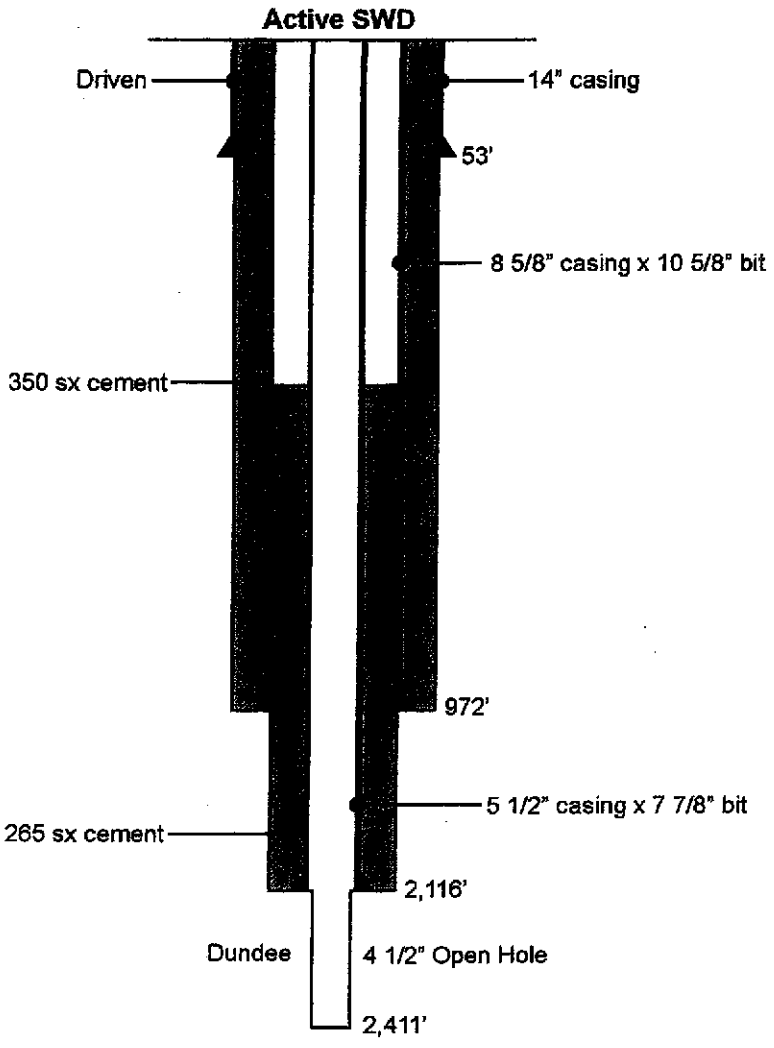
	Section	Address	City	Zip	Parcel No.
Biehl, Larry L	13	1070 South Ridge	Traverse City, MI	49686	013-001-20
Westphal, Charles E & Agnes V	13	11357 Woodside St	Elmira, MI	49730	013-001-55
Westphal, Charles E & Agnes V	13	11357 Woodside St	Elmira, MI	49730	013-001-58
Middleton, Green B & Jaqueline	13	11311 Woodside St	Elmira, MI	49730	013-001-60
Barrett, Julie K & Rodney A	13	*22503 Downing*	St Clair Shores, MI	48080	013-001-63
Workman, Jim F Jr	13	1328 S Holly Rd	Fenton, MI	48430	013-001-65
Patten, David & Kimberly A	13	11535 William	Taylor, MI	48180	013-001-68

	Section	Address	City	Zip	Parcel No.
Biehl, Larry L	13	1070 South Ridge	Traverse City, MI	49686	013-001-85
Groleau, Louis	13	1822 Hammond Rd	Traverse City, MI	49680	013-002-00
Martell, Keith R & Catherine L	13	205 Arrowhead Trail	Gaylord, MI	49735	013-003-00
Avery, James W - Wilhelm, Joanne	13	P O Box 1232	Gaylord, MI	49735	013-005-00
Hintz, Louis E & Sharlene J	13	11405 Alba Hwy	Elmira, MI	49730	013-006-00
Stapleton, John C & Elaine L	13	70827 Romeo Plank Rd	Armada, MI	48005	013-006-50
Marshall, Robin & Jacalyn J	14	2342 Patterson Rd	Elmira, MI	49730	014-002-00
Acer Paradise, Inc	14	PO Box 758	Mancelona, MI	49659	014-002-10
Chippa, Michael A & Janice K	14	10303 Alba Hwy	Elmira, MI	49730	014-003-00
Croft, LLC	14	121 E Front St Ste 200	Traverse City, MI	49684	014-006-00
Chippa, Michael A & Janice K	14	10304 Alba Hwy	Elmira, MI	49730	014-007-00
Pomeroy, Penny	14	10085 Alba Hwy	Elmira, MI	49730	014-008-00
Sloan, Donna J	14	2977 Primrose Rd	Elmira, MI	49730	014-008-05
Croft, LLC	14	121 E Front St Ste 200	Traverse City, MI	49684	014-008-10
Gates, Dale E	14	2525 Primrose Rd	Elmira, MI	49730	014-008-20
O'Connell, Rhonda L Dararah Cheryl -	14	P O Box 1	Alba, MI	49611	014-009-00
Voelker, Oreitha M. Living Trust	23	105 Boughey Street	Traverse City, MI	49684	023-001-00
Martin, Timothy G	23	3384 Patterson Rd	Elmira, MI	49730	023-002-00
Hostman, David J & Elizabeth A	23	P O Box 158	Elmira, MI	49730	023-002-10
Hostman, David J & Elizabeth A	23	P O Box 158	Elmira, MI	49730	023-002-20
Warren, Michael J & Robin R	23	3376 Patterson Rd	Elmira, MI	49730	023-002-25
Bradley, Anthony W	23	3322 Patterson Rd	Elmira, MI	49730	023-002-30
Hostman, David J & Elizabeth A	23	P O Box 158	Elmira, MI	49730	023-002-40
Kassuba, Evelyn M	23	520 N Townline Rd	Gaylord, MI	49735	023-002-50
Lamoreaux, Dawn	23	1906 Spruce St	West Point, GA	31833	023-002-60
Kassuba, Evelyn M	23	520 N Townline Rd	Gaylord, MI	49735	023-002-70
Croft, LLC	23	121 E Front St Ste 200	Traverse City, MI	49684	023-003-00
Chippa, Michael A & Rebecca M	23	10266 Alba Hwy	Elmira, MI	49730	023-003-10
Thurston, Todd M. & Deanna L	23	615 W. Sheldon St	Gaylord, MI	49735	023-003-20
Croft, LLC	23	121 E Front St Ste 200	Traverse City, MI	49684	023-004-00
Ray, James L	23	9972 Alba Hwy	Elmira, MI	49730	023-004-10
Croft, LLC	23	121 E Front St Ste 200	Traverse City, MI	49684	023-004-15

	Section	Address	City	Zip	Parcel No.
Taylor, Robert W Family Trust	24	P O Box 120401	Arlington, TX	76012	024-002-00
Voelker, Oreitha M. Living Trust	24	105 Boughey Street	Traverse City, MI	49684	024-006-00
Hunley, Robert & Annette	24	3121 Patterson Rd	Elmira, MI	49730	024-006-10
Milbocker, Terrance AA & Mathey, Carrie	24	11030 Alba Hwy	Elmira, MI	49730	024-006-15
Avery, James W - Wilhelm, Joanne	24	P O Box 1232	Gaylord, MI	49735	024-007-00
Britton, Harvet & Kimberly	24	3455 Patterson Rd	Elmira, MI	49730	024-008-00
Britton, Harvet & Kimberly	24	3455 Patterson Rd	Elmira, MI	49730	024-008-05
Huffman, Terry L - Wooley, Lisa	24	4001 W Silverspring Blvd	Ocala, FL	34482	024-008-10
Britton, Harvet & Kimberly	24	3455 Patterson Rd	Elmira, MI	49730	024-008-20



Petrotek Engineering Corporation	
Figure C-1	
Beeland Group, LLC. Alba, Michigan Facility	
AOR WELL SCHEMATIC WELL # 27750 SHELL OIL; GATES 1-26	
SCALE: NONE	DATE: 10/06

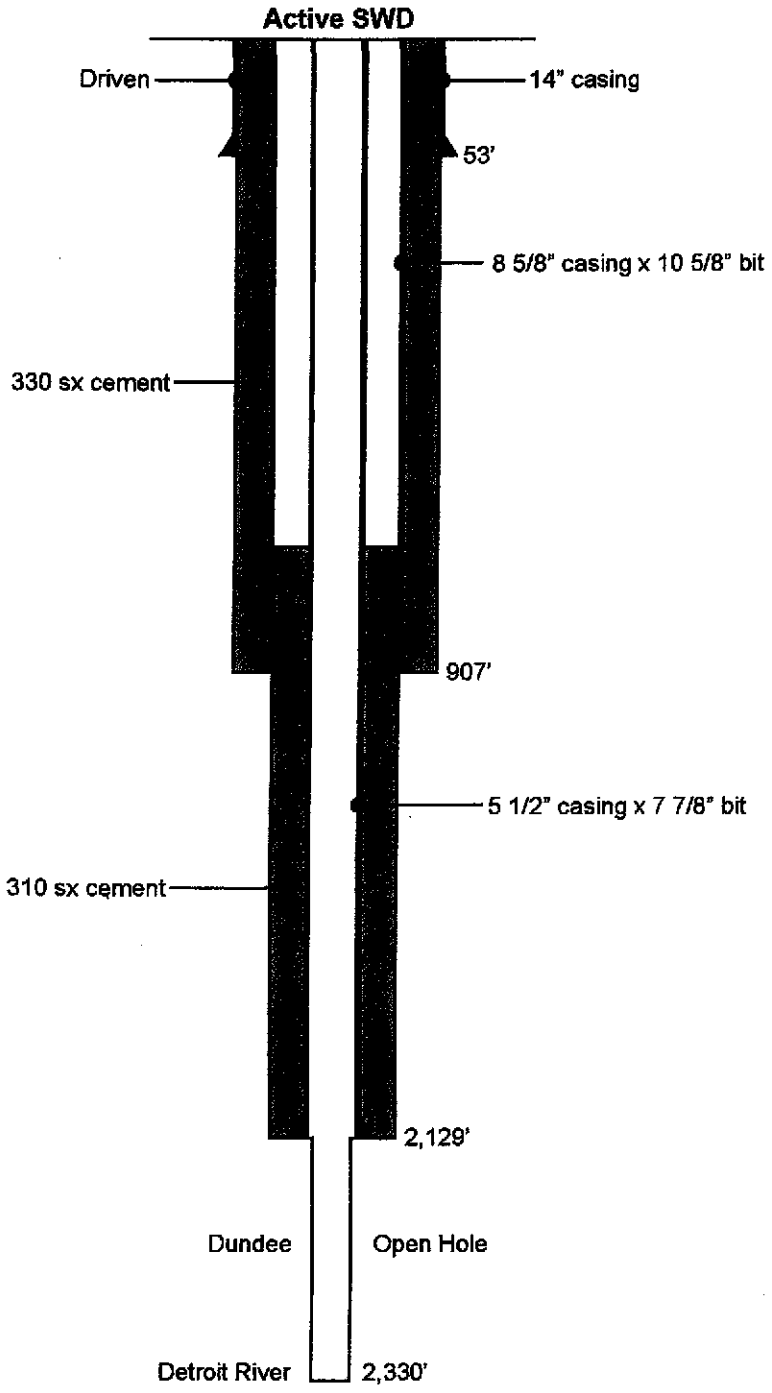


Assume cement yield of only 1.18 ft^3/sx

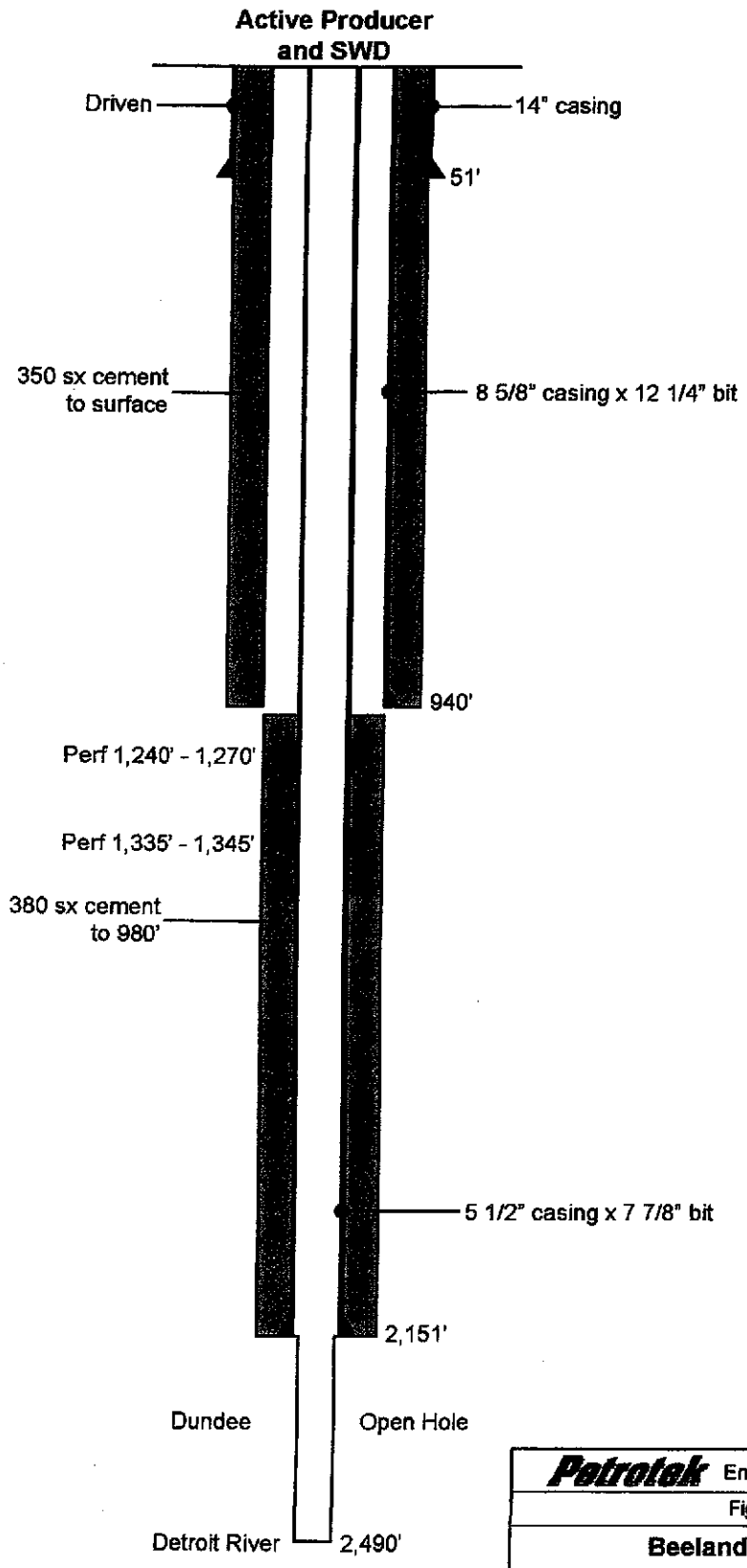
5.7719 ft/ft^3 * 265 sx * 1.18 ft^3/sx = 1,805 ft

4.7622 ft/ft^3 * 350 * 1.18ft^3/sx = 1,967 ft

Petrotek Engineering Corporation
Figure C-2
Beeland Group, LLC. Alba, Michigan Facility
AOR WELL SCHEMATIC WELL # 41955 TERRA; GATES # 1-23 SWD
SCALE: NONE DATE: 10/06



Petrotek Engineering Corporation
Figure C-3
Beeland Group, LLC. Alba, Michigan Facility
AOR WELL SCHEMATIC WELL # 46244 TERRA; ESTELLE D1-1SWD
SCALE: NONE DATE: 10/06



Petrotek Engineering Corporation

Figure C-4

Beeland Group, LLC.

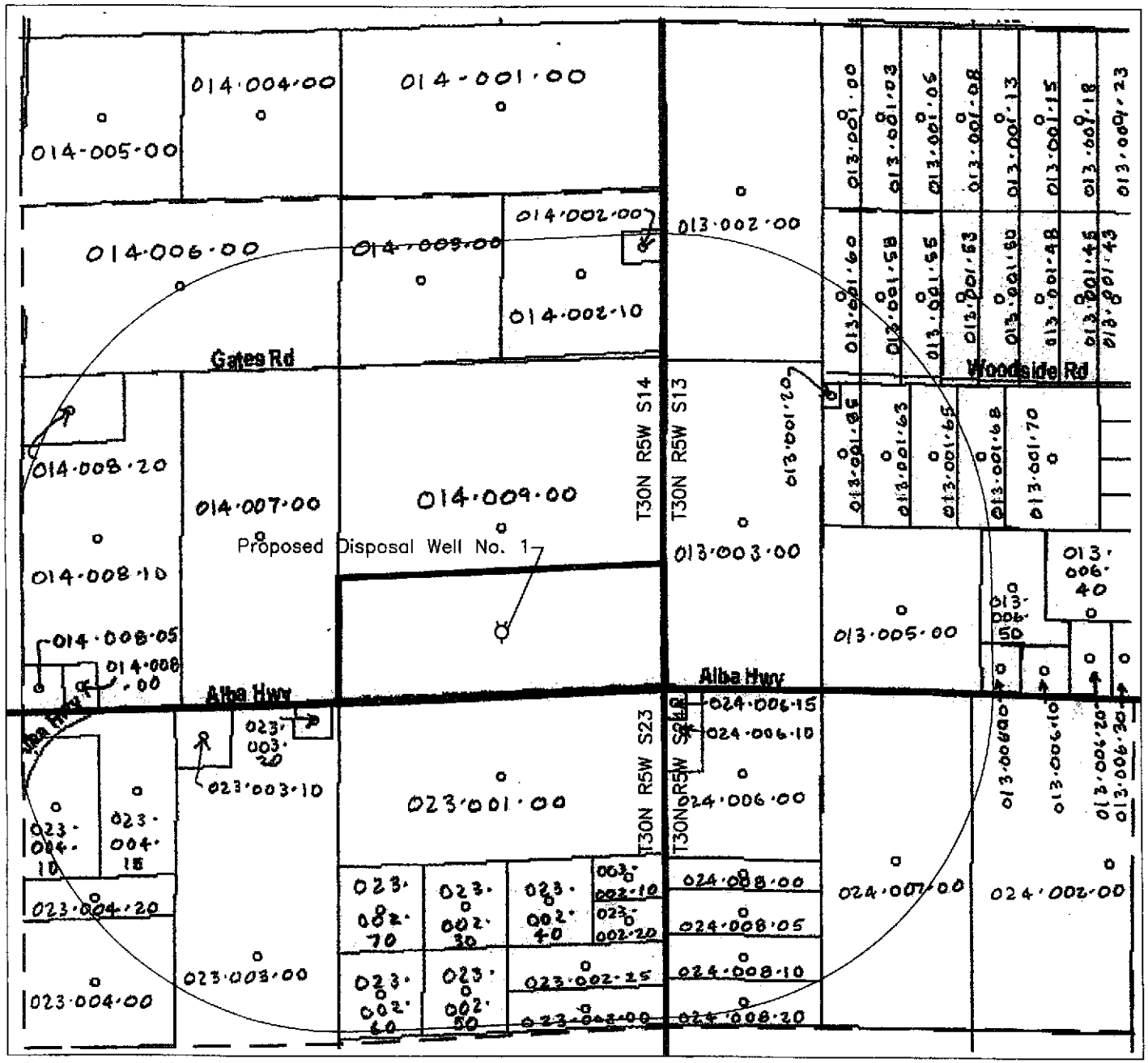
Alba, Michigan Facility

AOR WELL SCHEMATIC

WELL # 42680

TERRA; CAPLE #1-19

SCALE: NONE DATE: 10/06



Source: *Land Information Access Association*

BEELAND GROUP, LLC
ALBA, MICHIGAN FACILITY

FIGURE C-5
SURFACE OWNERS WITHIN 1/2 MILE RADIUS OF PROPERTY BOUNDARY

PROJECT: 309-1	DATE: SEPTEMBER 2006
Beeland No.1.dwg	BY: KS CHECKED: KC

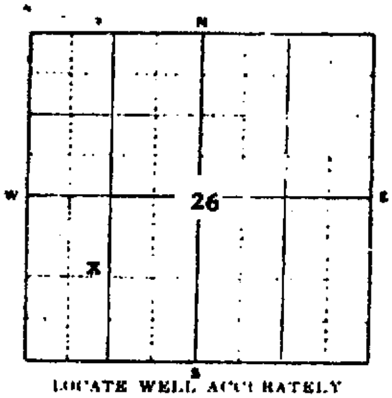
Petrotek
9088 S. Ridgeline Blvd, Ste 105
Littleton, Colorado 80129
303-290-9414
www.petrotek.com

NOV 6 1969

STATE OF MICHIGAN
DEPARTMENT OF CONSERVATION

LOG OF OIL. GAS OR TEST WELL

TO BE FILED WITH SUPERVISOR OF WELLS WITHIN 30 DAYS AFTER COMPLETION OF WELL (ACT 61 P. A. 1939 AND ACT 326 P. A. 1937)



LOCATE WELL ACCURATELY

Permit No. 27750 Deepening No.

Owner or Operator. Shell Oil Company

Address. 1700 Broadway, Denver, Colorado 80202

Well No. 1-26 Farm. Gerald G. Gates

Township. Star County. Antrim

Location. SE¼NW¼SW¼ Sec. 26 Twn [illegible] Range. 5W Elevation. 1306 KB

Footage. 1650 ft. from South l[illegible] [illegible]on West line of quarter section

Type of well. Dry Hole (OIL, GAS, BRINE DISPOSAL, DRY HOLE) T[illegible] [illegible]ted in. Dry

Name of producing formation. Dry [illegible]ion.

Date drilling begun. 9-13-69 Date compl[illegible] [illegible]ell [illegible]eted. 10-9-69

Drilling contractor. Calvert Eastern [illegible] Orchard Street, St. Clair, Michigan

This is in Antrim County. ~~The one~~ the Traverse Limestone has been Indentified as [illegible] in this [illegible] by GSD

WATER ZONES / OIL OR GAS ZONES / DEVIATION SURVEY

Name	From	To	Amount	Name	From	To	Amount	Run at	Degrees
None				None				1724'	1/4°
								2234'	1°
								2539'	1°
								3305'	1/4°
								3630'	1/4°
								4200'	1°
								4896'	3/4°
								5179'	1 1/4°

CASING AND CEMENTING / STEEL LINES RUN

Size	Where Set	Cement	Amt. Pulled	Run at	Corrected to	Run by
20"	121'	100 sx. light wt. followed by 100 sx. reg. All cmt. containg 2% $CaCl_2$ & ½# flocele/sx.	None			
8 5/8"	1116'	500 sx. reg. poz. w/4% gel. followed w/150 sx. reg. All cmt. containing 2% $CaCl_2$ & ½# flocele/sx.	None			

PERFORATIONS / ACID OR SHOOTING RECORD

Date	From	To	No. Holes	Date	From	To	Gals. Acid or Qts. Nitro
None							

Rotary tools from 0 feet to 6631 feet. Cable tools from feet to feet.

Natural initial production first 24 hours. P&A Bbls. After acid or shot Bbls.

If gas well, cu ft. per 24 hours Rock pressure, lbs. per sq. in.

The above information is complete and correct. Signed. *[signature] E. L. Wastick*

Date. October 27, 1969 Title. Division Drilling Superintendent

CONS. 7210 REV. 9/64

GIVE COMPLETE FORMATION RECORD ON REVERSE SIDE

(Submit in Duplicate)

Sample Descriptions

Shell, Gates 1-26
SE NW SW Section 26, T 30 N, R 5 W
Antrim County, Michigan
Elev. 1305.8' KB

Set 8-5/8" surface casing 1116' KB. Samples start at surface. Permit No. 27750.

0-795	Drift
Base Drift - Top Bedford	
795-1190	Shale, green-gray, blocky, dolomitic.
1120-1235	Shale, green-gray, blocky, dolomitic, with small amount light brown-gray.
Antrim	
1235-1340	Shale, gray-brown, blocky, minutely micaceous, dolomitic, with scattered Tasmanites, pyritic.
1340-50	Limestone, gray-tan, dense to extremely finely crystalline, slightly fossiliferous, with interbedded light gray-green, calcareous shale.
1350-60	Shale, light gray-green, blocky, calcareous.
1360-70	Shale, dark gray-brown, blocky, scattered Tasmanites.
1370-90	Limestone, gray-tan, extremely finely crystalline, argillaceous, with interbedded light gray-green shale.
1390-95	Limestone, brown, extremely finely crystalline, argillaceous, with interbedded brown, calcareous, shale.
Traverse	
1395-1420	Limestone, gray-tan, extremely finely crystalline, fossiliferous, argillaceous, with interbedded gray-tan, calcareous, shale.
1420-37	Limestone, tan to light brown, dense to extremely finely crystalline, fossiliferous, glauconitic.
Traverse Limestone	
1437-50	Limestone, buff to brown, extremely finely to medium crystalline, dolomitic, fossiliferous.

1450-80	Limestone, gray-white to gray-brown, dense to finely crystalline, fossiliferous, argillaceous.
1480-90	Limestone, tan, dense, finely oolitic, with fair inter-oolitic porosity.
1490-1505	Limestone, buff to brown, dense to very finely crystalline, fossiliferous.
1505-20	Limestone, tan, dense, finely oolitic, with poor inter-oolitic porosity.
1520-25	Limestone, tan to brown, dense.
1525-30	Gypsum, white.
1530-60	Limestone, tan to light brown, dense.
1560-90	Shale, green-gray, blocky, very calcareous, minutely micaceous.
1590-1620	Limestone, buff to gray-brown, dense to extremely finely crystalline, argillaceous, fossiliferous, with interbedded brown-gray shale.
1620-40	Limestone, tan to brown, dense to extremely finely crystalline, fossiliferous.
1640-60	Limestone, buff to brown, dense to medium crystalline, fossiliferous.
1660-70	Limestone, tan to brown, dense to extremely finely crystalline, with tan to brown, semi-opaque to opaque chert.
1670-80	Limestone, buff to brown, dense to medium crystalline, fossiliferous, with fair, finely vugular porosity, corals, crinoids.
1680-1710	Limestone, buff to brown, dense to extremely finely crystalline, fossiliferous.
1710-20	Limestone, cream to gray-brown, dense to medium crystalline, fossiliferous, argillaceous, coral, crinoid.
1720-30	Limestone, tan, finely crystalline, coralline, scattered finely vugular porosity.
1730-40	Limestone, gray-brown, dense to very finely crystalline, scattered fossils, argillaceous with thin beds dark gray shale.
1740-50	Limestone, cream to brown, dense to medium crystalline, fossiliferous.
1750-80	Limestone, tan to light brown, dense to extremely finely crystalline, fossiliferous.

1780-1800	Limestone, cream to light brown, dense to finely crystalline, fossiliferous.
1800-20	Limestone, tan to brown, dense to extremely finely crystalline, fossiliferous.
1820-30	Limestone, tan to brown, dense, trace finely oolitic and finely vugular porosity.
1830-50	Limestone, tan to brown, dense to extremely finely crystalline, slightly fossiliferous.
1850-1975	Limestone, tan to gray-brown, dense to extremely finely crystalline, slightly fossiliferous, argillaceous, with dark gray shale partings.
1975-90	Shale, medium gray, blocky, very calcareous, minutely micaceous, trace glauconite.
1990-2070	Limestone, buff to brown, dense to finely crystalline, fossiliferous, crinoid, coral, with scattered argillaceous partings.
2070-80	Limestone, as above, with scattered quartz crystals from 2070 to 2090.
2080-98	Dolomite, brown, very finely sucrosic to finely rhombic, with scattered white medium to coarse crystals.

Bell

2098-2172	Shale, medium gray to green-gray, blocky, calcareous, fossiliferous.

Dundee

2172-2240	Limestone, buff to brown, dense, fossiliferous, crinoids, scattered "spore cases".
2240-50	Dolomite, brown, very finely to finely sucrosic, with trace intercrystalline and finely vugular porosity.
2250-60	Dolomite, buff to brown, very finely sucrosic, trace finely vugular porosity.
2260-70	Dolomite, brown, finely rhombic, with fair intercrystalline and vugular porosity.
2270-80	Dolomite, buff to tan, very finely sucrosic.
2280-90	Dolomite, buff to tan, finely sucrosic to finely rhombic, with zones of fair intercrystalline porosity.
2290-2300	Limestone, buff to brown, dense, slightly fossiliferous.

2780-98	Dolomite, tan to brown, very finely sucrosic, with scattered fine vugs, probably salt filled.
2798-2840	Salt.
2840-70	Anhydrite with interbedded dolomite, tan, very finely sucrosic.
2870-90	Anhydrite.
2890-2900	Dolomite, buff to tan, very finely sucrosic.
2900-90	Anhydrite.
2990-3020	Limestone, buff to light brown, dense, slightly dolomitic.
3020-3340	Dolomite, buff to brown, very finely sucrosic, anhydritic.
3340-80	Limestone, buff to gray-brown, dense to very finely crystalline, slightly dolomitic, fossiliferous, with scattered dark gray shale partings.
3380-3490	Limestone, buff to gray-brown, dense to very finely crystalline, fossiliferous, with white devitrified and buff to brown, opaque chert.
3490-3530	Limestone, buff to brown, dense to very finely crystalline, fossiliferous.
3530-60	Dolomite, buff to tan, very finely sucrosic.
3560-3620	Limestone, buff to brown, dense to very finely crystalline.
3620-40	Dolomite, tan to brown, very finely sucrosic.
3640-60	Limestone, buff to brown, dense to very finely crystalline, slightly fossiliferous with gray to buff to brown, opaque, spicular in part, chert and white tripolitic chert.
3660-90	Limestone, as above, trace glauconite from 3660-80.
3690-3710	Dolomite, tan, extremely finely sucrosic.
3710-40	Dolomite, tan to brown, very finely to finely sucrosic, with fair intercrystalline and finely vugular porosity.
3740-69	Dolomite, buff to light brown, very finely sucrosic.
Bass Island	
3769-80	Dolomite, gray-tan, dense.
3780-4072	Dolomite, tan to brown, dense to extremely finely crystalline.

4072-4100	Dolomite, green-gray, dense, earthy, very argillaceous.
Salina	
4100-4166	Dolomite, green-gray, dense, earthy, very argillaceous.
4166-4340	Salt.
4340-50	Anhydrite.
4350-66	Salt.
4366-85	Anhydrite.
4385-92	Salt.
4392-4410	Anhydrite.
4410-77	Salt.
4477-4503	Anhydrite.
4503-4634	Salt.
4634-52	Anhydrite.
4652-87	Salt.
4687-4718	Anhydrite.
4718-88	Salt.
4788-4822	Anhydrite.
4822-4912	Salt.
Salina E	
4912-58	Anhydrite, white to brown, with streaks of dolomite, tan to brown, dense to extremely finely sucrosic.
4958-66	Salt.
4966-5066	Anhydrite and dolomite, as at 4912.
Salina D	
5066-84	Salt.
Salina C	
5084-5204	Shale, light gray-green, blocky, dolomitic, anhydritic.

Salina B

5204-5512	Salt.

Salina A-2 Carbonate - Niagaran

5512-26	Dolomite, tan to brown, dense to extremely finely sucrosic, fine salt-filled vugs.
5526-5617	Dolomite, brown, dense to extremely finely sucrosic.

Core #1 - 5617-5706

5617-30	Dolomite, dense, very finely laminated, anhydritic lenses, occasional carbonate partings.
5630-40	Dolomite, as above, anhydritic shale partings in top foot.
5640-73	Dolomite, very thinly laminated, dips of 30°, filled fractures at 5662 and 5667, bleeding oil.
5673-81	Dolomite, light gray, mottled, finely to coarsely sucrosic.
5681-5706	Dolomite, as above, pen point to ½" vugs, occasional hairline fractures, grades from tight at top to porous at base.

Core #2 - 5706-5796

5706-27	Dolomite, finely to medium sucrosic, slightly anhydritic, fossiliferous, pin point porosity.
5727-45	Dolomite, as above, more fossiliferous, increasing porosity, algal, stylolitic, corals.
5745-50	Dolomite, as above, with pin point porosity, no fossils.
5750-61	Dolomite, as above, very fossiliferous, stylolotic, some anhydrite-filled vugs.
5761-72	Dolomite, as above, pin point porosity, no fossils.
5772-96	Dolomite, as above, fossiliferous, vuggy porosity.

Core #3 - 5796-5884

5796-5801	Dolomite, light gray-brown, finely crystalline, fossiliferous, stylolitic, vugs to ½".
5801-06	Dolomite, as above, no fossils, pin point to vugular porosity.

CONS 7229
Rev. 5/67

STATE OF MICHIGAN
DEPARTMENT OF CONSERVATION
SUPERVISOR OF WELLS

PERMIT TO PLUG AND ABANDON

PERMIT NO. 27750

FIELD NAME: Wildcat

OWNER OR OPERATOR: Shell Oil Company

WELL NAME: Gerald E. Gates

WELL NO.: 1-36

LOCATION: SE NW SW | SECTION: 36 | T 30N | R 9W | TOWNSHIP: Star | COUNTY: Antrim

TYPE OF WELL (Oil, Gas, Dry Hole, etc.): Dry Hole

DATE COMPLETED: Oct. 8 19 69

LAST PRODUCTION: 19

LAST PRODUCTION (Amount per day) OIL, WATER, GAS

PLUGGING TO BE DONE BY: Halliburton or Dowell

DATE PLUGGING WILL START: Oct. 8 19 69

PLUGGING PERMIT REQUESTED BY (Well Owner or Authorized Representative): Bud Kennedy

DATE: Oct. 8 19 69

PERMIT MAILED TO: Shell Oil Company, % George Grignon,

ADDRESS: 1700 Broadway, Denver, Colorado

CASING AND CEMENTING RECORD

SIZE CASING	DEPTH SET	NO. SACKS CEMENT	PERFORATIONS
20"	121	100+	
9"	1116	550+	

FORMATION TOPS AND OTHER DATA
(Formation & depth, Oil, Gas & Water Shows, etc.)

Electric logs were run
Elev. 1292.8 Gr.
Drift 90S
No geological information as a released.
TD. 6613

PLUGGING REQUIREMENTS:

Run drill pipe to 5800' and spot 60 sacks of cement through and above the Niagaran and to the A-2 zone. Pull drill pipe to 4125' and spot 35 sacks of cement through the Saline. Pull drill pipe to 2400' and spot 60 sacks of cement through and above the Dundee-Detroit River section. Pull drill pipe to 1475' and spot 35 sacks through the top of the Traverse. Pull drill pipe to 1130' and spot 35 sacks of cement to the base of the 9" surface pipe.

9" and 20" casings to be abandoned with the well. Cut casings off 3' below ground level and cap with steel plate and cement.

Plugging requirements outlined above are to be executed in accordance with the provisions of Act 61, P.A. 1939, and/or Act 126, P.A. 1937, and the rules and regulations issued and adopted thereunder. NOTE: THE PLUGGING OF THIS WELL CANNOT BE APPROVED UNTIL THE PLUGGING IS COMPLETED, CELLAR, RAT HOLE AND PITS FILLED AND THE LOCATION HAS BEEN CLEANED AND LEVELED.

PERMIT ISSUED BY: Russell Wilson | FIELD OFFICE: Cadillac | DATE: Oct. 8 19 69

NOTE: WELL PLUGGING RECORD, Form CONS 7213, to be filed in TRIPLICATE within 30 days after completion.

Permit No. 27750

Co. Shell Oil Company
Farm Gerald G. Gates No. 1-26
Twp. Star Co. Antrim
Sec. SE NW SW Sec. 26 T. 30N R. 5W
* from and * from line of ¼ Sec.
* from and * from property line

Contractor Halliburton or Dowell
Comm. 10/8/69 Comp.

CASING RECORD

Size	Weight	Depth	Pulled
26	XX 20"	121 (100+)	
	10"		
	8¼"	1116 (550+)	
	6⅝"		

MUDDING AND CEMENTING RECORD

Date	Size	No. Sacks	Company
	10"		
	8¼"		
	6⅝"		

GEOLOGICAL FORMATION RECORD

Elevation 1292.8 Gr.
Drilled to 908

Plug Instr: 10/8/69

Pay plugged:

T. D. 6613
P. B.
I. P. (N) D & A
I. P. (A)
Plug Comp.

Run DP to 5800' & spot 60 sax of cement t
thru & above the Niag. & to the A-2 zone.
Pull DP to 4125' & spot 35 sax of cement
thru the Salina. Pull DP to 2400' & s
60 sax cement thru & above Dd.-Det. Rvr.
section. Pull DP to 1475' & spot 35 sax
thru the top of the Trv. Pull DP to 1130'
& spot 35 sax of cement to the base of
the 8" surface pipe. 8" & 20" csgs.
to be abandoned w/well. Cut csgs. off
3' below ground level & cap w/steel plate
& cement.

GS-14

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION
P.O. BOX 30028, LANSING, MICHIGAN 48909

APR 14 1993

RECORD OF WELL DRILLING OR DEEPENING

APPROPRIATE BLOCKS, FOR ITEMS NOT LISTED SUBMIT ATTACHMENTS.

REQUIRED BY AUTHORITY OF:
ACT 61, P.A. 1939, AS AMENDED. (Submit 2 copies within 30 days of completion.)
☐ ACT 315, P.A. 1969, AS AMENDED. (Submit 2 copies within 60 days of completion.)

NON-SUBMISSION AND/OR FALSIFICATION OF THIS INFORMATION MAY RESULT IN FINES AND/OR IMPRISONMENT.

PERMIT NO./DEEPENING PERMIT NO.	TYPE OF WELL (after completion)
46244	Brine Disposal

FIELD/FACILITY NAME: BART STAR

WELL NAME & NUMBER: Estelle D1-1 SWD

SURFACE LOCATION: SE ¼ of SW ¼ of SW ¼ Section 1 T 30N R 5W

NAME AND ADDRESS OF OWNER
Terra Energy Ltd.
1503 N. Garfield Rd.
Traverse City, MI 49684

TOWNSHIP	COUNTY
Star	Antrim

FOOTAGES: NORTH/SOUTH / EAST/WEST
339 Ft. from S Line and 769 Ft. from W Line of ¼ Sec.

NAME AND ADDRESS OF DRILLING CONTRACTOR
Bigard/Drillers Inc.
1315 N. Mission Rd.
Mt. Pleasant, MI 48858

SUBSURFACE LOCATION (if directionally drilled)
NA ¼ of ¼ of ¼ Section T R

TOWNSHIP	COUNTY
NA	NA

FOOTAGES: NORTH/SOUTH / EAST/WEST
NA Ft. from Line and Ft. from Line of ¼ Sec.

DATE DRILLING BEGAN	DATE DRILL. COMPLETED	DATE WELL COMPLETED
10-19-92	10-24-92	11/10/92

TOTAL DEPTH OF WELL	FORMATION AT T.D.	PROD. FORMATION(S)
Driller 2330 Log	Det. River Anhy	none

FEET DRILLED — CABLE TOOLS	FEET DRILLED — ROTARY TOOLS
From To	From 0 To 2330

DATE OF FIRST INJECTION	INJECTED FORMATION	SOLUTION FORMATION
12/23/92	Dundee	NA

ELEVATIONS

K.B.	R.F.	R.T	Grd.
1404 ft.	ft.	ft.	1394 ft.

CASING, CASING LINERS AND CEMENTING, OPERATING STRINGS

SIZE	WHERE SET	CEMENT	FT. PULLED
14	53	driven	
8 5/8	907	330	
5 1/2	2129	310	

PERFORATIONS

DATE	NUMBER HOLES	INTERVAL PERFORATED	OPEN YES	OPEN NO
		Open Hole Interval		
		2129 - 2330		

GROSS PAY INTERVALS

FORMATION	OIL OR GAS	FROM	TO
NA			

ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED

FORMATION	OIL OR GAS	DEPTH	WHERE OBSERVED (X) Samples	Odor	Pits	Mud Line	Gas Log.	Fill Up
NA								

STIMULATION BY ACID OR FRACTURING

DATE	INTERVAL TREATED	MATERIALS AND AMOUNT USED
10/29/92	2129-2330	2000 gal 15% HCl

WATER FILL UP (F.U.) OR LOST CIRCULATION (L.C.) (X)

FORMATION	F.U.	L.C.	DEPTH	AMOUNT
NA				

MECHANICAL LOGS, LIST EACH TYPE RUN

BRAND	(X)	LOG TYPES	LOGGED INTERVALS
Schlumberger		no logs run	
Birdwell			
OTHER			

DEPTH CORRECTION

DEPTH	CORRECTION
none	

DEVIATION SURVEY

RUN AT	DEGREES

PLUGGED BACK

YES	NO	DEPTH

PRODUCTION TEST DATA

Bbls/day	GRAVITY — °API	COND. Bbls/day	GAS — MCF/day	WATER — Bbls/day	H_2S — Grains/100 cu. ft.	B.H.P. AND DEPTH
NA	NA	NA	NA	NA	NA	NA

I AM RESPONSIBLE FOR THIS REPORT. THE INFORMATION IS COMPLETE AND CORRECT.

DATE	NAME AND TITLE (PRINT)	SIGNATURE
4/12/93	Stephen J. Savoie, Geologist	

NOTICE: REPORT COMPLETE SAMPLE AND FORMATION RECORD, CORING RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE.

PR 7200-5

FORMATION RECORD

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

#46244

ELEVATION USED: 1404 KB

GEOLOGIST NAME: Eric Taylor

TOPS TAKEN FROM: ☐ DRILLERS LOG ☒ SAMPLE LOG ☐ ELECTRIC LOG

NOTE: IF WELL DIRECTIONALLY DRILLED, *ADD* TRUE VERTICAL DEPTH FORMATION TOPS WHERE APPROPRIATE.

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)
1506	1522	Shale and limy Shale, gray, interbedded with Limestone, as above, dense
1522	1850	Limestone, brown tan gray, argillaceous in part, mostly fossiliferous, cherty in part, microcrystalline to extremely fine, dense
1850	2027	Shale and limy Shale, gray, interbedded with Limestone and shaly Limestone, dense
BELL SHALE		
2027	2110	Shale, gray, mostly non calcareous, soft texture
DUNDEE LIMESTONE		
2110	2174	Limestone, brown brown-gray, argillaceous, mostly fossiliferous, trace residual hydrocarbon stain, microcrystalline to extremely fine, dense to poor porosity
2174	2222	Dolomite, tan buff , mostly clean, somewhat fossiliferous, sucrosic texture in part, vuggy in part-large white dolomite rhombs, extremely fine to microcrystalline, good to fair porosity
2222	2315	Dolomite and Limestone, brown tan, fairly clean, fossiliferous, finely sucrosic texture in part, microcrystalline to extremely fine, good to poor porosity
DETROIT RIVER ANHYDRITE		
2315	2330	Anhydrite, white

IF WELL WAS CORED, ATTACH CORE DESCRIPTION

DRILL STEM TEST DATA

LIST ATTACHMENTS:

GEOLOGICAL SURVEY USE ONLY

REVIEWED BY:

DATE OF REVIEW:

#46244

FORMATION RECORD

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

ELEVATION USED:	GEOLOGIST NAME:	TOPS TAKEN FROM:
1104 KB	E. Taylor	☐ DRILLERS LOG ☒ SAMPLE LOG ☐ ELECTRIC LOG

NOTE: IF WELL DIRECTIONALLY DRILLED, *ADD* TRUE VERTICAL DEPTH FORMATION TOPS WHERE APPROPRIATE.

