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REPORTS

DATE:

2000

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

May 11, 2001

Mr. William C. Olson - Hydrologist
State of New Mexico Oil Conservation Division (**NMOCD**)
Environmental Bureau
1220 St. Francis Drive
Santa Fe, NM 87505

RE: Cross Timbers Operating Company (CTOC)
2000 Annual Groundwater Reports, San Juan County, NM
Permanent Closure Requested

Dear Mr. Olson:

Blagg Engineering, Inc. (**BEI**), on behalf of CTOC, respectfully submits the attached 2000 annual groundwater reports in which permanent closure is requested.

A total of seven (7) well sites, listed below, are associated with this correspondence. All work performed at these sites has been incorporated into individual packets (attached).

1. Frost, Jack B # 2
2. Hare GC B # 1E
3. Johnson, E.J. C # 1E
4. McCoy GC C # 1
5. Prespentt GC # 1
6. Stedje GC # 1
7. Sullivan Frame A # 1

The summaries and/or conclusions made for each site are based on data made available from the enclosed material as well as the information noted below. Any site specific inquiries should be examined within the individual packets.

On March 7, 2000, BEI communicated with NMOCD (fax and telecommunication) with respect to an apparent discrepancy in laboratory results by the two (2) analytical subcontractors employed (see attached *facsimile cover page* and *spreadsheet* documents). After examining the information, the NMOCD made recommendations as noted on the attached summary (*Sampling Event Categorization* ....) in order to achieve verification for permanent closure. In addition, NMOCD reiterated that the approved groundwater management plan (**GMP**) must be adhered to.

It should be noted that CTOC, upon acquiring these sites, as well as numerous others from BP Amoco (formerly Amoco Production Company) in 1998, requested from NMOCD to incorporate BP Amoco's own GMP for their exclusive use. It is BEI's understanding that the NMOCD approved this request. The approved GMP is included with this correspondence.

According to the above noted summary and GMP, BEI concludes that permanent closure has been

achieved at the sites included in this transmittal. Residual groundwater and/or soil contamination, if any, does not appear to pose a threat to nearby freshwater supplies, public health, or to the environment.

It should be recognized that CTOC, in the case of the McCoy GC C #1 well site, went beyond the recommendation made by NMOCD in the above noted summary (*Sampling Event Categorization* ....) by establishing four (4) consecutive quarterly sampling events below the NMWQCC's standards for BTEX (benzene, toluene, ethylbenzene, and total xylenes) in order to add more credibility to the suggestions made by NMOCD.

If you have questions, please call either myself or Jeffrey C. Blagg. Thank you for your cooperation and assistance.

Sincerely,
BLAGG ENGINEERING, INC.

Nelson Velez
Staff Geologist

Reviewed by:

Jeffrey C. Blagg, P.E.
President

Attachments: **Facsimile Cover Page & Spreadsheet**
Sampling Event Categorization and Permanent Closed Site Listing - Summary
CTOC's Groundwater Management Plan
Individual Well site packets

cc: Denny Foust, Environmental Geologist, NMOCD, Aztec, NM
Bill Liess, Regional Environmental Officer, Bureau of Land Management, Farmington, NM (2 copies of federal lease sites only)
Nina Hutton, Environmental & Safety Manager, CTOC, Ft. Worth, TX

NV/nv

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CROSS TIMBERS GROUNDWATER MONITOR WELL LAB RESULTS

SAMPLE DATE	MONITOR WELL No:	D.T.W. (ft)	T.D. (ft)	TDS mg/L	COND. umhos	pH	PRODUCT (in)	BTEX EPA METHOD 8021 (PPB) Benzene	Toluene	Ethyl Benzene	Total Xylene
JOHNSON, E.J. C #1E - PROD. TANK PIT											
27-Sep-99	MW #1	15.32	20.00	3,440	6,920	7.5		13.9	11.0	17.2	10.0
18-Feb-00		15.39			3,100	7.7		2.4	ND	11.0	ND
27-Sep-99	MW #2	12.96	20.00	720	1,472	8.1		58.7	39.0	90.2	107.4
18-Feb-00		13.08			1,500	8.2		ND	ND	86	42.6
27-Sep-99	MW #3	8.24	20.00	3,410	6,840	8.0		22.7	3.3	2.1	11.6
18-Feb-00		8.51			3,100	8.0		ND	ND	ND	ND
HARE GC B #1E - SEPARATOR PIT											
09-Dec-99	MW #2	6.99	18.00	3,500	7,020	7.0		9.0	8.7	5.3	10.7
21-Feb-00		7.47			3,100	7.1		ND	ND	ND	ND
09-Dec-99	MW #3	5.31	17.00	3,380	6,770	7.0		5.7	5.3	2.8	4.3
21-Feb-00		5.61			3,200	7.1		ND	ND	ND	ND
FROST, JACK B #2 - SEPARATOR PIT											
27-Sep-99	MW #1	8.73	20.00	3,400	6,810	8.0		24.9	4.0	ND	6.3
18-Feb-00		9.26			3,800	8.0		ND	ND	ND	ND
27-Sep-99	MW #2	11.71	20.00	915	1,876	7.6		350.0	60.1	90.5	253.9
18-Feb-00		11.87			1,900	7.7		0.9	ND	3	3.9
27-Sep-99	MW #3	13.76	20.00	2,080	4,180	8.1		21.2	3.1	3.1	15.1
18-Feb-00		12.87			2,700	8.2		ND	ND	ND	ND
MCCOY GC C #1 - BLOW PIT											
29-Nov-99	MW #1	5.85	15.00	1,360	2,735	7.0		8.5	3.4	35.0	68.7
21-Feb-00		5.74			2,000	7.2		ND	ND	ND	ND
29-Nov-99	MW #2	5.44	15.00	1,200	2,430	7.0		3.9	8.2	ND	73.5
21-Feb-00		5.36			1,700	7.2		ND	ND	ND	ND
29-Nov-99	MW #3	6.07	15.00	1,420	2,850	7.0		79.2	117	16.8	456.2
15-Mar-00		6.01			2,000	7.3		ND	ND	83	348
PRESPENTT GC #1 - BLOW PIT											
09-Dec-99	MW #2	14.38	20.00	275	505	6.5		7.9	14.9	26.9	73.4
21-Feb-00		16.38			500	7.0		ND	ND	ND	0.6
09-Dec-99	MW #3	13.84	20.00	260	515	7.2		9.4	20.9	15.7	33.0
21-Feb-00		15.68			500	7.6		ND	ND	0.9	19.2
STEDJE GC #1 - SEPARATOR PIT											
29-Nov-99	MW #2	10.80	15.00	450	910	7.1		50.0	37.3	124.0	621.8
15-Mar-00		10.57			800	7.3		ND	ND	ND	ND
29-