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)
		DRIFT
0	800	Sand, gravel and clay beds
		SUNBURY SHALE
800	950	Shale, black-very dark brown, carbonaceous, fissle
		ELLSWORTH SHALE
950	1180	Shale, gray-brown gray-green gray, very banded, silty in part
		ANTRIM SHALE
1180	1256	Shale, black-very dark brown, very carbonaceous, non-calcareous, grainy texture, fissle, trace disseminated pyrite, 1% to 10% gold spore fluorescence
1256	1296	Shale, gray brown-gray gray-green, limy in part, clay rich, carbonaceous in part, 1% gold spore fluor.
1296	1319	Shale, black, very carbonaceous, non-calcareous, grainy texture, fissle, minor disseminated pyrite, 10% to 20% gold spore fluor.
		TRAVERSE FORMATION
1319	1375	Shale, brown-gray, mostly calcareous, limy in part
		TRAVERSE LIMESTONE
1375	1404	Limestone, brown-gray, argillaceous, fossiliferous, microcrystalline, pyrite inclusions, dense
1404	1444	Shale and limy Shale, gray gray-brown, interbedded with shaly Limestone and Limestone, brown-gray, dense
1444	1506	Limestone, brown-gray, argillaceous, fossiliferous, cherty in part, algal mats, microcrystalline to extremely fine, dense

IF WELL WAS CORED, ATTACH CORE DESCRIPTION

DRILL STEM TEST DATA

LIST ATTACHMENTS:

GEOLOGICAL SURVEY USE ONLY

REVIEWED BY:

DATE OF REVIEW:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

EPA

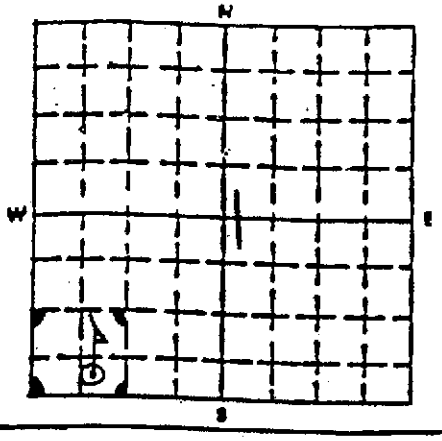
PLUGGING AND ABANDONMENT PLAN

MI-009-2D-0064
Page B-1 of 2

WELL NAME & NUMBER, FIELD NAME, LEASE NAME & NUMBER
ESTELLE #D1-1 SWD
Bart Star Antrim Gas Project

NAME, ADDRESS, & PHONE NUMBER OF OWNER/OPERATOR
TERRA ENERGY LTD.
1503 N. Garfield Rd.
Traverse City, MI 49684

Locate Well And Outline Unit On Section Plat — 640 Acres



STATE	COUNTY	STATE PERMIT NUMBER
MI	ANTRIM	pending

SURFACE LOCATION DESCRIPTION
SE SW SW Section 1 T30N-R5W Star Twp.

LOCATE WELL IN TWO DIRECTIONS FROM NEAREST LINES OF QUARTER SECTION AND DRILLING UNIT
Surface Location 339 ft. From (N/S) S Line Of Quarter Section
And 769 ft. From (E/W) W Line Of Quarter Section

TYPE OF AUTHORIZATION
- [X] Individual Permit
- [ ] Rule
- [ ] Area Permit

Number of Wells in Area Permit ____
U.S. EPA Permit Number ____

WELL ACTIVITY
- [ ] Class I
  - [ ] Hazardous
  - [ ] Nonhazardous
- [X] Class II
  - [X] Brine Disposal
  - [ ] Enhanced Recovery
  - [ ] Hydrocarbon Storage
- [ ] Class III
- [ ] Class V

CASING/TUBING/CEMENT RECORD AFTER PLUGGING AND ABANDONMENT

14	54#	50	50	NA	Driven	NA
8 5/8	20#	1000	1000	12 1/4	400	Poz A
5 1/2	15.5#	2125	2125	7 7/8	500	Poz A

METHOD OF EMPLACEMENT OF CEMENT PLUGS
- [X] The Balance Method
- [ ] The Dump Bailer Method
- [ ] The Two Plug Method
- [ ] Other, Explain:

CEMENT TO PLUG AND ABANDON DATA:	Plug # 1	Plug # 2	Plug # 3	Plug # 4	Plug # 5	Plug #	Plug #
Size of Hole or Pipe in Which Plug Will Be Placed (inches)	4 3/4	5 1/2	5 1/2	5 1/2			
Calculated Top of Plug (ft.)	2125	1875	850	surf			
Measured Top of Plug (ft.)	NA	NA	NA	NA			
Depth to Bottom of Plug (ft.)	2425	2125	1050	50			
Sacks of Cement to Be Used	37	30	24	6			
Slurry Volume to Be Used (cu. ft.)	44	35	28	7			
Slurry Weight (lb./gal.)	15.6	15.6	15.6	15.6			
Type of Cement, Spacer or Other Material Used	A	A	A	A			
Type of Fluid Used							

DESCRIPTION OF PLUGGING PROCEDURE

Circulate and balance hole, Thru tubing spot 37 sx cement plug at 2125, pull tubing to 1875 and spot 30 sx plug. Pull tubing to 850 and spot 24 sx plug. Pulltubing to 50 and spot 6 sx plug. Plug rat and mouse holes with cement. Cut casing 3 feet below ground level and weld on 1/2" steel plate.

ESTIMATED COST OF PLUGGING AND ABANDONMENT

Cement	$ 1800.00	Cast Iron Bridge Plug	$
Logging	$	Cement Retainer	$
Rig or Pulling Unit	$ 700.00	Miscellaneous	$ 700.00

CERTIFICATION

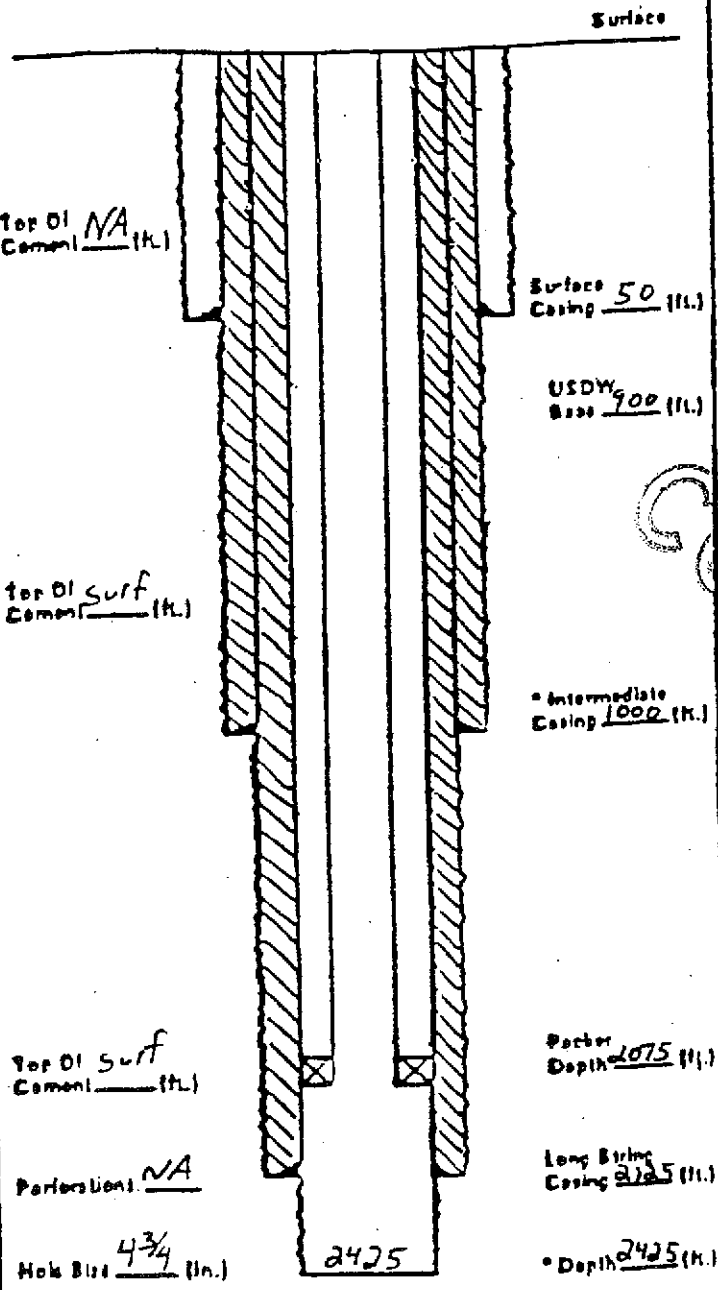
I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

NAME AND OFFICIAL TITLE (Please type or print)	SIGNATURE	DATE SIGNED
Stephen J. Savoie, Geologist	Stephen J. Savoie	7/9/92

EPA Form 7520-14 (3-84)

ORIGINAL WELL CONSTRUCTION DURING OPERATION

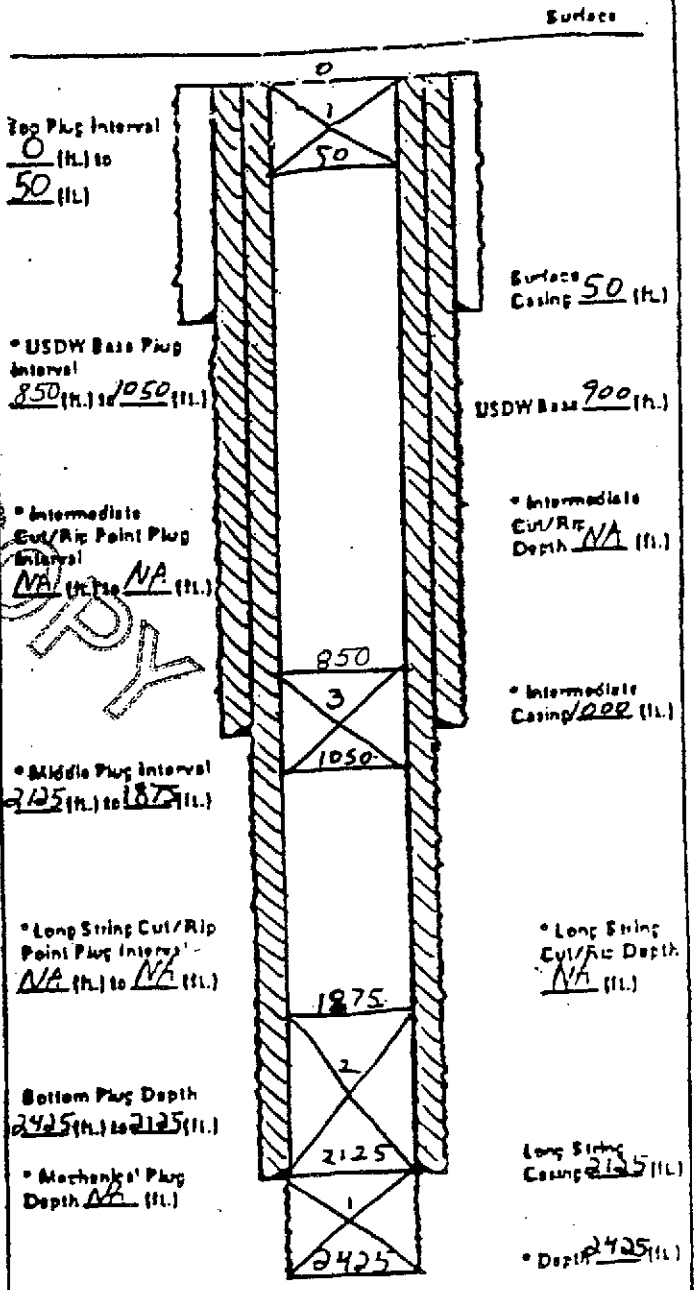
ESTELLE #D1-1 SWD



** Add Any Additional Information
* May Not Apply

PLUGGING AND ABANDONMENT CONSTRUCTION

ESTELLE #D1-1 SWD



** Add Any Additional Information
* May Not Apply

LIST OF ALL OPEN AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED

Specify Open Hole or Perforated Interval and/or Intervals of Casing	From	To	Formation Name
OPEN HOLE	2125	2425	Dundee / Det Riv Salt

FEB 06 1990

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION
P O BOX 30028 LANSING, MICHIGAN 48909

RECORD OF WELL DRILLING OR DEEPENING

USE APPROPRIATE BLOCKS FOR ITEMS NOT LISTED SUBMIT ATTACHMENTS

REQUIRED BY AUTHORITY OF

☐ ACT 61, P.A 1939, AS AMENDED (Submit 2 copies within 30 days of completion)

☐ ACT 315, P.A 1969, AS AMENDED (Submit 2 copies within 60 days of completion)

NON SUBMITTAL OR FALSIFICATION OF THIS INFORMATION MAY RESULT IN FINES AND/OR IMPRISONMENT

PERMIT NO./DEEPENING PERMIT NO: 42680

TYPE OF WELL (after completion): GAS /DISPOSAL

FIELD/FACILITY NAME: CAPLE RANCH

WELL NAME & NUMBER: CAPLE #1-19

SURFACE LOCATION: NE ¼ of SE ¼ of SE ¼ Section 19 T30N R 4W

TOWNSHIP: HAYES

COUNTY: OTSEGO

FOOTAGES NORTH/SOUTH: 970 Ft. from S Line and EAST/WEST 495 Ft. from E Line of ¼ Sec

SUBSURFACE LOCATION (if directionally drilled): ¼ of ¼ of ¼ Section T R

TOWNSHIP:

COUNTY:

FOOTAGES NORTH/SOUTH: Ft. from Line and EAST/WEST Ft. from Line of ¼ Sec.

NAME AND ADDRESS OF OWNER:
TERRA ENERGY, LTD.
1503 N. GARFIELD ROAD
TRAVERSE CITY, MICHIGAN 49684

NAME AND ADDRESS OF DRILLING CONTRACTOR:
James Bigard Drilling
P.O. Box 509, 1315 N. Mission Road
Mt. Pleasant, MI 48804

DATE DRILLING BEGAN	DATE DRILL COMPLETED	DATE WELL COMPLETED
11-13-89	11-19-89	12/11/89
TOTAL DEPTH OF WELL	**FORMATION AT T.D**	**PROD FORMATION(S)**
Driller 2490 Log	Det Riv Salt	Antrim
DATE OF FIRST INJECTION	**INJECTED FORMATION**	**SOLUTION FORMATION**
Pending	Dundee	

FEET DRILLED — CABLE TOOLS: From To

FEET DRILLED — ROTARY TOOLS: From 0 To TD

ELEVATIONS: K.B. 1360 ft. | R.F. ft. | R.T ft. | Grd. 1347 ft

CASING, CASING LINERS AND CEMENTING, OPERATING STRINGS

SIZE	WHERE SET	CEMENT	FT. PULLED
14	51	Driven	
8 5/8	940	200 sx 35/65 poz	
		150 sx class A	
5 1/2	2151	100 sx 35/65 poz	
		280 sx class A	

PERFORATIONS

DATE	NUMBER HOLES	INTERVAL PERFORATED	OPEN YES	OPEN NO
12/8	66	1244-1247	X	
	22	1337-1347		

GROSS PAY INTERVALS

FORMATION	OIL OR GAS	FROM	TO
ANTRIM	GAS	1205	1284
		1320	1354

ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED

FORMATION	OIL OR GAS	DEPTH	Samples	Odor	Pits	Mud Line	Gas Log	Fl Us

STIMULATION BY ACID OR FRACTURING

DATE	INTERVAL TREATED	MATERIALS AND AMOUNT USED
12/11	1244-1274	279,000 Scf N2
	1337-1347	300 sx 20/40 sand
		100 sx 12/20 sand
		243 bbls fluid

WATER FILL UP (F.U.) OR LOST CIRCULATION (L.C.) (X)

FORMATION	F.U	L.C	DEPTH	AMOUNT

MECHANICAL LOGS, LIST EACH TYPE RUN

BRAND	(X)	LOG TYPES	LOGGED INTERVALS
Schlumberger		No logs run	
Birdwell			
Other			

DEPTH CORRECTION / DEVIATION SURVEY / PLUGGED BACK

DEPTH	CORRECTION	RUN AT	DEGREES	YES	NO	DEPTH

PRODUCTION TEST DATA

OIL — Bbls day	GRAVITY — °API	COND Bbls/day	GAS — MCF/day	WATER — Bbls/day	H2S — Grains/100 cu ft	BHP AND DEPTH
			39	13		

I AM RESPONSIBLE FOR THIS REPORT. THE INFORMATION IS COMPLETE AND CORRECT.

DATE: 1/11/90

NAME AND TITLE (PRINT): Stephen J. Savoie, Geologist

SIGNATURE: Stephen J Savoie

NOTICE: REPORT COMPLETE SAMPLE AND FORMATION RECORD, CORING RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE

PR 7200-1

FORMATION RECORD

PN. 42680

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

ELEVATION USED	GEOLOGIST NAME	TOPS TAKEN FROM
KB 1360	Stephen J. Savoie	☐ DRILLERS LOG ☒ SAMPLE LOG ☐ ELECTRIC LOG

NOTE: IF WELL DIRECTIONALLY DRILLED, *ADD* TRUE VERTICAL DEPTH FORMATION TOPS WHERE APPROPRIATE.

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)
	833	Base of Drift
	1205	Dark Antrim
	1354	Traverse Fm
	1404	Traverse LS
	2061	Bell Shale
	2141	Dundee
	2472	Det Riv Salt
	2490	TD
833	1165	Shale, light to med gray, soft, firm, calc
1165	1205	Shale, med. to dark gray, firm, fissile, sl carb.
1205	1284	Shale, black, firm, fissile, carb.
1284	1320	Shale, light to med. gray firm, calc.
1320	1354	Shale, black, firm fissle, carb.
1354	1404	Shale, light gray, firm, calc.
1404	2061	Limestone, tan to light gray to white, with scattered beds of shale, light gray soft, calc.
2061	2141	Shale, light gray, soft, calc.
2141	2472	Limestone, gray to tan to brown with scattered dolomite & anhydrite beds.
2472	2490	Salt

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)

IF WELL WAS CORED, ATTACH CORE DESCRIPTION

DRILL STEM TEST DATA

LIST ATTACHMENTS:

GEOLOGICAL SURVEY USE ONLY

REVIEWED BY:

DATE OF REVIEW:

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION
BOX 30028
LANSING, MICHIGAN 48909

REQUIRED BY AUTHORITY OF
☐ ACT 61, P.A. 1939, AS AMENDED ☐ ACT 315, P.A. 1969, AS AMENDED

APPLICATION TO (Submit 4 copies):

☒ CHANGE WELL STATUS ☐ PLUG AND ABANDON

NON-SUBMISSION AND/OR FALSIFICATION OF THIS INFORMATION MAY RESULT IN FINES AND OR IMPRISONMENT

PERMIT NO	TYPE OF WELL
42680	Dry Hole

NAME AND ADDRESS OF WELL OWNER ☐ APPROVAL MAILED

TERRA ENERGY LTD
1503 North Garfield Road
Traverse City, Michigan 49684

CHANGE OF WELL STATUS REQUESTED FOR

☐ PLUG BACK ☐ EXTEND PLUGGING (T.A.) ☒ PERFORATE
☐ CONVERT TO INJECTION OR DISPOSAL WELL ☐ OTHER

☐ ACIDIZE (315 ONLY) ☒ FRACTURE (315 ONLY)

FIELD/FACILITY NAME: WILDCAT

WELL NAME: CAPLE — WELL NO: 1-19

WELL LOCATION: NE ¼ of SE ¼ of SE ¼ Section T 30N R 4W

LAST PRODUCTION / INJECTION AND TYPE OF FLUID (Amount per day & injection pressure): Never Produced

TOWNSHIP: HAYES — COUNTY: OTSEGO

DATE DRILLING COMPLETED: 11-19-89 — DATE LAST PRODUCED/UTILIZED: NA

WORK TO BE DONE BY: ☐ APPROVAL MAILED: TERRA ENERGY LTD. — STARTING DATE: 12-1-89

CASING AND CEMENTING RECORD

HOLE DIA	CASING DIA & WT /FT	DEPTHS SET	CEMENT QUANTITY TYPE ADDITIVES	CMT TOP	PERFORATIONS
NA	14"	56'	Driven		
12 1/4"	8 5/8"	926'	200 sx 35/65 poz 150 sx class A	Surface	
7 7/8"	5 1/2" 15.5#	2151'	100 sx 35/65 poz 280 sx class A	980'	

FORMATION RECORD (Formation and depth, oil, gas and water shows, etc.)

BOD	833
Dark Antrim	1205
Trav Fm	1354
Trav Lm	1404
Bell Shale	2061
Dundee	2141
TD	2490

GEOLOGICAL SURVEY
AUG 15 1994
Permits & Bonding Unit

DETAIL PROPOSED PROCEDURES

Rig up completion rig and set retrievable bridge plug at 2100'. TIH with casing gun and perforate interval from 1240' to 1270' and 1335' and 1345' with 4jspf. TOH with casing gun and TIH with tubing to 1140'. Rig up fracturing equipment and fracture perfed formation with nitrogen and sand. Flow well back and test Antrim Fm for possible gas.

DNR ADDITIONAL REQUIREMENTS

NAME SIGNATURE (Authorized Representative): William C. Quinlan, Geological Engineer — DATE: 11/30/94

APPROVED BY: DNR — OFFICE: Gaylord — APPROVAL DATE: 12-7-94 — TERMINATION DATE: NA

NOTE: THREE COPIES OF WELL PLUGGING OR REWORK (PR 7200-8) ARE TO BE FILED WITHIN 30 DAYS OF COMPLETION

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION
BOX 30028
LANSING, MICHIGAN 48909

USE APPROPRIATE BLOCKS. FOR ITEMS NOT LISTED SUBMIT ATTACHMENTS.
REQUIRED BY AUTHORITY OF:
☐ ACT 61, P.A. 1939, AS AMENDED ☐ ACT 315, P.A. 1969, AS AMENDED

NON-SUBMISSION AND/OR FALSIFICATION OF THIS INFORMATION MAY RESULT IN FINES AND/OR IMPRISONMENT.

RECORD OF WELL: ☐ PLUGGING ☒ REWORK
(MAIL THREE COPIES TO THE DISTRICT OFFICE WITHIN 30 DAYS AFTER COMPLETION OF PLUGGING OR REWORK)

PERMIT NO.	TYPE OF WELL
42680	Gas

FIELD/FACILITY NAME: Wildcat

WELL NAME & NUMBER: Caple #1-19

WELL LOCATION: NE ¼ of SE ¼ of SE ¼ Section 19 T 30N R 4W

TOWNSHIP	COUNTY
Hayes	Otsego

TOTAL DEPTH	FORMATION
2490	Detroit River Salt

...G/REWORK STARTING DATE	PLUGGING/REWORK COMPLETION DATE
07-89	12-12-89

...EPTH AFTER REWORK	MECHANICAL LOGS RUN
	GR/CCL

...MPLETED FOR	FORMATION AND ZONE
S	Antrim Shale

To Well or Update files

NAME AND ADDRESS OF WELL OWNER
Terra Energy Ltd.
1503 N. Garfield Road
Traverse City, MI 49684

CASING SIZE	WHERE SET	AMOUNT RECOV
5-1/2	2151	NA

...IDGES OR PLUGS	DEPTH PLACED	SACKS OF CEMENT & ADDITIVES
...ridge plug	1425	NA

WERE TOOLS, TUBING, CASING, ETC. LOST OR LEFT IN THE HOLE BEFORE OR AFTER PLUGGING? IF YES, GIVE DETAILS.
NO

DID A SERVICE COMPANY PUMP MUD, SPOT CEMENT, OR SET BRIDGE PLUGS? IF YES, GIVE NAME AND ADDRESS.
Dowell Schlumberger
Kalkaska, MI 49646

WELL PLUGGING/REWORK CONTRACTOR AND ADDRESS
Phoenix Operating Company
1623 Northern Star DRive
Traverse City, MI 49684

PERMITEE'S PLUGGING WITNESS
Jack Lauber

NAME(S) OF DNR REPRESENTATIVE WHO:
Andrea Sullivan
☒ ISSUED PERMIT
☐ WITNESSED PLUGGING

GEOLOGICAL SURVEY
AUG 17 1994
Permits & Bonding Unit

WELL CASING RECORD — BEFORE REWORK

Casing Size	Casing Depth	Cement Sacks	Cement Type	Perforations From	Perforations To	Acid or Fracture Treatment Record	Perforations If plugged, how?
14	56	NA	NA				
8-5/8	926	200/150	POZ/A				
5-1/2	2151	110/280	POZ/A				

WELL CASING RECORD — AFTER REWORK (Indicate additions and changes only)

Casing Size	Casing Depth	Cement Sacks	Cement Type	Perforations From	Perforations To	Acid or Fracture Treatment Record	Perforations If plugged, how?
5-1/2	2141	100/280	POZ/A	1244	1274	Acidize open hole 2151-2490 with 2000 gal HCl acid. Frac perfs with 279,000 Scf N2, 300 sx 20/40 sand, 100 sx 12/20 sand 243 bbls fluid.	
				1337	1347		

DESCRIBE IN DETAIL HOW WELL WAS PLUGGED OR REWORKED

Move in Pool rig, rig up. TIH with tubing and acidize open hole section with 1000 gal 15% HCl and 1000 gal 28% HCl acid. TIH with CIBP set at 1425'. TIH with perf gun and perf 5-1/2" casing from 1244-1274', 1337-1347', acidize perfs with 3400 gal Fe acid. Frac well with 279 MCF N2 foam, 300 sx 20/40 sand, 100 sx 12/20 sand, 243 bbls fluid. Flow back frac and shut in well.

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION
BOX 30028
LANSING, MICHIGAN 48909

USE APPROPRIATE BLOCKS. FOR ITEMS NOT LISTED SUBMIT ATTACHMENTS.
REQUIRED BY AUTHORITY OF:
☐ ACT 61, P.A. 1939, AS AMENDED ☐ ACT 315, P.A. 1969, AS AMENDED

NON-SUBMISSION AND/OR FALSIFICATION OF THIS INFORMATION MAY RESULT IN FINES AND/OR IMPRISONMENT.

RECORD OF WELL: ☐ **PLUGGING** ☒ **REWORK**
(MAIL THREE COPIES TO THE DISTRICT OFFICE WITHIN 30 DAYS AFTER COMPLETION OF PLUGGING OR REWORK)

PERMIT NO.	TYPE OF WELL
42680	Gas
FIELD/FACILITY NAME	
Wildcat	
WELL NAME & NUMBER	
Caple #1-19	
WELL LOCATION	
NE ¼ of SE ¼ of SE ¼ Section 19 T 30N R 4W	
TOWNSHIP	**COUNTY**
Hayes	Otsego
TOTAL DEPTH	**FORMATION**
2490'	Dundee
PLUGGING/REWORK STARTING DATE	**PLUGGING/REWORK COMPLETION DATE**
07-27-90	07-30-90
TOTAL DEPTH AFTER REWORK	**MECHANICAL LOGS RUN**
2490'	
WELL COMPLETED FOR	**FORMATION AND ZONE**
Gas/Disposal	Antrim

NAME AND ADDRESS OF WELL OWNER
Terra Energy Ltd.
1503 N. Garfield Road
Traverse City, MI 49684

CASING SIZE	WHERE SET	AMOUNT RECOVERED	SHOT OR RIPPED	TYPE OF BRIDGES OR PLUGS	DEPTH PLACED	SACKS OF CEMENT & ADDITIVES

RECEIVED GEOLOGICAL SURVEY
AUG 10 1990
Permits & Bonding Unit

WERE TOOLS, TUBING, CASING, ETC. LOST OR LEFT IN THE HOLE BEFORE OR AFTER PLUGGING? IF YES, GIVE DETAILS.

DID A SERVICE COMPANY PUMP MUD, SPOT CEMENT, OR SET BRIDGE PLUGS? IF YES, GIVE NAME AND ADDRESS.

WELL PLUGGING/REWORK CONTRACTOR AND ADDRESS

PERMITEE'S PLUGGING WITNESS

NAME(S) OF DNR REPRESENTATIVE WHO: ☐ ISSUED PERMIT ☐ WITNESSED PLUGGING

WELL CASING RECORD — BEFORE REWORK

Casing Size	Casing Depth	Cement Sacks	Cement Type	Perforations From	Perforations To	Acid or Fracture Treatment Record	Perforations If plugged, how?
14"	56'	NA	NA				
8-5/8	926'	200/150	POZ/CLA				
5-1/2	2151'	100/280	POZ/CLA				

WELL CASING RECORD — AFTER REWORK (Indicate additions and changes only)

Casing Size	Casing Depth	Cement Sacks	Cement Type	Perforations From	Perforations To	Acid or Fracture Treatment Record	Perforations If plugged, how?
14"	56'	NA	NA				
8-5/8	926'	200/150	POZ/CLA				
5-1/2	2151'	100/250	POZ/CLA	1244	1274	3560 gal Fe acid	1244 to 1274
						30,000# 20/40, 10,000#	1337 to 1347
						12/20 sand frac	

DESCRIBE IN DETAIL HOW WELL WAS PLUGGED OR REWORKED.

Acidize Dd w/1000 gal 15% HCL and 1000 gal 25% HCL. TIH with CIBP to 1425' and set. Spot 250 gal 15% Fe at 1350'. TIH wtih perf gun and perf 1244' to 1274' and 1337' to 1347' with 4 jspf. Acidize perfs with 3400 gal 15% Fe. Flow back frac. Drill up CIBP at 1425'. TIH with Arrow XLW packer and set at 2096'. TIH with 29 jts 2-3/8" tubing, dual packer and 36 jts 1.9" tubing and sting into at 2096'. Set dual packer at 1202'. TIH with 36 jts 1.9" tubing and circulate corrosion inhibitor with tubing/casing annulus. Sting into dual packer.

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION
P.O. BOX 30028 LANSING MICHIGAN 48909

RECORD OF WELL DRILLING OR DEEPENING

USE APPROPRIATE BLOCKS FOR ITEMS NOT LISTED SUBMIT ATTACHMENTS

REQUIRED BY AUTHORITY OF

☐ ACT 61, P.A. 1939 AS AMENDED (Submit 2 copies within 30 days of completion)

☐ ACT 315, P.A. 1969, AS AMENDED (Submit 2 copies within 60 days of completion)

NON SUBMISSION AND/OR FALSIFICATION OF THIS INFORMATION MAY RESULT IN FINES AND/OR IMPRISONMENT

PERMIT NUMBER: 41955	TYPE OF WELL: Salt water disposal
FIELD/FACILITY NAME: Star "23" Antrim Field	
WELL NAME & NUMBER: Gates #1-23 SWD	
SURFACE LOCATION: SE ¼ of NE ¼ of NW ¼ Section 23 T30N R5W	
TOWNSHIP: STAR	COUNTY: ANTRIM
FOOTAGES NORTH/SOUTH: 1250 Ft from N Line and EAST/WEST: 100 Ft from E Line of ¼ Sec	
SUBSURFACE LOCATION (if directionally drilled): ¼ of ¼ of ¼ Section T R	
TOWNSHIP:	COUNTY:
FOOTAGES NORTH/SOUTH: Ft from Line and EAST/WEST: Ft. from Line of ¼ Sec	
FEET DRILLED — CABLE TOOLS: From To	FEET DRILLED — ROTARY TOOLS: From 0 To TD

NAME AND ADDRESS OF OWNER:
TERRA ENERGY, LTD.
1503 N. GARFIELD ROAD
TRAVERSE CITY, MICHIGAN 49684

NAME AND ADDRESS OF DRILLING CONTRACTOR:
McLachlan Drilling
P.O. Box 548
Evart, Michigan 49631

DATE DRILLING BEGAN	DATE DRILL COMPLETED	DATE WELL COMPLETED
5-10-89	5-15-89	5-16-89

TOTAL DEPTH OF WELL	FORMATION AT T.D.	PROD. FORMATION(S)
Driller 2411 Log	Dundee	None

DATE OF FIRST INJECTION	INJECTED FORMATION	SOLUTION FORMATION
Pending	Dundee	

ELEVATIONS

K.B.	R.F.	R.T.	Grd
1321 ft	ft	ft	1307 ft

CASING, CASING LINERS AND CEMENTING, OPERATING STRINGS

SIZE	WHERE SET	CEMENT	FT. PULLED
14"	53	Driven	
8 5/8	972	200 sx 35/65 poz	
		150 sx Class A	
5 1/2	2116	190 sx 35/65 poz	
		75 sx RFC	

PERFORATIONS

DATE	NUMBER HOLES	INTERVAL PERFORATED	OPEN YES	OPEN NO
		Open hole completion		

GROSS PAY INTERVALS

FORMATION	OIL OR GAS	FROM	TO

ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED

FORMATION	OIL OR GAS	DEPTH	Samples	Odor	Pits	M. Line	Gas Log	E. L.

STIMULATION BY ACID OR FRACTURING

DATE	INTERVAL TREATED	MATERIALS AND AMOUNT USED

WATER FILL UP (F.U.) OR LOST CIRCULATION (L.C.) (X)

FORMATION	F.U.	L.C.	DEPTH	AMOUNT
Traverse		X	1470	Unknown
Dundee		X	2260	Unknown

MECHANICAL LOGS, LIST EACH TYPE RUN

BRAND	(X)	LOG TYPES	LOGGED INTERVALS
Schlumberger			
Birdwell			
Other: Halliburton	X	GR-Neutron	0-2155

DEPTH CORRECTION

DEPTH	CORRECTION

DEVIATION SURVEY

RUN AT	DEGREES

PLUGGED BACK

YES	NO	DEPTH

PRODUCTION TEST DATA

OIL — Bbls/day	GRAVITY — °API	COND. Bbls/day	GAS — MCF/day	WATER — Bbls/day	H_2S — Grains/100 cu ft	BHP AND DEPTH

I AM RESPONSIBLE FOR THIS REPORT. THE INFORMATION IS COMPLETE AND CORRECT.

DATE	NAME AND TITLE (PRINT)	SIGNATURE
6/2/89	Stephen J. Savoie, Geologist	[signature]

NOTICE: REPORT COMPLETE SAMPLE AND FORMATION RECORD, CORING RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE

FORMATION RECORD

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

#41955

ELEVATION DATUM	GEOLOGIST NAME	TOPS TAKEN FROM
KB 1321	Stephen J. Savoie	☐ DRILLERS LOG ☒ SAMPLE LOG ☒ ELECTRIC LOG

NOTE IF WELL DIRECTIONALLY DRILLED, *ADD* TRUE VERTICAL DEPTH FORMATION TOPS WHERE APPROPRIATE

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)
	907	Base of drift
	907	Top of Ellsworth
	1180	Dark Antrim
	1320	Traverse Fm
	1376	Traverse LS
	2035	Bell Shale
	2114	Dundee
	2411	Total Depth
907	1125	Shale, light gray, soft, firm,calc.
1125	1180	Shale, light to med Gray, soft-firm, calc
1180	1257	Shale, black, firm fissile, carb.
1257	1194	Shale, light gray, firm,fissile,calc
1194	1320	Shale, black, firm, fissile, carb.
1320	1376	Shale, light gray, firm, calc., some lime-stone, white.
1376	2035	Limestone, white to tan to dk brown, some scattered shale, light gray, firm, calc.
2035	2114	Shale light to med blue gray, soft, calc.
2114	2250	Limestone, gray to tan to brown, tight with scattered dolomite beds
2250	2385	Dolomite, med to dk brown, porous
2385	2390	Anhydrite , white
2390	2411	Limestone, light gray tight with scattered beds of anhydrite and dolomite.

FROM	TO	FORMATION (TYPE COLOR HARDNESS)

IF WELL WAS CORED, ATTACH CORE DESCRIPTION

DRILL STEM TEST DATA

LIST ATTACHMENTS:

GEOLOGICAL SURVEY USE ONLY

REVIEWED BY:

SEC 23 30N 5W PERMIT 41955
MICH ANTRIM * 1250FNL 100FEL NW SE NE NW
TERRA ENERGY U U
1-23 GATES S W D
1321KB 1307GR MANCELONA E
API 21-009-41955-0000
SPUD 05/10/1989 COMP 05/18/1989 ROTARY SERVCE
PROJ DEPTH 2800 DUNDEE CONTR MCLACHLAN L M #2
DTD 2411 LTD 2155 FM/TD DUNDEE
5 7/8 MI N MANCELONA EAST FLD
10 1/2 MI NE MANCELONA, MI
DRLG UNIT: SEC 23 (NE,NW)
CSG 14 @ 53
CSG 8 5/8 @ 972 W/ 350 SACKS
CSG 5 1/2 @ 2116 W/ 265 SACKS
LOG DRIFT 907 414
LOG ELLSWRTH 907 414
LOG ANTRIM DK 1180 141
LOG TRAVERSE 1320 1
LOG TRAV LM 1376 -55
LOG BELL 2035 -714
LOG DUNDEE 2114 -793
TD 2411 -1090
DUNDEE ORDINHOLE 2116- 2411
DISPOSAL RATE NA
NATURAL
LOGS 0- 2155 GRNL
NAMED TWP STAR

21 S

GEOL STEPHEN J SAVOIE
TERRA ENERGY
1800 N GARFIELD DR
TRAVERSE CITY, MI 49684
616-941-7919

03/01 LOC/1989/

06/14/89
21 5

MICHIGAN DEPARTMENT OF PUBLIC HEALTH
WATER WELL AND PUMP RECORD

TAX NO: 05-13-013-00135

PERMIT NO: A96-21

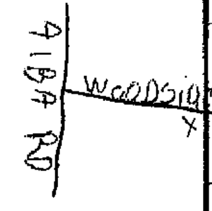
1. LOCATION OF WELL

County	Township Name	Fraction	Section No.	Town No.	Range No.
ANTRIM	StAr	1/4 1/4 1/4	13	30N	5W

Distance and Direction from Road Intersection: From ALBA RD & Woodside, go Down Woodside About 3/4 Mi.

Street Address & City of Well Location

Locate with 'x' in Section Below — Sketch Map



3. OWNER OF WELL Charles Westphal

Address: 680 Sparr RD / 11357 Woodside / Alba Mi

Address Same as Well Location [X] Yes [ ] No

4. WELL DEPTH: 160 ft. Date Completed 5/6/96 [X] New Well [ ] Replacement Well

5. [ ] Cable Tool [X] Rotary [ ] Driven [ ] Dug [ ] Hollow Rod [ ] Auger/Bored [ ] Jetted [ ] ______

6. USE: [X] Household [ ] Type I Public [ ] Type III Public [ ] Irrigation [ ] Type IIa Public [ ] Heat Pump [ ] Test Well [ ] Type IIb Public [ ]

7. CASING: [ ] Steel [ ] Threaded [X] Plastic [ ] Welded [ ] Other ______

Height: (Above)/Below Surface: 1 ft

Diameter: 5 in. to 154 ft. depth — Weight: ______ lbs./ft.

______ in. to ______ ft. depth

BORE HOLE: Diameter: 8 in. to 160 ft. depth; ______ in. to ______ ft. depth

[ ] Drive Shoe [ ] Shale Packer

2. FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Br SAND	5	5
Corse TAN SAND	55	60
Corse TAN SAND & SMAll gravel	100	160

USE A 2ND SHEET IF NEEDED

8. SCREEN: [ ] Not Installed [X] Gravel-Packed

Type PVC Diameter 4IN

(Slot)/Gauze 15 Length: 6 Feet

Set Between 154 ft. and 160 ft.

FITTINGS: [ ] K-Packer [ ] Bremer Check [ ] Blank Above Screen ______ ft. Other PVC Bell

9. STATIC WATER LEVEL: 130 ft. Below Land Surface [ ] Flowing

10. PUMPING LEVEL: Below Land Surface ______ ft. After ______ hrs. Pumping at 50 G.P.M.

[ ] Plunger [ ] Bailer [X] Air [ ] Test Pump

11. WELL HEAD COMPLETION: [X] Pitless Adapter [ ] 12" Above Grade [ ] Basement Offset [ ] Well House

12. WELL GROUTED? [ ] No [X] Yes From 0 to 144 ft.

[ ] Neat Cement [X] Bentonite [X] Other Grout Mix

No. of Bags 5 Additives ______

13. NEAREST SOURCE OF POSSIBLE CONTAMINATION:

Type Septic Distance 60+ ft. Direction NE

Type ______ Distance ______ ft. Direction ______

14. PUMP: [ ] Not Installed [ ] Pump Installation Only

Manufacturer's Name MEYERS

Model Number ______ HP 3/4 Volts 220

Length of Drop Pipe 155 ft. Capacity 12 G.P.M.

TYPE: [X] Submersible [ ] Jet [ ] Other ______

PRESSURE TANK:

Manufacturer's Name XTROL

Model Number 203 Capacity 9.9 Gallons 32

15. ABANDONED WELL PLUGGED? [ ] Yes [ ] No

Casing Diameter ______ in. Depth ______ ft.

PLUGGING MATERIAL: [ ] Neat Cement [ ] Bentonite Slurry [ ] Cement/Bentonite Slurry [ ] Concrete Grout [ ] Bentonite Chips

No. of Bags ______ Casing Removed? [ ] Yes [ ] No

16. REMARKS: (Elevation, Source of Data, etc.)

17. DRILLING MACHINE OPERATOR: [ ] Employee [ ] Subcontractor

Name ______

15. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Stephen T Johnson Water Well Drilling — REGISTERED BUSINESS NAME — 69-1897 REGISTRATION NO.

Address 1990 Van Tyle RD Gaylord Mi. 49735

Signed Stephen T Johnson (AUTHORIZED REPRESENTATIVE) Date 5,12,96

GW-2-228 9/93

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation of any provision is a misdemeanor.

GEOLOGICAL SURVEY COPY

WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978.

Failure to comply is a misdemeanor.

Well ID: 05000000748

Tax No: 05-13-013-001-60	Permit No: A01-004	County: Antrim	Township: Star

Well ID: 05000000748

Elevation:

Latitude: 44.99581562

Longitude: -84.86237975

Fraction:	Section:	Town/Range:	French Claim:	WSSN:
NE¼ SW¼ U¼	13	30N 05W		

Distance and Direction from Road Intersection:

Well Name:

Well Owner: Middleton, Green B.

Well Address:	Owner Address:
11311 WOODSIDE DR.	90 MCCOY RD. GAYLORD MI 49735

Drilling Method: Auger/Bored

Well Depth: 161.00 ft. **Well Use:** Household

Well Type: New **Date Completed:** 3/20/2001

Casing Type: Steel - black
Casing Joint: Threaded & coupled
Diameter: 4.00 in. to 157.00 ft. depth

Bore Diameter 1: 5.00 in. to 165.00 ft. depth
Bore Diameter 2:
Bore Diameter 3:
Height: 1.00 ft. above grade
Casing Fitting: None

Static Water Level: 140.00 ft. Below Grade(Not Flowing)
Yield Test Method: Test pump
Measurement Taken During Pump Test:
0.50 hrs. pumping at 22.00 GPM

Abandoned Well Plugged: No
Reason for not plugging Well:

Abandoned well ID:

Screen Installed: Yes **Well Intake:**
Filter Packed: No
Screen Diameter: 3.00 in. **Length:** 4.00 ft.
Screen Material Type: Stainless steel-wire wrapped
Slot: 10.00 in. Set Between 157.00 ft. and 161.00 ft.
Blank:
Fittings:
Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown
No. of Bags: 4 **Additives:** None
Grouting Materials:
Bentonite slurry From 0.00 ft. to 150.00 ft.

Well Head Completion: Pitless adapter

Nearest source of possible contamination:

Type	Distance	Direction
Septic tank	60.00 ft.	North

Drilling Machine Operator Name: JACK

Employment: Subcontractor

Pump Installed: Yes **Pump Installation only:** No
Pump Installation date: **HP:** 0.75
Manufacturer: Goulds **Pump Type:** Submersible
Model Number: **Pump Capacity:** 12.00 GPM
Length of Drop Pipe: 154.00 ft. **Id of Well:**
Diameter of Drop Pipe:
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Challenger
Model Number : **Tank Capacity :** 20 Gallons
Pressure Relief Valve Installed : No

Formation Description	Thickness	Depth to Bottom
Sand	140.00	140.00
Sand Water Bearing	25.00	165.00

Geology Remarks:

Contractor Type: Water well drilling contractor
Registration Number: 1617
Business Name: JACK'S WELL DRILLING
Business Address:

WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Signature of Registered Representative **Date**

General Remarks:
OTHER REMARKS

EQP 2017C (2/2000)

ATTENTION WELL OWNER: FILE WITH DEED

7/10/2002 12:38

DEQ MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER & RADIOLOGICAL PROTECTION DIVISION

WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978
Failure to comply is a misdemeanor

TAX NO:

PERMIT NO: 96-358

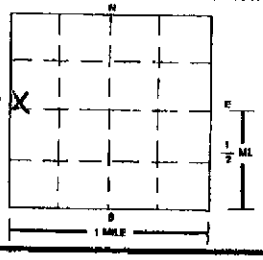
1. LOCATION OF WELL

County	Township Name	Fraction	Section No.	Town No.	Range No.
Antrim	Star	SW 1/4 NW 1/4 1/4	14	30	5E

Distance and Direction from Road Intersection: on Primrose Road

Street Address & City of Well Location

Locate with 'x' in Section Below — Sketch Map



3. OWNER OF WELL
Address: Dale Gates
9991 Primrose Rd.
Elmira, MI 49730
Address Same as Well Location ☒ Yes ☐ No

4. WELL DEPTH: 160 ft. | Date Completed 8/8/97 | ☒ New Well ☐ Replacement Well

5. ☐ Cable Tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow Rod ☒ Auger/Bored ☐ Jetted ☐ _____

6. USE: ☒ Household ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat Pump ☐ Test Well ☐ Type IIb Public ☐ _____

7. CASING: ☒ Steel ☒ Threaded ☐ Plastic ☐ Welded ☐ Other _____
Diameter: 4 in. to _____ ft. depth
_____ in. to _____ ft. depth
BORE HOLE:
Diameter: 7 in. to _____ ft. depth
_____ in. to _____ ft. depth
Height: Above/Below Surface: T ft
Weight: _____ lbs./ft.
☐ Drive Shoe ☐ Shale Packer

8. SCREEN: ☐ Not Installed ☐ Gravel-Packed
Type S-S Diameter 4"
Slot/Gauze 10 Length: 4'
Set Between 156 ft. and 160 ft.
FITTINGS: ☒ K-Packer ☐ Bremer Check ☐ Blank Above Screen _____ ft. Other _____

9. STATIC WATER LEVEL: 140 ft. Below Land Surface ☐ Flowing

10. PUMPING LEVEL: Below Land Surface
_____ ft. After 1/2 hrs. Pumping at 20 G.P.M.
☐ Plunger ☐ Bailer ☐ Air ☒ Test Pump

11. WELL HEAD COMPLETION:
☒ Pitless Adapter ☐ 12" Above Grade ☐ Basement Offset ☐ Well House

12. WELL GROUTED? ☐ No ☒ Yes From _____ to _____ ft.
☐ Neat Cement ☒ Bentonite ☐ Other _____
No. of Bags 9 Additives Slurry

13. NEAREST SOURCE OF POSSIBLE CONTAMINATION:
Type Septic Distance 60 ft. Direction E
Type _____ Distance _____ ft. Direction _____

14. PUMP: ☐ Not Installed ☐ Pump Installation Only
Manufacturer's Name Goulds
Model Number _____ HP 3/4 Volts 220
Length of Drop Pipe 151 ft. Capacity 10 G.P.M.
TYPE: ☒ Submersible ☐ Jet ☐ Other _____
PRESSURE TANK:
Manufacturer's Name Challenger
Model Number _____ Capacity 30 Gallons

2. FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand	140	140
water sand	20	160

USE A 2ND SHEET IF NEEDED

RECEIVED
MICHIGAN DEPARTMENT OF
ENVIRONMENTAL QUALITY
AUG 29 97
GWRPD
GROUND WATER SUPPLY SEC.

15. ABANDONED WELL PLUGGED? ☐ Yes ☐ No
Casing Diameter _____ in. Depth _____ ft.
PLUGGING MATERIAL:
☐ Cement/Bentonite Slurry ☐ Neat Cement ☐ Concrete Grout ☐ Bentonite Slurry ☐ Bentonite Chips
No. of Bags _____ Casing Removed? ☐ Yes ☐ No

16. REMARKS: (Elevation, Source of Data, etc.)

17. DRILLING MACHINE OPERATOR:
☒ Employee ☐ Subcontractor
Name Roger Sekowski

18. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Jack's well Drilling (REGISTERED BUSINESS NAME) 1617 (REGISTRATION NO.)
Address Elmira
Signed Jack Sekowski (AUTHORIZED REPRESENTATIVE) Date 8-8-97

GEOLOGICAL SURVEY COPY

EQP 2017 (12/96)

WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978.

Failure to comply is a misdemeanor.

Well ID: 05000001341

Tax No: 05-13-014-008-15	Permit No: 03-111	County: Antrim	Township: Star

Well ID: 05000001341

Elevation:

Latitude: 44.98925512

Longitude: -84.88761098

Fraction:	Section:	Town/Range:	French Claim:	WSSN:
SW¼ SW¼ U¼	14	30N 05W		

Distance and Direction from Road Intersection: OFF PRIMROSE ROAD

Well Name:

Well Owner: Robert Sloan

Well Address:

MI

Owner Address:
5345 KORTASE
BOYNE CITY MI 49712

Drilling Method: Auger/Bored

Well Depth: 130.00 ft. **Well Use:** Household

Well Type: New **Date Completed:** 4/30/2003

Casing Type: Steel - unknown
Casing Joint: Threaded & coupled
Diameter: 4.00 in. to 126.00 ft. depth

Bore Diameter 1: 7.00 in. to 130.00 ft. depth
Bore Diameter 2:
Bore Diameter 3:
Height: 1.00 ft. above grade
Casing Fitting: None

Static Water Level: 95.00 ft. Below Grade(Not Flowing)
Yield Test Method: Test pump
Measurement Taken During Pump Test:
100.00 ft. after 20.00 hrs. pumping at 12.00 GPM

Abandoned Well Plugged: No
Reason for not plugging Well:

Abandoned well ID:

Screen Installed: Yes **Well Intake:**
Filter Packed: No
Screen Diameter: 3.00 in. **Length:** 4.00 ft.
Screen Material Type: Stainless steel-wire wrapped
Slot: 10.00 in. Set Between 126.00 ft. and 130.00 ft.
Blank:
Fittings:
Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown
No. of Bags: 5 **Additives:** None
Grouting Materials:
Bentonite slurry From 5.00 ft. to 110.00 ft.

Well Head Completion: Pitless adapter

Nearest source of possible contamination:

Type	Distance	Direction
Unknown		
Unknown		

Drilling Machine Operator Name: JACK

Employment: Subcontractor

Pump Installed: Yes **Pump Installation only:** No
Pump Installation date: **HP:** 0.75
Manufacturer: Goulds **Pump Type:** Submersible
Model Number: BRUISER **Pump Capacity:** 12.00 GPM
Length of Drop Pipe: 120.00 ft. **Id of Well:**
Diameter of Drop Pipe:
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Challenger
Model Number: PC66 **Tank Capacity:** 20 Gallons
Pressure Relief Valve Installed: No

Formation Description	Thickness	Depth to Bottom
Sand	95.00	95.00
Sand Water Bearing	35.00	130.00

Geology Remarks:

Contractor Type: Water well drilling contractor
Registration Number: 1617
Business Name: JACK'S WELL DRLG
Business Address:

WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Signature of Registered Representative **Date**

General Remarks:

OTHER REMARKS

EQP 2017C (2/2000)

ATTENTION WELL OWNER: FILE WITH DEED

5/14/2003 09:31

DEQ MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER & RADIOLOGICAL PROTECTION DIVISION

WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978
Failure to comply is a misdemeanor

TAX NO: 05-13-014-007-00

PERMIT NO: A99-59

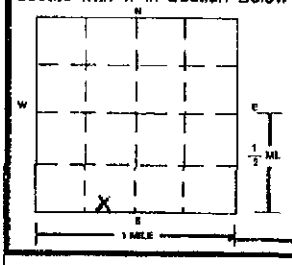
1. LOCATION OF WELL

County	Township Name	Fraction	Section No.	Town No.	Range No.
Antrim	Star	SW 1/4 SE 1/4 SW 1/4	14	30 N	5 W

Distance and Direction from Road Intersection

Street Address & City of Well Location: 10303 Alba Hwy.

Locate with 'x' in Section Below



Sketch Map: WELL X ← C-42

C-42 OLDS RD

3. OWNER OF WELL
Address: CHIPPA, MIKE
10303 ALBA HWY.
ELMIRA MI 49730
Address Same as Well Location ☑ Yes ☐ No

4. WELL DEPTH: 129 ft. Date Completed 5 / 18 / 99 ☐ New Well ☑ Replacement Well

5. ☐ Cable Tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow Rod ☑ Auger/Bored ☐ Jetted ☐ _____

6. USE: ☑ Household ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat Pump ☐ Test Well ☐ Type IIb Public ☐ _____

7. CASING: ☑ Steel ☑ Threaded ☐ Plastic ☐ Welded ☐ Other _____
Diameter: 4 in. to 125 ft. depth
_____ in. to _____ ft. depth
BORE HOLE:
Diameter: 7 in. to 129 ft. depth
_____ in. to _____ ft. depth
Height: Above/Below Surface: 1 ft
Weight: 11 lbs/ft.
☑ Drive Shoe ☐ Shale Packer

2. FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
SAND AND GRAVEL	129	129

USE A 2ND SHEET IF NEEDED

RECEIVED
MICH DEPT OF ENVIRONMENTAL QUALITY
MAY 27 1999
Drinking Water & Radiological Protection Division
Ground Water Supply Section
WELL CONSTRUCTION UNIT

8. SCREEN: ☐ Not Installed ☐ Gravel-Packed
Type TELESCOPE Diameter 3"
Slot/Gauge 10 Length: 4'
Set Between 125 ft. and 129 ft.
FITTINGS: ☑ K-Packer ☐ Bremer Check
☑ Blank Above Screen 1 ft. Other 3" PLUG

9. STATIC WATER LEVEL:
97 ft. Below Land Surface ☐ Flowing

10. PUMPING LEVEL: Below Land Surface
125 ft. After 1 hrs. Pumping at _____ G.P.M.
☐ Plunger ☐ Bailer ☐ Air ☑ Test Pump

11. WELL HEAD COMPLETION:
☑ Pitless Adapter SOLID ☐ 12" Above Grade
☐ Basement Offset ☐ Well House

12. WELL GROUTED? ☐ No ☑ Yes From 115 to 0 ft.
☐ Neat Cement ☑ Bentonite ☐ Other _____
No. of Bags 7 Additives 67-MUD

13. NEAREST SOURCE OF POSSIBLE CONTAMINATION:
Type SEPTIC Distance 65 ft. Direction E
Type _____ Distance _____ ft. Direction _____

14. PUMP: ☐ Not Installed ☐ Pump Installation Only
Manufacturer's Name GOULDS 2-W
Model Number 195B-15422 HP 1½ Volts 230
Length of Drop Pipe 115 ft. Capacity _____ G.P.M.
1¼-80
TYPE: ☑ Submersible ☐ Jet ☐ Other _____
PRESSURE TANK:
Manufacturer's Name FLEXCON
Model Number WR-240 Capacity 81 Gallons 20-28

15. ABANDONED WELL PLUGGED? ☐ Yes ☑ No
Casing Diameter _____ in. Depth _____ ft.
PLUGGING MATERIAL: ☐ Neat Cement ☐ Bentonite Slurry ☐ Cement/Bentonite Slurry ☐ Concrete Grout ☐ Bentonite Chips
No. of Bags _____ Casing Removed? ☐ Yes ☐ No

16. REMARKS: (Elevation, Source of Data, etc.)

17. DRILLING MACHINE OPERATOR:
☑ Employee ☐ Subcontractor
Name RON FLORCZSKI II

18. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
RON'S WELL DRILLING, INC (REGISTERED BUSINESS NAME) 1234 (REGISTRATION NO.)
Address BOX 18 ALBA, MICH 49611
Signed Ron Florczski (AUTHORIZED REPRESENTATIVE) Date 5-18-99

GEOLOGICAL SURVEY COPY

EQP 2017 (12/96)

DEQ MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER & RADIOLOGICAL PROTECTION DIVISION

WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978
Failure to comply is a misdemeanor

TAX NO:

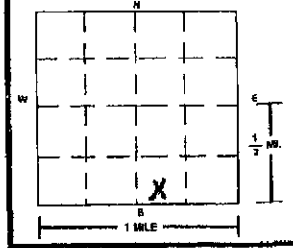
PERMIT NO: 99-524

1. LOCATION OF WELL
County: Antrim | Township Name: Star | Fraction: S ½ 1/4 S E ¼ 1/4 | Section No.: 14 | Town No.: 30 | Range No.: 5

Distance and Direction from Road Intersection: ON C42

Street Address & City of Well Location

Locate with 'x' in Section Below



Sketch Map

3. OWNER OF WELL: Warde Primrose
Address: 10577 Alba Hwy.
Elmira MI 49730
Address Same as Well Location ☒ Yes ☐ No

4. WELL DEPTH: 109 ft. | Date Completed: 9-14-99 | ☒ New Well ☐ Replacement Well

5. ☐ Cable Tool ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow Rod ☒ Auger/Bored ☐ Jetted ☐ _____

6. USE: ☒ Household ☐ Type I Public ☐ Type III Public
☐ Irrigation ☐ Type IIa Public ☐ Heat Pump
☐ Test Well ☐ Type IIb Public ☐ _____

7. CASING: ☒ Steel ☒ Threaded ☐ Plastic ☐ Welded ☐ Other _____
Diameter: 4 in. to 105 ft. depth
_____ in. to _____ ft. depth
BORE HOLE:
Diameter: 7 in. to 110 ft. depth
_____ in. to _____ ft. depth
Height: Above/Below Surface: 1 ft
Weight: _____ lbs./ft.
☐ Drive Shoe ☐ Shale Packer

8. SCREEN: ☐ Not Installed ☐ Gravel-Packed
Type: S-S | Diameter: 4"
Slot/Gauze: 10 | Length: 4'
Set Between: 105 ft. and 109 ft.
FITTINGS: ☒ K-Packer ☐ Bremer Check
☐ Blank Above Screen _____ ft. Other _____

9. STATIC WATER LEVEL:
85 ft. Below Land Surface ☐ Flowing

10. PUMPING LEVEL: Below Land Surface
_____ ft. After ½ hrs. Pumping at 20 G.P.M.
☐ Plunger ☐ Bailer ☐ Air ☒ Test Pump

11. WELL HEAD COMPLETION:
☒ Pitless Adapter ☐ 12" Above Grade
☐ Basement Offset ☐ Well House

12. WELL GROUTED? ☐ No ☒ Yes From _____ to _____ ft.
☐ Neat Cement ☐ Bentonite ☐ Other _____
No. of Bags 3 Additives Wellstuff Slurry

13. NEAREST SOURCE OF POSSIBLE CONTAMINATION:
Type septic Distance 60 ft. Direction W
Type _____ Distance _____ ft. Direction _____

14. PUMP: ☐ Not Installed ☐ Pump Installation Only
Manufacturer's Name: Goulds
Model Number _____ HP ½ Volts 220
Length of Drop Pipe 106 ft. Capacity 10 G.P.M.
TYPE: ☒ Submersible ☐ Jet ☐ Other _____
PRESSURE TANK:
Manufacturer's Name _____
Model Number _____ Capacity _____ Gallons _____

2. FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand	85	85
water sand	25	110

RECEIVED
MICH DEPT OF ENVIRONMENTAL QUALITY
OCT 05 1999
Drinking Water & Radiological Protection Division
Ground Water Supply Section
WELL CONSTRUCTION UNIT

USE A 2ND SHEET IF NEEDED

15. ABANDONED WELL PLUGGED? ☐ Yes ☐ No
Casing Diameter _____ in. Depth _____ ft.
PLUGGING MATERIAL: ☐ Neat Cement ☐ Bentonite Slurry
☐ Cement/Bentonite Slurry ☐ Concrete Grout ☐ Bentonite Chips
No. of Bags _____ Casing Removed? ☐ Yes ☐ No

16. REMARKS: (Elevation, Source of Data, etc.)

17. DRILLING MACHINE OPERATOR:
☐ Employee ☐ Subcontractor
Name Roger

18. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Jacks well Drilling 1617
REGISTERED BUSINESS NAME REGISTRATION NO.
Address Elmira
Signed _____ Date 9-20-99
AUTHORIZED REPRESENTATIVE

GEOLOGICAL SURVEY COPY

BQP 2017 (12/96)

WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978.

Failure to comply is a misdemeanor.

Well ID: 05000000682

Tax No: 05-13-015-003-05	**Permit No:** A00-597	**County:** Antrim	**Township:** Star

Fraction:	**Section:**	**Town/Range:**	**French Claim:**	**WSSN:**
NE¼ SE¼ U¼	15	30N 05W		

Well ID: 05000000682

Elevation:

Latitude: 44.99308632

Longitude: -84.88885784

Distance and Direction from Road Intersection:

Well Name:

Well Owner: Jeny & Wettlayfer Broods

Well Address: Primrose

Owner Address: 11050 Sprucedale, Elmira MI 49730

Drilling Method: Auger/Bored

Well Depth: 150.00 ft. **Well Use:** Household

Well Type: New **Date Completed:** 10/11/2000

Casing Type: Steel - black
Casing Joint: Threaded & coupled
Diameter: 4.00 in. to 146.00 ft. depth

Bore Diameter 1: 8.00 in. to 150.00 ft. depth
Bore Diameter 2:
Bore Diameter 3:
Height: 1.00 ft. above grade
Casing Fitting: None

Static Water Level: 125.00 ft. Below Grade(Not Flowing)
Yield Test Method: Test pump
Measurement Taken During Pump Test:
0.50 hrs. pumping at 22.00 GPM

Abandoned Well Plugged: No
Reason for not plugging Well:

Abandoned well ID:

Screen Installed: Yes **Well Intake:**
Filter Packed: No
Screen Diameter: 3.00 in. **Length:** 4.00 ft.
Screen Material Type: Stainless steel-wire wrapped
Slot: 10.00 in. Set Between 146.00 ft. and 150.00 ft.
Blank:
Fittings:
Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown
No. of Bags: 4 **Additives:** None
Grouting Materials:
Bentonite dry granular From 0.00 ft. to 150.00 ft.

Well Head Completion: Pitless adapter

Nearest source of possible contamination:

Type	Distance	Direction
Septic tank	70.00 ft.	West

Drilling Machine Operator Name: Jack

Employment: Subcontractor

Pump Installed: Yes **Pump Installation only:** No
Pump Installation date: **HP:** 0.75
Manufacturer: *Goulds* **Pump Type:** Submersible
Model Number: **Pump Capacity:** 10.00 GPM
Length of Drop Pipe: 140.00 ft. **Id of Well:**
Diameter of Drop Pipe:
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Challenger
Model Number : V-60 **Tank Capacity :** 20 Gallons
Pressure Relief Valve Installed : No

Formation Description	Thickness	Depth to Bottom
Sand	125.00	125.00
Sand Water Bearing	25.00	150.00

Geology Remarks:

Contractor Type: Water well drilling contractor
Registration Number: 1617
Business Name: Jack's Well Drilling
Business Address:

WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Signature of Registered Representative **Date**

General Remarks:

OTHER REMARKS

EQP 2017C (2/2000)

ATTENTION WELL OWNER: FILE WITH DEED

6/20/2002 08:47

WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978.

Failure to comply is a misdemeanor.

Well ID: 05000000751

Tax No: 05-13-015-005-00	Permit No: A01-010	County: Antrim	Township: Star

Well ID: 05000000751

Elevation:

Latitude: 44.99198635

Longitude: -84.8885592

Fraction:	Section:	Town/Range:	French Claim:	WSSN:
U¼ U¼ U¼	15	30N 05W		

Distance and Direction from Road Intersection:

Well Name:

Well Owner: Dennis Cross

Well Address:	Owner Address:
2576 PRIMROSE RD. ELMIRE MI 49730	2576 PRIMROSE RD. ELMIRE MI 49730

Drilling Method: Auger/Bored

Well Depth: 151.00 ft. **Well Use:** Household

Well Type: New **Date Completed:** 2/28/2001

Casing Type: Steel - black
Casing Joint: Threaded & coupled
Diameter: 4.00 in. to 147.00 ft. depth

Bore Diameter 1: 5.00 in. to 155.00 ft. depth
Bore Diameter 2:
Bore Diameter 3:
Height:
Casing Fitting: None

Static Water Level: 120.00 ft. Below Grade(Not Flowing)
Yield Test Method: Test pump
Measurement Taken During Pump Test:
0.50 hrs. pumping at 20.00 GPM

Abandoned Well Plugged: No
Reason for not plugging Well:

Abandoned well ID:

Screen Installed: Yes **Well Intake:**
Filter Packed: No
Screen Diameter: 3.00 in. **Length:** 4.00 ft.
Screen Material Type: Stainless steel-wire wrapped
Slot: 10.00 in. Set Between 147.00 ft. and 151.00 ft.
Blank:
Fittings:
Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown
No. of Bags: 5 **Additives:** None
Grouting Materials:
Bentonite slurry From 0.00 ft. to 135.00 ft.

Well Head Completion: Pitless adapter

Nearest source of possible contamination:

Type	Distance	Direction
Unknown		
Unknown		

Drilling Machine Operator Name: JACK

Employment: Subcontractor

Pump Installed: Yes **Pump Installation only:** No
Pump Installation date: **HP:** 0.75
Manufacturer: Goulds **Pump Type:** Submersible
Model Number: **Pump Capacity:** 12.00 GPM
Length of Drop Pipe: 135.00 ft. **Id of Well:**
Diameter of Drop Pipe:
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Challenger
Model Number : **Tank Capacity :** 20 Gallons
Pressure Relief Valve Installed : No

Formation Description	Thickness	Depth to Bottom
Sand	120.00	120.00
Sand Water Bearing	35.00	155.00

Geology Remarks:

Contractor Type: Water well drilling contractor
Registration Number: 1617
Business Name: JACK'S WELL DRILLING
Business Address:

WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Signature of Registered Representative **Date**

General Remarks:

OTHER REMARKS

EQP 2017C (2/2000)

ATTENTION WELL OWNER: FILE WITH DEED

7/10/2002 12:54

GEOLOGICAL SURVEY SAMPLE No.

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

County	Twp.	Fraction	Section No.	Town	Range
ANTRIM	STAR	SW¼ NW¼ NW¼	23	30 N.	8 W.

Distance And Direction from Road Intersections: Easton 620 1/4 Mile Right 2 Blocks East 1 Block

OWNER No.

Street address & City of Well Location: Alba Mich

3 OWNER OF WELL: Mr. William Bates
Address: Vernon Mich

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand & Gravel	98	98

4 WELL DEPTH: (completed) 98 ft. Date of Completion april 21 67

5 ☐ Cable tool ☐ Rotary ☒ Driven ☐ Dug ☒ Hollow rod ☒ Jetted ☐ Bored ☐

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐

7 CASING: Threaded ☒ Welded ☐ Diam. 2 in. to 93 ft. Depth; ___ in. to ___ ft. Depth
Height: Above/~~Below~~ surface 1 ft. Weight 3.25 lbs/ft. Drive Shoe? Yes ☒ No ☐

8 SCREEN: Type: Clayton Mark Dia.: 1 1/4
~~Slot~~/Gauze 60 Length 48" 84
Set between 98 ft. and 94 ft.
Fittings: Brass Check 3 FT Leader

9 STATIC WATER LEVEL 75 ft. below land surface

10 PUMPING LEVEL below land surface
75 ft. after 1 hrs. pumping 14 g.p.m.
___ ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million: Iron (Fe) ___ Chlorides (Cl) ___ Hardness ___

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☒ 12" Above Grade

13 GROUTING: Well Grouted? ☐ Yes ☒ No
Material: ☐ Neat Cement ☐
Depth: From ___ ft. to ___ ft.

14 SANITARY: Nearest Source of possible contamination
60 feet S Direction Bed Hogs Type
Well disinfected upon completion ☒ Yes ☒ No

15 PUMP: Manufacturer's Name Owner Installed
Model Number ___ HP ___
Length of Drop Pipe ___ ft. capacity ___ G.P.M.
Type: ☐ Submersible ☐ ☐ Jet ☐ Reciprocating

16 Remarks, elevation, source of data, etc.
ADDED INFO. BY DRILLER, ITEM NO.
*CORRECTED BY:
**ADDITION BY:

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Bingham Well Drilling — REGISTERED BUSINESS NAME; 0195 — REGISTRATION NO.
Address Elmira Mich
Signed [signature] AUTHORIZED REPRESENTATIVE Date april 21 67

D67D 100M 6-66 JUL 20 1967

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY NO.

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

WATER WELL AND PUMP RECORD

PERMIT NUMBER: A 96 - 155

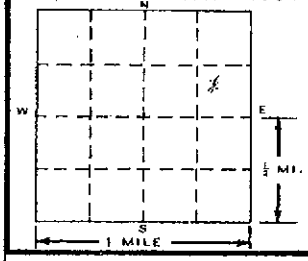
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Antrim	STAR	NE ¼ SE ¼ NW ¼	23	30 N	5 W

Distance And Direction From Road Intersection: C42 West Turn South on Patterson Drive 3/10 miles Turn West go Thru Easement 2/10 mile

Street Address & City of Well Location: Weld on North Side Rd.

Locate with "X" in Section Below



Sketch Map: S- To ALBA C42 Patterson Rd. Easement to prop

3 OWNER OF WELL

Anthony Bradley

Address: 1491 S. Coppins Rd. Gaylord, Mich. 49735

Address Same As Well Location? ☐ Yes ☑ No

4 WELL DEPTH

106 FT. 00

Date Completed: MO. 6 DAY 26 YEAR 96

☑ New Well ☐ Replacement Well

5

☐ Cable tool ☐ Rotary ☐ Driven ☐ Dug

☑ Hollow rod ☐ Auger ☐ Jetted ☐ _____

6 USE

☑ Domestic ☐ Type I Public ☐ Type III Public

☐ Irrigation ☐ Type IIa Public ☐ Heat pump

☐ Test Well ☐ Type IIb Public ☐ _____

7 CASING

Diameter: ☑ Steel ☐ Threaded ☐ Plastic ☐ Welded

4 in. to 100 ft. depth

_____ in. to _____ ft. depth

Grouted Drill Hole Diameter: 8" in. to 100 ft. depth

_____ in. to _____ ft. depth

Height: Above/Below Surface 18" ft.

Weight 11 lbs./ft.

Drive Shoe ☑ Yes ☐ No

2 FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Fine & Med Sand	0	40
Fine Sand	40	70
Very Fine Sand	70	100
Coarse Sand	100	106

USE A 2ND SHEET IF NEEDED

8 SCREEN

☐ Not Installed

Type PVC Diameter 3"

Slot 10 Length 6"

Set between 100 ft. and 106 ft.

FITTINGS: ☑ K-Packer ☐ Lead Packer ☐ Bremer Check

☐ Blank above screen 1 ft. Other _____

9 STATIC WATER LEVEL

70 ft. below land surface ☐ Flow

10 PUMPING LEVEL: below land surface

72.00 ft. after 2 hrs. pumping at 20 G.P.M.

_____ ft. after _____ hrs. pumping at _____ G.P.M.

RECEIVED
Mich. Dept. of Public Health
OCT 10 1996
BUREAU OF ENVIRONMENTAL AND OCCUPATIONAL HEALTH-GWQS

11 WELL HEAD COMPLETION

☐ Pitless adapter ☑ 18" above grade

☐ Basement offset ☐ Approved pit

12 WELL GROUTED?

☐ No ☑ Yes From 0 to 100 ft.

☐ Neat cement ☑ Bentonite ☐ Other _____

No. of bags of cement 35 Additives _____

13 Nearest source of possible contamination

Type Septic Distance 70 ft. Direction W

Well disinfected upon completion? ☑ Yes ☐ No

Was old well plugged? ☐ Yes ☐ No

14 PUMP

☑ Not Installed ☐ Pump Installation Only

Manufacturer's name _____

Model number _____ HP _____ Volts _____

Length of Drop Pipe _____ ft. capacity _____ G.P.M.

TYPE: ☐ Submersible ☐ Jet _____

PRESSURE TANK:

Manufacturer's name _____

Model number _____ Capacity _____ Gallons

15. Remarks, elevation, source of data, etc.

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Rankins Well Drilling 60-1515

REGISTERED BUSINESS NAME REGISTRATION NO.

Address 12610 Airport Rd. Mikado, Mich. 48759

Signed Boyd Rankin Date 9-30-96

AUTHORIZED REPRESENTATIVE

17. Rig Operator's Name:

Dan Ludden & Rick Rankin

D67d 2/89

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation of any provision is a misdemeanor.

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No. [ ]

MAY 13 1976

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

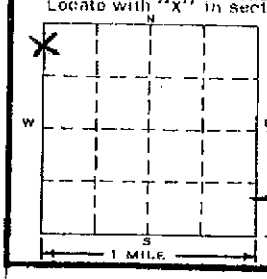
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Antrim	Star	W½ ¼ W½ ¼ W½ ¼	23	30 N/S.	5 E/W.

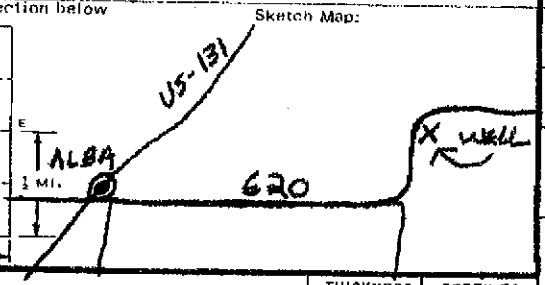
Distance And Direction from Road Intersections: 4 miles East and 1 mi North of Alba on County Rd 620.

Street address & City of Well Location

Locate with "X" in section below



Sketch Map:



3 OWNER OF WELL: Leland Gates
Address RR Elmira, Mich

4 WELL DEPTH: (completed) 113 ft. Date of Completion 5-6-76

5 ☐ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☒ Bored ☐ ____

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ ____

7 CASING: Threaded ☒ Welded ☐ Diam. 4 in. to 109 ft. Depth; ____ in. to ____ ft. Depth
Height: Above/Below Surface 1 ft. Weight 1100 lbs./ft. Drive Shoe? Yes ☐ No ☒

8 SCREEN: Howard-Smith 304
Type: Slush Dia.: 4"
Slot/Gauge 10 Length 4'
Set between 109 ft. and 113 ft.
Fittings 4X3 K-Packer 3" plug 3X18 Nipple

9 STATIC WATER LEVEL 85 ft. below land surface

10 PUMPING LEVEL below land surface 104 ft. after 1 hrs. pumping 30 g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ____ Chlorides (Cl) ____
Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☒ Pitless Adapter ☐ 12" Above Grade

13 Well Grouted? ☐ Yes ☒ No ☐ Neat Cement ☐ Bentonite ☐ ____
Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination
80 feet N Direction Septic-tank Type
Well disinfected upon completion ☒ Yes ☐ No

15 PUMP: ☐ Not installed
Manufacturer's Name Goulds
Model Number 25EL15412 HP ½ Volts 230
Length of Drop Pipe 99 ft. capacity 30 G.P.M.
Type: ☒ Submersible ☐ Jet ☐ Reciprocating

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand & Gravel	115	115

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

ADDED INFO BY DRILLER, ITEM NO.
*CORRECTED BY
**ADDITION BY
ELEVATION
DEPTH TO ROCK

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Ron's Well Drilling Inc 1234
REGISTERED BUSINESS NAME REGISTRATION NO.

Address Box 18 Alba, Mich 49611

Signed Ron Florenski Date 5-7-76
AUTHORIZED REPRESENTATIVE

D67d 100M (Rev. 12-68)

GEOLOGICAL SURVEY COPY

TAX NO: ~~05-13-023-003-10~~

MICHIGAN DEPARTMENT OF PUBLIC HEALTH
WATER WELL AND PUMP RECORD

PERMIT NO: A96-104

1. LOCATION OF WELL

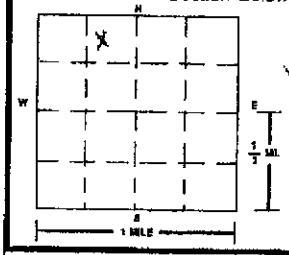
County	Township Name	Fraction	Section No.	Town No.	Range No.
Antrim	Star	NW 1/4 ~~NE 1/4 NW 1/4~~	~~23~~	~~30~~	~~5W~~

Distance and Direction from Road Intersection

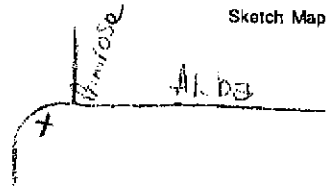
200 ft South of Alba Rd
⅛ mile East of Primrose Rd

Street Address & City of Well Location

Locate with 'x' in Section Below



Sketch Map



3. OWNER OF WELL
Address: Chris and Karen Harvey
10266 Alba Hwy.
Elmira, MI 49730
Address Same as Well Location ☒ Yes ☐ No

4. WELL DEPTH: 129 ft. | Date Completed 5 / 8 / 96 | ☐ New Well ☒ Replacement Well

5. ☒ Cable Tool ☐ Hollow Rod ☐ Rotary ☒ Auger/Bored ☐ Driven ☐ Jetted ☐ Dug ☐ ____

6. USE: ☒ Household ☐ Irrigation ☐ Test Well ☐ Type I Public ☐ Type IIa Public ☐ Type IIb Public ☐ Type III Public ☐ Heat Pump ☐ ____

7. CASING: ☒ Steel ☒ Threaded ☐ Plastic ☐ Welded ☐ Other ____
Diameter: 4 in. to 125 ft. depth
____ in. to ____ ft. depth
BORE HOLE:
Diameter: ____ in. to ____ ft. depth
____ in. to ____ ft. depth
Height: Above/Below Surface: ____ ft
Weight: 11 lbs./ft.
☐ Drive Shoe ☐ Shale Packer

8. SCREEN: ☐ Not Installed ☐ Gravel-Packed
Type Stainless Steel Diameter 3
Slot/Gauge ~~xxx~~ 10 Length: 4 ft
Set Between 125 ft. and 129 ft.
FITTINGS: ☒ K-Packer ☐ Bremer Check
☒ Blank Above Screen 1½ ft. Other ____

9. STATIC WATER LEVEL:
96½ ft. Below Land Surface ☐ Flowing

10. PUMPING LEVEL: Below Land Surface
____ ft. After ____ hrs. Pumping at ____ G.P.M.
☐ Plunger ☐ Bailer ☐ Air ☐ Test Pump

11. WELL HEAD COMPLETION:
☒ Pitless Adapter ☐ Basement Offset ☒ 12" Above Grade ☐ Well House

12. WELL GROUTED? ☐ No ☒ Yes From ____ to ____ ft.
☒ Neat Cement ☐ Bentonite ☐ Other ____
No. of Bags 3 Additives ____

13. NEAREST SOURCE OF POSSIBLE CONTAMINATION:
Type Septic Distance 60 ft. Direction East
Type ____ Distance ____ ft. Direction ____

2. FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
top soil	1	1
red sandy gravel	6	7
white sand	23	30
red sandy gravel	10	40
white sandy gravel	60	100
medium brown water sand & gravel	29	129

USE A 2ND SHEET IF NEEDED

14. PUMP: ☐ Not Installed ☐ Pump Installation Only
Manufacturer's Name Meyers
Model Number 2NFL52-12 HP ½ Volts 230
Length of Drop Pipe 120 ft. Capacity 12 G.P.M.
TYPE: ☒ Submersible ☐ Jet ☐ Other ____
PRESSURE TANK:
Manufacturer's Name Amtrol
Model Number WX202 Capacity ____ Gallons 20

15. ABANDONED WELL PLUGGED? ☒ Yes ☐ No
Casing Diameter ____ in. Depth ____ ft.
PLUGGING MATERIAL: ☒ Neat Cement ☐ Bentonite Slurry ☐ Cement/Bentonite Slurry ☐ Concrete Grout ☐ Bentonite Chips
No. of Bags 2 Casing Removed? ☐ Yes ☐ No

16. REMARKS: (Elevation, Source of Data, etc.)

17. DRILLING MACHINE OPERATOR:
☐ Employee ☐ Subcontractor ☒ OWNER
Name [signature]

15. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
J.W. Morey Well Drilling 0193
REGISTERED BUSINESS NAME REGISTRATION NO.
Address 72 Hayes Tower Rd Gaylord, MI 49735
Signed [signature] AUTHORIZED REPRESENTATIVE Date 5/8/96

GW-2-226 9/93

GEOLOGICAL SURVEY COPY

Authority: Act 368 PA 1978 Completion: Required
Penalty: Conviction of a violation of any provision is a misdemeanor.

GEOLOGICAL SURVEY NO

MICHIGAN DEPARTMENT OF PUBLIC HEALTH
WATER WELL AND PUMP RECORD

PERMIT NUMBER

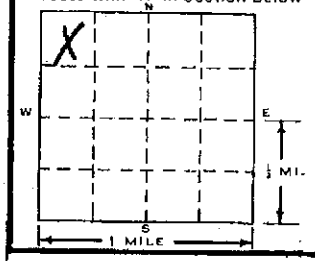
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
ANTRIM	STAR	NW¼ NW¼ ¼ ¼	24	30 N/S	5 E/W

Distance And Direction From Road Intersection: ON OLDS ROAD

Street Address & City of Well Location:

Locate with "X" in Section Below — Sketch Map:



3 OWNER OF WELL:
Randy Ramsey
Address: 7140 Willowbrook Cr.
Mancelona, MI 49659
Address Same As Well Location? ☐ Yes ☒ No

4 WELL DEPTH: 109 FT. — Date Completed: MO. 5 DAY 15 YEAR 95 — ☒ New Well ☐ Replacement Well

5 ☐ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☒ Auger ☐ Jetted ☐ _____

6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐

7 CASING: Diameter: ☒ Steel ☒ Threaded ☐ Plastic ☐ Welded
4 in. to _____ ft. depth
_____ in. to _____ ft. depth
Grouted Drill Hole Diameter
_____ in. to _____ ft. depth
_____ in. to _____ ft. depth
Height: Above/Below Surface 1 ft.
Weight _____ lbs./ft.
Drive Shoe ☐ Yes ☐ No

2 FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
SAND	90	90
WATER SAND	20	110

RECEIVED MICH. DEPT. OF PUBLIC HEALTH JUN 15 95 BUREAU OF ENVIRONMENTAL AND OCCUPATIONAL HEALTH

USE A 2ND SHEET IF NEEDED

8 SCREEN: ☐ Not Installed
Type S-S Diameter 4 in.
Slot/Gauze 10 Length 4 Feet
Set between 105 ft. and 104 ft.
FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check
☐ Blank above screen _____ ft. Other _____

9 STATIC WATER LEVEL:
90 ft. below land surface ☐ Flow

10 PUMPING LEVEL: below land surface
_____ ft. after ½ hrs. pumping at 20 G.P.M.
_____ ft. after _____ hrs. pumping at _____ G.P.M.

11 WELL HEAD COMPLETION: ☒ Pitless adapter ☐ 12" above grade ☐ Basement offset ☐ Approved pit

12 WELL GROUTED? ☐ No ☒ Yes From _____ to _____ ft.
☐ Neat cement ☒ Bentonite ☐ Other natural
No. of bags of cement _____ Additives _____

13 Nearest source of possible contamination
Type Septic Distance 50 ft. Direction N
Well disinfected upon completion? ☒ Yes ☐ No
Was old well plugged? ☐ Yes ☐ No

14 PUMP: ☐ Not Installed ☐ Pump Installation Only
Manufacturer's name Grundfos
Model number _____ HP ½ Volts 220
Length of Drop Pipe 100 ft. capacity 10 G.P.M.
TYPE: ☒ Submersible ☐ Jet _____
PRESSURE TANK:
Manufacturer's name U G
Model number _____ Capacity 16 Gallons

15. Remarks, elevation, source of data, etc.

16. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Jack's Well Drilling — REGISTERED BUSINESS NAME — 1617 REGISTRATION NO.
Address Elmira
Signed Jack Serenki — AUTHORIZED REPRESENTATIVE — Date 5-15-95

17. Rig Operator's Name: Jack

D67d 2/89

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation of any provision is a misdemeanor.

GEOLOGICAL SURVEY COPY

WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978.

Failure to comply is a misdemeanor.

Well ID: 05000000600

Tax No: 05-13-024-008-20	Permit No: 00-265	County: Antrim	Township: Star

Fraction:	Section:	Town/Range:	French Claim:	WSSN:
SW¼ SW¼ NW¼	24	30N 05W		

Well ID: 05000000600

Elevation:

Latitude: 44.98354657

Longitude: -84.86856011

Distance and Direction from Road Intersection: 4/10 MILE SOUTH OF C-42

Well Name:

Well Owner: Harvey Britton

Well Address: 3455 PATTERSON ROAD

Owner Address: 5765 OLD ALBA ROAD GAYLORD MI 49735

Drilling Method: Other

Well Depth: 113.00 ft. **Well Use:** Household

Well Type: New **Date Completed:** 7/22/2000

Casing Type: Steel - black
Casing Joint: Welded
Diameter: 4.00 in. to 109.00 ft. depth

Bore Diameter 1: 7.00 in. to 113.00 ft. depth
Bore Diameter 2:
Bore Diameter 3:
Height: 1.00 ft. above grade
Casing Fitting: None

Static Water Level: 87.00 ft. Below Grade(Not Flowing)
Yield Test Method: Test pump
Measurement Taken During Pump Test:
88.00 ft. after 1.00 hrs. pumping at 16.00 GPM

Abandoned Well Plugged: No
Reason for not plugging Well:

Abandoned well ID:

Screen Installed: Yes **Well Intake:**
Filter Packed: No
Screen Diameter: 3.00 in. **Length:** 4.00 ft.
Screen Material Type: Stainless steel-wire wrapped
Slot: 10.00 in. Set Between 109.00 ft. and 113.00 ft.
Blank: 0.50 ft. Above
Fittings:
Neoprene packer

Well Grouted: Yes **Grouting Method:** Unknown
No. of Bags: 5 **Additives:** Other
Grouting Materials:
Bentonite slurry From 5.00 ft. to 99.00 ft.

Well Head Completion: Pitless adapter

Nearest source of possible contamination:

Type	Distance	Direction
Septic tank	70.00 ft.	Northeast

Drilling Machine Operator Name: KEN KOSCIELNIAK

Employment: Employee

Pump Installed: Yes **Pump Installation only:** No
Pump Installation date: **HP:** 0.75
Manufacturer: Goulds **Pump Type:** Submersible
Model Number: 105B05422 **Pump Capacity:** 10.00 GPM
Length of Drop Pipe: 104.00 ft. **Id of Well:**
Diameter of Drop Pipe: Unknown in.
Draw Down Seal Used: No

Pressure Tank Installed: Yes
Pressure Tank Type: Unknown
Manufacturer: Goulds
Model Number: V-60 **Tank Capacity:** 9999 Gallons
Pressure Relief Valve Installed: No

Formation Description	Thickness	Depth to Bottom
Brown Sand Medium	20.00	20.00
Brown Sand Medium W/Gravel	20.00	40.00
Yellow Sand Medium W/Gravel	20.00	60.00
Light Brown Sand Medium	27.00	87.00
Light Brown Sand Medium Water Bearing	11.00	98.00
Light Brown Sand Coarse Water Bearing	15.00	113.00

Geology Remarks:

Contractor Type: Water well drilling contractor
Registration Number: 617
Business Name: K&T DRLG, INC.
Business Address:

WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Signature of Registered Representative **Date**

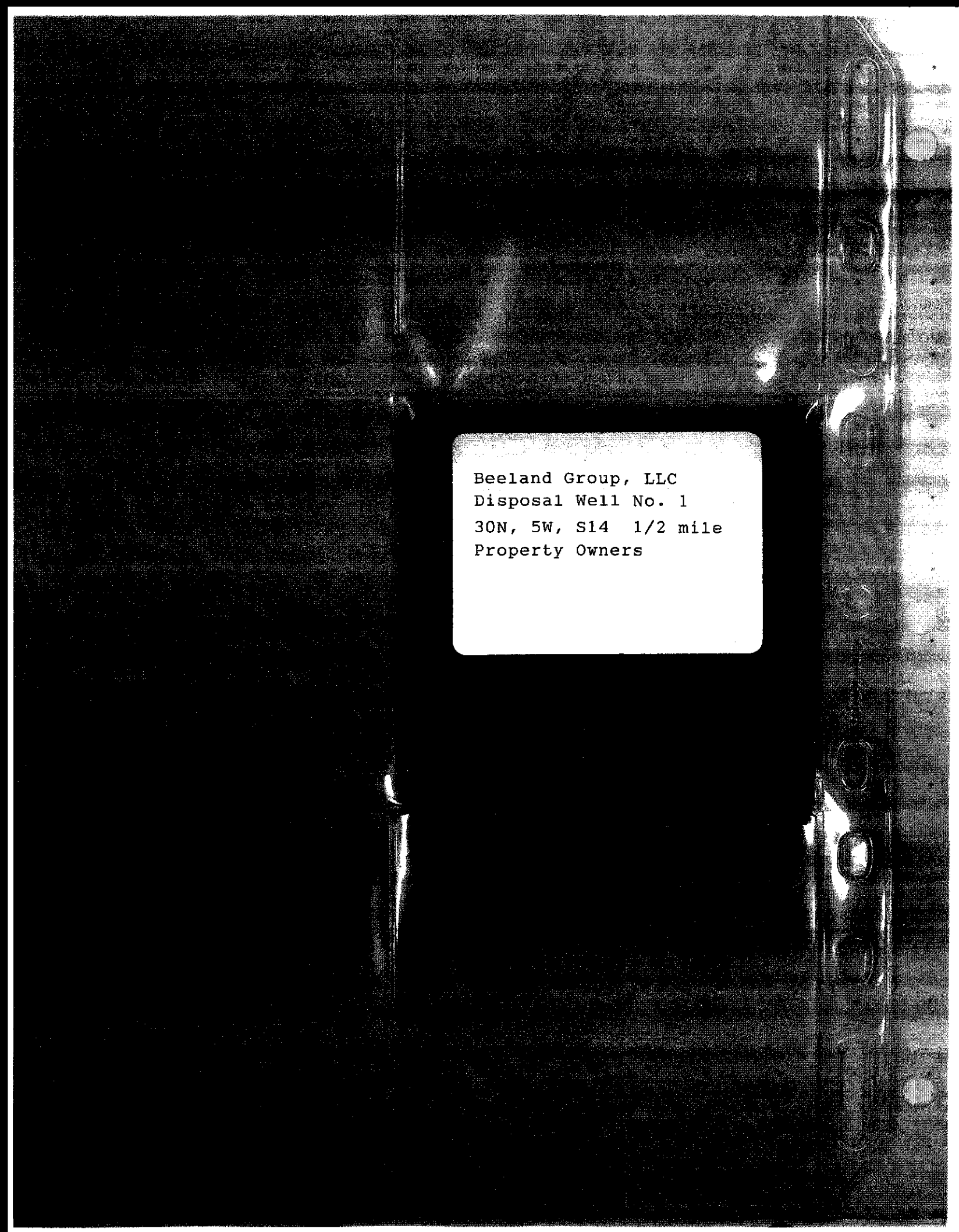
General Remarks:

OTHER REMARKS **Drilling Method:** AUGER/BORED **Additives:** EZ-MUD

EQP 2017C (2/2000)

ATTENTION WELL OWNER: FILE WITH DEED

2/14/2002 08:16


Beeland Group, LLC
Disposal Well No. 1
30N, 5W, S14 1/2 mile
Property Owners

Antrim County Community Center

Parcel 05-13-013-001-20

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): BIEHL LARRY R
Property Address: 11290 WOODSIDE STREET
ELMIRA, MI 49730
Mailing Address: 1070 SOUTH RIDGE
TRAVERSE CITY, MI 49686

Property Information

Current Taxable Value: $3,354

Current Assessment: $4,200
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $4,050
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $25
Village Tax: $0
Township Tax: $111

Property Sale Information

Sale Date: 6/19/1995
Sale Amount: $9,500
Liber and Page: 436-398

Legal Description

PARCEL 201-A..COM AT THE E 1/4 COR OF SEC 13; TH S 163.88 FT; TH N 88 DEG W 3539.36 FT TO POB; TH CONT N 88 DEG W 150.40 FT; TH S 200 FT; TH N 88 DEG E 150.40 FT; TH N 200 FT; TH S 88 DEG E 170 FT TO POB SEC 13 T30N R5W 0.69 A M/L

Antrim County Community Center

Parcel 05-13-013-001-55

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): WESTPHAL CHARLES E & AGNES V
Property Address: 11357 WOODSIDE STREET
ELMIRA, MI 49730
Mailing Address: 11357 WOODSIDE ST
ELMIRA, MI 49730

Property Information

Current Taxable Value: $36,595

Current Assessment: $51,250
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $48,350
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $278
Village Tax: $0
Township Tax: $579

Legal Description

PARCEL 121 COM AT E 1/4 COR, TH S 163.88 FT, TH N 88 DEG W 2759.1 FT FOR POB, TH N 1406 FT, TH N 88 DEG W 310.22 FT, TH S 1406 FT, TH S 88 DEG E 310.22 FT TO POB SEC 13 T30N R5W 10 A M/L

Antrim County Community Center

Parcel 05-13-013-001-58

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): WESTPHAL CHARLES E & AGNES V
Property Address: 11345 WOODSIDE STREET
ELMIRA, MI 49730
Mailing Address: 11357 WOODSIDE ST
ELMIRA, MI 49730

Property Information

Current Taxable Value: $4,459

Current Assessment: $12,500
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $11,500
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $34
Village Tax: $0
Township Tax: $70

Legal Description

PARCEL 122 COM AT E 1/4 COR, TH S 163.88 FT, TH N 88 DEG W 3069.32 FT FOR POB, TH N 1406 FT, TH N 88 DEG W 310.22 FT, TH S 1406 FT, TH S 88 DEG E 310.22 FT TO POB SEC 13 T30N R5W 10 A M/L

Antrim County Community Center

Parcel 05-13-013-001-60

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): MIDDLETON GREEN B & JACQUELINE
Property Address: 11311 WOODSIDE STREET
ELMIRA, MI 49730
Mailing Address: 11311 WOODSIDE ST
ELMIRA, MI 49730

Property Information

Current Taxable Value: $71,174

Current Assessment: $72,900
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $69,050
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $540
Village Tax: $0
Township Tax: $1,125

Property Sale Information

Sale Date: 6/27/2000
Sale Amount: $18,000
Liber and Page: 549-1127

Legal Description

PARCEL 123 COM AT E 1/4 COR, TH S 163.88 FT, TH N 88 DEG W 3379.54 FT FOR POB, TH N 1406 FT, TH N 88 DEG W 310.22 FT, TH S 1406 FT, TH S 88 DEG E 310.22 FT TO POB SEC 13 T30N R5W 10 A M/L

Antrim County Community Center

Parcel 05-13-013-001-63

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): BARRETT JULIE K & RODNEY A
Property Address: 11352 WOODSIDE STREET
ELMIRA, MI 49730
Mailing Address: 22503 DOWNING
ST CLAIR SHORES, MI 48080

Property Information

Current Taxable Value: $12,500

Current Assessment: $12,500
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $11,500
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $58
Village Tax: $0
Township Tax: $253

Property Sale Information

Sale Date: 9/24/2005
Sale Amount: $25,000
Liber and Page: 741-1156

Sale Date: 5/5/2003
Sale Amount: $10,000
Liber and Page: 664-433

Sale Date: 7/19/2000
Sale Amount: $10,000
Liber and Page: 615-374

Legal Description

PARCEL 202..COM AT THE E 1/4 COR OF SEC 13; TH S 0 DEG W 163.88 FT ALG E SEC LINE; TH N 88 DEG W 2996.60 FT TO POB; TH S 0 DEG W 1169.49 FT; TH N 88 DEG W 372.78 FT; TH N 0 DEG E 1170.51 FT; TH S 88 DEG E 372.80 FT TO POB SEC 13 T30N R5W 10.01 A M/L

Antrim County Community Center

Parcel 05-13-013-001-65

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): WORKMAN JIM F JR
Property Address: 11450 WOODSIDE STREET
ELMIRA, MI 49730
Mailing Address: 1328 S HOLLY RD
FENTON, MI 48430

Property Information

Current Taxable Value: $9,285

Current Assessment: $20,000
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $18,600
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $70
Village Tax: $0
Township Tax: $308

Property Sale Information

Sale Date: 8/18/1998
Sale Amount: $10,100
Liber and Page: 496-395

Legal Description

PARCEL 203 COM AT E 1/4 COR, TH S 163.88 FT, TH N 88 DEG W 2623.6 FT FOR POB, TH CONT N 88 DEG W 373 FT, TH S 1169.49 FT, TH S 88 DEG E 372.98 FT, TH N 1168.47 FT TO POB SEC 13 T30N R5W 10 A M/L

Antrim County Community Center

Parcel 05-13-013-001-68

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): PATTEN DAVID & KIMBERLY A
Property Address: 11560 WOODSIDE STREET
ELMIRA, MI 49730
Mailing Address: 11535 WILLIAM
TAYLOR, MI 48180

Property Information

Current Taxable Value: $7,736

Current Assessment: $15,200
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $14,050
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $59
Village Tax: $0
Township Tax: $256

Property Sale Information

Sale Date: 9/30/1995
Sale Amount: $11,000
Liber and Page: 434-791

Legal Description

PARCEL 204; COM AT E 1/4 COR, TH S 163.88 FT, TH N 88 DEG W 2250.1 FT FOR POB, TH CONT N 88 DEG W 393.5 FT, TH S 1168.47 FT, TH S 88 DEG E 373.48 FT, TH N 1167.35 FT TO POB SEC 13 T30N R5W 10 A M/L

Antrim County Community Center

Parcel 05-13-013-001-85

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): BIEHL LARRY R
Mailing Address: 1070 SOUTH RIDGE
TRAVERSE CITY, MI 49686

Property Information

Current Taxable Value: $4,761

Current Assessment: $9,400
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $8,400
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $36
Village Tax: $0
Township Tax: $158

Legal Description

PARCEL 201-B..COM AT THE E 1/4 COR OF SEC 13; TH S 163.88 FT; TH N 88 DEG W 3369.4 FT FOR POB; TH CONT N 88 DEG W 170 FT; TH S 200 FT; TH N 88 DEG W 150.40 FT; TH S 00 DEG W 971.39 FT; TH S 88 DEG E 320.33 FT; TH N 00 DEG E 1170.51 FT TO POB SEC 13 T30N R5W 7.92 A M/L

Antrim County Community Center

Parcel 05-13-013-002-00

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): GROLEAU LOUIS D
Mailing Address: 1822 HAMMOND RD EAST
TRAVERSE CITY, MI 49686

Property Information

Current Taxable Value: $83,600

Current Assessment: $83,600
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $83,600
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $655
Village Tax: $0
Township Tax: $2,862

Property Sale Information

Sale Date: 4/17/2004
Sale Amount: $1
Liber and Page: 709-1315

Legal Description

W 1/2 OF NW 1/4 SEC 13 T30N R5W 80 A.

Antrim County Community Center

Parcel 05-13-013-003-00

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): MARTELL KEITH R & CATHERINE L
Mailing Address: 205 ARROWHEAD TRL
GAYLORD, MI 49735

Property Information

Current Taxable Value: $17,682

Current Assessment: $83,600
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $83,600
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $134
Village Tax: $0
Township Tax: $586

Property Sale Information

Sale Date: 4/17/1995
Sale Amount: $65,000
Liber and Page: 426-158

Legal Description

W 1/2 OF SW 1/4 SEC 13 T30N R5W 80 A

Antrim County Community Center

Parcel 05-13-013-005-00

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): AVERY JAMES W - WILHELM JOANNE
Mailing Address: P O BOX 1232
GAYLORD, MI 49735

Property Information

Current Taxable Value: $8,077

Current Assessment: $38,000
Current Homestead: 100%
Current Property Class: 10 - Agricultural

Last Year's Assessment: $40,000
Last Year's Homestead: 100%
Last Year's Property Class: 10 - Agricultural

Property Tax Information

Taxable Year: 2005
Summer Tax: $61
Village Tax: $0
Township Tax: $128

Legal Description

SE 1/4 OF SW 1/4 SEC 13 T30N R5W 40 A.

Antrim County Community Center

Parcel 05-13-013-006-00

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): HINTZ LOUIS E & SHARLENE J
Property Address: 11405 ALBA HIGHWAY
ELMIRA, MI 49730
Mailing Address: 11405 ALBA HWY
ELMIRA, MI 49730

Property Information

Current Taxable Value: $49,345

Current Assessment: $53,800
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $49,000
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $374
Village Tax: $0
Township Tax: $780

Property Sale Information

Sale Date: 9/10/2003
Sale Amount: $15,000
Liber and Page: 684-35

Sale Date: 8/15/2003
Sale Amount: $85,000
Liber and Page: 680-1389

Sale Date: 7/30/2002
Sale Amount: $85,000
Liber and Page: 621-1388

Sale Date: 1/23/2002
Sale Amount: $0
Liber and Page: 601-1233

Sale Date: 8/21/2001
Sale Amount: $0
Liber and Page: 587-261

Legal Description

PARCEL A..BEG AT THE S 1/4 COR OF SEC 13; TH N 00 DEG E 420 FT ALG N-S 1/4 LINE; TH S 88 DEG E 300 FT; TH S 00 DEG W 420 FT; TH N 88 DEG W 300 FT ALG S SEC LINE & C/L OF ALBA HWY TO POB; BEING PART OF THE SW 1/4 OF THE SE 1/4 SEC 13 T30N R5W 2.892 A M/L

Antrim County Community Center

Parcel 05-13-013-006-50

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): STAPLETON JOHN C & ELAINE L
Mailing Address: 70827 ROMEO PLANK RD
ARMADA, MI 48005

Property Information

Current Taxable Value: $14,513

Current Assessment: $14,750
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $14,050
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $110
Village Tax: $0
Township Tax: $481

Property Sale Information

Sale Date: 1/12/2004
Sale Amount: $32,500
Liber and Page: 699-972

Legal Description

PARCEL F..COM AT THE S 1/4 COR OF SEC 13; TH N 00 DEG E 420 FT ALG N-S 1/4 LINE TO THE POB; TH CONT N 00 DEG E 906.89 FT; TH S 88 DEG E 483.02 FT; TH S 00 DEG W 776.30 FT; TH S 88 DEG E 136.26 FT; TH S 00 DEG W 130 FT; TH N 88 DEG W 685 FT TO THE POB; BEING PART OF THE SW 1/4 OF THE SE 1/4 SEC 13 T30N R5W 11.829 A M/L

Antrim County Community Center

Parcel 05-13-014-002-00

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): MARSHALL ROBIN & JACALYN J
Property Address: 2342 PATTERSON ROAD
ELMIRA, MI 49730
Mailing Address: 2342 PATTERSON RD
ELMIRA, MI 49730

Property Information

Current Taxable Value: $18,694

Current Assessment: $43,550
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $40,150
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $142
Village Tax: $0
Township Tax: $296

Property Sale Information

Sale Date: 3/24/2004
Sale Amount: $37,500
Liber and Page: 708-806

Sale Date: 10/5/1998
Sale Amount: $37,500
Liber and Page: 500-1378

Sale Date: 5/12/1998
Sale Amount: $132,000
Liber and Page: 488-936

Legal Description

COM 330 FT SOUTH OF NE COR OF SE 1/4 OF NE 1/4, TH W 330 FT, TH S 264 FT, TH E 330 FT, TH N TO POB SEC 14 T30N R5W 2 A M/L

Antrim County Community Center

Parcel 05-13-014-002-10

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): ACER PARADISE INC
Mailing Address: P O BOX 758
MANCELONA, MI 49659

Property Information

Current Taxable Value: $15,477

Current Assessment: $40,000
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $40,000
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $117
Village Tax: $0
Township Tax: $513

Property Sale Information

Sale Date: 5/12/1998
Sale Amount: $132,000
Liber and Page: 488-936

Legal Description

SE 1/4 OF NE 1/4 EXC COM 330 FT S OF NE COR FOR POB, TH W 330 FT, TH S 264 FT, TH E 330 FT, TH N TO POB SEC 14 T30N R5W 38 A M/L

Antrim County Community Center

Parcel 05-13-014-003-00

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): CHIPPA MICHAEL A & JANICE K
Mailing Address: 10303 ALBA HWY
ELMIRA, MI 49730

Property Information

Current Taxable Value: $8,530

Current Assessment: $38,000
Current Homestead: 100%
Current Property Class: 10 - Agricultural

Last Year's Assessment: $40,000
Last Year's Homestead: 100%
Last Year's Property Class: 10 - Agricultural

Property Tax Information

Taxable Year: 2005
Summer Tax: $65
Village Tax: $0
Township Tax: $135

Legal Description

SW 1/4 OF NE 1/4 SEC 14 T30N R5W 40 A.

Antrim County Community Center

Parcel 05-13-014-006-00

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): CROFT LLC
Mailing Address: 121 E FRONT ST STE 200
TRAVERSE CITY, MI 49684

Property Information

Current Taxable Value: $17,508

Current Assessment: $76,000
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $76,000
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $133
Village Tax: $0
Township Tax: $580

Property Sale Information

Sale Date: 12/31/2004
Sale Amount: $0
Liber and Page: 728-2462

Legal Description

S 1/2 OF NW 1/4 SEC 14 T30N R5W 80 A M/L

Antrim County Community Center

Parcel 05-13-014-007-00

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): CHIPPA MICHAEL A & JANICE K
Property Address: 10303 ALBA HIGHWAY
ELMIRA, MI 49730
Mailing Address: 10303 ALBA HWY
ELMIRA, MI 49730

Property Information

Current Taxable Value: $47,064

Current Assessment: $115,300
Current Homestead: 100%
Current Property Class: 10 - Agricultural

Last Year's Assessment: $113,350
Last Year's Homestead: 100%
Last Year's Property Class: 10 - Agricultural

Property Tax Information

Taxable Year: 2005
Summer Tax: $357
Village Tax: $0
Township Tax: $744

Legal Description

E 1/2 OF SW 1/4 SEC 14 T30N R5W 80 A.

Antrim County Community Center

Parcel 05-13-014-008-00

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): POMEROY PENNY
Property Address: 10085 ALBA HIGHWAY
ELMIRA, MI 49730
Mailing Address: 10085 ALBA HWY
ELMIRA, MI 49730

Property Information

Current Taxable Value: $36,646

Current Assessment: $39,600
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $36,300
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $278
Village Tax: $0
Township Tax: $579

Property Sale Information

Sale Date: 6/16/2003
Sale Amount: $0
Liber and Page: 669-320

Sale Date: 1/29/2002
Sale Amount: $67,900
Liber and Page: 603-905

Legal Description

COM AT THE SW COR OF THE W 1/2 OF THE SW 1/4 OF SEC 14; TH E 355 FT ALG S SEC LINE TO POB; TH N 350 FT; THE E 270 FT; TH S 350 FT; TH W 270 FT TO THE POB; BEING PART OF THE SW 1/4 OF THE SW 1/4 SEC 14 T30N R5W

Antrim County Community Center

Parcel 05-13-014-008-05

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): SLOAN DONNA J
Property Address: 2977 PRIMROSE ROAD
ELMIRA, MI 49730
Mailing Address: 2977 PRIMROSE RD
ELMIRA, MI 49730

Property Information

Current Taxable Value: $36,614

Current Assessment: $41,650
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $37,100
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $278
Village Tax: $0
Township Tax: $579

Property Sale Information

Sale Date: 8/28/2002
Sale Amount: $11,000
Liber and Page: 625-645

Legal Description

BEG AT THE SW COR OF THE W 1/2 OF THE SW 1/4 OF SEC 14; TH N 350 FT; TH E 355 FT; TH S 350 FT; TH W 355 FT TO POB; BEING PART OF THE SW 1/4 OF THE SW 1/4 SEC 14 T30N R5W 2.8 A M/L

Antrim County Community Center

Parcel 05-13-014-008-10

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): CROFT LLC
Mailing Address: 121 E FRONT ST STE 200
TRAVERSE CITY, MI 49684

Property Information

Current Taxable Value: $13,331

Current Assessment: $60,800
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $60,800
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $101
Village Tax: $0
Township Tax: $442

Property Sale Information

Sale Date: 12/31/2004
Sale Amount: $0
Liber and Page: 728-2462

Legal Description

THE W 1/2 OF THE SW 1/4 OF SEC 14, EXC COM AT THE SW COR OF W 1/2 OF SW 1/4 DESC AS COM AT THE SW COR OF SEC, TH N 350 FT, TH E 625 FT, TH S 350 FT, TH W 625 FT TO POB, ALSO EXC COM AT THE NW COR OF THE W 1/2 OF SW 1/4 SEC 14, TH E 860 FT, TH S PARA TO THE W LINE 540 FT, TH W 860 FT TO W SEC LINE, TH N TO POB, BEING PART OF THE W 1/2 OF THE SW 1/4 SEC 14, T30N, R5W 64.32 A M/L

Antrim County Community Center

Parcel 05-13-014-008-20

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): GATES DALE E
Property Address: 2525 PRIMROSE ROAD
ELMIRA, MI 49730
Mailing Address: 2525 PRIMROSE RD
ELMIRA, MI 49730

Property Information

Current Taxable Value: $44,530

Current Assessment: $65,600
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $62,050
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $338
Village Tax: $0
Township Tax: $704

Legal Description

COM AT THE NW COR OF THE W 1/2 OF THE SW 1/4 OF SEC 14 TH E 860 FT, TH S 540 FT, TH W 860 FT TO W LINE OF SEC, TH N 540 FT TO POB, BEING PART OF THE W 1/2 OF THE SW 1/4 SEC 14 T30N R5W 10.68 A M/L

Parcel 05-13-014-009-00

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): O'CONNELL RHONDA L DARRAH CHERYL - MASSEY ROBERT
Property Address: 10577 ALBA HIGHWAY
ELMIRA, MI 49730
Mailing Address: P O BOX 1
ALBA, MI 49611

Property Information

Current Taxable Value: $165,800

Current Assessment: $165,800
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $170,550
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $1,272
Village Tax: $0
Township Tax: $2,650

Property Sale Information

Sale Date: 7/26/2006
Sale Amount: $0
Liber and Page: 755-2327

Sale Date: 2/4/2002
Sale Amount: $0
Liber and Page: 603-535

Legal Description

SE 1/4 SEC 14 T30N R5W 160 A M/L

Antrim County Community Center

Parcel 05-13-023-001-00

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): VOELKER OREITHA M LIVING TRUST
Property Address: 10814 ALBA HIGHWAY
ELMIRA, MI 49730
Mailing Address: 105 BOUGHEY ST
TRAVERSE CITY, MI 49684

Property Information

Current Taxable Value: $18,688

Current Assessment: $81,650
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $84,400
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $142
Village Tax: $0
Township Tax: $619

Legal Description

N 1/2 OF NE 1/4 SEC 23 T30N R5W 80 A

Antrim County Community Center

Parcel 05-13-023-002-00

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): MARTIN TIMOTHY G
Property Address: 3384 PATTERSON ROAD
ELMIRA, MI 49730
Mailing Address: 3384 PATTERSON RD
ELMIRA, MI 49730

Property Information

Current Taxable Value: $41,650

Current Assessment: $41,650
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $39,000
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $211
Village Tax: $0
Township Tax: $439

Property Sale Information

Sale Date: 9/7/2005
Sale Amount: $90,000
Liber and Page: 740-56

Legal Description

PARCEL 9, COM AT THE E 1/4 COR OF SEC 23, TH S 88 DEG W ALG THE EW 1/4 LINE 1226 FT, TH N 0 DEG E 310.80 FT, TH N 88 DEG E 1225.86 FT TO THE E LINE OF SEC 23, TH S 0 DEG W ALG SD E LINE 310.80 FT TO THE POB SEC 23 T30N R5W 8.75 A M/L

Antrim County Community Center

Parcel 05-13-023-002-10

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): HOSTMAN DAVID J & ELIZABETH A
Property Address: 3298 PATTERSON ROAD
ELMIRA, MI 49730
Mailing Address: P O BOX 158
ELMIRA, MI 49730

Property Information

Current Taxable Value: $7,736

Current Assessment: $15,000
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $12,100
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $59
Village Tax: $0
Township Tax: $122

Property Sale Information

Sale Date: 12/5/1997
Sale Amount: $21,000
Liber and Page: 476-784

Sale Date: 5/6/1996
Sale Amount: $0
Liber and Page: 459-1222

Legal Description

PARCEL 7..COM AT THE E 1/4 COR OF SEC 23, TH N 0 DEG E ALG THE E LINE OF SEC 23 1000.8 FT TO THE POB, TH S 88 DEG W 569.85 FT, TH N 1 DEG E 333.3 FT, TH N88 DEG E 569.6 FT TO THE E LINE OF SEC, TH S 0 DEG W ALG THE SD E LINE 333.6 FT TO THE POB SEC 23 T30N R5W 4.36 A M/L

Antrim County Community Center

Parcel 05-13-023-002-20

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): HOSTMAN DAVID J & ELIZABETH A
Property Address: 3352 PATTERSON ROAD
ELMIRA, MI 49730
Mailing Address: P O BOX 158
ELMIRA, MI 49730

Property Information

Current Taxable Value: $15,001

Current Assessment: $22,900
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $19,550
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $114
Village Tax: $0
Township Tax: $237

Property Sale Information

Sale Date: 12/5/1997
Sale Amount: $21,000
Liber and Page: 476-784

Legal Description

PARCEL 6 COM AT E 1/4 CORNER, TH N 0 DEG E ALG EAST SEC LINE 667.2 FT TO POB, TH S 88 DEG W 570.63 FT, TH N 1 DEG E 333.3 FT, TH N 88 DEG E 569.85 FT TO E LINE OF SEC, TH S ALG E SEC LINE 333.6 FT TO POB SEC 23 T30N R5W 4.37 A M/L

Antrim County Community Center

Parcel 05-13-023-002-25

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): WARREN MICHAEL J & ROBIN R
Property Address: 3376 PATTERSON ROAD
ELMIRA, MI 49730
Mailing Address: 3376 PATTERSON RD
ELMIRA, MI 49730

Property Information

Current Taxable Value: $9,875

Current Assessment: $18,050
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $35,900
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $186
Village Tax: $0
Township Tax: $387

Property Sale Information

Sale Date: 2/28/1995
Sale Amount: $0
Liber and Page: 424-665

Legal Description

PARCEL 5-1..COM AT THE E 1/4 COR OF SEC 23; TH N 00 DEG E 310.80 FT ALG E SEC LINE TO POB; TH S 88 DEG W 1225.88 FT; TH N 01 DEG E 355.21 FT; TH N 88 DEG E 1025.03 FT; TH S 00 DEG W 150 FT; TH N 88 DEG E 200 FT TO E SEC LINE; TH S 00 DEG W 206.40 FT TO POB; BEING PART OF THE NE 1/4 SEC 23 T30N R5W 9.31 A M/L

Antrim County Community Center

Parcel 05-13-023-002-30

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): BRADLEY ANTHONY W
Property Address: 3322 PATTERSON ROAD
ELMIRA, MI 49730
Mailing Address: 3322 PATTERSON RD
ELMIRA, MI 49730

Property Information

Current Taxable Value: $24,159

Current Assessment: $33,400
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $31,850
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $183
Village Tax: $0
Township Tax: $801

Legal Description

PARCEL 11 COM AT THE E 1/4 COR OF SEC, TH S 88 DEG W ALG E-W 1/4 LINE 1226.6 FT, TH N 01 DEG E 666.01 FT TO POB, TH S 88 DEG W 655 FT, TH N 01 DEG E 665.42 FT, TH N 88 DEG E 655 FT, TH S 01 DEG W 666.01 FT TO THE POB SEC 23 T30N R5W 10.01 A M/L

Antrim County Community Center

Parcel 05-13-023-002-40

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): HOSTMAN DAVID J & ELIZABETH A
Mailing Address: P O BOX 158
ELMIRA, MI 49730

Property Information

Current Taxable Value: $5,057

Current Assessment: $11,000
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $10,500
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $38
Village Tax: $0
Township Tax: $168

Property Sale Information

Sale Date: 10/27/2004
Sale Amount: $8,500
Liber and Page: 725-1971

Sale Date: 9/24/1998
Sale Amount: $8,500
Liber and Page: 499-860

Legal Description

PARCEL 8 COM AT THE E 1/4 COR OF SEC 23, TH N 0 DEG E ALG E SEC LINE 667.2 FT, TH S 88 DEG W 570.63 FT TO THE POB, TH CONT S 88 DEG W 654.4 FT, TH N 01 DEG E 666.01 FT, TH N 88 DEG E 654.4 FT, TH S 01 DEG W 666.6 FT TO THE POB SEC 23 T30N R5W 10.01 A M/L

Antrim County Community Center

Parcel 05-13-023-002-50

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): KASSUBA EVELYN M
Mailing Address: 520 N TOWNLINE RD
GAYLORD, MI 49735

Property Information

Current Taxable Value: $2,489

Current Assessment: $11,000
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $10,500
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $19
Village Tax: $0
Township Tax: $82

Legal Description

PARCEL 10 COM AT THE E 1/4 COR OF SEC 23, TH S 88 DEG W ALG EW 1/4 LINE 1226.6 FT TO THE POB, TH CONT S 88 DEG W ALG EW 1/4 LINE 655 FT, TH N 01 DEG E 665.4 FT, TH N 88 DEG E 655 FT, TH S 01 DEG W 666.01 FT TO THE EW 1/4 LINE AND POB SEC 23 T30N R5W 10.01 A M/L

Antrim County Community Center

Parcel 05-13-023-002-60

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): LAMOREAUX DAWN
Mailing Address: 1906 SPRUCE ST
WEST POINT, GA 31833

Property Information

Current Taxable Value: $5,057

Current Assessment: $11,000
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $10,500
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $38
Village Tax: $0
Township Tax: $168

Property Sale Information

Sale Date: 5/15/2002
Sale Amount: $7,500
Liber and Page: 618-476

Sale Date: 9/4/1998
Sale Amount: $7,500
Liber and Page: 502-563

Sale Date: 9/16/1998
Sale Amount: $0
Liber and Page: 502-562

Legal Description

PARCEL 13 COM AT THE E 1/4 COR OF SEC 23, TH S 88 DEG W ALG EW 1/4 LINE 1881.6 FT TO THE POB, TH CONT S 88 DEG W ALG SD EW 1/4 LINE 655.6 FT TO THE CENTER 1/4 COR OF SD SEC, TH N 01 DEG E ALG THE NS 1/4 LINE 664.83 FT, TH N 88 DEG E 655.6 FT, TH S 01 DEG W 665.42 FT TO THE EW 1/4 LINE AND THE POB, BEING PART OF THE SW 1/4 OF THE NE 1/4 SEC 23 T30N R5W 10.01 A M/L

Antrim County Community Center

Parcel 05-13-023-002-70

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Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): KASSUBA EVELYN M
Mailing Address: 520 N TOWNLINE RD
GAYLORD, MI 49735

Property Information

Current Taxable Value: $2,489

Current Assessment: $11,000
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $10,500
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $19
Village Tax: $0
Township Tax: $82

Legal Description

PARCEL 12 COM AT THE E 1/4 COR OF SEC 23, TH S 88 DEG W ALG THE E-W 1/4 LINE OF SD SEC 655.6 FT TO THE N-S 1/4 LINE OF SEC, TH N 01 DEG E ALG N-S 1/4 LINE 664.83 FT, TH N 88 DEG E 655.6 FT, TH S 01 DEG W 665.23 FT TO THE POB SEC 23 T30N R5W 10.01 A M/L

Antrim County Community Center

Parcel 05-13-023-003-00

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): CROFT LLC
Property Address: 10426 ALBA HIGHWAY
ELMIRA, MI 49730
Mailing Address: 121 E FRONT ST STE 200
TRAVERSE CITY, MI 49684

Property Information

Current Taxable Value: $22,244

Current Assessment: $118,100
Current Homestead: 0%
Current Property Class: 30 - Industrial

Last Year's Assessment: $124,300
Last Year's Homestead: 0%
Last Year's Property Class: 30 - Industrial

Property Tax Information

Taxable Year: 2005
Summer Tax: $169
Village Tax: $0
Township Tax: $737

Property Sale Information

Sale Date: 12/31/2004
Sale Amount: $0
Liber and Page: 0-0

Legal Description

THE N 3/4 OF E 1/2 OF W 1/2 EXC COM AT THE N 1/4 POST OF SEC 23, TH S 87 DEG W 828.6 FT FOR POB, TH S 87 DEG W 436.28 FT, TH S 1 DEG W ON THE W 1/8 LINE OF SD SEC 500 FT, TH N 87 DEG E 436.28 FT, TH N 1 DEG E 500 FT TO THE POB, BEING PART OF THE NE 1/4 OF THE NW 1/4 EXC COM AT N 1/4 COR OF SEC 23, TH S 87 DEG W ALG N LINE 50.05 FT TO NE COR FOR POB, TH S 0 DEG W 295.17 FT, TH S 87 DEG W 295.17 FT, TH N 0 DEG E 295.17 FT TO A PT ON N LINE OF SD SEC 23, TH N 87 DEG E ALG N SEC LINE 295.17 FT TO POB..... SEC 23 T30N R5W.....113 A M/L

Parcel 05-13-023-003-10

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): CHIPPA MICHAEL A & REBECCA M
Property Address: 10266 ALBA HIGHWAY
ELMIRA, MI 49730
Mailing Address: 10266 ALBA HWY
ELMIRA, MI 49730

Property Information

Current Taxable Value: $30,835

Current Assessment: $34,300
Current Homestead: 100%
Current Property Class: 10 - Agricultural

Last Year's Assessment: $29,850
Last Year's Homestead: 100%
Last Year's Property Class: 10 - Agricultural

Property Tax Information

Taxable Year: 2005
Summer Tax: $234
Village Tax: $0
Township Tax: $487

Property Sale Information

Sale Date: 7/18/1997
Sale Amount: $7,000
Liber and Page: 466-1402

Sale Date: 2/23/1996
Sale Amount: $21,000
Liber and Page: 441-1164

Legal Description

COM AT THE N 1/4 POST OF SEC 23, TH S 87 DEG W ON SEC LINE 828.6 FT FOR POB, TH S 87 DEG W 436.28 FT, TH S 1 DEG W ON THE W 1/8TH LINE OF SD SEC 500 FT, TH N 87 DEG E 436.28 FT, TH N 1 DEG E 500 FT TO POB, BEING PART OF THE NE 1/4 OF THE NW 1/4 SEC 23 T30N SEC 23 T30N R5W 5 A M/L

Antrim County Community Center

Parcel 05-13-023-003-20

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): THURSTON TODD M & DEANNA L
Property Address: 10464 ALBA HIGHWAY
ELMIRA, MI 49730
Mailing Address: 615 W SHELDON ST
GAYLORD, MI 49735

Property Information

Current Taxable Value: $16,400

Current Assessment: $16,400
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $13,600
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $70
Village Tax: $0
Township Tax: $146

Property Sale Information

Sale Date: 12/27/2005
Sale Amount: $35,450
Liber and Page: 745-313

Sale Date: 12/17/2001
Sale Amount: $0
Liber and Page: 597-835

Sale Date: 3/16/2000
Sale Amount: $15,000
Liber and Page: 543-85

Legal Description

COM AT N 1/4 COR OF SEC 23, TH S 87 DEG W ALG N LINE OF SD SEC 50.05 FT FOR POB, TH S 0 DEG W 295.17 FT, TH S 87 DEG W 295.17 FT TH N 0 DEG E 295.17 FT TO A PT ON N SEC LINE, TH N 87 DEG E ALG N SEC LINE 295.17 FT TO POB, BEING PART OF NE 1/4 OF NW 1/4..... SEC 23 T30N R5W.....2 A M/L

Antrim County Community Center

Parcel 05-13-023-004-00

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): CROFT LLC
Mailing Address: 121 E FRONT ST STE 200
TRAVERSE CITY, MI 49684

Property Information

Current Taxable Value: $1,592

Current Assessment: $31,350
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $41,250
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $12
Village Tax: $0
Township Tax: $53

Property Sale Information

Sale Date: 12/31/2004
Sale Amount: $0
Liber and Page: 728-2464

Sale Date: 12/20/1996
Sale Amount: $0
Liber and Page: 457-1386

Legal Description

SW 1/4 OF THE NW 1/4; EXC THE N 1/2 OF THE N 1/2 OF THE SW 1/4 OF THE NW 1/4 SEC 23 T30N R5W 30 A M/L

Parcel 05-13-023-004-10

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): RAY JAMES L
Property Address: 9972 ALBA HIGHWAY
ELMIRA, MI 49730
Mailing Address: 9972 ALBA HWY
ELMIRA, MI 49730

Property Information

Current Taxable Value: $59,061

Current Assessment: $71,700
Current Homestead: 74%
Current Property Class: 40 - Residential

Last Year's Assessment: $69,100
Last Year's Homestead: 74%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $448
Village Tax: $0
Township Tax: $1,200

Property Sale Information

Sale Date: 8/17/2000
Sale Amount: $54,293
Liber and Page: 553-16

Sale Date: 6/18/1999
Sale Amount: $47,000
Liber and Page: 553-15

Sale Date: 1/14/1997
Sale Amount: ($100)
Liber and Page: 460-1328

Legal Description

COM AT THE NW COR OF SEC 23; TH S 200 FT ALG W SEC LINE TO THE POB; TH S 1120 FT; TH E 660 FT; TH N 1120 FT; TH W 660 FT TO THE POB; BEING PT OF THE NW 1/4 OF THE NW 1/4 SEC 23 T30N R5W 17 A M/L

Antrim County Community Center

Parcel 05-13-023-004-15

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): CROFT LLC
Mailing Address: 121 E FRONT ST STE 200
TRAVERSE CITY, MI 49684

Property Information

Current Taxable Value: $5,653

Current Assessment: $24,050
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $24,050
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $43
Village Tax: $0
Township Tax: $187

Property Sale Information

Sale Date: 12/31/2004
Sale Amount: $0
Liber and Page: 728-2464

Legal Description

BEG AT THE NW COR OF THE NW 1/4 OF THE NW 1/4; TH E 1320 FT; TH S 1320 FT; TH W 660 FT; TH N 1120 FT; TH W 660 FT TO W SEC LINE; TH N 200 FT ALG SD LINE TO THE POB; BEING PT OF THE NW 1/4 OF THE NW 1/4 SEC 23 T30N R5W 23 A M/L

Parcel 05-13-023-004-20

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): CROFT LLC
Mailing Address: 121 E FRONT ST STE 200
TRAVERSE CITY, MI 49684

Property Information

Current Taxable Value: $7,417

Current Assessment: $13,750
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $12,650
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $56
Village Tax: $0
Township Tax: $246

Property Sale Information

Sale Date: 12/31/2004
Sale Amount: $0
Liber and Page: 0-0

Sale Date: 12/9/1999
Sale Amount: $15,000
Liber and Page: 535-714

Sale Date: 12/9/1997
Sale Amount: ($100)
Liber and Page: 460-1327

Legal Description

THE N 1/2 OF THE N 1/2 OF THE SW 1/4 OF THE NW 1/4 SEC 23 T30N R5W 10 A M/L

Antrim County Community Center

Parcel 05-13-024-002-00

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): TAYLOR ROBERT W FAMILY TRUST
Mailing Address: P O BOX 120401
ARLINGTON, TX 76012

Property Information

Current Taxable Value: $30,749

Current Assessment: $114,950
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $114,950
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $233
Village Tax: $0
Township Tax: $1,019

Property Sale Information

Sale Date: 2/3/2003
Sale Amount: $0
Liber and Page: 651-931

Legal Description

W 1/2 OF NE 1/4; ALSO NE 1/4 OF NE 1/4; EXC E 10 ACRES SEC 24 T30N R5W 110 A M/L

Antrim County Community Center

Parcel 05-13-024-006-00

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): VOELKER OREITHA M LIVING TRUST
Mailing Address: 105 BOUGHEY ST
TRAVERSE CITY, MI 49684

Property Information

Current Taxable Value: $10,631

Current Assessment: $37,700
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $42,650
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $81
Village Tax: $0
Township Tax: $352

Legal Description

NW 1/4 OF NW 1/4 EXC THE W 1/2 OF NW 1/4 OF NW 1/4 OF NW 1/4 SEC 24 T30N R5W 35 A M/L

Antrim County Community Center

Parcel 05-13-024-006-10

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): HUNLEY ROBERT & ANNETTE
Property Address: 3121 PATTERSON ROAD
ELMIRA, MI 49730
Mailing Address: 3121 PATTERSON RD
ELMIRA, MI 49730

Property Information

Current Taxable Value: $34,344

Current Assessment: $47,600
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $42,400
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $261
Village Tax: $0
Township Tax: $543

Property Sale Information

Sale Date: 9/24/2003
Sale Amount: $85,000
Liber and Page: 686-686

Sale Date: 9/24/2003
Sale Amount: $87,500
Liber and Page: 686-687

Sale Date: 9/19/2001
Sale Amount: $85,000
Liber and Page: 679-1303

Sale Date: 9/5/2001
Sale Amount: $0
Liber and Page: 591-445

Sale Date: 9/5/2001
Sale Amount: $0
Liber and Page: 591-446

Sale Date: 6/9/2000
Sale Amount: $10,900
Liber and Page: 548-156

Sale Date: 7/1/1999
Sale Amount: $0
Liber and Page: 521-892

Sale Date: 6/23/1998
Sale Amount: $5,700
Liber and Page: 498-1355

Legal Description

THE W 1/2 OF THE NW 1/4 OF THE NW 1/4 OF THE NW 1/4; EXC THE N 250 FT OF THE W 174.24 FT OF THE W 1/2 OF NW 1/4 OF NW 1/4 OF THE NW 1/4 SEC 24 T30N R5W 4 A M/L

Antrim County Community Center

Parcel 05-13-024-006-15

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): MILBOCKER TERRANCE AA MATHEY CARRIE A
Property Address: 11030 ALBA HIGHWAY
ELMIRA, MI 49730
Mailing Address: 11030 ALBA HWY
ELMIRA, MI 49730

Property Information

Current Taxable Value: $25,297

Current Assessment: $53,050
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $50,650
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $192
Village Tax: $0
Township Tax: $400

Legal Description

THE N 250 FT OF THE W 174.24 FT OF THE W 1/2 OF THE NW 1/4 OF NW 1/4 OF NW 1/4 SEC 24 T30N R5W

Antrim County Community Center

Parcel 05-13-024-007-00

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: *Star Twp*
Owner Name(s): AVERY JAMES W - WILHELM JOANNE WILD WINGS GAME FARM
Property Address: 11378 ALBA HIGHWAY
ELMIRA, MI 49730
Mailing Address: P O BOX 1232
GAYLORD, MI 49735

Property Information

Current Taxable Value: $55,402

Current Assessment: $117,500
Current Homestead: 100%
Current Property Class: 10 - Agricultural

Last Year's Assessment: $114,900
Last Year's Homestead: 100%
Last Year's Property Class: 10 - Agricultural

Property Tax Information

Taxable Year: 2005
Summer Tax: $420
Village Tax: $0
Township Tax: $876

Legal Description

E 1/2 OF NW 1/4 SEC 24 T30N R5W.

Antrim County Community Center

Parcel 05-13-024-008-00

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): BRITTON HARVEY & KIMBERLY
Mailing Address: 3455 PATTERSON RD
ELMIRA, MI 49730

Property Information

Current Taxable Value: $7,187

Current Assessment: $8,600
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $7,600
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $55
Village Tax: $0
Township Tax: $238

Property Sale Information

Sale Date: 10/31/2002
Sale Amount: $22,000
Liber and Page: 634-77

Legal Description

COM AT THE W 1/4 COR OF SEC 24, TH N 0 DEG E ALG THE W LINE OF SD SEC 1069.8 FT TO THE POB, TH CONT N ALG W LINE OF SD SEC 264.5 FT, TH S 88 DEG E 1225.46 FT, TH S 262.6 FT, TH N 88 DEG W 1224.92 FT TO THE W LINE AND THE POB, BEING PART OF THE SW 1/4 OF NW 1/4 PARCEL 1.....SEC 24 T30N R5W.....7.4 A M/L

Antrim County Community Center

Parcel 05-13-024-008-05

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): BRITTON HARVEY & KIMBERLY
Property Address: 3351 PATTERSON ROAD
ELMIRA, MI 49730
Mailing Address: 3455 PATTERSON RD
ELMIRA, MI 49730

Property Information

Current Taxable Value: $25,562

Current Assessment: $28,750
Current Homestead: 0%
Current Property Class: 40 - Residential

Last Year's Assessment: $22,450
Last Year's Homestead: 0%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $160
Village Tax: $0
Township Tax: $700

Property Sale Information

Sale Date: 10/31/2002
Sale Amount: $30,000
Liber and Page: 634-767

Legal Description

COM AT THE W 1/4 COR OF SEC 24, TH N 0 DEG E ALG THE W LINE OF SD SEC 713.2 FT TO THE POB, TH CONT N 0 DEG E ALG THE W LINE OF SD SEC 356.6 FT, TH S 88 DEG E 1224.92 FT, TH S 0 DEG W 356.6 FT, TH N 88 DEG W 1224.2 FT TO THE W LINE AND POB, BEING PART OF THE SW 1/4 OF NW 1/4 PARCEL 2.....SEC 24 T30N R5W 10.01 A M/L

Antrim County Community Center

Parcel 05-13-024-008-10

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): HUFFMAN TERRY L - WOOLLEY LISA
Property Address: 3393 PATTERSON ROAD
ELMIRA, MI 49730
Mailing Address: 4001 W SILVERSPRING BLVD
OCALA, FL 34482

Property Information

Current Taxable Value: $10,776

Current Assessment: $19,100
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $17,900
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $82
Village Tax: $0
Township Tax: $170

Property Sale Information

Sale Date: 2/23/2001
Sale Amount: $174
Liber and Page: 568-803

Sale Date: 1/29/2001
Sale Amount: $0
Liber and Page: 564-733

Legal Description

PARCEL 3 COM AT THE W 1/4 COR OF SEC 24, TH N 0 DEG E ALG W LINE OF SEC 356.6 FT TO THE POB, TH CONT N 0 DEG E 356.6 FT, TH S 88 DEG E 1224.2 FT, TH S 0 DEG W 356.6 FT, TH N 88 DEG W 1223.5 FT TO THE W LINE OF SEC AND THE POB, SEC 24 T30N R5W 10.01 A M/L

Antrim County Community Center

Parcel 05-13-024-008-20

Close This Window

Antrim County Parcel Information for 2006 Assessment Year

Jurisdiction: Star Twp
Owner Name(s): BRITTON HARVEY & KIMBERLY
Property Address: 3455 PATTERSON ROAD
ELMIRA, MI 49730
Mailing Address: 3455 PATTERSON RD
ELMIRA, MI 49730

Property Information

Current Taxable Value: $55,776

Current Assessment: $58,600
Current Homestead: 100%
Current Property Class: 40 - Residential

Last Year's Assessment: $54,700
Last Year's Homestead: 100%
Last Year's Property Class: 40 - Residential

Property Tax Information

Taxable Year: 2005
Summer Tax: $423
Village Tax: $0
Township Tax: $882

Property Sale Information

Sale Date: 9/18/1998
Sale Amount: $10,000
Liber and Page: 499-205

Legal Description

PARCEL 4 COM AT THE W 1/4 COR OF SD SEC 24, TH N 0 DEG E ALG THE W LINE OF SD SEC 24 356.6 FT, TH S 88 DEG E 1223.5 FT, TH S 0 DEG W 356.6 FT TO THE EW 1/4 LINE OF SD SEC, TH N 88 DEG W ALG SD EW 1/4 LINE 1222.79 FT TO THE W LINE OF SEC AND THE POB, BEING PART OF THE SW 1/4 OF NW 1/4 SEC 24 T30N R5W 10.01 A M/L

DEQ MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER & RADIOLOGICAL PROTECTION DIVISION

WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978
Failure to comply is a misdemeanor

TAX NO:

PERMIT NO: 96-358

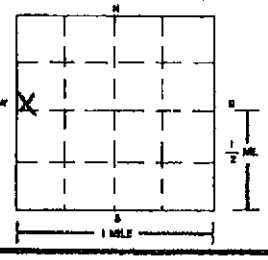
1. LOCATION OF WELL

County	Township Name	Fraction	Section No.	Town No.	Range No.
Antrim	Star	SE 1/4 of NE 1/4	14	30	5

Distance and Direction from Road Intersection: on Primrose Road

Street Address & City of Well Location

Locate with 'x' in Section Below — Sketch Map



3. OWNER OF WELL
Address: Dale Gates
9991 Primrose Rd.
Elmira, MI 49730
Address Same as Well Location ☒ Yes ☐ No

4. WELL DEPTH: 160 ft. | Date Completed 8/8/97 | ☒ New Well ☐ Replacement Well

5. ☐ Cable Tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow Rod ☒ Auger/Bored ☐ Jetted ☐ _____

6. USE: ☒ Household ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat Pump ☐ Test Well ☐ Type IIb Public ☐ _____

7. CASING: ☒ Steel ☒ Threaded ☐ Plastic ☐ Welded ☐ Other _____
Diameter: 4" in. to _____ ft. depth
_____ in. to _____ ft. depth
BORE HOLE:
Diameter: 7 in. to _____ ft. depth
_____ in. to _____ ft. depth
Height: Above/Below Surface: 1 ft
Weight: _____ lbs./ft.
☐ Drive Shoe ☐ Shale Packer

2. FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand	140	140
water sand	20	160

RECEIVED
AUG 29 97
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER & RADIOLOGICAL SECT.

USE A 2ND SHEET IF NEEDED

8. SCREEN: ☐ Not Installed ☐ Gravel-Packed
Type S-S Diameter 4"
Slot/Gauze 10 Length: 4'
Set Between 156 ft. and 160 ft.
FITTINGS: ☒ K-Packer ☐ Bremer Check
☐ Blank Above Screen _____ ft. Other _____

9. STATIC WATER LEVEL: 140 ft. Below Land Surface ☐ Flowing

10. PUMPING LEVEL: Below Land Surface
_____ ft. After ½ hrs. Pumping at 20 G.P.M.
☐ Plunger ☐ Bailer ☐ Air ☒ Test Pump

11. WELL HEAD COMPLETION:
☒ Pitless Adapter ☐ 12" Above Grade
☐ Basement Offset ☐ Well House

12. WELL GROUTED? ☐ No ☒ Yes From _____ to _____ ft.
☐ Neat Cement ☒ Bentonite ☐ Other _____
No. of Bags 9 Additives Slurry

13. NEAREST SOURCE OF POSSIBLE CONTAMINATION:
Type Septic Distance 60 ft. Direction E
Type _____ Distance _____ ft. Direction _____

14. PUMP: ☐ Not Installed ☐ Pump Installation Only
Manufacturer's Name Goulds
Model Number _____ HP ¾ Volts 220
Length of Drop Pipe 151 ft. Capacity 10 G.P.M.
TYPE: ☒ Submersible ☐ Jet ☐ Other _____
PRESSURE TANK:
Manufacturer's Name Challenger
Model Number _____ Capacity 20 Gallons

15. ABANDONED WELL PLUGGED? ☐ Yes ☐ No
Casing Diameter _____ in. Depth _____ ft.
PLUGGING MATERIAL:
☐ Neat Cement ☐ Bentonite Slurry
☐ Cement/Bentonite Slurry ☐ Concrete Grout ☐ Bentonite Chips
No. of Bags _____ Casing Removed? ☐ Yes ☐ No

16. REMARKS: (Elevation, Source of Data, etc.)

17. DRILLING MACHINE OPERATOR:
☒ Employee ☐ Subcontractor
Name Roger Serowski

18. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Jack's well Drilling (REGISTERED BUSINESS NAME) 1617 (REGISTRATION NO.)
Address Elmira
Signed Jack Serowski (AUTHORIZED REPRESENTATIVE) Date 8-8-97

GEOLOGICAL SURVEY COPY

EQP 2017 (12/96)

DEQ MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER & RADIOLOGICAL PROTECTION DIVISION

WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978
Failure to comply is a misdemeanor

TAX NO: 05-13-014-007-00

PERMIT NO: A99-59

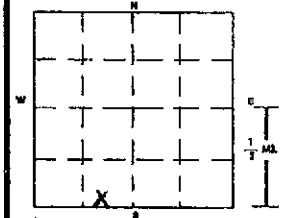
1. LOCATION OF WELL

County	Township Name	Fraction	Section No.	Town No.	Range No.
Antrim	Star	SW 1/4 SE 1/4 SW 1/4	14	30 N	5 W

Distance and Direction from Road Intersection

Street Address & City of Well Location: 10303 Alba Hwy.

Locate with 'x' in Section Below



Sketch Map: WELL X ← C-42 ; C-42 ; OLDS RD

3. OWNER OF WELL
Address: CHIPPA, MIKE
10303 ALBA HWY.
ELMIRA MI 49730
Address Same as Well Location ☑ Yes ☐ No

4. WELL DEPTH: 129 ft. Date Completed 5 / 18 / 99 ☐ New Well ☑ Replacement Well

5. ☐ Cable Tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow Rod ☑ Auger/Bored ☐ Jetted ☐ _____

6. USE: ☑ Household ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat Pump ☐ Test Well ☐ Type IIb Public ☐ _____

7. CASING: ☑ Steel ☑ Threaded ☐ Plastic ☐ Welded ☐ Other _____
Diameter: 4 in. to 125 ft. depth
_____ in. to _____ ft. depth
BORE HOLE:
Diameter: 7 in. to 129 ft. depth
_____ in. to _____ ft. depth
Height: Above/Below Surface: 1 ft
Weight: 11 lbs./ft.
☑ Drive Shoe ☐ Shale Packer

2. FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
SAND AND GRAVEL	129	129

RECEIVED
MICH DEPT OF ENVIRONMENTAL QUALITY
MAY 27 1999
Drinking Water & Radiological Protection Division
Groundwater Quality Section
WELL CONSTRUCTION UNIT

USE A 2ND SHEET IF NEEDED

8. SCREEN: ☐ Not Installed ☐ Gravel-Packed
Type Telescope Diameter 3"
Slot/Gauge 10 Length 4'
Set Between 125 ft. and 129 ft.
FITTINGS: ☑ K-Packer ☐ Bremer Check
☑ Blank Above Screen 1 ft. Other 3" PLUG

9. STATIC WATER LEVEL:
97 ft. Below Land Surface ☐ Flowing

10. PUMPING LEVEL: Below Land Surface
125 ft. After 1 hrs. Pumping at _____ G.P.M.
☐ Plunger ☐ Bailer ☐ Air ☑ Test Pump

11. WELL HEAD COMPLETION:
☑ Pitless Adapter 50'/11 ☐ 12" Above Grade
☐ Basement Offset ☐ Well House

12. WELL GROUTED? ☐ No ☑ Yes From 115 to 0 ft.
☐ Neat Cement ☑ Bentonite ☐ Other _____
No. of Bags 7 Additives EZ-MUD

13. NEAREST SOURCE OF POSSIBLE CONTAMINATION:
Type Septic Distance 65 ft. Direction E
Type _____ Distance _____ ft. Direction _____

14. PUMP: ☐ Not Installed ☐ Pump Installation Only
Manufacturer's Name GOULDS 2-W
Model Number 1SB8-15422 HP 1½ Volts 230
Length of Drop Pipe 115 ft. Capacity _____ G.P.M.
TYPE: ☑ Submersible ☐ Jet ☐ Other _____
PRESSURE TANK:
Manufacturer's Name FLEXCON
Model Number WR-240 Capacity 81 Gallons 20-28

15. ABANDONED WELL PLUGGED? ☐ Yes ☑ No
Casing Diameter _____ in. Depth _____ ft.
PLUGGING MATERIAL: ☐ Neat Cement ☐ Bentonite Slurry ☐ Cement/Bentonite Slurry ☐ Concrete Grout ☐ Bentonite Chips
No. of Bags _____ Casing Removed? ☐ Yes ☐ No

16. REMARKS: (Elevation, Source of Data, etc.)

17. DRILLING MACHINE OPERATOR:
☑ Employee ☐ Subcontractor
Name Ron Florenski II

18. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Ron's Well Drilling Inc (REGISTERED BUSINESS NAME) 1234 (REGISTRATION NO.)
Address Box 18 Alba, Mich 49611
Signed Ron Florenski (AUTHORIZED REPRESENTATIVE) Date 5-18-99

GEOLOGICAL SURVEY COPY

EQP 2017 (12/96)

DEQ MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER & RADIOLOGICAL PROTECTION DIVISION

WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978
Failure to comply is a misdemeanor

TAX NO:

PERMIT NO: 99-524

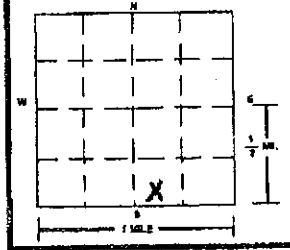
1. LOCATION OF WELL

County: Antrim | Township Name: Star | Fraction: S ½ 1/4 S E 1/4 1/4 | Section No.: 14 | Town No.: 30 | Range No.: S

Distance and Direction from Road Intersection: ON C42

Street Address & City of Well Location:

Locate with 'x' in Section Below — Sketch Map



3. OWNER OF WELL: Warde Primrose
Address: 10577 Alba Hwy.
Elmira MI 49730
Address Same as Well Location ☒ Yes ☐ No

4. WELL DEPTH: 109 ft. | Date Completed: 9-14-99 | ☒ New Well ☐ Replacement Well

5. ☐ Cable Tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow Rod ☒ Auger/Bored ☐ Jetted ☐ _____

6. USE: ☒ Household ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat Pump ☐ Test Well ☐ Type IIb Public ☐ _____

7. CASING: ☒ Steel ☒ Threaded ☐ Plastic ☐ Welded ☐ Other _____
Diameter: 4 in. to 105 ft. depth
_____ in. to _____ ft. depth
BORE HOLE:
Diameter: 7 in. to 110 ft. depth
_____ in. to _____ ft. depth
Height: Above/Below Surface: 1 ft
Weight: _____ lbs./ft.
☐ Drive Shoe ☐ Shale Packer

2. FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand	85	85
Water Sand	25	110

RECEIVED
MICH DEPT OF ENVIRONMENTAL QUALITY
OCT 05 1999
Drinking Water & Radiological Protection Division
Ground Water Supply Section
WELL CONSTRUCTION UNIT

USE A 2ND SHEET IF NEEDED

8. SCREEN: ☐ Not Installed ☐ Gravel-Packed
Type: S-S | Diameter: 4"
Slot/Gauze: 10 | Length: 4'
Set Between: 105 ft. and 109 ft.
FITTINGS: ☒ K-Packer ☐ Bremer Check
☐ Blank Above Screen _____ ft. Other _____

9. STATIC WATER LEVEL: 85 ft. Below Land Surface ☐ Flowing

10. PUMPING LEVEL: Below Land Surface
_____ ft. After ½ hrs. Pumping at 20 G.P.M.
☐ Plunger ☐ Bailer ☐ Air ☒ Test Pump

11. WELL HEAD COMPLETION:
☒ Pitless Adapter ☐ 12" Above Grade
☐ Basement Offset ☐ Well House

12. WELL GROUTED? ☐ No ☒ Yes From _____ to _____ ft.
☐ Neat Cement ☐ Bentonite ☐ Other _____
No. of Bags 3 Additives Hydrated Bentonite Slurry

13. NEAREST SOURCE OF POSSIBLE CONTAMINATION:
Type Septic Distance 40 ft. Direction W
Type _____ Distance _____ ft. Direction _____

14. PUMP: ☐ Not Installed ☐ Pump Installation Only
Manufacturer's Name Goulds
Model Number _____ HP ½ Volts 220
Length of Drop Pipe 100 ft. Capacity 10 G.P.M.
TYPE: ☒ Submersible ☐ Jet ☐ Other _____
PRESSURE TANK:
Manufacturer's Name _____
Model Number _____ Capacity _____ Gallons _____

15. ABANDONED WELL PLUGGED? ☐ Yes ☐ No
Casing Diameter _____ in. Depth _____ ft.
PLUGGING MATERIAL: ☐ Neat Cement ☐ Bentonite Slurry ☐ Cement/Bentonite Slurry ☐ Concrete Grout ☐ Bentonite Chips
No. of Bags _____ Casing Removed? ☐ Yes ☐ No

16. REMARKS: (Elevation, Source of Data, etc.)

17. DRILLING MACHINE OPERATOR:
☐ Employee ☐ Subcontractor
Name Roger

18. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Jacks well Drilling (REGISTERED BUSINESS NAME) 1617 (REGISTRATION NO.)
Address Elmira
Signed Jack Devereaux (AUTHORIZED REPRESENTATIVE) Date 9-20-99

GEOLOGICAL SURVEY COPY

EQP 2017 (12/96)

MAR 17

Layne NORTHERN COMPANY
INCORPORATED
INDIANAPOLIS • MISHAWAKA • LANSING

TRW 9-30-71

☐ TEST
☒ PERMANENT

Job No. L-32636

WELL LOG No. 1 CITY ALBA County ANTRIM
Owner AMERICAN CENTRAL CORPORATION Township STAR
Section 13, T30N, R5W
Location State MICHIGAN
From Land Description 1500' East & 2500' North S.W. Cor. Sec. 13.
From Street or Road NE ¼ NE ¼ SW ¼

FORMATION FOUND – DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Sand	0	23	23	
Fine gravel & sand	23	26	3	
Coarse gravel & sand	26	57	31	
Clay & gravel	57	61	4	
Clay very little gravel	61	69	8	
Clay & gravel	69	81	2	
Gravel & some clay	81	86	5	
Clay & gravel	86	103	17	
Coarse gravel very little clay	103	105	2	
Coarse clean gravel	105	136	31	25'-6"
Clay & gravel	136	143	7	

Hole 15 "Dia Drilled by: Cable Tool ____ Rotary X Jetting ____
Reverse Circ. ____ Bucket ____ Auger ____
Rotary Hole Grouted: Neat Cement ____ Drilling Mud ____ Other Emma Hotte - Stahl, PE
Casing 10 3/4 "OD From + 6 "above ground to 103 feet below ground. Weight 41 Pounds per foot
Screen 6 " Set from 106 to 135 feet Make JOHNSON Type S.S. Slot .030
Pumping test 500 GPM drawdown to 59 feet after 48 hours pumping
Date Completed 9/17/70 Driller C.P. JOHNSON

0550

GEOLOGICAL SURVEY NO

MICHIGAN DEPARTMENT OF PUBLIC HEALTH
WATER WELL AND PUMP RECORD

PERMIT NUMBER

1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
ANTRIM	STAR	NW 1/4 NW 1/4 1/4	24	30 N/S	5 E/W

Distance And Direction From Road Intersection: ON OLDS ROAD

Street Address & City of Well Location

Locate with "X" in Section Below (N, W, E, S; 1 MILE; ½ MI.)

Sketch Map:

3 OWNER OF WELL:
Randy Ramsey
Address: 7140 Willowbrook Cr.
Mancelona, MI 49659
Address Same As Well Location? ☐ Yes ☒ No

4 WELL DEPTH: 109 FT. | Date Completed MO. 5 DAY 15 YEAR 95 | ☒ New Well ☐ Replacement Well

5 ☐ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☒ Auger ☐ Jetted ☐ _____

6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐ _____

7 CASING: Diameter ☒ Steel ☒ Threaded ☐ Plastic ☐ Welded
4 in. to _____ ft. depth
_____ in. to _____ ft. depth
Grouted Drill Hole Diameter
_____ in. to _____ ft. depth
_____ in. to _____ ft. depth
Height: Above/Below Surface 1 ft.
Weight _____ lbs./ft.
Drive Shoe ☐ Yes ☐ No

2 FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
SAND	90	90
WATER SAND	20	110

8 SCREEN: ☐ Not Installed
Type S-S Diameter 4"
Slot/Gauze 10 Length 4 FOOT
Set between 105 ft. and 109 ft.
FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check
☐ Blank above screen _____ ft. Other _____

9 STATIC WATER LEVEL: 90 ft. below land surface ☐ Flow

10 PUMPING LEVEL: below land surface
_____ ft. after ½ hrs. pumping at 20 G.P.M.
_____ ft. after _____ hrs. pumping at _____ G.P.M.

11 WELL HEAD COMPLETION: ☒ Pitless adapter ☐ 12" above grade ☐ Basement offset ☐ Approved pit

12 WELL GROUTED? ☐ No ☒ Yes From _____ to _____ ft.
☐ Neat cement ☒ Bentonite ☐ Other NATURAL
No. of bags of cement _____ Additives _____

13 Nearest source of possible contamination
Type Septic Distance 50 ft. Direction N
Well disinfected upon completion? ☒ Yes ☐ No
Was old well plugged? ☐ Yes ☐ No

14 PUMP: ☐ Not Installed ☐ Pump Installation Only
Manufacturer's name GRUNDFOS
Model number _____ HP ½ Volts 220
Length of Drop Pipe 100 ft. capacity 10 G.P.M.
TYPE: ☒ Submersible ☐ Jet
PRESSURE TANK:
Manufacturer's name U G
Model number _____ Capacity 16 Gallons

USE A 2ND SHEET IF NEEDED

RECEIVED
MICH. DEPT. OF PUBLIC HEALTH
JUN 15 95
BUREAU OF ENVIRONMENTAL AND OCCUPATIONAL HEALTH

15. Remarks, elevation, source of data, etc.

17. Rig Operator's Name: Jack

16. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Jack's Well Drilling 1617
REGISTERED BUSINESS NAME REGISTRATION NO.
Address Elmira
Signed Jack Sorenti AUTHORIZED REPRESENTATIVE Date 5-15-95

D67d 2/89

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation of any provision is a misdemeanor.

GEOLOGICAL SURVEY COPY

2.D MAPS AND CROSS SECTIONS OF USDWs

Submit maps and cross sections indicating the vertical limits of all underground sources of drinking water indicating the vertical limits of all underground sources of drinking water within the area of review (both vertical and lateral limits for Class I), their position relative to the injection formation and the direction of water movement, where known, in every underground source of drinking water which may be affected by the proposed injection activities.

RESPONSE

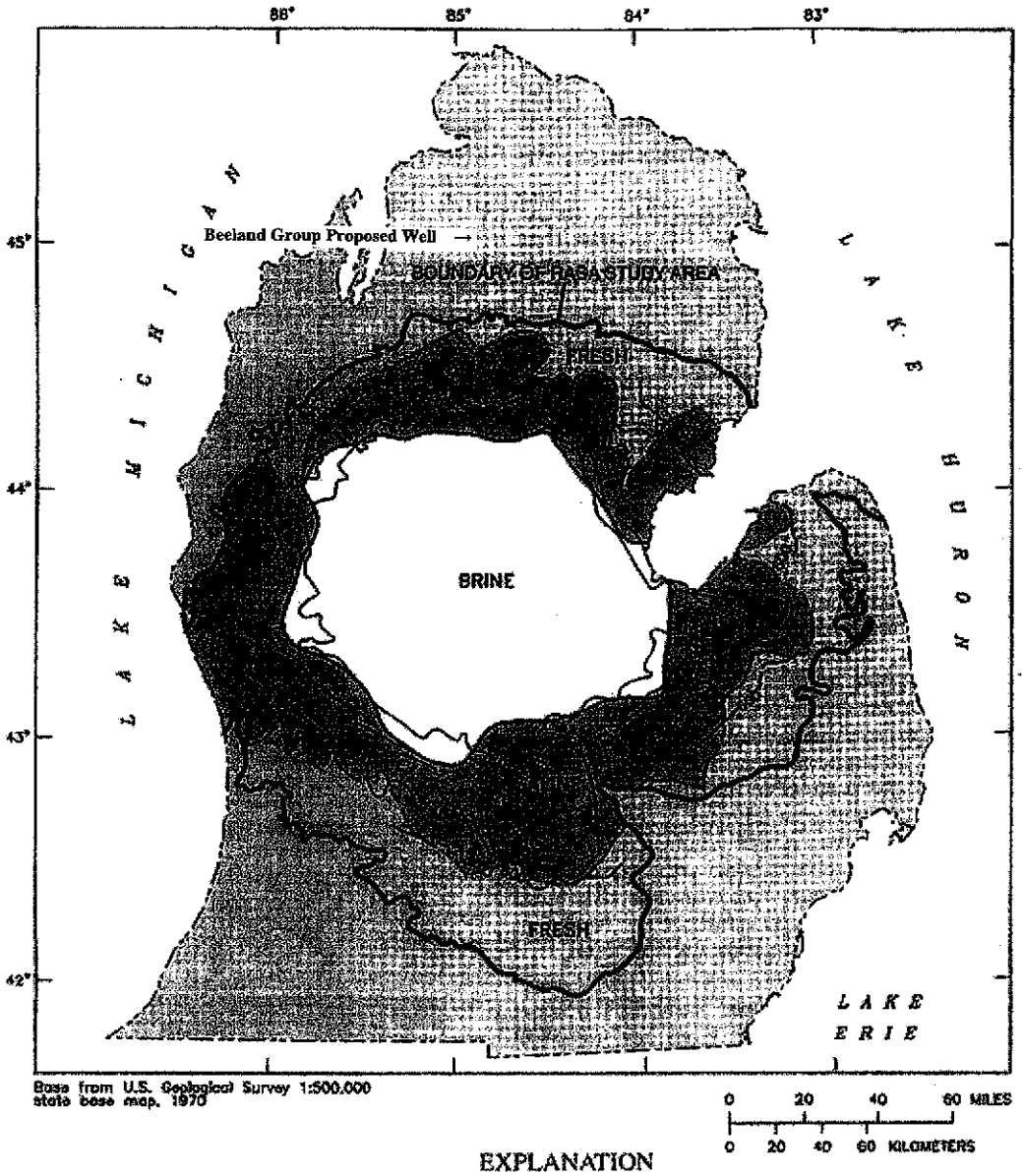
The location of the lowest potential USDW is considered to be the base of the Glacial Drift at a depth that is estimate to be approximately 850 to 900 feet BGL. The lower portions of the Glacial Drift in the area have not been explored for water quality because of plentiful fresh water supplies are present in the upper 200 feet of the section. Locally, water wells completed at depths of less than 200 feet can produce at sufficient rates. Records of typical water wells are attached at the end of Response 2.D for wells within one mile of the proposed Beeland well that are representative of water wells in the area. In order to provide conservative projections, the entire Glacial Drift is considered here to be a USDW. Below the Glacial Drift lies more than 300 feet of section that is dominated by low permeability units including a variety of shale layers. Below this sequence is the Antrim Shale, which based on significant gas production activities in the area, has been shown to contain hydrocarbon accumulations and brines with total dissolved solids contents in the range of 100,000 mg/liter.

Potential USDWs are defined for the purpose of regulatory protection as aquifers that can yield producible quantities of water that have total dissolved solids (TDS) concentrations of less than 10,000 mg/l or ppm (parts per million). Within the two-mile radius AOR, the Coldwater, Sunbury, Bedford and Ellsworth Shales are the first "bedrock" units encountered. These units are considered aquitards, not aquifers. The Marshall and the Saginaw Aquifers are not present in the vicinity. This is consistent with Figures D-1, and D-2 from USGS publications that provide data regarding potential USDWs.

Below the Antrim, the Traverse Group, and the Bell Shale are present before the Dundee Limestone is encountered. Below the Dundee, the Detroit River and Salina Groups are encountered, containing saline bines, salt layers and stringers, and massive anhydrites. Dundee Water Quality Data.

The USGS Produced Water Database (http://energy.cr.usgs.gov/prov/prodwat/data2.htm) was queried to identify Michigan wells for which Dundee water quality was available. The query identified 133 individual wells in Michigan for which Dundee water samples had been taken; 132 of the 133 samples exhibited water quality between 91,333- 398,470 TDS. The single well that exhibited a TDS less than 10,000 is located in Northwest Michigan more than a dozen miles northwest of the proposed well location in closer proximity to the unit outcrop, thus offering a possible explanation why this well exhibited relatively anomalous water quality. Further, while there are no Dundee brine concentration data points available specifically at the proposed well location, data from a well to the east of the proposed location completed in the Detroit River group had a TDS of about 300,000 ppm. Also, a well to the south and east of the proposed well and completed in the Traverse Group exhibited a water quality of about 65,000 ppm TDS. It is also noted that the proposed Beeland well location is surrounded by currently active Class II injection wells that utilize the Dundee for produced brine disposal. These data indicate that brines within the Dundee is expected to be much greater than 10,000 TDS at the proposed well location. See Appendix A for water quality data.

As discussed in Responses 2.I. and 2.L., during installation of the Beeland Disposal Well No. 1, geophysical well logs will be run, and fluid samples will be taken from the Dundee Formation to confirm the salinity of the injection interval and for correlations of the base of the USDW.



Base from U.S. Geological Survey 1:500,000 state base map, 1970

EXPLANATION

—200— BEDROCK CONTOUR—Shows altitude of top of Marshall aquifer in selected areas. Contour interval 200 feet. Datum is sea level

– – – – FRESH WATER/SALINE WATER INTERFACE

——— SALINE WATER/BRINE INTERFACE

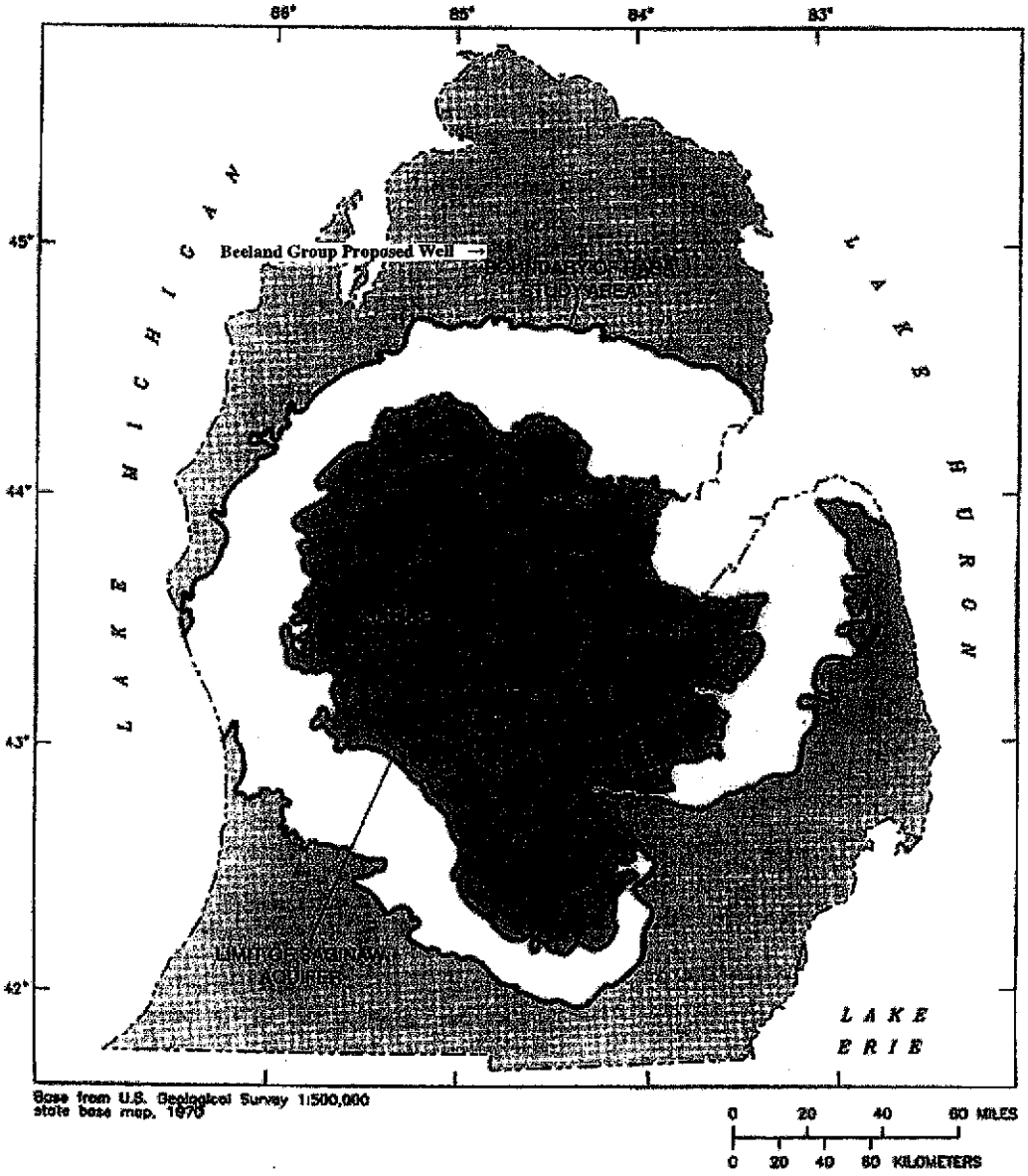
FRESH FRESH WATER—1,000 mg/L (milligrams per liter) or less dissolved solids

SALINE SALINE WATER—Greater than 1,000 and less than 100,000 mg/L dissolved solids

BRINE 100,000 mg/L or more dissolved solids

Distribution of freshwater, saline water, and brine in the [redacted] central Lower Peninsula of Michigan.

Petrotek Engineering Corporation
Figure D -1
Beeland Group, LLC Alba, Michigan Facility
Marshall Aquifer Extent DISPOSAL WELL # 1
SCALE: NOTED DATE: 10/06



EXPLANATION

FRESH FRESH WATER—1,000 mg/L (milligrams per liter) or less dissolved solids

SALINE SALINE WATER—Greater than 1,000 and less than 10,000 mg/L dissolved solids

Distribution of freshwater and saline water in the [redacted], central Lower Peninsula of Michigan.

Petrotek Engineering Corporation
Figure D -2
Beeland Group, LLC Alba, Michigan Facility
Saginaw Aquifer Extent DISPOSAL WELL # 1
SCALE: NOTED DATE: 10/06

2.E NAME AND DEPTH OF USDWs

For Class II Well (Not Applicable to this Application)

2.F MAPS AND CROSS SECTIONS OF GEOLOGIC STRUCTURE

Submit maps and cross sections detailing the geologic structure of the local area (including the lithology of injection and confining intervals) and generalized maps and cross sections illustrating the regional geologic setting.

RESPONSE

The proposed Beeland Disposal Well No. 1 is to be located in the northwestern Michigan Basin in an area extensively explored for oil and gas resources. A variety of literature and public well data are available regarding the nature of the structure and stratigraphy in Antrim County.

Stratigraphy and Lithology

The strata in this region consist of almost fifteen thousand feet of sandstones, shales, limestones, conglomerates and clays. The relatively extensive knowledge of the deep geology of the northeastern portion of the Michigan Basin is primarily based on data gathered from the installation of many oil and gas exploration wells that have been drilled since the 1920's in this vicinity of Michigan. Figure F-1 presents an MDEQ figure showing the stratigraphic column in Michigan. Table F-1 presents a listing of projected depths (BGL) to top of formations based on a ground level of approximately 1,335 feet as determined by interpretation of data from surrounding wells by state of Michigan Geologic and Land Management Division personnel.

TABLE F-1 PROPOSED BEELAND NO. 1 WELL PROJECTED FORMATION DEPTH SUMMARY

UNIT	Mich. GLMD (feet) BGL
GLACIAL DRIFT	0
ELLSWORTH*	850-950
ANTRIM – (UPPER MBR)	1,200
TRAVERSE FORMATION	1,350
TRAVERSE LIMESTONE	1,400
BELL SHALE	2,050
DUNDEE	2,150
DETROIT RIVER GROUP	2,350
BASS ISLANDS	3,700

* Coldwater and Sunbury Shales have also been reported in this part of the stratigraphic column

Figures F-1 through F-5 are presented to provide additional information regarding the regional geologic setting, and the injection and arrestment intervals. Figures F-6 and F-7 present local cross-sections to the base of the proposed injection interval based on data from the MDEQ well database. An index of these cross-section orientations is presented in Figure B-2. From the base of the injection zone upward, the following major intervals are anticipated to be penetrated at the Proposed Beeland Well No. 1 location:

Detroit River Group (lower injection and arrestment)

It has been customary to include the Devonian-age Bois Blanc, Sylvania, Amherstburg, Lucas and Anderdon Formations in the Detroit River Group. The base of the openhole completion of the Beeland Well No. 1 will be completed within the Detroit River Group above the top of the Amherstburg Formation. The Amherstburg is typically a dark brown to black carbonaceous limestone. It is poorly bedded, dense and may be up to 200 feet thick in the vicinity of the proposed well. Where dominated by limestone, it is an aquiclude and typically has low effective porosities and permeability. General practice has been to call the portion of the column between the top of the Amherstburg and the base of the Dundee Limestone the "Detroit River" although it is also known as the Lucas and/or Anderdon Formations to the east of the site and includes a wide variety of lithologies and several distinct members. For example, the Richfield Zone has been described as a basal member of the Lucas/Detroit River sequence and is comprised of interbedded limestone dolomite and anhydrite. Above the Richfield is the Massive Anhydrite that is, in turn, overlain by a thick halite-bearing evaporite sequence, the Horner Member of the Lucas Formation. In the vicinity of the Beeland well, the Horner Member likely consists of a series of limestone and anhydrite layers with limited dolomite stringers. The dolomite stringers can have low, but measurable permeability, but the majority of the interval that is comprised of limestone, anhydrite and halite serves as an excellent confining unit. The top of the Detroit River can be difficult to determine both on logs and in samples. In the local vicinity of the Beeland Well No. 1 area, the units immediately below the Dundee (i.e. upper Detroit River of Lucas) have been described as light to dark brown limestones and dolomites that are micro crystalline to very finely crystalline with traces of intercrystalline porosity.

Dundee Limestone (injection interval)

The Devonian age Dundee is predominately a carbonate section ranging from dense, fine-grained, light colored limestones on the east side of the state to coarse-textured bioclastic limestone (with portions secondarily dolomitized) in the central part of the state. The top of the Dundee is easily picked on geophysical logs in the area of the proposed well because the Bell Shale is present. In the vicinity of the Proposed WDW Beeland Well No. 1, the Dundee is a predominantly limestone formation that ranges from a light to dark brown with a basal dolomite section. Figures F-2 and F-3 present regional Dundee information.

Bell Shale (arrestment interval)

The Devonian age Bell Shale is typically a soft, gray, gummy and silty shale containing scattered fossil fragments. In the local vicinity, the Bell Shale is projected to be comprised of almost 75 to 100 feet of medium green to green-gray shale overlain by a sequence that transitions to a limestone and dolomite dominated sequence. Transmissive fractures are not known to be present in this shale.

Traverse Group

The Traverse Group occurs above the Bell shale, and includes what is locally described as the Traverse Limestone and Traverse Formation. Figures F-4 and F-5 present regional Traverse information. Both formations are described below.

Traverse Limestone

In the western part of the State, the Devonian-age Traverse Limestone is dominantly gray to gray-grown limestone with lesser gray shales. A few anhydrite stringers may also be present. To the east, the Traverse Limestone becomes increasingly shaly, and in southeastern Michigan the unit is composed almost entirely of shale. The Traverse Limestone is a poor marker both on logs and in samples. In the vicinity of the proposed Beeland Well No.1 , the Traverse Limestone is described as a thin buff to brown, medium to very finely crystalline layer that overlies a 350-foot plus clean, thick tan to brown very fine to microcrystalline limestone

with a trace crystalline porosity and trace of pyrite.

Traverse Formation

Above the Traverse Limestone is the Traverse Formation, which is comprised of a 50-foot thick interbedded limestone and shale that is described as gray-tan and calcareous. Within the Traverse Formation there exists limestone stringers that may make picking the underling Traverse Limestone difficult, and the Traverse Formation is also sometimes interbedded with the overlying Antrim shale.

Antrim Shale

The Devonian age Antrim Shale is typically a black to brown, brittle, platy shale. It is characterized by high radioactivity and is easily recognized on gamma ray logs, and can be identified on electric logs by its unusually high resistivity. In the southeastern part of the state, several large tongues or interbeds of gray shale are present in the middle part of the Antrim. Locally, near the proposed Beeland Well No. 1 location, the Antrim (sometimes referred to as the Antrim-Dark) is gray-brown to gray-green and blocky, with both silt interbeds and significant limestone interbeds. The upper member of the Antrim is reported as a 100-foot plus thick blocky gray-brown shale, pyretic, with scattered tasmanites.

Devonian-Mississippian Shales

Local geologic data suggest that a shale sequence occurs between the tops of the Antrim and base of the Glacial Drift. Available geologic data indicate that the Ellsworth (Bedford) shale is likely present immediately above the Antrim, and suggest that the Ellsworth may either extend to the Glacial Drift, or may be capped by the Coldwater/Sunbury Shales. Both the Ellsworth and Coldwater/Sunbury are described below, noting that regardless of nomenclature, both units are predominantly shale and provide additional confinement between the Dundee and Glacial till.

Ellsworth (Bedford)

The Devonian Ellsworth is a greenish-gray shale that occurs in the western portion of the state. The Bedford shale occurs in the eastern portion of the state, and may inter-tongue with the Ellsworth Shale in the vicinity of Alba several miles from the proposed Beeland Well No. 1 location. The Bedford is a gray shale immediately overlying the radioactive Antrim shale in the eastern half of the basin. The Bedford has a fairly uniform, moderate shale response on gamma ray curves. Although the Bedford is listed here under the Devonian, it may well be of Mississippian age.

Coldwater and Sunbury Shales

The Mississippian age Sunbury and Coldwater shales are described as two distinct intervals. The Coldwater is locally an interbedded light to medium gray firm, flaky and platy shale with a trace of pyrite and a brown very finely crystalline argillaceous limestone at its base in the vicinity. The deeper Sunbury, where present in the vicinity of the proposed Beeland Well No. 1 location, is likely to be a dark brown firm, brittle, carbonaceous shale with a trace of fluorescence.

Glacial Drift

See Response 2.D regarding the USDW for information pertaining to the Glacial Drift.

Faulting

There is no evidence of significant faulting in the immediate vicinity of the Proposed Beeland Well No. 1. The

Hydrogeologic Atlas of Michigan (Plate 16) is referenced regarding this matter. Additionally, Ryder (1996) constructed a structure contour map on the Traverse in Antrim County. This map showed there to be no mappable faults transecting the Traverse at the proposed well location.

Seismic Activity

The Alba area of northwestern Michigan Basin has been designated as a relatively minor seismic risk area by the USGS(http://earthquake.usgs.gov/regional/states/michigan/hazards.php). The proposed area has a peak acceleration of 0-2 percent g, and no earthquakes have been identified in the Alba area over the past 100 years. A category VI earthquake occurred in southern Michigan in 1947, but USGS data do not suggest that this event was felt north of Cadillac, Michigan.

Reference:

Ryder, Robert T, Fracture Patterns and their Origin in the Upper Devonian Antrim Shale Gas Reservoir of the Michigan Basin: a Review, USGS Open File Report 96-23, 1996.

STRATIGRAPHIC NOMENCLATURE FOR MICHIGAN

Michigan Dept. of Environmental Quality
Geological Survey Division
Harold Fitch, State Geologist
and
Michigan Basin Geological Society

Stratigraphic Nomenclature Project Committee:
Dr. Paul A. Catacosinos, Co-chairman
Mr. Mark S. Wollensak, Co-chairman

Principal Authors:
Dr. Paul A. Catacosinos
Dr. William B. Harrison III
Mr. Robert F. Reynolds
Dr. David B. Westjohn
Mr. Mark S. Wollensak

2000

Acknowledgements

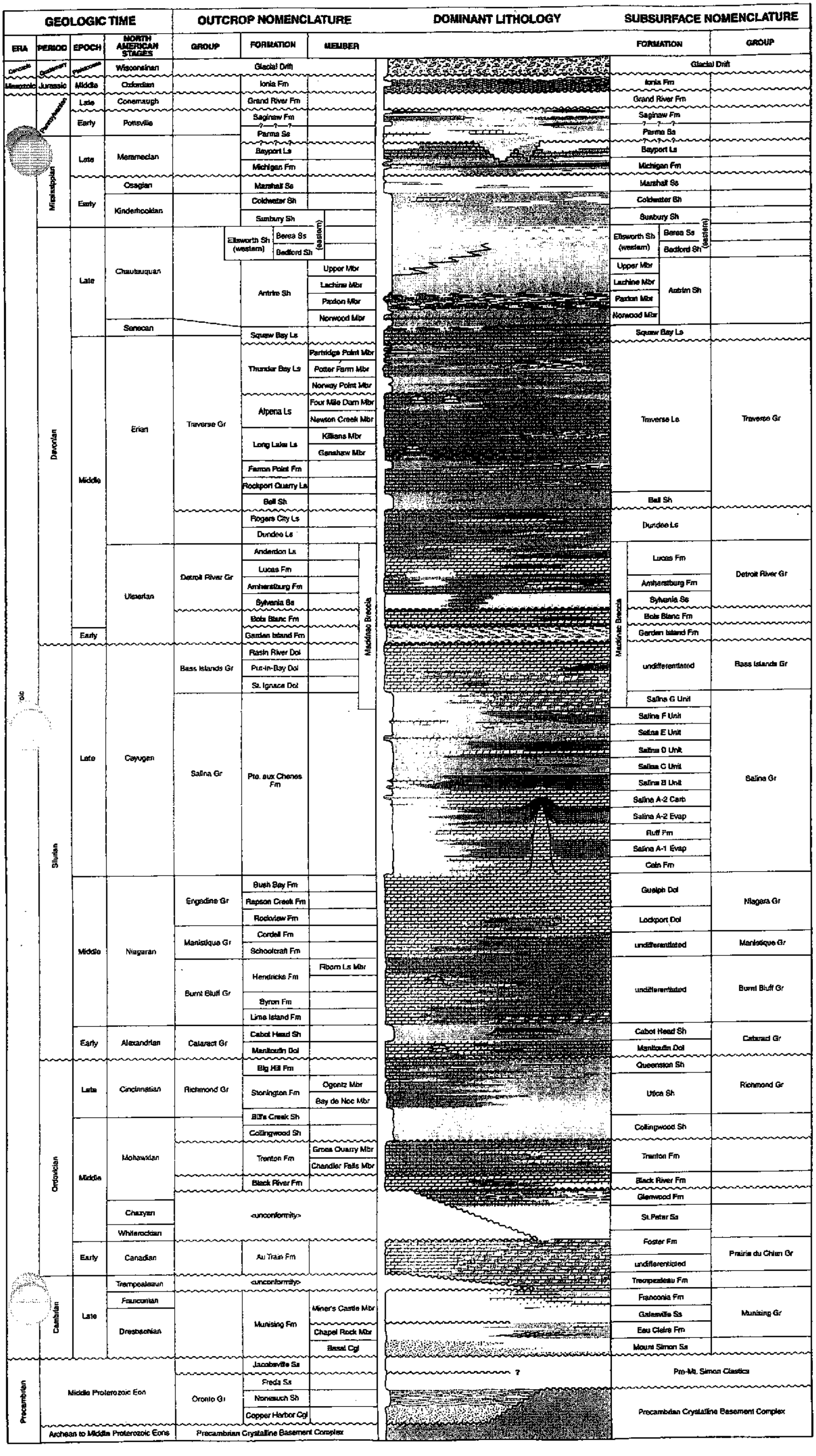
This work is the product of the combined efforts of the geological communities of Michigan and the surrounding states and provinces. Below are given just a representative few of the contributors:

Academia: Dr. Aureal T. Cross, Michigan State University; Dr. Robert H. Dott, Jr., University of Wisconsin; Mr. William D. Everham, Ph.D. Candidate, Michigan Technological University.

Government: Dr. Terry R. Carter, Ontario Ministry of Natural Resources; Mr. John M. Esch, Michigan Department of Environmental Quality; Dr. Brian D. Keith, Indiana Geological Survey; Mr. Lawrence H Wickstrom, Ohio Geological Survey.

Industry: Mr. Donald J. Bailey, Consultant; Mr. Jimmy R. Myles, Scot Energy; Mr. Dan E. Pfeiffer, Pfeiffer Exploration Services.

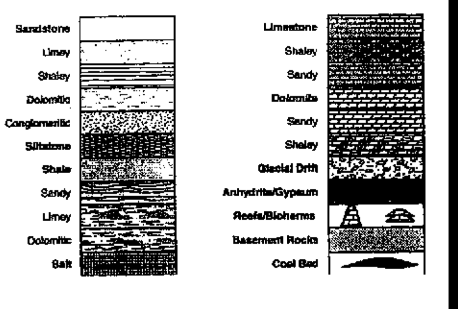
A complete listing of all contributors will be found in the Stratigraphic Lexicon for Michigan, of which this column is an integral part.

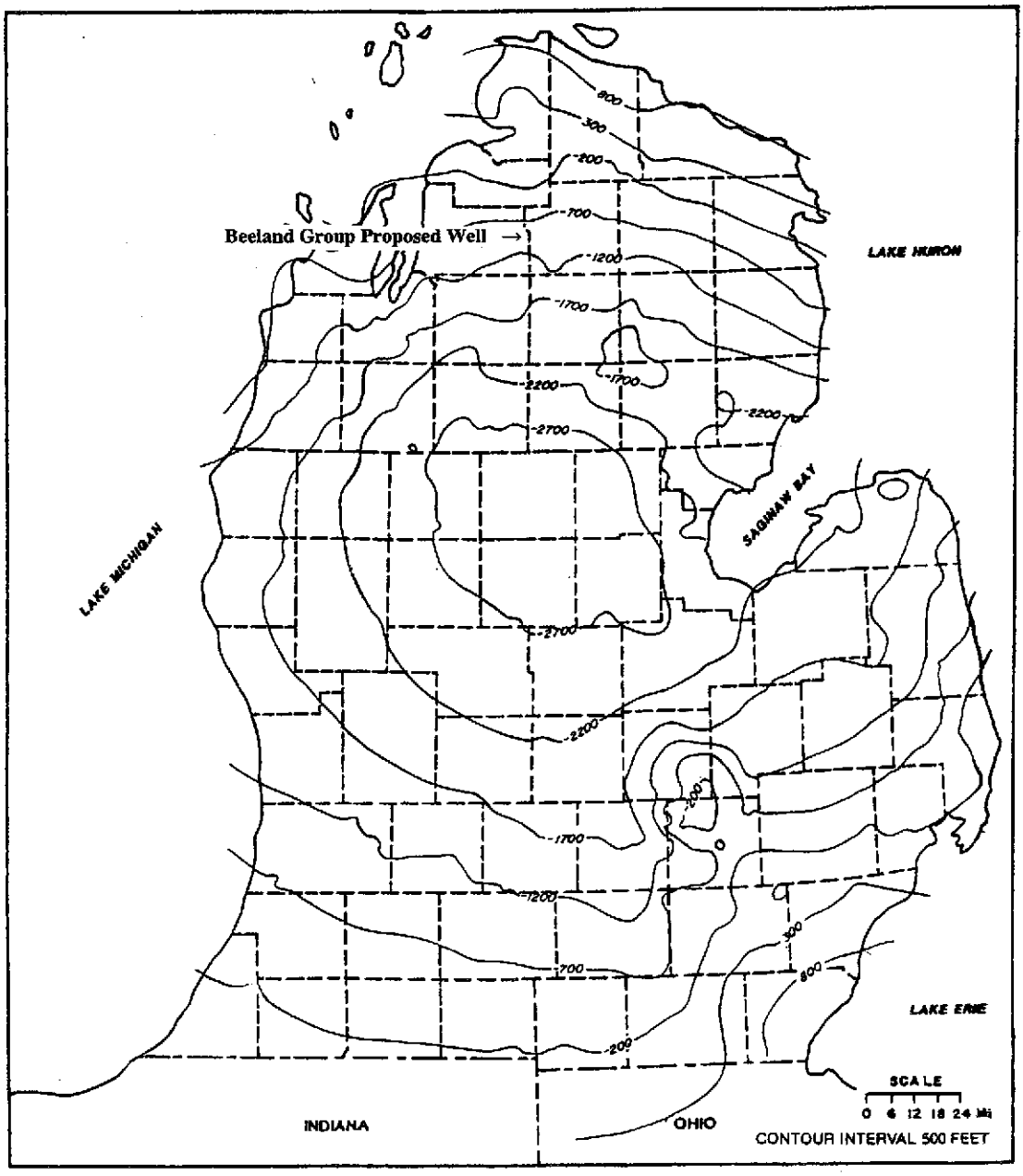


RELATED TERM CORRELATION

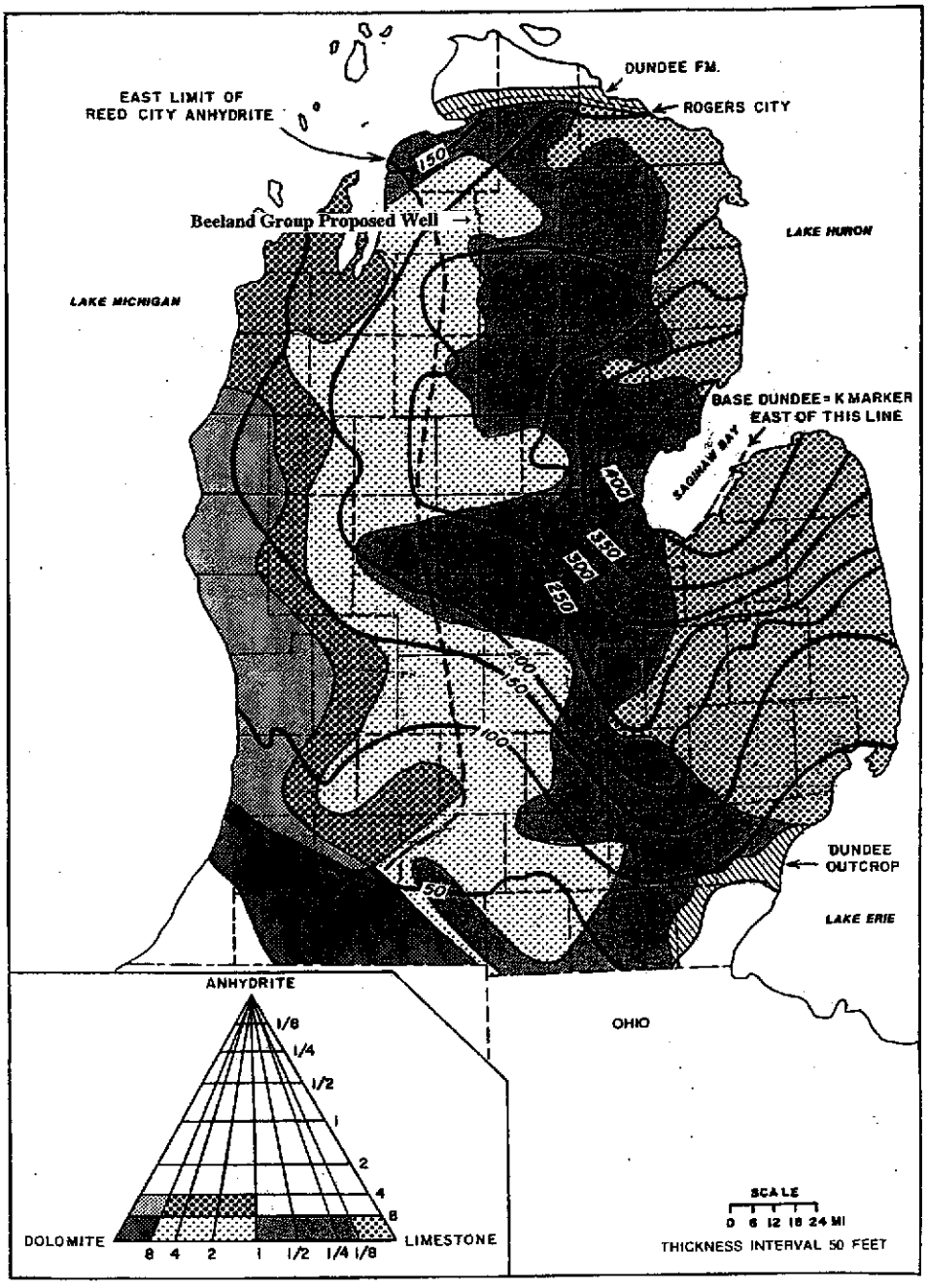
STRATIGRAPHIC POSITION	RELATED TERMS
Ionia Fm	Jurassic Red Beds
Michigan Fm	Clare Dolomite, Brown Lime, Stray Dolomite, Stray Sandstone, Stray-Stray Sandstone, Stray-Stray-Stray Sandstone, Triple Gyp
Coldwater Sh	Coldwater Red Rock, Speckled Dolomite, Wier Sand
Antrim Sh	Charlton Black Shale Member, Elltrim, Chester Black Shale Member, Upper Black Shale, Light Antrim, Lower Black, Lower Antrim Middle Antrim, Middle Gray Antrim, Dark Antrim, Middle Gray Shale, Unit 1A, Unit 1B, Unit 1C, Crappo Creek Grey Shale Member
Dundee Ls	Reed City Member/Dolomite/Anhydrite
Lucas Fm	Freer Sandstone, Horner Member, Iutzi Member, Massive Salt/Anhydrite, Sour Zone, Big Anhydrite, Richfield Zone/Member/Sandstone, Big Salt
Amherstburg Fm	Filer Sandstone, Meldrum Member, Black Lime
St. Ignace Dolomite	Salina H Unit
Salina B Unit	Big Salt, B Salt
Ruff Formation	Salina A-1 Carbonate, Rabbit Ears Anhydrite,
Cain Fm	Salina A-0 Carbonate
Guelph Dolomite	Brown Niagara, Niagaran Reef, Pinnacle Reef, Engadine Dolomite
Lockport Dolomite	Gray Niagara, White Niagara
Burnt Bluff Gr	Clinton Formation
Trenton Fm	Cap Dolomite
Black River Fm	Van Wert Zone, Sneaky Peak, Black River Shale
Glenwood Fm	Goodwell Unit, Zone of Unconformity
St. Peter Sandstone	Bruggers Sandstone, Jordan Sandstone, Knox Sandstone, Massive Sand
Prairie du Chien Gr	Foster Formation, New Richmond Sandstone, Lower Knox Carbonate, St. Lawrence Formation, T-PDC, Oneota Dolomite, Brazos Shale
Trempealeau Fm	Lodi Formation
Galesville Ss	Dresbach Sandstone
Pre-Mt. Simon Clastics	Precambrian "Red Beds"

LEGEND





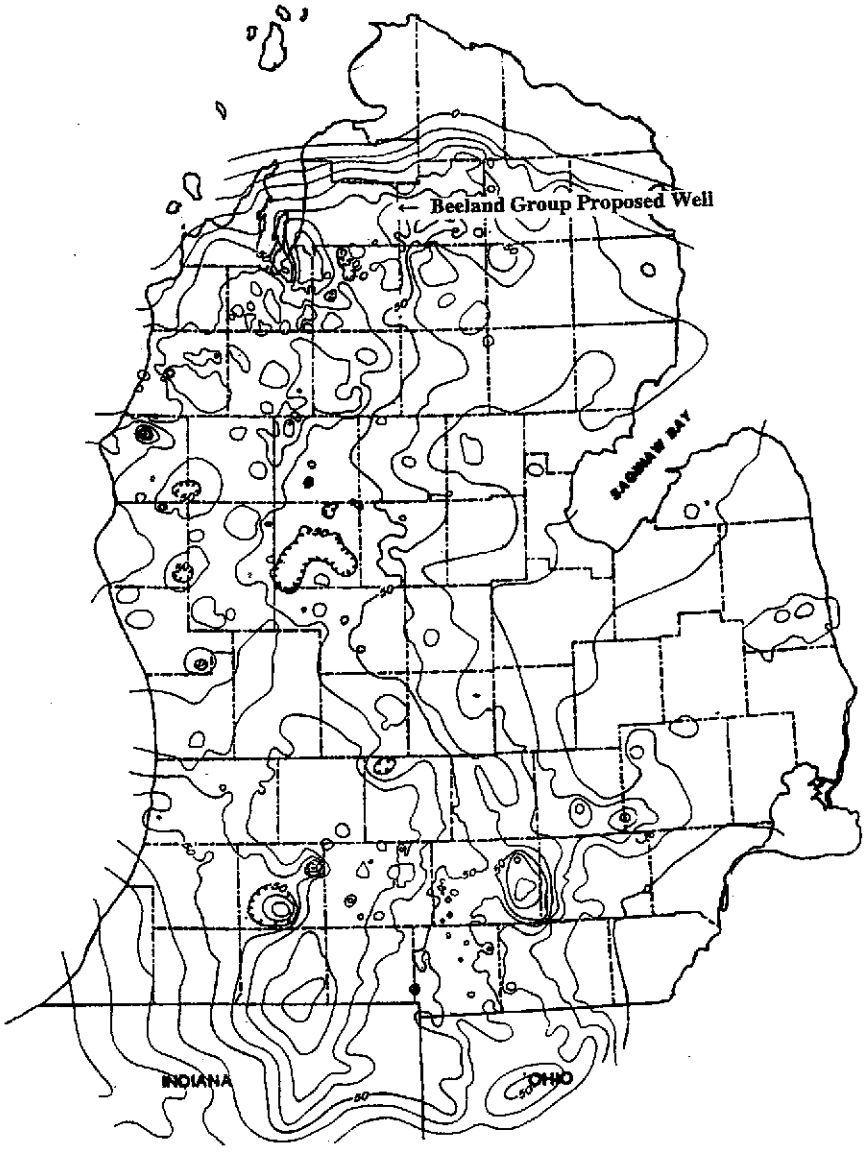
Petrotek Engineering Corporation
Figure F -2
Beeland Group, LLC Alba, Michigan Facility
Regional Michigan Dundee Structure (from Fisher, 1980)
DISPOSAL WELL # 1
SCALE: NOTED ' DATE: 10/06



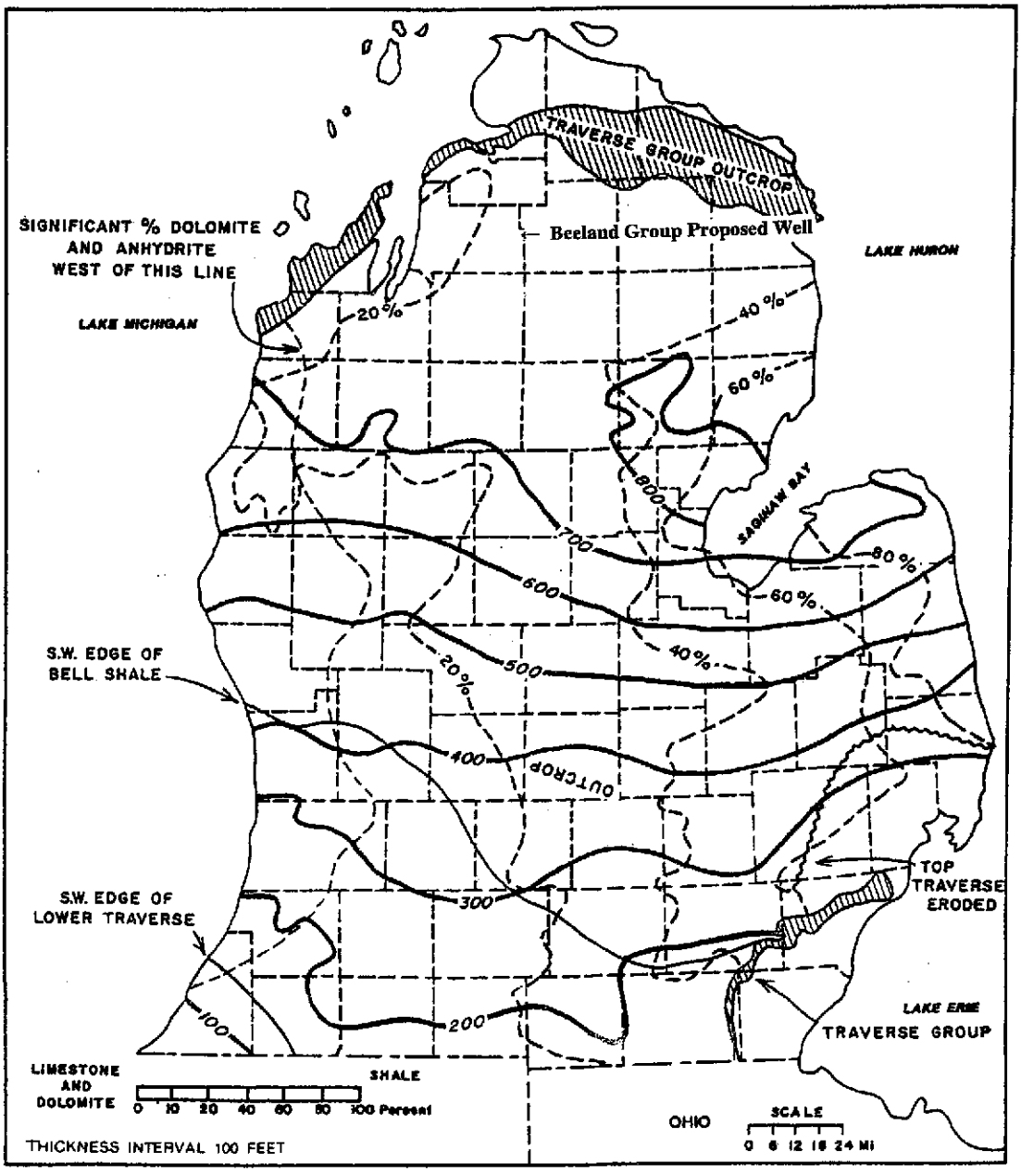
Thickness - Lithofacies of the Dundee Formation

(From Gardner, 1974. Reproduced with permission from the Michigan Basin Geological Society.)

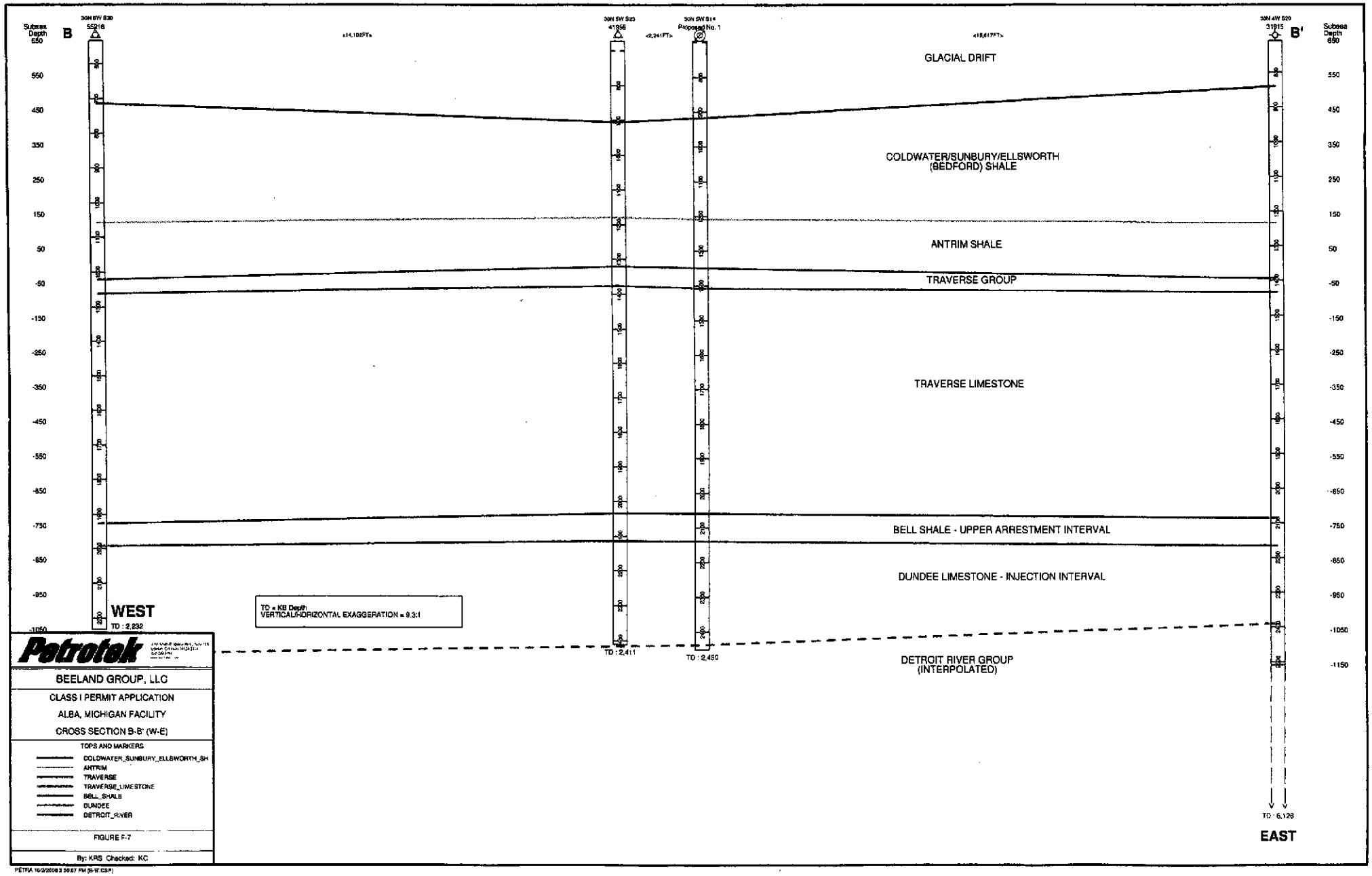
Petrotek Engineering Corporation
Figure F-3
Beeland Group, LLC
Alba, Michigan Facility
Regional Michigan Dundee Thickness Lithofacies Map (from Gardner, 1974)
DISPOSAL WELL # 1
SCALE: NOTED DATE: 10/06

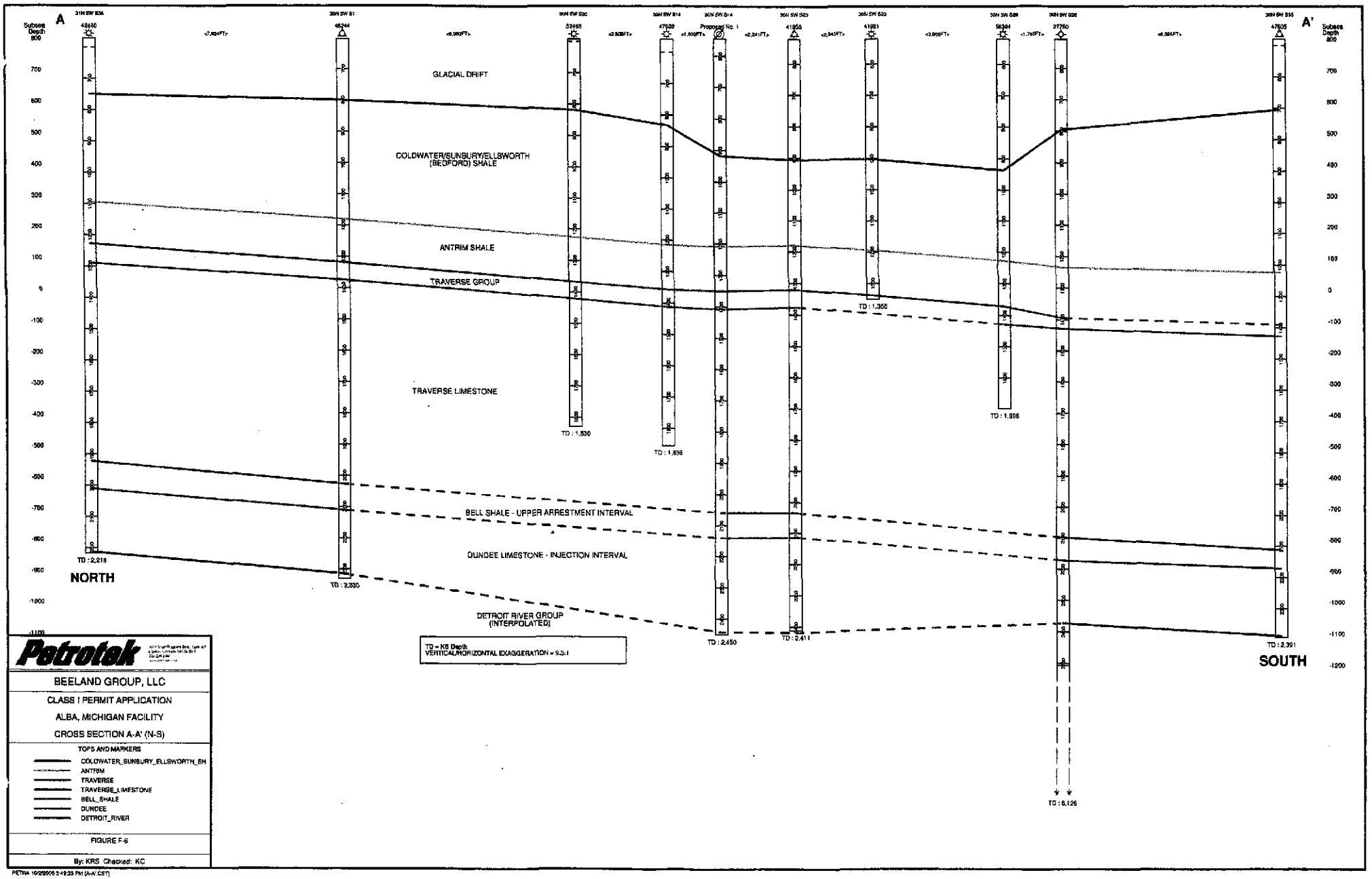


Petrotek Engineering Corporation
Figure F-4
Beeland Group, LLC Alba, Michigan Facility
Regional Michigan Traverse Thickness (from Fisher, 1980) DISPOSAL WELL # 1
SCALE: NOTED DATE: 10/06



Petrotek Engineering Corporation
Figure F-5
Beeland Group, LLC Alba, Michigan Facility
Regional Michigan Traverse Group Shale Percentage Thickness (from Gardner, 1974) DISPOSAL WELL # 1
SCALE: NOTED DATE: 10/06


B
B'
Subsea Depth
650
550
450
350
250
150
50
-50
-150
-250
-350
-450
-550
-650
-750
-850
-950
-1050
-1150
30N 5W S30
55216
30N 5W S23
41955
30N 5W S14
Proposed No. 1
30N 4W S29
31915
<14,102FT>
<2,241FT>
<15,617FT>
GLACIAL DRIFT
COLDWATER/SUNBURY/ELLSWORTH
(BEDFORD) SHALE
ANTRIM SHALE
TRAVERSE GROUP
TRAVERSE LIMESTONE
BELL SHALE - UPPER ARRESTMENT INTERVAL
DUNDEE LIMESTONE - INJECTION INTERVAL
DETROIT RIVER GROUP
(INTERPOLATED)
WEST
TD : 2,232
TD : 2,411
TD : 2,480
TD : 6,129
EAST
TD = KB Depth
VERTICAL/HORIZONTAL EXAGGERATION = 9.3:1
Petrotek
BEELAND GROUP, LLC
CLASS I PERMIT APPLICATION
ALBA, MICHIGAN FACILITY
CROSS SECTION B-B' (W-E)
TOPS AND MARKERS
COLDWATER_SUNBURY_ELLSWORTH_SH
ANTRIM
TRAVERSE
TRAVERSE_LIMESTONE
BELL_SHALE
DUNDEE
DETROIT_RIVER
FIGURE F-7
By: KRS Checked: KC
PETRA 10/2/2008 3:30:57 PM (B-B'.CSP)



Petrotek

BEELAND GROUP, LLC

CLASS I PERMIT APPLICATION

ALBA, MICHIGAN FACILITY

CROSS SECTION A-A' (N-S)

TOPS AND MARKERS

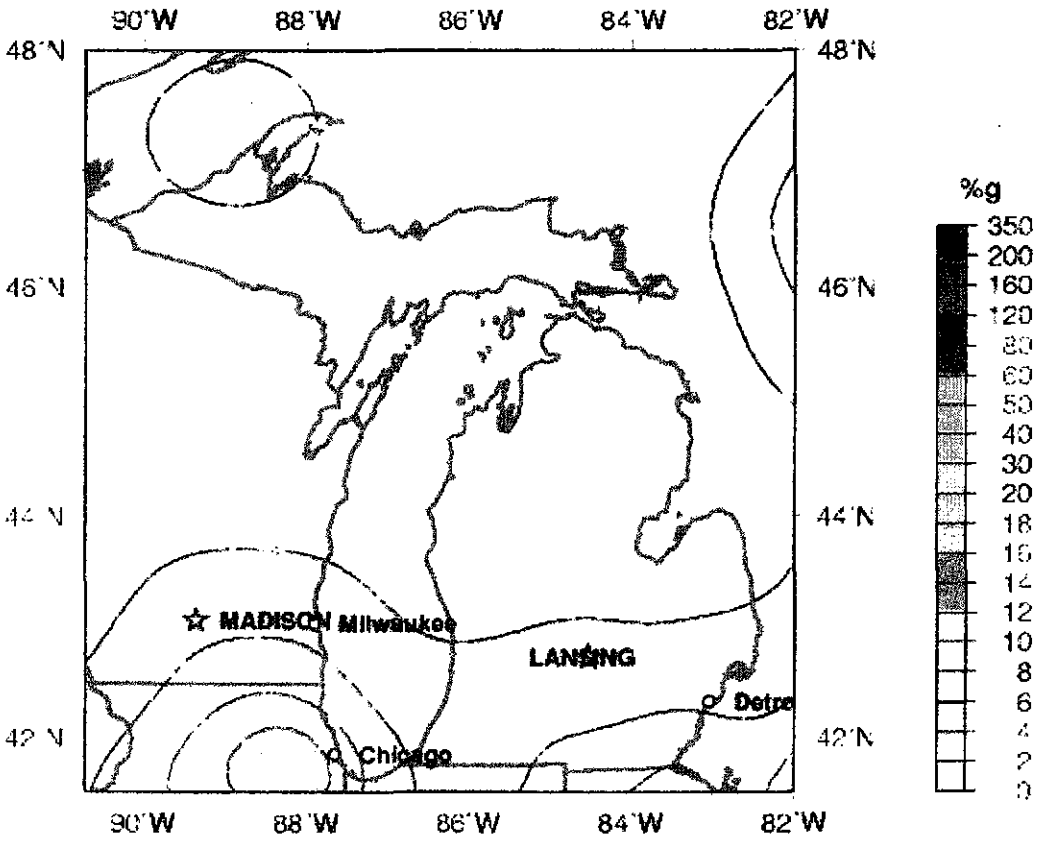
- COLDWATER_SUNBURY_ELLSWORTH_SH
- ANTRIM
- TRAVERSE
- TRAVERSE_LIMESTONE
- BELL_SHALE
- DUNDEE
- DETROIT_RIVER

FIGURE F-6

By: KRS Checked: KC

PETRA 10/2/2006 3:49:35 PM [A-A'.CST]

Seismic Hazard Map of Michigan



Peak Acceleration (%g) with 2% Probability of Exceedance in 50 Years
site: NEHRP B-C boundary
National Seismic Hazard **Mapping Project**

USGS National Seismic Hazard Maps

Earthquake History of Michigan

The earliest record of earthquake tremors felt in Michigan Territory (statehood came in 1837) were from the great series of shocks centered near New Madrid, Missouri in 1811 and 1812. As many as nine tremors from the New Madrid earthquake series were reported felt distinctly at Detroit.

A damaging earthquake, apparently centered between Montreal and Quebec in the Saint Lawrence Valley, occurred on October 20, 1870. This shock was felt over an area estimated to be at least a million square miles including Sault Sainte Marie.

Between 1872 and 1883 a number of moderate earthquakes were centered within Michigan. On February 6, 1872, three shocks lasting 30 seconds were reported at Wenona. No additional information is known about these tremors. Reports from Redford and Greenfield Village, not far from Detroit, indicated a minor earthquake occurred on August 17, 1877. It was noted that horses were frightened during this shock. Some persons reported hearing a noise like a train. On February 4, 1883, an earthquake cracked windows and shook buildings at Kalamazoo (intensity VI). This shock was felt in southern Michigan and northern Indiana. Cities as distant as Bloomington, Illinois and St. Louis, Missouri also reported feeling this earthquake.

The destructive earthquake that hit Charleston, South Carolina on August 31, 1886, was felt as far north as Milwaukee, Wisconsin and probably in parts of Michigan. On October 31, 1895, Charleston, Missouri experienced a major earthquake. Considered the severest shock in the central U.S. region since the 1811 - 1812 earthquakes, the 1-million-square-mile felt area included parts of Michigan. A moderate earthquake of intensity V was felt at Menominee on March 13, 1905.

A series of unusual occurrences in the Keweenaw Peninsula mining area form a significant part of the seismic history of Michigan. The first disturbance was on July 26, 1905 at about 6:20 in the evening. At Calumet there occurred what appeared to be a terrific explosion. Chimneys fell with a crash and plate glass windows were broken (intensity VII). The explosion was heard far down in a mine and the shock was felt all over the Keweenaw Peninsula area and as far away as Marquette, about 70 miles southeast across Lake Superior. Ten months later, on May 26, 1906, a similar phenomenon occurred. Train rails were twisted, and there was a notable sinking of the earth above the Atlantic mine. The disturbance was reported felt over an area about 30 to 40 miles in diameter. Another shock occurred in the same region on January 22, 1909. A rumbling tremor was felt around Houghton and was believed to be caused by the crushing of pillars in a mine.

The earthquake of August 9, 1947, damaged chimneys and cracked plaster over a large area of south-central Michigan and affected a total area of about 50,000 square miles, including points north to Muskegon and Saginaw and parts of Illinois, Indiana, and Wisconsin. The cities of Athens, Bronson, Coldwater, Colon, Matteson Lake, Sherwood,

and Union City in the south-central part of the State all experienced intensity VI effects. Reports of damage to chimneys and some instances of cracked or fallen plaster, broken windows, and merchandise thrown from store shelves were common over the epicentral area.

A number of other earthquakes centered outside the State have been felt in Michigan. Noteworthy among these are the following:

February 28, 1925
St. Lawrence River region northwest of Murray Bay (La Malbaie), Quebec, Canada; felt area approximately 2 million square miles; intensity V at Grand Rapids, Newberry, and Whitefish Point, Michigan.

November 1, 1935
Timiskaming, Quebec, Canada; 1-million-square-mile felt area; intensity V at Alpena, Hillman, Mount Clemens, Pellston, and Port Huron, Michigan.

March 2 and 8, 1937
Western Ohio; 150,000-square-mile felt area (second shock); felt at many places in southern Michigan.

September 4, 1944
St. Lawrence River region between Massena, New York and Cornwall, Ontario, Canada; 175,000-square-mile felt area (in the U.S.); felt at Alpena, Detroit, Grand Rapids, Lansing, Saginaw, and Sault Sainte Marie, Michigan.

November 9, 1968
South-central Illinois; felt area approximately 580,000 square miles (including all or portions of 23 states); felt throughout southern Michigan.

Abridged from Earthquake Information Bulletin, Volume 5, Number 6, November - December 1973, by Carl A. von Hake.

For a list of earthquakes that have occurred since this article was written, use the Earthquake Search.

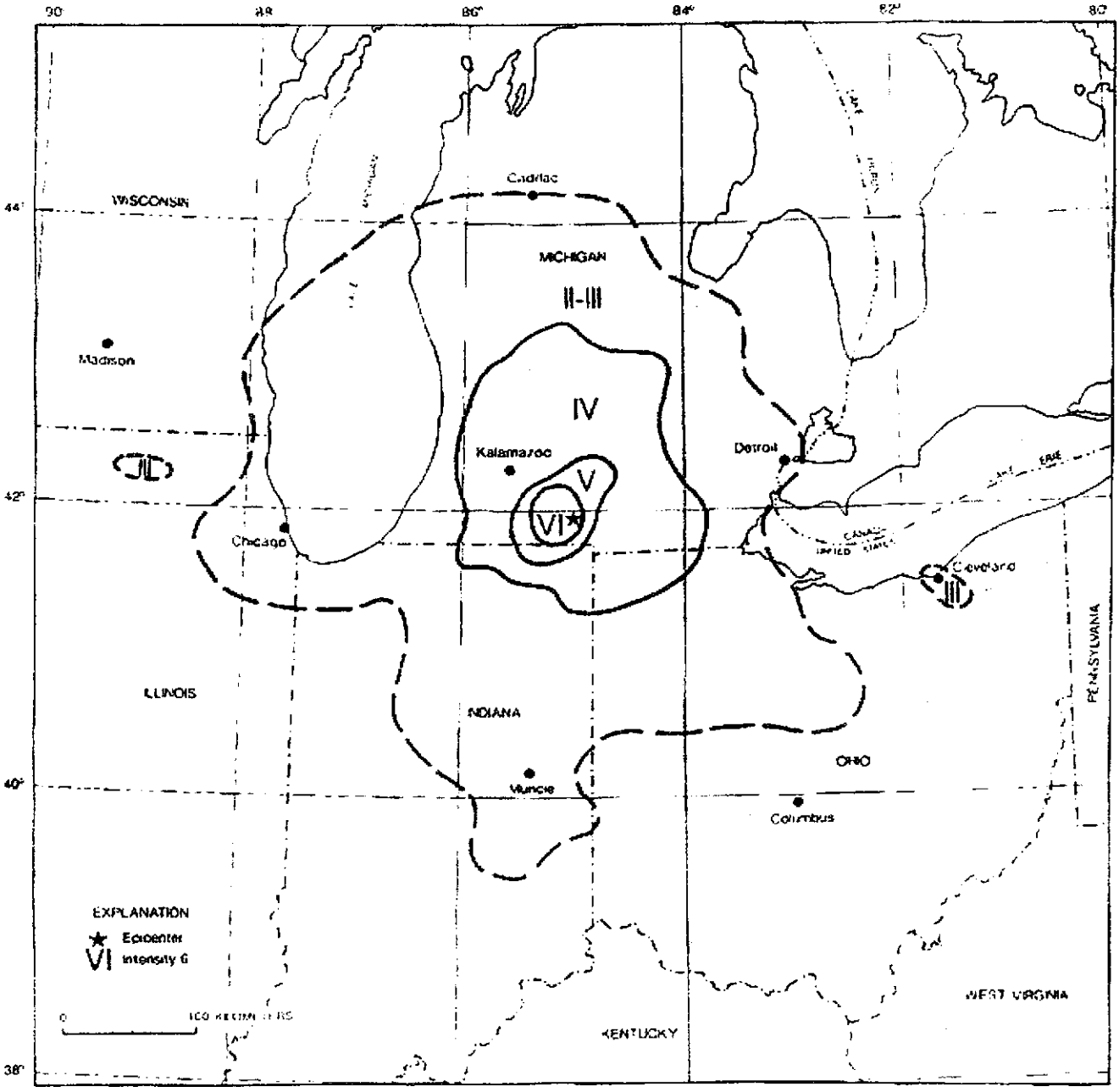
Historic Earthquakes

Southern Michigan
1947 08 10 02:46:41.3 UTC (local 08/09)
Magnitude 4.60
Intensity VI

Largest Earthquake in Michigan

Isoseismal Map

Isoseismals are based on intensity estimates from data.



Abridged from Seismicity of the United States, 1568-1989 (Revised), by Carl W. Stover and Jerry L. Coffman, U.S. Geological Survey Professional Paper 1527, United States Government Printing Office. Washington: 1993.

2.G GEOLOGICAL DATA ON INJECTION AND CONFINING ZONES

For Class II Well (Not Applicable to this Application)

2.H OPERATING DATA

Submit the following proposed operating data for each well (including all those to be covered by area permits): (1) average and maximum daily rate and volume of the fluids to be injected; (2) average and maximum injection pressure; (3) nature of annulus fluid; (4) for Class I well, source and analysis of the chemical, physical, radiological and biological characteristics, including density and corrosiveness, of injection fluids. If the information is proprietary, maximum concentrations only may be submitted, but all records must be retained.

RESPONSE

Maximum Injection Pressure

The well has been designed for operation on a vacuum or with a small injection pump. It is probable that no injection pump will be required to dispose of desired volumes of fluid. However, a pump may be installed to increase capacity if necessary. Although no site specific data are available, Region 5 USEPA Guidance #7 includes a value of 0.8 psi for the fracture gradient of the Dundee Limestone. If injection fluid is assumed to be comprised of a brine with a maximum specific gravity of 1.15 that fills the tubing from the surface to a depth of 2,150 feet, a maximum wellhead injection pressure of 649 psi is calculated based on this Region 5 assigned gradient. No allowances for tubing friction are included in this calculation. Note that the average specific gravity is expected to be in the 1.01 to 1.05 range.

Based on a calculated wellhead fracture pressure value of 648 psi (assuming a maximum continuous specific gravity of 1.15), it is requested that a maximum wellhead injection pressure of 150 psi be authorized for future injection activities without additional testing.

If necessary, subsequent testing may be conducted in the future to justify the use of pressures above 150 psi at the wellhead during future disposal operations. At the current time, it is believed that restriction to flow under gravity conditions are likely to provide for insufficient operational flexibility and could contribute to unwarranted compliance complications.

Average Rates, Volumes and Pressures

The range of injection rates and pressures is expected to fluctuate depending on the demands of the groundwater remediation project along with variables related to the well and the reservoir conditions. Injection rates are projected to average between 50 and 200 gpm based on continuous operations. However, injection may occur in a periodic or "batch mode" depending on demand.

Average injection pressures during active operations are expected to range from approximately –12 to 100 psi depending on the history of recent well capacity demands and the condition of the well and the injection reservoir.

Annulus Pressure

Annulus pressure will be maintained at a minimum of 100 psi above injection pressure, even during shutdown, except during the course of workovers and/or maintenance operations.

Nature of Annulus Fluid

In the proposed Beeland Well, the annulus space between the injection tubing and the well protection casing will be sealed and filled with fresh water containing a corrosion inhibitor, an oxygen scavenger and a biocide. Annulus fluids will include Baker Petrolite CRW0037F or Unichem Technihib 366W corrosion inhibitors and

bactericides, CRW 132 oxygen scavenger A-303 corrosion inhibitor, Knockout 50 oxygen scavenger, and Bacban 3 Biocides or suitable equivalents. No permit condition regarding specific brands or fluid additives are requested at this time.

Monitoring the pressure changes in the sealed annulus space is a means of verifying the continued mechanical integrity of the well. It must be non-corrosive, not subject to biologic degradation, and preferably non-freezing at winter temperatures. At this time, methanol, diesel, heat tracing, and/or a wellhouse heater may be used at the wellhead and annulus tank system to manage any potential for weather related problems.

The well is to be operated, and operating data reported, according to the following requirements:

TABLE H-1 OPERATING, MONITORING AND REPORTING REQUIREMENTS BEELAND GROUP, LLC DISPOSAL WELL NO. 1

Characteristic	Value	Minimum Monitoring Frequency	Minimum Reporting Frequency
Average Injection Rate	6,857 bpd max.	Continuous	monthly
Instantaneous Injection Rate	10 bpm max.	Continuous	monthly
Cumulative Volume	6,857 bpd max.	Continuous	monthly
Max. Injection Pressure	150 psig	Continuous	monthly
Ave. Injection Pressure	0 psig	Continuous	monthly
Annulus Pressure	100 psig min.	Continuous	monthly
Annulus/Tubing Pressure Differential	100 psig min.	Continuous	monthly
Sight Glass Level	Visible	daily when operated	monthly
Annulus Fluid Addition Or Removal		Daily	monthly
Chemical Composition of Injected Fluids [1]		Variable	within 30 days of sampling
Physical Characteristics of Injected Fluids [1]		Variable	within 30 days of sampling

[1] As specified in the Waste Analysis Plan.

Injectate Characteristics

As discussed in Attachment U, groundwater remediation project related non-hazardous wastes are to be brought to the Alba, Michigan facility. A Waste Analysis Plan intended to comply with USEPA Region V Guideline #8 is presented in Response 2.P of this permit application. Fluid from the remediation project will be sampled on a quarterly basis. Attached at the end of Response 2.H is a copy of typical analysis for the fluid generated by this remediation project. Historically, fluids from this remediation project have been managed as non-hazardous via both injection and surface discharge after treatment. Fluids typically have contained various levels of total dissolved solids and are expected to range from 2,500 mg/l to 25,000 mg/l. Specific gravity is expected to range from 1.00 to 1.05, and pH is typically expected to range from 7.0 to 10.0.

TABLE H-2 EXAMPLE ANALYSIS OF INJECTATE FROM BAY HARBOR, MICHIGAN REMEDIATION

Parameter	Units	Results	Method	Date	Analyst
Oxidation Reduction Potential	mV	296	Field	9/28/2004	EB
pH	s.u.	7.42	Field	9/28/2004	EB
Temperature	°C	19.1	Field	9/28/2004	EB
Alkalinity-Phenolphthalein	mg/L	0	310.1	9/30/2004	REG
Alkalinity-Total	mg/L	1,620	310.1	9/30/2004	REG
Carbonate Alkalinity	mg/L	0	Calc.	9/30/2004	REG
Bicarbonate Alkalinity	mg/L	1,620	Calc.	9/30/2004	REG
Hydroxide Alkalinity	mg/L	0	Calc.	9/30/2004	REG
Total Organic Carbon	mg/L	260	415.1	10/5/2004	BA
Total Inorganic Carbon	mg/L	88	415.1	10/5/2004	BA
Total Dissolved Solids	mg/L	32,800	160.1	9/29/2004	REG
Total Suspended Solids	mg/L	123	160.2	9/29/2004	REG
Biochemical Oxygen Demand	mg/L	*	405.1	10/8/2004	PJC
Chemical Oxygen Demand	mg/L	992	410.1	9/30/2004	REG
Total Phosphorus	mg/L	1.4	365.2	9/30/2004	REG
Phosphate, Orhto	mg/L	< 1	300	9/29/2004	DMJ
Nitrate-Nitrogen	mg/L	0.97	300	9/29/2004	DMJ
Nitrite-Nitrogen	mg/L	0.74	300	9/29/2004	DMJ
Ammonia-Nitrogen	mg/L	8.5	350.1	10/1/2004	BEK
Total Kjeldahl Nitrogen	mg/L	29	351.2	10/1/2004	BA
Aluminum	mg/L	19.8	6020	10/3/2004	EB
Antimony	mg/L	< 0.05	6020	10/3/2004	EB
Arsenic	mg/L	0.237	6020	10/3/2004	EB
Barium	mg/L	0.017	6020	10/3/2004	EB
Beryllium	mg/L	< 0.005	6020	10/3/2004	EB
Cadmium	mg/L	< 0.001	6020	10/3/2004	EB
Chromium, Total	mg/L	0.029	6020	10/3/2004	EB
Cobalt	mg/L	< 0.015	6020	10/3/2004	EB
Copper	mg/L	0.024	6020	10/3/2004	EB
Iron	mg/L	1.42	6020	10/3/2004	EB

Parameter	Units	Results	Method	Date	Analyst
Mercury	mg/L	0.0008	245.1	10/20/2004	Merit
Manganese	mg/L	0.088	6020	10/3/2004	EB
Nickel	mg/L	0.223	6020	10/3/2004	EB
Selenium	mg/L	0.063	6020	10/3/2004	EB
Silver	mg/L	0.0005	6020	10/3/2004	EB
Strontium	mg/L	0.034	6020	10/3/2004	EB
Zinc	mg/L	0.019	6020	10/3/2004	EB
Silica, Reactive as SiO2	mg/L	16.8	370.1	10/4/2004	REG
Total Silicon as SiO2	mg/L	66.3	6020	10/2/2004	EB
Calcium	mg/L	12.1	6020	10/3/2004	EB
Magnesium	mg/L	< 0.5	6020	10/3/2004	EB
Potassium	mg/L	13,800	6020	10/3/2004	EB
Sodium	mg/L	889	6020	10/3/2004	EB
Bromide	mg/L	15.2	300	9/29/2004	DMJ
Chloride	mg/L	1,730	300	9/29/2004	DMJ
Fluoride	mg/L	18.1	300	9/29/2004	DMJ
Sulfide	mg/L	1.29	376.2	10/5/2004	Merit
Sulfate	mg/L	14,500	300	9/29/2004	DMJ

Impact of Injection

Based on historical operating data from surrounding Class II injection wells in Antrim County, it appears that well capacity is likely to be sufficient for proposed disposal operations. Until actual data are obtained from installation of the well, conservative estimates of formation properties have been assigned, along with projected operational parameters, to generate an estimate of the fluid front for the Beeland well. Standard equations for the volume of a porous cylinder can be used with the following parameters to generate a piston-like displacement fluid front radius: 100-foot net thickness, 10 percent effective porosity, and 2,103,840,000 gallons of injectate estimated based on twenty years of continuous injection at a rate of 200 gpm. This yields a 100 percent injected fluid front radial distance of approximately 2,992 feet from the well. It is noted that "continuous" injection rates are more likely to be less than 125 gpm based on historical operation of the groundwater remediation project. Although dispersion will play a role in spreading this plume over a slightly larger area, even a relatively large dispersivity combined with a low concentration of interest would yield a plume that is less than one mile radially from the well. This is substantially smaller than the required Region 5 minimum two-mile AOR conducted for this site.

2.I FORMATION TESTING PROGRAM

Describe the proposed formation testing program. For Class I well the program must be designed to obtain data on fluid pressure, temperature, fracture pressure, other physical, chemical, and radiological characteristics of the injection matrix and physical and chemical characteristics of the formation fluids.

RESPONSE

The Beeland Disposal Well No. 1 is to be installed and tested in 2007 according to applicable regulations and permit requirements. Static pressure of the Dundee and estimates of various injection interval characteristics are to be determined via pressure transient testing, while native brine chemistry and characteristics are to be determined based on acquisition of a fluid sample. Characteristics of the injection interval are also to be evaluated based on conducting geophysical well logging. Additional details regarding the well logging are presented in Response 2.L, construction details.

After the open hole has been drilled, but prior to conducting any injection testing, injection interval fluid will be produced from the well using either a submersible pump or swabbing equipment. Based on fluid loss during drilling and field conditions, target production volumes for obtaining representative samples will be adjusted in the field. Field parameters including pH and conductivity will also be monitored at surface as fluid is recovered to determine when representative sampling is practical. Fluid will be subjected to analysis for the following parameters:

Alkalinity, Arsenic, Barium, Bicarbonate, Cadmium, Calcium, Carbonate, Chloride, Chromium, Conductivity, Copper, Hardness, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Nitrate, as (N), pH, Potassium, Radium 226, Radium 228, Selenium, Silica as SiO2, Sodium, Specific Gravity, Strontium, Sulfur, TDS, TSS, Zinc

Annual Part I mechanical integrity testing for the Beeland well will include reservoir monitoring as specified in 40 CFR 146.13 (d) in addition to static annulus pressure testing. Beeland will provide the agency with a minimum of 30 days notice of annual testing. Notice is to include proposed procedures for testing. Although test procedures or methods may be changed based on approval by Region 5 USEPA staff, the following procedure will be utilized for the first such testing to be performed:

1. Conduct Wellsite Safety Meeting

   A. Prior to commencement of field activities, conduct safety meeting with contractors and personnel to be involved with field services and MIT testing. Ensure that all safety procedures are understood and review days work activities.

2. Conduct Fall-Off Test

   A. Record data regarding test well injection at typical operating conditions (constant rate). Rate, temperature and specific gravity versus time will be sampled and recorded during the injection period. Cumulative volume injected should also be recorded. Continue injection for a minimum of approximately five hours. Note that significant rate variations may yield poor quality data or require more complicated analysis techniques.

   B. Rig-up pressure gauge.

   C. Obtain final stabilized injection pressure for a minimum of one hour. Ensure that the gauge temperature readings have also stabilized.

D. After gauge recordings are stable, cease injection and monitor pressure fall-off. Instantaneous shut-in yields best results. Continue monitoring pressure for a minimum of five hours or until a valid observation of fall-off curve is observed.

E. Stop test data acquisition, rig-down and release equipment.

3. Annulus Pressure Test

A. Stabilize well pressure and temperature.

B. Arrangements will be made for a representative from the USEPA to be present to witness this testing.

C. Install ball valve or similar type "bleed" valve on annulus gate valve. Pressurize annulus to a minimum of 100 psig with liquid and shut-in pump side gate valve. If typical operating annulus pressures are above 100 psi, higher pressures acceptable to the agency and compatible with the well completion configuration will be utilized in this testing. Pressure to be used will be detailed in proposed procedures supplied with notification of testing. Install USEPA-certified gauge on "bleed" type valve. The annulus may need to be pressurized and bled off several times to ensure an absence of air. Monitor and record pressure for one hour. Pressure may not fluctuate more than 3 percent during the one-hour test. At the conclusion of the test, lower the annulus pressure to normal operating pressure.

2.J STIMULATION PROGRAM

Outline any proposed stimulation program.

RESPONSE

No specific stimulation program is currently scheduled for the proposed Beeland well. Class II injection in the immediate vicinity has been historically successful in the proposed Dundee Formation injection interval. Based on typical oilfield operations, hydrochloric acid stimulation of the injection interval may be required as part of the original completion or as maintenance during operations. If necessary to maintain desired injectivity, mechanical well clean out or acidization of a similar nature to programs used in other Class I or Class II injector in Michigan may be conducted to reduce injection pressures. The USEPA will be notified prior to any stimulation activities being conducted in the well.

2.K INJECTION PROCEDURES

Describe the proposed injection procedures including pump, surge tank, etc.

RESPONSE

The Beeland Group, LLC well is to be dedicated to the injection of fluids derived from the Bay Harbor groundwater remediation project. Details regarding the waste stream, surface equipment and practices to be followed for operation of the well are presented in this attachment. Note that additional details regarding the wellhead, annulus components and surface facilities of the system are provided in Response 2.M of this document. Additional details regarding operating parameters for the system are included in Attachment H of this document.

Surface Facility Description

The Beeland Group, LLC facility is located east of Alba, Michigan in Antrim County. The facility is to be entered via a dedicated site access road from the north side of the Alba Highway, approximately five miles east of US 131. The site access road will lead to a concrete unloading pad, which will be installed with sufficient curbs and drainage slopes to allow the containment and collection of any possible leakage during transport unloading operations. All traffic entering and exiting the pad will pass an office/shop building on site and through a gate at the highway entrance, which provide location security.

Figure K-1 is a process flow diagram of the major surface facility components. They consist of the above-mentioned unloading pad, an unloading manifold, screen and filters, pumps, tank battery (consisting of between 20,000 and 200,000 gallons of storage) and flow line piping.

Injection Procedures

Fluids will be collected at the Bay Harbor remediation facilities and transported via tanker truck to the Alba, Michigan site. Upon arrival, necessary paperwork documenting each shipment will be completed, and transports will be directed to the concrete unloading pad. Loads will then pumped through screens and routed to the desired storage tank. Fluids collected from the unloading pad and well site and storage tank containment areas may also be collected and routed to the storage tanks. Fluids will then be moved between tanks as necessary under gravity flow or using transfer pumps. Depending on fluid quality and well performance, fluids may be routed through filters prior to injection into the well under gravity flow. In the future, if transfer pumps and/or injection pumps become necessary, fluids will be transferred from a final head tank to the suction end of an injection pump. Injection will take place at desired flow rates, with a maximum injection pressure not to exceed 150 psi as previously indicated in this document (see Response 2.H). Figure K-1 also presents a general flow diagram of proposed instrumentation.

Well Operating Procedures, Alarms and Annulus Pressure Maintenance

It is anticipated that the well will be automated, but may also be operated manually for disposal. Operators will start the injection process by opening necessary valves to allow the pumps to be started, or for the well to draw fluid from the storage tanks under gravity flow. Restraints will be incorporated into the well monitoring systems to meet UIC regulations and permit conditions. The automated control system will include control switches to alarm the operator if certain operating conditions are encountered. For regulatory purposes, a high injection pressure switch (set below the permit maximum) and a low annulus differential switch (set above the permit minimum) will shut-off any injection pump power and alarm the operator so that manual valves can be actuated to stop injection. In the event that any of the permit condition related set points are exceeded, injection operations will cease until the problem is identified, corrected, and the system is manually restarted by an operator.

Annulus pressure in the well system will be maintained with a nitrogen bottle attached to an annulus fluid reservoir (head tank). Annulus fluid level can be monitored in the annulus fluid head tank by the use of a level indicator or a sight glass, and additions or subtractions of fluid from the annulus tank will be recorded for monitoring purposes and reported on a monthly basis per permit requirements.

If the proposed Beeland Well is monitored and operated remotely, the following special conditions shall be applicable. For the purpose of this permit, remote monitoring is defined as injection into the well when a trained operator is not present on site property and able to perceive shut-down alarms and able to physically respond to the well controls or the wellhead within 15 minutes of a compliance alarm condition.

1. Local operating system and remote monitoring system: If remote monitoring is to be used to operate the well, an automatic pager designed to alert designated on-call, off-site personnel in the event of a well alarm or shut-in shall be onsite and equipped with a back-up power supply.

2. Response to automatic shut-downs: Alarm shut-downs of the operating well related to permit compliance conditions of the well under Part II (B) (5) shall be investigated on-site by a trained operator within one (1) hour of pager notification of the occurrence.

3. Loss of power to the control system: In the event of a power failure beyond the capability of the back-up power supply shuts down the control system, the well shall be shut-in.

4. Loss of dial tone: If the automatic pager cannot get a dial tone for 30 minutes, the well shall automatically be shut-in.

5. Restart of the well after an automatic shut-in: Restart of the well after an shut-in related to a permit condition alarm (including, but not limited to, injection pressure, annulus differential pressure, loss of dial tone for more than 30 minutes or control system power failure) shall require the physical presence of the operator on-site before the well can be restarted.

6. Restart of the well after non-permit condition related or scheduled shut-ins: If the well is shut-in for more than 48 hours for circumstances unrelated to permit conditions, restart of the well shall require the physical presence of the operator on-site.

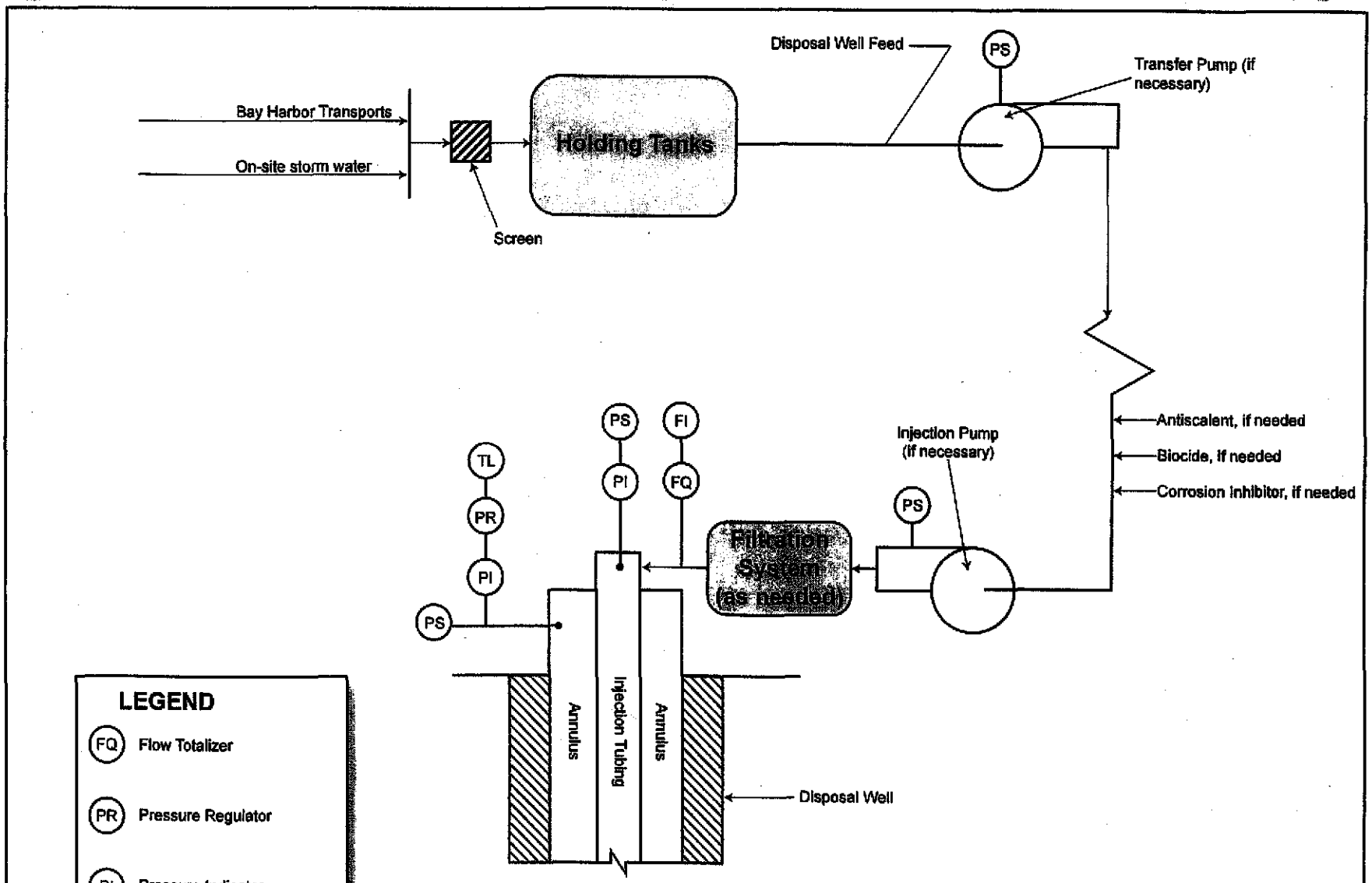
7. Weekly operator inspections: If fluid injection occurs during the period of any week and the well is being monitored remotely, a trained operator shall physically visit the site to inspect the facility at a minimum frequency of not less than once per week. This inspection shall verify the correct operation of the remote monitoring system by review of items such as, but not limited to, a comparison of the values shown on mechanical gauges with those reported by the remote operating system. Unless annulus pressure changes by more than 10 percent per week while the well is injecting, only one annulus fluid level per week shall be required to be taken, recorded and reported when injection takes place.

8. When the well is not actively being used for injection, one annulus tank fluid level measurement shall be taken, recorded and reported per week unless annulus fluid pressure decreases more than 10 percent per week. In such cases of increased annulus pressure change, annulus fluid level measurements shall be taken, recorded and reported twice per week.

9. When not in use by a trained well operator, offloading connections shall be secured and shall be locked at the valves leading to waste water tanks so that access is restricted to trained well operators.

10. Offloading of fluid from transports can only occur with a trained operator physically present on

site. A waste related log sheet and/or waste manifest file will be maintained documenting that a trained well operator allowed fluid to be unloaded. At a minimum, waste log entries are to include operator name, date, time, truck identification and approximate volume.



Petrotek Engineering Corporation

Figure K-1

Beeland Group, LLC.

Alba, Michigan Facility

SURFACE INJECTION PROCESS AND INSTRUMENTATION

DAVIS WELL #1-19

SCALE: NONE DATE: 10/06

2.L CONSTRUCTION PROCEDURES

Discuss the construction procedures (according to §146.12 for Class I, §146.22 for Class II, and §146.32 for Class III) to be utilized. This should include details of the casing and cementing program, logging procedures, deviation checks, and the drilling, testing and coring programs, and proposed annulus fluid (Request and submission of justifying data must be made to use an alternative to a packer for Class I).

RESPONSE

The proposed Beeland Well No. 1 is to be a newly installed Class I well. Well No. 1 will be located in the Southeast 1/4 of Section 14, Township 30 North, Range 5 West, Antrim County, Michigan. Ground level is estimated to be approximately 1,335 feet above sea level (ASL) with Kelly Bushing (KB) that will be dependent on rig availability. The well will be drilled to a Total Depth (TD) of approximately 2,450 feet BGL into the top of the Detroit River Group and will be completed openhole in the Dundee formation.

Drilling, Casing and Testing Program

The conductor casing, 13-3/8-inch, 61 lb/ft, J-55 grade, ST&C, or equivalent will be driven to refusal in the Glacial Drift to a maximum depth of approximately 175 feet BGL.

After a rotary rig is brought to the location, a 12¼-inch hole will be drilled out of the surface casing to a depth of approximately 950 feet. The intermediate casing shoe will be targeted at a minimum of 100 feet below the base of the Glacial Drift. After the shallow openhole logging program is complete (see attached table), the hole will be conditioned and minimum 9 5/8-inch, 36 lb/ft, J-55, ST&C, or equivalent surface casing will be installed to a depth of approximately 950 feet. The cementing program will be determined based on field conditions, but will likely consist of a mixture of 273 sacks (based on a gauge hole) of Michigan equivalent Class A standard cement with 3 percent CaCl2 and additives. Appropriate excess cement will be pumped based on field conditions. It is anticipated that a float shoe will be used plus a float collar one joint up from the bottom and that centralizers are to be placed a minimum of one every fourth joint.

After the intermediate casing string has been cemented, a cement bond log will be conducted to document cement circulation to surface. The cement will be drilled out of the intermediate string and an 8 1/2-inch hole will then drilled to approximately 2,150 feet BGL. The top of the Dundee injection formation will be penetrated in this stage of the drilling process. After the deep openhole logging program is complete (see attached table), the hole will be conditioned and minimum 7-inch, 26 lb/ft, J-55, ST&C, or equivalent long-string casing will be installed to a depth of approximately 2,150 feet. The cementing program for the long string will be determined based on field conditions, but will likely consist of a mixture of 264 sacks (based on a gauge hole) of Michigan equivalent Class A standard cement with 3 percent CaCl2 and additives. Appropriate excess cement will be pumped based on field conditions. It is anticipated that a float shoe will be used plus a float collar one joint up from the bottom and that centralizers are to be placed a minimum of one every fourth joint.

The final stage of drilling will be conducted using a 6-1/4-inch drill bit to drill out cement and complete the well as an openhole to a depth of approximately 2,450 feet. After drilling is complete, additional openhole logging will be conducted to obtain data regarding the Dundee injection interval. A cement bond log and a baseline casing inspection log will be conducted in the long-string casing, and a directional survey will be conducted to ascertain the bottomhole location and trajectory of the wellbore. A packer will be set at a depth of approximately 2,100 feet inside the 7-inch long string casing. Four and one-half inch injection tubing is proposed for the completion. As noted in Response 2.I., fluid will then be swabbed from the well to obtain a sample of injection interval fluids. A radioactive tracer survey and a temperature log will then be conducted to establish baseline conditions and initial external mechanical integrity. A pressure transient test will also be conducted to derive estimates of formation pressure and properties (See Response 2.I). A proposed schematic for the Beeland Well is presented in Figure M-1.

TABLE L-1 LIST OF PROPOSED LOGS
BEELAND GROUP, LLC WELL NO. 1

Description	Depth Run
Dual Laterolog Gamma Ray, Formation Density, and Caliper Logs (openhole before intermediate casing)	100-950'
Cement Bond Log (intermediate casing)	surf-950'
Dual LateroLog, SP, Gamma Ray, Formation Density, Compensated Neutron, and Caliper Log (openhole before long string casing and in openhole completion)	950- TD(2,450')
If required, Fracture Finder ID Log (openhole before long-string casing)	1,950-2,150'
Cement Bond Log, Casing Inspection Log and Directional Survey (long-string casing)	surf-2,150'
Temperature Log	surf-TD (2,450')
Radioactive Tracer Log	long string casing
Pressure/Temperature Gradient and Pressure Transient Falloff test	2,150'

Nature of Annulus Fluid

In the proposed Beeland well, the annulus space between the injection tubing and the well protection casing will be sealed and filled with fresh water containing a corrosion inhibitor, an oxygen scavenger and a biocide. Annulus fluids will include Baker Petrolite CRW0037F or Unichem Technihib 366W corrosion inhibitors and bactericides, CRW 132 oxygen scavenger A-303 corrosion inhibitor, Knockout 50 oxygen scavenger, and Bacban 3 Biocides or suitable equivalents. No permit conditions regarding specific brands or fluid additives are requested at this time.

2.M CONSTRUCTION DETAILS

Submit schematic or other appropriate drawings of the surface and subsurface construction details of the well.

RESPONSE

Figure M-1 presents a schematic of the proposed subsurface construction details of the well. Figure M-2 and K-1 present details regarding the wellhead, annulus and the surface facilities associated with the well.

Proposed Subsurface Well Construction Details

The proposed Well No. 1 is to be drilled, tested and completed during 2007.

Surface Well Construction Details

Wellhead

The proposed wellhead will consist of a standard 7-inch slip-on weld casing head or equivalent. The wellhead will include a 7-inch by 4½-inch tubing hanger and slips, pack-off and flanged fitting which act as the upper seal to the 7-inch by 4½-inch annulus. There will be two, 2-inch welded NPT nipples on the 7-inch casing for access to the annulus. Annulus fluid can be added through a 2-inch valve and annulus sampling can be conducted opposite the annulus valve through a ½-inch quick connect coupling or equivalent. A 4-inch flow-line is to be connected to a 4-inch ball valve or gate valve, which will be coupled to a 4-inch tee. This tee will also be connected to a 4-inch valve that is coupled to the tubing and this valve will be connected to a swedge that allows for connection of a pressure gauge or bullplug at the top of the wellhead. The tee or the flow line will also have a ½-inch needle valve tap to allow wellhead waste sampling. Figure M-2 is a diagram of the proposed wellhead assembly.

Annulus Monitoring System

The proposed annulus monitoring system will consist of an annulus fluid tank with a level indicator or site glass, pressure transducers and gauges, a nitrogen regulator and a nitrogen supply cylinder. The systems will be installed on the wellhead, in the wellhouse building, or in the immediately adjacent facilities building.

As specified in all Region 5 Class I permits, the annulus pressure will be designed to exceed the injection pressure throughout the length of the wellbore at all times. This will serve to ensure that, in the unlikely event of a mechanical integrity failure related to downhole tubulars, injected fluid will not enter the annulus to contact the long-string casing. Annulus fluid will enter into the injection tubing rather than the injected fluids entering into the annulus. Continuous monitoring of the annulus pressure will be required to ensure this pressure is maintained.

In addition to the positive annulus pressure operating and monitoring requirements, an interlock system will be installed to prevent the well from being operated if permit conditions are exceeded or if unsafe conditions exist. Several operating systems will have preset limits, which can be adjusted depending upon specific operating conditions and reporting requirements.

The following engineering restraints are proposed for incorporation into the well monitoring system to meet current UIC regulations and likely permit conditions.

1. Set points to ensure that the annulus pressure is maintained a minimum of 100 psig above the injection pressure all times.

2. The differential pressure will be controlled so that:

   a) The annulus pressure exceeds the injection pressure at all depths.

   b) The injection pressure and annulus pressure will not exceed the mechanical limits of the downhole tubulars and will not have sufficient force to unseat the packer.

   c) In the event of a disruption of differential pressure, the monitoring equipment will activate an alarm.

   d) A high differential pressure will cause a pressure relief valve located on the annulus reservoir tank to open.

3. A high injection pressure switch will activates an alarm and terminate power to any transfer or injection pump if the maximum allowable injection pressure is exceeded.

Annulus pressure in this system will be maintained with a nitrogen blanket supplied from pressurized nitrogen cylinders. In the event of power failure, positive pressure can still be maintained on the annulus at all times.

A computerized data acquisition system will be used to monitor injection rate, injection pressure, annulus pressure and simultaneous differential pressure. Maximum, minimum and average values for each of the four parameters along with total volume will be digitally recorded at least once every five minutes. A chart recorder will also be used to record the annulus pressure, injection pressure and injection flow rate. Pressure transducers located near the wellhead and downstream of any pumping devices will be used to measure pressures. Flow rate is to be measured utilizing an inline turbine meter and totalizer or equivalent. Well operators will be required to visually inspect the recorder and computer on a daily basis when injection occurs to verify proper operation. The annulus tank level and any annulus fluid added to the system will be recorded daily by the well operators.

A backup power source (battery) will be used to ensure continuous collection of operating and well alarm data for up a minimum of 30 minutes should power failure occur. In the event that a power failure persists past the ability of the battery systems to allow power, the well will be shut-in, and annual readings recorded a minimum of once every six hours until power is restored to the monitoring equipment.

The annulus tank will sufficient reservoir capacity to accommodate double the anticipated volume fluctuations due to temperature and pressure limitations. Pressure will be maintained through the use of high-pressure nitrogen cylinders. The cylinders will be replaced and recharged as required. The annulus tank is to be equipped with a level indicator or a full length armored reflex sight glass, a pressure relief valve, and an independent liquid fill nozzle.

In the event that any of the permit conditions are exceeded, including injection pressure or differential pressure a visual alarm light will be illuminated at the well building. In addition, the computerized data acquisition system will be coupled to a telephone autodialer that will send a page to the operator to ensure that the condition is communicated. Upon an alarm condition, injection will be stopped by the operator until the problem is identified, corrected, and the system manually restarted.

Mechanical Integrity

Part I and Part II mechanical integrity demonstrations will be conducted as discussed in Response 2.L of this document when the well is completed.

(○) CEMENT, VOLUMES, FLUIDS and HOLE SIZE

[ ] TUBULARS and COMPONENTS

(A) 12 1/4" Hole, Cemented to Surface with 273 sacks Class A

(B) 8 1/2" Hole, Cemented to Surface with 264 sacks Class A

(C) Annulus Fluid: Fresh water with Inhibitor and scavenger

(D) Completion: 6 1/4" Open Hole, total depth @ +/-2,450'

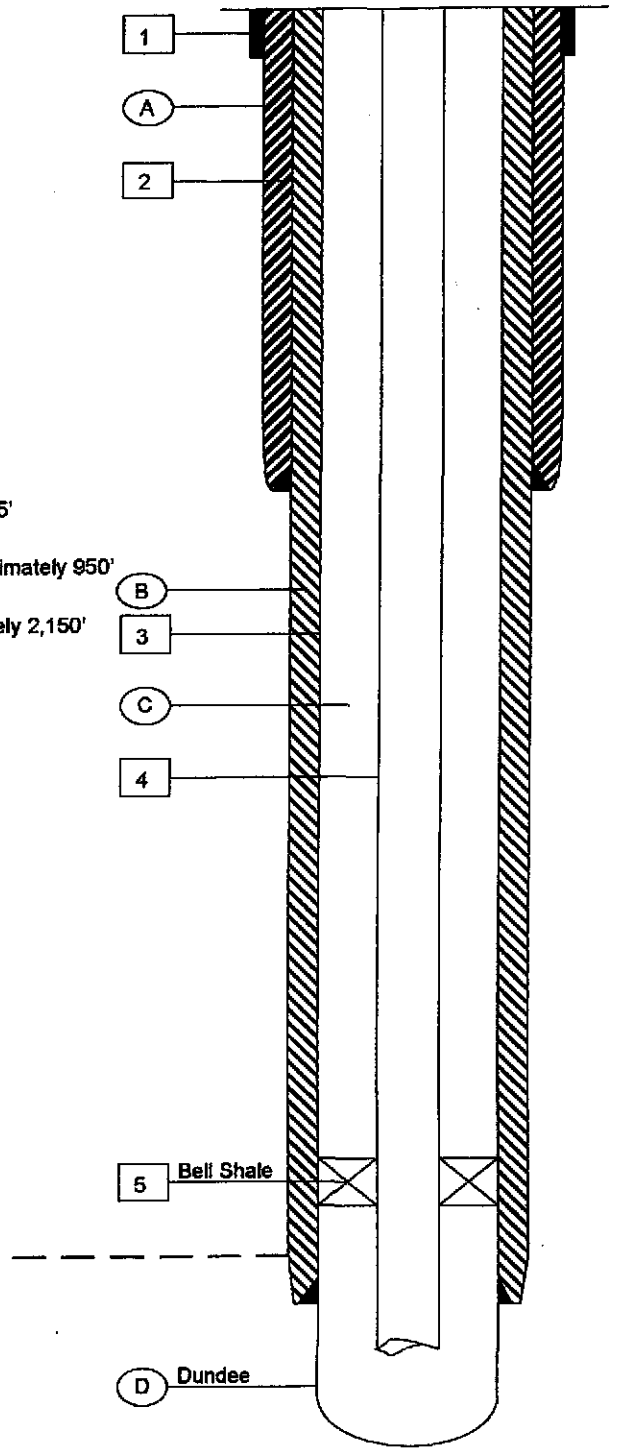
[1] Surface Casing: 13 3/8", 61#/ft., Driven to refusal as deep as 175'

[2] Intermediate Casing: 9 5/8", 36 lb/ft., K-55 or J-55, Set @ approximately 950'

[3] Long String Casing: 7", 26 lb/ft., J-55 or K-55, Set @ approximately 2,150'

[4] Injection Tubing: 4 1/2", 11.6 lb/ft., J-55

[5] Packer: 7" x 4 1/2" Large Bore, Set @ approximately 2,100'



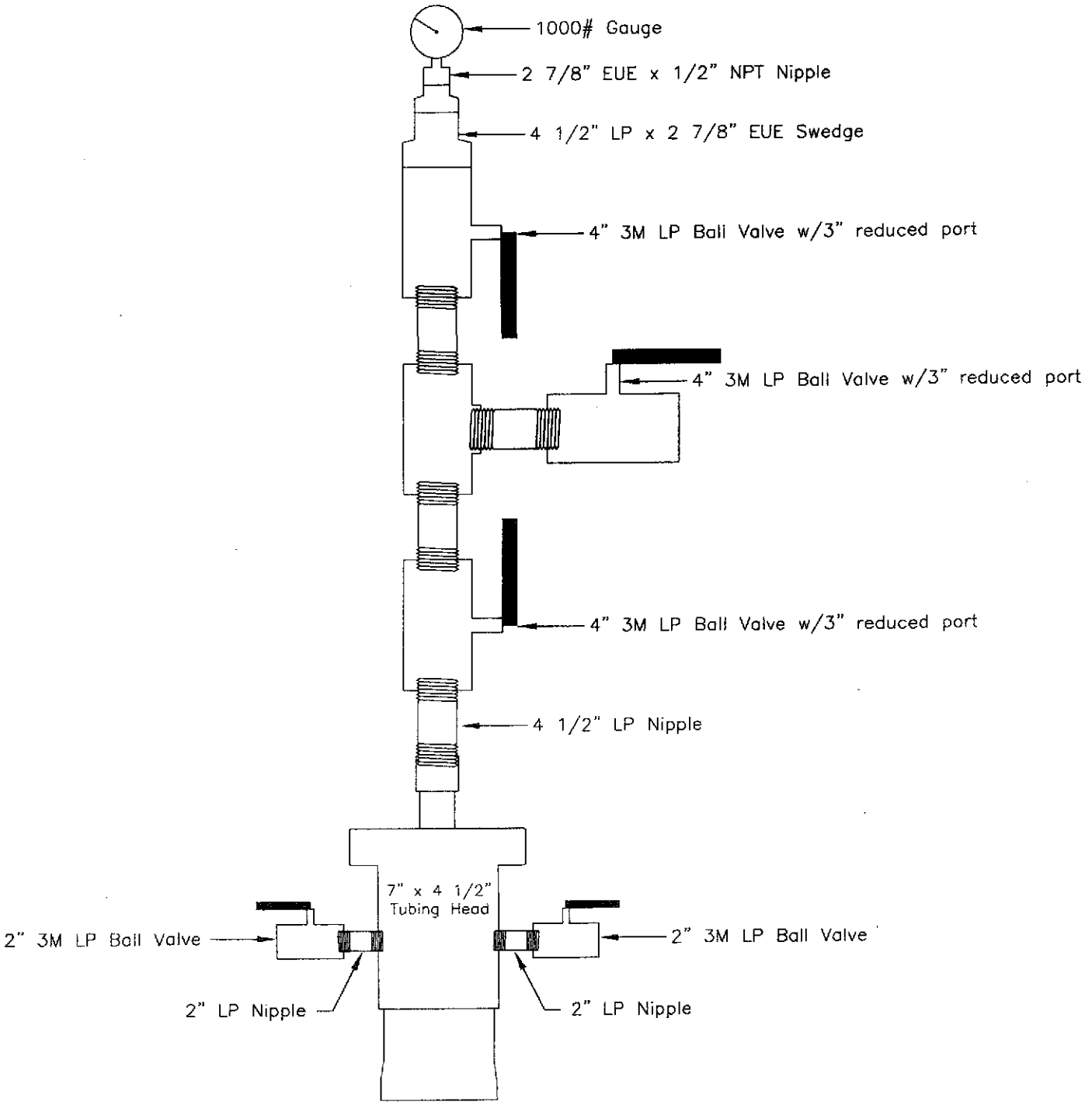
Petrotek Engineering Corporation

Figure M-1

Beeland Group, LLC.
Alba, Michigan Facility

WELL SCHEMATIC
DISPOSAL WELL NO. 1

SCALE: NONE DATE: 10/06



NOT TO SCALE

BEELAND GROUP, LLC ALBA, MICHIGAN FACILITY		
FIGURE M-2 TREE SCHEMATIC		
PROJECT: 309-1	DATE: SEPTEMBER 2006	
Beeland No.1.dwg	BY: KS	CHECKED: KC

Petrotek
9088 S. Ridgeline Blvd, Ste 105
Littleton, Colorado 80129
303-290-9414
www.petrotek.com

2.N CHANGES IN INJECTED FLUID

For Class III well (Not Applicable to this Application)

2.0 PLANS FOR WELL FAILURES

Outline contingency plans (proposed plans, if any, for Class II) to cope with all shut-ins or well failures, so as to prevent migration of fluids into any USDW.

RESPONSE

The proposed Beeland Group, LLC Well No. 1 will be operated from limited tank storage at relatively low injection pressures. Depending on rate requirements and well conditions, injection may take place via gravity flow. The following summarizes the plan to address failure of the well to protect the surface environment and prevent migration of injected fluids into any USDW:

Beeland Group, LLC
Alba, Michigan
Proposed Well No. 1 Contingency Plan

1. Monitoring and periodic routine investigative procedures will be performed on the injection well as required by applicable laws, permits and regulations. Pertinent data will be forwarded to the agencies as required. Monitoring and testing will be designed to assure well integrity and safe operations.

2. If the well fails required monitoring or periodic testing standards, the well will be shut-in and the agency notified according to applicable regulations and permit conditions. After investigation into the cause for the failure, work plans will be prepared and reviewed with the regulators for repairing the problem.

3. If a workover is performed on a well, mechanical integrity testing will be conducted as required by applicable regulations before the well is returned to service. Copies of all work reports and logs will be forwarded to the regulatory agencies per applicable requirements.

4. During the period of time required for a well workover or for shut-ins due to MIT failure, the contingency plans of the facility will include the following:

    a. If shut-in period is sufficiently brief, the fluids accumulated during this period of time will be held in storage at the facility.

    b. If required due to length of shut-in, fluids will no longer be generated or accepted at the facility and remaining fluids in on-site tanks will be removed from the facility via licensed transport vehicles and managed according to applicable regulations.

Should the mode of failure be beyond the limits of economic feasibility to repair, the guidelines for plugging and abandonment in Attachment Q will be followed.

2.P MONITORING PROGRAM

Discuss the planned monitoring program. This should be thorough, including maps showing the number and location of monitoring wells as appropriate and discussion of monitoring devices, sampling frequency, and parameters measured. If a manifold monitoring program is utilized, pursuant to §146.23(b)(5), describe the program and compare it to individual well monitoring.

RESPONSE

The monitoring program proposed for injection operations at this site focuses on the active injection well itself. No monitoring program specifically focused on the investigation of injectate containment via dedicated monitor wells is in place nor is one proposed. The primary injection interval is the Dundee Limestone (formation top approximately 2,100 to 2,150 feet BGL). The thickness of the overlying arrestment interval, including the Bell Shale and a portion of the Traverse Limestone in addition to the additional protection provided by the overlying Devonian and Mississippian Formation through the top of the Coldwater Shale create a large separation between the injectate and the waters of the USDW quality water above the based of the Glacial Drift. This separation distance (projected to be in excess of 1,200 feet), coupled with the absence of faults in the area, the significant under-pressure projected for the injection interval, and the suitability of well construction and operation requirements indicate that no groundwater monitoring program is required at this facility.

However, a variety of data is collected to monitor the injection well operations. This monitoring takes place through utilizing both periodic and continuous techniques.

Mechanical Integrity and Periodic Testing

Periodic monitoring is to be performed to conform to both Part I and Part II mechanical integrity requirements. Annual testing including reservoir monitoring and annulus pressure testing will be conducted once each calendar year in addition to Part II testing which will be performed once each fifth calendar year and will include one of the following logs (temperature, noise or oxygen activation) per applicable non-hazardous well regulations. Casing inspection logs may be conducted to investigate corrosion if it is determined to be necessary due to operational or regulatory concerns when tubing is already removed from the borehole during a workover or stimulation.

Annual Part I mechanical integrity testing for Well No. 1 will include reservoir monitoring as specified in 40 CFR 146.13 (d) in addition to static or dynamic annulus pressure testing. Although test procedures or methods may be changed based on request of the permittee and approval by Region 5 USEPA staff, the following procedure is expected to be typical for such monitoring. The Beeland Group will provide the agency with a minimum of 30 days notice of annual testing (when practical) to allow the agency to witness testing. Such notice is to include proposed procedures for testing.

1. Conduct Well Site Safety Meeting

   A. Prior to commencement of field activities, conduct safety meeting with contractors and personnel to be involved with field services and MIT testing. Ensure that all safety procedures are understood and review days work activities.

2. Conduct Reservoir (Fall-Off or Static) Pressure Test

   A. For fall-off, record data regarding test well injection at typical operating conditions (constant rate). Rate, temperature and fluid consistency will be recorded during the injection period. Cumulative volume injected should also be recorded. Continue

injection for a minimum of approximately twelve hours. Note that significant rate variations may yield poor quality data or require more complicated analysis techniques.

B. Rig-up pressure gauge and run in well to a depth of approximately 2,100 feet or other depth approved by USEPA consistent with historical measurements.

C. For pressure transient fall-off, obtain final stabilized injection pressure for a minimum of 1 hour. Ensure that the gauge temperature readings have also stabilized.

D. After gauge recordings are stable, cease injection and monitor pressure fall-off. Continue monitoring pressure for a minimum of four hours or until a valid observation of fall-off curve is observed. For static survey, the well will be shut-in for a minimum of 48 hours before testing. Static data will be collected by using downhole gauges at an approved depth consistent with past measurements as approved by USEPA.

E. Stop test data acquisition, rig-down and release equipment.

3. Annulus Pressure Test

A. Stabilize well pressure and temperature.

B. As practical, arrangements will be made for a representative from the USEPA to be present to witness this testing.

C. Pressurize annulus to a minimum of 500 psig or 100 psig above maximum permitted operating pressure with liquid and shut-in valve. Install certified gauge on "bleed" type valve. The annulus may need to be pressurized and bled off several times to ensure an absence of air. Monitor and record pressure for one hour. Pressure may not fluctuate more than 3 percent during the one-hour test. At the conclusion of the test, lower the annulus pressure to normal operating pressure.

Part II (5 year) mechanical integrity demonstration for the well will be accomplished via an approved test method(s) such as temperature log, or noise log, or oxygen activation log. The Beeland Group will provide the agency with a notice of Part II testing to allow the agency to witness data collection activities. Although Beeland may utilize any acceptable method per USEPA procedure approval, at this time it is proposed that temperature logging be utilized for future Part II mechanical integrity testing. Differential temperature logging to be conducted as follows:

1. Conduct Differential Temperature Log.

A. Shut-in well for stabilization (minimum of 36 hours) prior to running base temperature log.

B. Rig-up temperature log and run base log from surface to total depth. Pull tool to surface and shut-in master valve.

C. Rig down equipment and return the well to normal operations.

Continuous and Operational Monitoring

The proposed well will have one long string protective casing extending into the injection interval with cement isolating all permeable intervals. All casing strings are intended to have cement circulated from each shoe to

the surface. As previously noted in this document, the annulus area between the protective casings and injection tubing string is to be filled with treated fresh water. The annulus pressure is to be continually monitored to detect any leaks in the tubing or casing. If leaks develop during injection, pressurized annulus fluid would be injected into the permitted injection interval, and injected fluids would not be able to contact the long-string casing above the permitted injection zone. Injectate should therefore have no potential for leakage into un-permitted formations. Details regarding the proposed system components are provided in Attachments L and M of this document.

Monitoring of physical parameters associated with injection operations will be conducted pursuant to 40.CFR.146 regulations. At a minimum the monitoring will include, injection pressure, annulus pressure, injection rate, injection volume, annulus level, and injectate characteristics. Details regarding this monitoring follow. Automatic shutdown capability as specified in Attachment K of this document will be operated to ensure that maximum pressure or minimum annulus differential requirements are not exceeded.

Annulus and Injection Pressure

Both the injection pressure and the annulus pressure are continuously to be recorded for the well. Electronic pressure transducers will be placed in pressure taps on the annulus system and injection flow lines. A signal will sent from these transducers to a computer recorder and a chart recorder. The automated control system data will be visually inspected a minimum of once daily for anomalies when the well is operating. As part of the process and controls, the computer will record maximum, minimum and average information. Differential pressures are to be obtained by comparison of simultaneous readings of the annulus and injection pressure transducer readings obtained for the well.

Injection Rate and Volume

The flow rate to the well will be determined by a liquid flow meter designed for continuous monitoring. Flow rate is to be measured in the flow line to the well. The instrument will send signals to the process control system that calculates cumulative volume. Beeland reserves the right to substitute equivalent or superior equipment to fulfill these data measurement functions at any time.

Annulus Tank Levels

The annulus tank in the well system will have sufficient reservoir capacity to accommodate the anticipated volume fluctuations due to temperature and pressure limitations. The annulus tank is equipped with an armored reflex sight glass, pressure relief valve and independent liquid fill nozzle. If any annulus fluid is added, it will be recorded by the well operators on an operator log sheet. Annulus tank level is to be recorded on days when injection occurs.

Waste Characterization and Analysis

Injectate characteristics will be monitored by collecting samples per the approved waste analysis plan entered as part of the administrative record for this permit. The waste analysis to be conducted is intended to provide representative data regarding average injectate chemical constituents. A waste analysis plan prepared in accordance with applicable information from the USEPA Region 5 Waste Analysis Plan Guidance document is presented as a supplement to this attachment.

WASTE ANALYSIS PLAN

Class I Non-Hazardous Injection Well

Beeland Group, LLC

Alba, Michigan Facility

Antrim County

T30N, R5W, Section 14, SE ¼ Section

EPA Permit # TBD

October 6, 2006

Prepared By:

Petrotek

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Fax: (303) 290-9580

TABLE OF CONTENTS

1.0 INTRODUCTION

1.A. Background

The purpose of this Waste Analysis Plan (WAP) is to characterize the non-hazardous waste-water that is injected into the proposed new Beeland Group, LLC (Beeland) No. 1 well at the Alba, Michigan facility. Beeland will be responsible for ensuring this WAP is implemented. The well is a proposed as a non-hazardous, non- commercial Class I industrial disposal well that is to be dedicated to the injection of fluids generated in association with a groundwater remediation project.

Beeland will operate the well under this Waste Analysis Plan in accordance with Title 40 of the Code of Federal Regulations (40 CFR), Section 146.13 that requires operators of Class I underground injection wells to monitor and analyze the fluids injected into the well "to yield representative data of their characteristics." This Waste Analysis Plan has been prepared to fulfill the specifications of 40 CFR 146.68 such that the plan presents parameters for which the waste will be analyzed, methods that will be used to test for these parameters, and methods that will be used to obtain a representative samples of the waste to be analyzed.

1.B. Waste Source

The Class I non-hazardous waste to be injected into the Beeland Well No. 1 under this Waste Analysis Plan include fluids that are to be recovered at the Bay Harbor, Michigan Remediation Project along with fluids generated at the disposal well facility operation itself. These fluids are to be comprised of recovered groundwater and surface waters, both treated and untreated, storm-water run-off from the Bay Harbor project and at the well facility, along with any fluids generated during the operation and maintenance of the Class I injection well and the related unloading pad and surface facilities. No commercial or oilfield waste is to be managed at the facility.

1.C. Summary

Major portions of the Beeland waste characterization and monitoring program related to the acceptance and injection of off-site fluids consist of:

Volume Monitoring
Generator Certification
Sampling and Analysis
Quality Assurance/Quality Control

The WAP may be reviewed and, if necessary, revised. Revisions to the WAP, upon approval, will become part of the administrative record and constitute a minor modification of the permit.

Compatibility problems between the waste and the injection or confining zone lithologies or with the well construction materials are not anticipated. The fluids have been previously managed at both POTW and injection well locations successfully. Limited filtration or additives may be required, and stimulation of the well may also be required.

Data appropriate to evaluate compatibility will be collected only when deemed necessary by Beeland through identification based on specific process or characterization data that is collected during operations. Possible issues could include the potential for scale and corrosion problems from wastes with high pH (above 10). However, the intended operating parameters include a pH range of 7 to 10. If problematic wastes are encountered on a regular basis, periodic metal thickness monitoring via coupons or non-invasive electrical or magnetic monitoring may be implemented. Economic and well performance issues regarding well flow rate capacity and maintenance will be addressed, if necessary, by utilizing additives, settling and/or filtration of the waste prior to injection. No waste treatment at the well site for regulatory purposes is anticipated.

2.0 PROCEDURES

2.A. Waste Unloading and Volume Monitoring

Offloading of fluid transports delivered from the Bay Harbor collection facilities will only be conducted with a trained operator physically present on site. A log sheet will be maintained on the site documenting that a trained well operator allowed waste to be unloaded. At a minimum, log sheet entries are to include operator name, date, time, approximate volume, truck or transport identification. Similar data may be obtained and recorded by filing manifest forms for the deliveries. The log sheet(s) and/or manifests will be considered part of the plant monitoring records regarding the injection well.

As discussed in the main text of the permit application, a recorder will be utilized to continuously monitor injection pressure, annulus pressure, flow rate and totalized cumulative volumes. A summary of recorded data will be provided to the EPA and/or MDEQ per applicable permit requirements. Records of daily volume accepted from the remediation project and any fluids managed from the onsite facility will be recorded and a total monthly volume of injectate calculated based on data maintained in the records will be noted in the monthly well reports made to EPA.

2.B. Waste Characterization

At a minimum, the following composition parameters will be monitored once quarterly for any quarterly period that fluid is injected. These parameters shall include:

pH
total dissolved solids
total suspended solids
specific gravity
specific conductance
total organic carbon
BTEX (if unloading pad fluids are being actively managed)
aluminum
arsenic
bicarbonate alkalinity
bromide
calcium
chloride
chromium
flouride
iron
mercury

potassium
silica
sodium
sulfate

For the purpose of this Waste Analysis Plan, the first quarter shall be considered the first three calendar months of the year, and the remaining quarters shall be considered subsequent divisions of the year into three-month segments. If fluids are not injected into the Beeland well during a calendar year, sample or analyses will be required.

2.C. Sampling and Analysis

Beeland, or contracted personnel will collect necessary waste stream samples. All sampling procedures will be conducted at the direction of the selected, certified analytical laboratory and in accordance with acceptable US EPA procedures. The sampler's name, sampling point, and date sampled will be documented in chain-of-custody paperwork. Samples will be collected with the grab method.

The table included below summarizes the analytical method and sampling frequency for typical parameters that may be included in the waste sampling for a particular waste source.

WASTE SAMPLING METHODS

Test Parameter	Test Method	Units
Total Dissolved Solids, TDS	EPA 160.1	mg/L
Total Suspended Solids, TSS	EPA 160.2	mg/L
Specific Gravity	ASTM 2710 F	-
Total Organic Carbon, TOC	415.1,415.2	mg/L
Specific Conductance	120.1	-
Sodium	EPA 6010B	mg/L
Calcium	EPA 6010B	mg/L
Bicarbonate	EPA 310.1	mg/L
Sulfate	EPA 300.0	mg/L
Chloride	EPA 325.3	mg/L
BTEX	EPA 5030/8020	ug/l
Iron (Fe)	EPA 200.7	mg/L

Mercury (Hg)	EPA 7470	mg/L
Arsenic (As)	EPA 6010B	mg/L
Chromium (Cr)	EPA 6010B	mg/L
Corrosivity (D002)	SW-846 1110,9045	pH units

Notes: Beeland reserves the right to select use of the cited method or method with equal or greater detection limit

Samples will be collected at the point of generation or at the Beeland facility from transport tanks prior to unloading wastes into the storage or injection facilities.

3.0 QUALITY ASSURANCE/QUALITY CONTROL

3.A. General Sampling and Analytical Information

The sampling protocol will be followed by properly trained personnel conducting the sample collection and analysis. Beeland will adhere to guidelines set forth in "Test Methods for Evaluating Solid Waste", SW-846 and 'Methods for Chemical Analysis of Water and Wastes", EPA 600/4-79/020 as appropriate. Approved sample preservation techniques from 40 CFR 136.3 will be followed as appropriate. These will include preservation in plastic or glass sample containers provided by the laboratory and storage in a sample refrigerator or cooler for shipment to the laboratory. Beeland reserves the option to choose suitable laboratories for testing provided equivalent QA/QC standards are met.

Standard chain of custody protocols will be followed for waste collection, transport and analysis. Below are summaries of the minimum sampling and analysis protocols which will be followed for each characterization parameter:

Labeling

1. Sample name, date and time
2. Name of sample collector; (include sampling company name if not Beeland);
3. Sample collection method;
4. Sample collection point;

Reporting

1. Sample preservation technique, as appropriate;
2. Analytical method for parameter detection/quantification;
3. Analytical method accuracy and quantification limits; and
4. Field documentation of sampling.

The following are QA/QC parameters which will be followed to ensure the adequacy of the sampling and analytical techniques for wellhead sampling and analysis described in this plan.

3.B. Sampling Controls

1. Equipment Blanks

If possible, samples will be obtained directly from the sample tap or valve being used to

access the tank or containment vessel and not be transferred to any secondary container or device before being stored in the sample container to be shipped to the laboratory. In this case, no equipment blanks will be required. If not, equipment blanks will be taken as deemed appropriate by Beeland for the purpose of detecting potential cross contamination due to improper decontamination of sampling equipment. After sampling, any secondary container or sampling device used will be decontaminated according to the sampling plan protocol. The sampling device will then be rinsed with deionized water and the rinsate collected in a sample container for transport to the laboratory for analysis of, at a minimum, the same parameters chosen in the sampling plan above.

2. Trip Blanks

In the case of suspect analysis from any laboratory, trip blanks will be used and will be sample containers filled with Type II reagent grade water at the laboratory, sealed at the laboratory, which accompany the sample containers used throughout the sampling event. The sample containers shall be handled in the same manner as the samples. Trip blank(s) will be sent to the laboratory for analysis of, at a minimum, the same parameters chosen in the sampling plan above. A minimum of one (1) trip blank per sampling event will be utilized, if necessary.

3. Sample Duplicates

On advance written demand of EPA, duplicate samples will be taken to assess the QA/QC of the laboratory conducting the analysis. Such samples will be drawn from the same site from which primary samples are taken. Duplicate samples, if taken, will be split from the original sample in a manner to emphasize sample representativeness. The duplicate will be labeled with a sample number that will not conflict with the other samples, but will not be discernable to the laboratory as a duplicate sample. If requested by EPA or MDEQ, one duplicate sample per sampling event will be taken and analyzed for the same parameters listed in the sampling plan.

4. Sample Chain-of-Custody Protocol

Sample chain-of-custody will be followed at all times during the sampling and subsequent analysis. Chain-of-custody will be used to document the handling and control necessary to identify and trace a sample from collection to final analytical results.

3.C. Analytical Controls

1. Equipment Calibration

Selected laboratories will maintain QA/QC data in accordance with that laboratory's Q/A plan regarding the frequency and type of instrument calibration performed at the laboratory and in the field. Any calibration of thermometers, gauges, chromatographs, spectrometers and other meters will be conducted according to appropriate instrument manufacturer specifications and manufacturer recommended frequencies or as dictated by applicable laboratory Q/A plans.

2. Data Reduction

The process of transcription of the raw data into the reportable units will be conducted by the laboratory in accordance with that laboratory's Q/A plan. Data reduction utilized in the analysis and reporting process will be presented in the reports to the US EPA for each sampling event and parameter tested by the specific laboratory used at the time.

3. Data Verification

Data verification will be conducted in accordance with the selected laboratory's Q/A plan after each sampling event by assigned laboratory personnel. Typical procedures will include review of chain-of-custody forms, equipment calibration records and data completeness. Spot checks of raw data versus reported data may be performed to review math accuracy, significant numbers and reporting units. In addition, certified laboratory standard quality assurance/quality control checklists will be utilized per the selected laboratory's Q/A plan for individual test methods such as blanks, standards, and comparisons of internal lab test duplicate results. Problems with any of these items will be indicated in the report to the agency.

4. Internal Quality Control

Certified quality control samples may be run periodically in accordance with the selected laboratory's Q/A plan with sample batches obtained from appropriate commercial sources, or appropriate regulatory entities. Internal quality control will be addressed as required by the selected laboratory's Q/A plan and will typically include disclosure of the laboratory's use of blanks, blind standards, matrix spikes and matrix spike duplicates, preparation of reagents, and laboratory duplicate or replicate analyses.

3.D. Actions

1. Corrective Actions

Corrective actions will be implemented by laboratories if the analytical or sampling method does not achieve laboratory standards or Beeland objectives. Actions may entail re-sampling the waste stream and/or re-analyzing the fluid for a particular parameter, re-calibrating an analytical device, or other appropriate actions. Action levels will be taken in accordance with SW 846 or other approved EPA methods.

2. Reports to US EPA, Region 5 and MDEQ

Reports to US EPA and MDEQ will contain results, data and sampling descriptions regarding the accuracy, completeness and repeatability of the reported analytical results. The report will contain a table that specifies the type of sample (blank, waste, etc.), sampling date, sampling location, analytical method, method detection limit and analytical result. The results of analyses and all accompanying data, including chain-of-custody forms, will be reported to US EPA with the next monthly operating report submitted to the agency after the receipt of the final sample analysis report from the laboratory. This submittal to the agency will typically be within sixty (60) days of the sampling event, unless prior arrangements have been made with the agency due to conditions beyond the control of the operator that prohibit such reporting.

2.Q PLUGGING AND ABANDONMENT PLAN

Submit a plan for plugging and abandonment of the well Including (1) describe the type, number, and placement (including the elevation of the top and bottom) of plugs to be used; (2) describe the type, grade, and quantity of cement to be used; and (3) describe the method to be used to place plugs, including the method used to place the well in a state of static equilibrium prior to placement of the plugs. Also, for a Class III well that underlies or is in an exempted aquifer, demonstrate adequate protection of USDWs. Submit this information on USEPA Form 7520-14, Plugging and Abandonment Plan.

RESPONSE

The following completed copy of US EPA Form 7520-14, Plugging and Abandonment Plan, are submitted to satisfy this requirement. The modifications made to this form are to provide consistency with all available and current information. The plan for the well is also summarized in graphical form (Figure Q-1) in this response. Costs associated with the plugging and abandonment of the well per the following procedures is presented in the completed plugging forms and in Response 2.R of this document.

The following is the proposed plan for plugging and abandonment of the proposed Beeland Group, LLC non-hazardous Class I Well.

1. Install a test gauge on the annulus to perform a static pressure test. Ensure that the annulus is fluid filled and that the well has been shut-in for a minimum of 24 hours. Pressurize annulus to approximately 500 psig and isolate from the annulus system. Monitor annular pressure for one hour. The test will be successful if the pressure change is less than 3 percent of the starting pressure.

2. Prepare well and location for plugging. Remove wellhouse, well monitoring equipment and wellhead injection piping.

3. Move in and rig-up workover rig, mud pump, circulating pit and pipe racks as necessary. Flush well with approximately 100 bbl fresh water.

4. Remove wellhead and release slips.

5. Release injection packer. Displace annular fluid from well into injection formation by flushing with approximately 100 bbl fresh water.

6. Pull and lay down the injection tubing and packer.

7. Run cement retainer to approximately 2,100 feet.

8. Pump approximately 55 sacks of Class A cement with 4 percent bentonite (14.1 ppg, 1.55 cf/sx yield) below cement retainer and into 6 ¼-inch openhole.

9. Tag cement on top of retainer at approximately 2,100 feet.

10. Stage cement remainder of casing to surface in approximately 500 foot stages using the balanced plug method. Pump approximately 291 sacks of Class A cement with 4 percent bentonite (14.1 ppg, 1.55 cf/sx yield).

11. Cut off wellhead approximately 3 feet BGL and weld cap with permanent marker on casing.

12. Rig down and move out pulling unit and equipment.

13. Submit required plugging records to USEPA and MDEQ.

Post-Closure Care Requirements

Beeland will provide notification of closure to USEPA, Region 5, the MDEQ and the local zoning authorities. Included with the notification will be information regarding the nature of the injected waste stream, identification of the depths of the injection and confining zones, well schematics and plugging records. Beeland will retain, for a period of three years following the well closure, records reflecting the nature, composition and volume of all injected fluids. At the discretion of the director of USEPA, Region 5, Beeland will then deliver the records to the director at the conclusion of the retention period, or dispose of such records upon written approval of the director.

Petrotek

Petrotek Engineering Corporation 9088 South Ridgeline Boulevard, Suite 105 Littleton, Colorado 80129 USA (303) 290-9414 FAX (303) 290-9580

October 5, 2006

Ms. Lisa Perenchio
US EPA, Region 5
UIC Section, (WU-16J)
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

RE: Plugging and Abandonment Costs for Class I Well
Proposed Beeland Group, LLC Disposal Well No. 1 Alba, Michigan

Dear Ms. Perenchio:

Petrotek has prepared procedures and a cost estimate for the plugging and abandonment of the proposed Beeland Group, LLC Class I Non-Hazardous injection well at Alba, Michigan in Antrim County. This well is to be completed as a Dundee injector at a depth of approximately 2,150' to 2,450' BGL. It is to be located in reasonably close proximity to oilfield contractor service companies in the northern Michigan Basin.

This cost estimate has been prepared based on satisfying minimum federal requirements for plugging and does not include budget for any additional integrity testing or the decommissioning of any related surface facilities. Copies of the EPA Form 7520-14 have been provided that summarize the plan. Required financial assurance amounts for this proposed well are estimated as $26,700. Adjustments may be necessary based on actual conditions encountered during completion of the well. This includes line item budgeting as follows:

$ 12,900	Cement
$ 2,500	Rig or Pulling Unit
$ 500	Welder
$ 6,800	Cement Retainer and Top Plug
$ 4,000	Miscellaneous
$ 26,700	Total

As always, if you have any questions or require further information regarding any issues related to the wells, feel free to contact any of us at Petrotek.

Sincerely,

Petrotek Engineering Corporation
Ken Cooper, PE

(○) CEMENT, VOLUMES, FLUIDS and HOLE SIZE

[ ] TUBULARS and COMPONENTS

(A) 12 1/4" Hole, Cemented to Surface with 273 sacks

(B) 8 1/2" Hole, Cemented to Surface with 264 sacks

(C) 291 Sacks Cement, 2,100' to surface

(D) 7 Sacks Cement, 2,150' - 2,100'

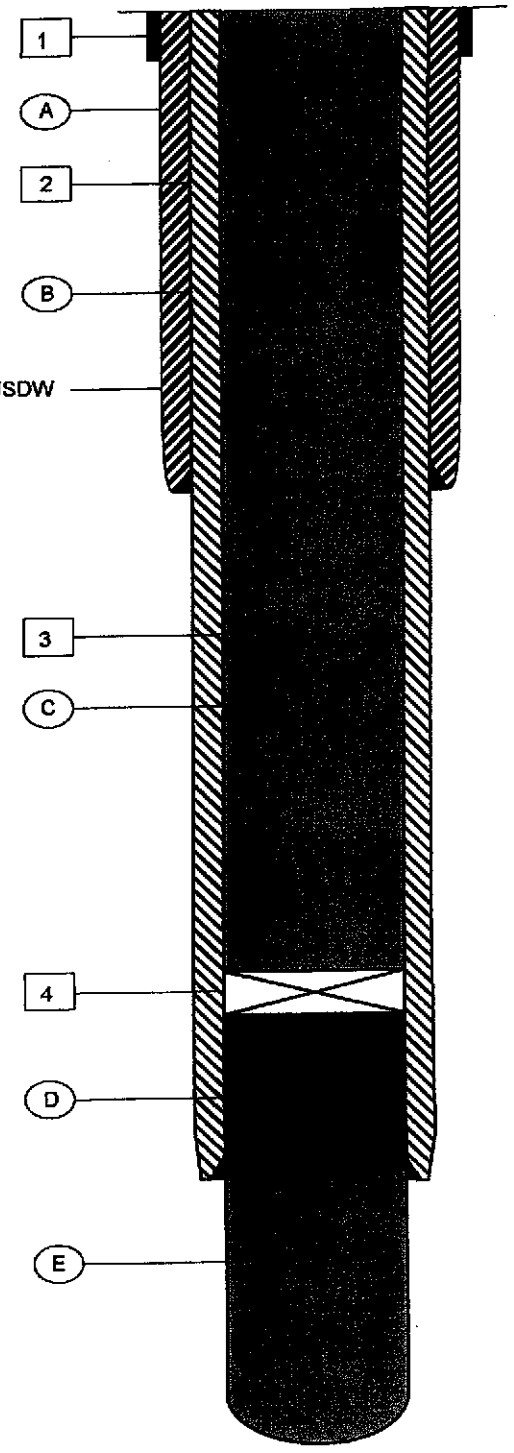
(E) 48 Sacks Cement, 2,450' - 2,150'

[1] Surface Casing: 13 3/8", Driven to refusal

[2] Intermediate Casing: 9 5/8", 36 lb/ft., K-55 or J-55, Set @ 950'

[3] Long String Casing: 7", 26 lb/ft., J-55 or K-55, Set @ 2,150'

[4] Mechanical Plug: Set @ 2,100' on top of cement retainer or original packer



Petrotek Engineering Corporation

Figure Q-1

Beeland Group, LLC.

Alba, Michigan Facility

WELL SCHEMATIC

DISPOSAL WELL NO. 1

SCALE: NONE

DATE: 10/06

2.R NECESSARY RESOURCES

Submit evidence such as a surety bond or financial statement to verify that the resources necessary to close, plug, or abandon the well is available.

RESPONSE

With respect to financial assurance, a Letter of Credit in the amount of $40,000 will be maintained as required by applicable regulations. Included as documentation for this Response are copies of an independent plugging cost estimate for the proposed Beeland Group, LLC Well No. 1, a copy of the Letter of Credit that has been secured for the required financial assurance amounts per applicable regulations. The Letter of Credit is committed to the State of Michigan, Director of Mineral Wells. A letter requesting the use of this mechanism to also satisfy federal financial assurance requirements is included in this response.

Materials to be forwarded to USEPA regarding financial assurance will be forwarded by Beeland Group, LLC to the following address:

US Environmental Protection Agency
Region 5 UIC Branch, DI Section
77 West Jackson Blvd.
Chicago, IL 60604-3590

With respect to continued demonstration of financial assurance, the Letter of Credit will be maintained as required by applicable regulations. Within ninety (90) days after the close of each fiscal year, the permittee will obtain verification that the amount used for financial assurance is sufficient to address updated plugging and abandonment costs and will submit updated financial assurance information if the cost of plugging and abandonment has exceeded the existing financial assurance. In such an event, the information submitted to the Director will consist of a letter from the permittee regarding the change in the financial assurance requirements, verification from the appropriate financial institution regarding the increased financial assurance and a copy of the independent geologist or engineering estimate of the updated plugging and abandonment costs.

Beeland Group, LLC

One Energy Plaza Jackson, Michigan 49201

October 5, 2006

Rebecca L. Harvey, Chief
Underground Injection Control Branch
U.S. Environmental Protection Agency
77 West Jackson Boulevard, WU-16J
Chicago, Illinois 60604-3590

Dear Ms. Harvey:

This letter requests that the attached Letter of Credit submitted to the State of Michigan in the total amount of $40,000 be considered an acceptable mechanism for meeting the Federal Underground Injection Control program financial responsibility requirement for the following well:

1. Well Name:	Beeland Disposal Well No. 1
2. Well Location:	Township 30N Range 5W SE 1/4 of Section 14 Antrim County, Michigan
3. UIC Application:	Pending
4. Owner/Operator Name:	Beeland Group, LLC
5. Address:	One Energy Plaza Jackson, Michigan 49201
6. Phone:	(517) 788-9045

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

Joseph D Tomasik — 10/5/06

Joseph Tomasik, Vice-President
Beeland Group, LLC

Date Signed

cc: Thomas Wellman, Michigan Department of Environmental Quality

IRREVOCABLE STANDBY LETTER OF CREDIT NUMBER SM222299W

LETTER OF CREDIT AMOUNT	ISSUE DATE	EXPIRY DATE
USD 40,000.00	10/05/06	10/04/07

BENEFICIARY:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF GEOLOGICAL SURVEY
525 WEST ALLEGAN ST.
1ST FLOOR, SOUTH TOWER
LANSING, MI 48933

APPLICANT:
CMS ENERGY ON BEHALF OF
BEELAND GROUP LLC
ONE ENERGY PLAZA EP10-431
JACKSON, MI 49201

WE HEREBY ISSUE OUR IRREVOCABLE LETTER OF CREDIT IN YOUR FAVOR ON BEHALF OF BEELAND GROUP LLC, HEREINAFTER KNOWN AS THE COMPANY, FOR A SUM OF $40,000.00 (USD PORTY THOUSAND AND 00/100'S), AVAILABLE BY YOUR DRAFTS AT SIGHT DRAWN ON OUR INSTITUTION WACHOVIA BANK, NATIONAL ASSOCIATION, 401 LINDEN STREET, WINSTON-SALEM, NORTH CAROLINA 27101, ATTN: STANDBY LETTER OF CREDIT UNIT. DRAFTS MUST BE MARKED "DRAWN UNDER WACHOVIA BANK, NATIONAL ASSOCAITION LETTER OF CREDIT NO. SM222299W DATED 10/05/06.

THIS LETTER OF CREDIT IS ISSUED TO PROVIDE FINANCIAL ASSURANCE TO THE STATE OF MICHIGAN FOR THE WELL KNOWN AS BEELAND DISPOSAL NO. 1.

THE SUPERVISOR OF WELLS MAY DRAW ON THIS LETTER OF CREDIT IN THE EVENT (1) THAT THE DEPARTMENT OF ENVIRONMENTAL QUALITY ISSUES THAT CERTAIN NOTICE OF VIOLATION INDICATING THAT THE COMPANY HAS FAILED TO COMPLY WITH THE PROVISIONS OF THAT CERTAIN PART 615 SUPERVISOR OF WELLS, 1994 PA 451, AS AMENDED IN THE FINAL COMPLETION OF ITS WELL OR WELLS. "FINAL COMPLETION" MEANS THE LOCATING, DRILLING, COMPLETING, PRODUCING, REWORKING, PLUGGING, FILLING OF PITS, AND CLEAN-UP OF WELL SITE, INCLUDING THE FILING OF PRESCRIBED RECORDS AND APPROVAL THEREOF BY THE SUPERVISOR OF WELLS; OR (2) THAT THE COMPANY FAILS TO PROVIDE THE SUPERVISOR OF WELL WITH AN EXTENSION OF THIS LETTER OF CREDIT OR OTHER FINANCIAL ASSURANCE OR (3) THAT THE COMPANY IS ADJUDGED INSOLVENT OR BANKRUPT. THE COMPANY SHALL BE DEEMED, FOR PURPOSES OF THIS LETTER OF CREDIT, ADJUDGED BANKRUPT UPON ANY PETITION UNDER THAT CERTAIN TITLE 11 OF THE UNITED STATES CODE, FILED ON THE DEBTORS BEHALF, AND AN ORDER FOR RELIEF GRANTED BY ANY OF THE UNITED STATES DISTRICT OR BANKRUPTCY COURTS.

IF ANY PROVISION OF THIS LETTER OF CREDIT IS CONSTRUED AS INEFFECTIVE BY A COURT OF COMPETENT JURISDICTION, ALL OTHER PROVISIONS OF THIS LETTER OF CREDIT SHALL REMAIN IN FULL EFFECT AND BE ENFORCEABLE PURSUANT TO THE EFFECTIVE PROVISIONS CONTAINED HEREIN.

THIS LETTER OF CREDIT IS SUBJECT TO THE UNIFORM CUSTOMS AND PRACTICES FOR DOCUMENTARY LETTERS OF CREDITS", 1993 REVISION OF THE INTERNATIONAL CHAMBER OF COMMERCE, PUBLICATION NO. 500, AND AS TO MATTERS NOT GOVERNED BY THE UNIFORM CUSTOMS AND PRACTICE FOR DOCUMENTARY CREDITS, AFOREMENTIONED, SHALL BE GOVERNED BY, AND CONSTRUED IN ACCORDANCE WITH THE UNIFORM COMMERCIAL CODE OF THE STATE OF MICHIGAN.

CONTINUED ON NEXT PAGE WHICH FORMS AN INTEGRAL PART OF THIS LETTER OF CREDIT

PARTIAL DRAWINGS ARE PERMITTED WITHOUT CANCELING THE LETTER OF CREDIT BALANCE. THIS ORIGINAL LETTER OF CREDIT MUST BE SUBMITTED TO US TOGETHER WITH ANY DRAWINGS THEREUNDER FOR OUR ENDORSEMENT OF ANY PAYMENTS AFFECTED BY US AND OR CANCELLATION.

IT IS A CONDITION OF THIS LETTER OF CREDIT THAT IT SHALL BE AUTOMATICALLY EXTENDED FOR ADDITIONAL TERMS OF ONE (1) YEAR FROM THE PRESENT OR EACH FUTURE EXPIRATION DATE UNLESS WE GIVE THE SUPERVISOR OF WELLS AND THE COMPANY, AT LEAST NINETY (90) DAYS BEFORE SAID EXPIRATION DATE, WRITTEN NOTICE BY CERTIFIED MAIL, RETURN RECEIPT REQUESTED, COURIER OR HAND DELIVERY, THAT WE ELECT TO TERMINATE THIS CREDIT AT THE END OF ITS THEN CURRENT TERM.

IN THE EVENT WE GIVE NOTICE OF OUR ELECTION TO TERMINATE THIS LETTER OF CREDIT AND BEELAND GROUP LLC FAILS TO REPLACE THIS LETTER OF CREDIT WITH OTHER FINANCIAL ASSURANCES ACCEPTABLE TO THE DEPARTMENT, YOU MAY DRAW ON THIS LETTER OF CREDIT, UP TO THE AGGREGATE AMOUNT, LESS ANY PRIOR DRAFTS PRESENTED BY THE DEPARTMENT AND PAID BY US, NOT SOONER THAN THIRTY (30) DAYS AFTER THE DATE OF SUCH NOTICE BY PRESENTATION OF A DRAFT MARKED DRAWN UNDER,WACHOVIA BANK, NATIONAL ASSOCIATIONLETTER OF CREDIT NO. SM222299W, ACCOMPANIED BY A STATEMENT PURPORTEDLY SIGNED BY AN AUTHORIZED REPPRESENTATIVE OF THE DEPARTMENT READING AS FOLLOWS:

THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY IS MAKING THIS DRAWING BECAUSE BEELAND GROUP LLC , HAS FAILED TO REPLACE THIS LETTER OF CREDIT WITH OTHER FINANCIAL ASSURANCES ACCEPTABLE TO THE DEPARTMENT.

WE HEREBY ENGAGE WITH YOU THAT DRAFTS IN CONFORMITY WITH THE TERMS OF THIS LETTER OF CREDIT SHALL BE DULY HONORED UPON PRESENTATION AND DELIVERY OF DOCUMENTS AS SPECIFIED TO OUR OFFICE LOCATED AT 401 LINDEN STREET, WINSTON-SALEM, NORTH CAROLINA 27101, ATTN: STANDBY LETTER OF CREDIT UNIT,ON OR AFTER OCTOBER 4, 2007 OR ANY FUTURE EXPIRATION DATE. THE AMOUNT OF EACH DRAFT MUST BE ENDORSED ON THE REVERSE OF THIS LETTER OF CREDIT BY THE NEGOTIATING FINANCIAL INSTITUTION.

_____

FINANCIAL INSTITUTION AUTHORITY SIGNATURE

_____

FINANCIAL INSTITUTION AUTHORITY NAME

_____

FINANCIAL INSTITUTION AUTHORITY TITLE

PLEASE DIRECT ANY CORRESPONDENCE INCLUDING DRAWING OR INQUIRY QUOTING OUR REFERENCE NUMBER TO:

WACHOVIA BANK, NATIONAL ASSOCIATION

WACHOVIA

IRREVOCABLE STANDBY LETTER OF CREDIT NUMBER SM222299W

LETTER OF CREDIT AMOUNT	ISSUE DATE	EXPIRY DATE
USD 40,000.00	10/05/06	10/04/07

BENEFICIARY:
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF GEOLOGICAL SURVEY
525 WEST ALLEGAN ST.
1ST FLOOR, SOUTH TOWER
LANSING, MI 48933

APPLICANT:
CMS ENERGY ON BEHALF OF
BEELAND GROUP LLC
ONE ENERGY PLAZA EP10-431
JACKSON, MI 49201

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CONTINUED ON NEXT PAGE WHICH FORMS AN INTEGRAL PART OF THIS LETTER OF CREDIT

fpac

WACHOVIA

IRREVOCABLE STANDBY LETTER OF CREDIT NO. SM222299W PAGE NO. 2 10/05/06

PARTIAL DRAWINGS ARE PERMITTED WITHOUT CANCELING THE LETTER OF CREDIT BALANCE. THIS ORIGINAL LETTER OF CREDIT MUST BE SUBMITTED TO US TOGETHER WITH ANY DRAWINGS THEREUNDER FOR OUR ENDORSEMENT OF ANY PAYMENTS AFFECTED BY US AND OR CANCELLATION.

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IN THE EVENT WE GIVE NOTICE OF OUR ELECTION TO TERMINATE THIS LETTER OF CREDIT AND BEELAND GROUP LLC FAILS TO REPLACE THIS LETTER OF CREDIT WITH OTHER FINANCIAL ASSURANCES ACCEPTABLE TO THE DEPARTMENT, YOU MAY DRAW ON THIS LETTER OF CREDIT, UP TO THE AGGREGATE AMOUNT, LESS ANY PRIOR DRAFTS PRESENTED BY THE DEPARTMENT AND PAID BY US, NOT SOONER THAN THIRTY (30) DAYS AFTER THE DATE OF SUCH NOTICE BY PRESENTATION OF A DRAFT MARKED DRAWN UNDER WACHOVIA BANK, NATIONAL ASSOCIATIONLETTER OF CREDIT NO: SM222299W, ACCOMPANIED BY A STATEMENT PURPORTEDLY SIGNED BY AN AUTHORIZED REPRESENTATIVE OF THE DEPARTMENT READING AS FOLLOWS:

THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY IS MAKING THIS DRAWING BECAUSE BEELAND GROUP LLC HAS FAILED TO REPLACE THIS LETTER OF CREDIT WITH OTHER FINANCIAL ASSURANCES ACCEPTABLE TO THE DEPARTMENT.

WE HEREBY ENGAGE WITH YOU THAT DRAFTS IN CONFORMITY WITH THE TERMS OF THIS LETTER OF CREDIT SHALL BE DULY HONORED UPON PRESENTATION AND DELIVERY OF DOCUMENTS AS SPECIFIED TO OUR OFFICE LOCATED AT 401 LINDEN STREET, WINSTON-SALEM, NORTH CAROLINA 27101, ATTN: STANDBY LETTER OF CREDIT UNIT ON OR AFTER OCTOBER 4, 2007 OR ANY FUTURE EXPIRATION DATE. THE AMOUNT OF EACH DRAFT MUST BE ENDORSED ON THE REVERSE OF THIS LETTER OF CREDIT BY THE NEGOTIATING FINANCIAL INSTITUTION.

Sharon P. Peace

FINANCIAL INSTITUTION AUTHORITY SIGNATURE

Sharon P. Peace

FINANCIAL INSTITUTION AUTHORITY NAME

Assistant Vice President

FINANCIAL INSTITUTION AUTHORITY TITLE

PLEASE DIRECT ANY CORRESPONDENCE INCLUDING DRAWING OR INQUIRY QUOTING OUR REFERENCE NUMBER TO:

WACHOVIA BANK, NATIONAL ASSOCIATION

401 [illegible] MAIL WACHOVIA INT 034
WINSTON SALEM, NORTH CAROLINA 27101

WACHOVIA

OUR CUSTOMER CARE PHONE NUMBER FOR ANY QUERIES IS 800-776-3862
OUR FAX NUMBER IS 336-735-0950

2.S AQUIFER EXEMPTIONS

If an aquifer exemption is requested, submit data necessary to demonstrate that the aquifer meets the following criteria: (1) does not serve as a source of drinking water; (2) cannot now, and will not in the future, serve as a source of drinking water; and (3) the TDS content of the ground water is more than 3,000 and less than 10,000 mg/l and is not reasonably expected to supply a public water system. Data to demonstrate that the aquifer is expected to be mineral or hydrocarbon producing, such as general description of the mining zone, analysis of the amenability of the mining zone to the proposed method, and time table for proposed development must also be included. For additional information on aquifer exemptions, see 40 CFR 144.7 and 146.04.

RESPONSE

No aquifer exemption is requested for the injection interval or injection zone at this site. The Dundee Formation is the primary injection interval while the upper members of the Detroit River Group are also anticipated to be open to the rathole of the openhole completion. The lower members of the Detroit River Group will comprise the lower arrestment interval and the Bell Shale will comprise the upper arrestment interval for the well. All formations of the injection zone are expected to contain brines with salinities significantly in excess of 10,000 ppm. The Dundee Formation is separated from the lowermost USDW by a number of hydrocarbon bearing formations that also contain brines with salinities well in excess of 10,000 ppm in the area. The Dundee Formation is used for the injection of Class II fluids in Star Township and elsewhere in Antrim County and surrounding counties. As discussed in Response 2.I., laboratory analyses of a fluid sample taken from the Dundee will be submitted as part of the completion report for this well.

2.T EXISTING EPA PERMITS

List program and permit number of any existing EPA permits, for example. NPDES, PSD, RCRA, etc.

RESPONSE

The Beeland Group, LLC currently retains no permits for the Alba, Michigan facility. As facility construction is pursued, applicable permits will be obtained as necessary.

2.U DESCRIPTION OF BUSINESS

Give a brief description of the nature of the business.

RESPONSE

The Beeland Group, LLC is a privately owned Michigan LLC that is wholly owned by CMS Energy Corporation. The limited liability company purchased the Beeland property in 2006 for the sole purpose of installing and operating a Class I non-commercial injection well. Approval is being requested to install this well to inject non-hazardous fluids generated from the operation of the remediation of groundwater and surface water at the Bay Harbor, Michigan facility managed by CMS Energy Corporation.

Petrotek Engineering Corporation 9088 South Ridgeline Boulevard, Suite 105 Littleton, Colorado 80129 USA (303) 290-9414 FAX (303) 290-9580

September 29, 2006

Mr. Brian Conway
State Historic Preservation Officer
State Historic Preservation Office
Michigan Historical Center
702 West Kalamazoo Street
P.O. Box 30740
Lansing, MI 48909-8240

Re: National Historic Register Determination Request
New Underground Injection Well Location
Well Name: Beeland Disposal Well No. 1
Well Location: Township 30N Range 5W S 1/2; SE 1/4 of Section 14 (495' SL, 1320' EL)
Antrim County, Michigan

Dear Mr. Conway:

In order to apply for a United States Environmental Protection Agency (USEPA) permit for an underground injection well, the USEPA regulations require a determination that the injection well will not impact any properties listed or eligible for listing in the National Register of Historic Places. The well will be located as shown on the enclosed attachment. Please review this well location to make a determination in this matter. Please contact our office in writing at the address above with your determination so that we may forward the information to the USEPA.

Should you have any questions or require any additional information regarding this location, please feel free to call me at (303) 290-9414 ext 15.

Sincerely yours,

Petrotek Engineering Corporation
Ken Cooper, PE

Enclosure: Antrim County Topo Map Showing Beeland No. 1 Location

cc: Ms. Lisa Perenchio – USEPA Region 5
Mr. Ray Vugrinovich – MDEQ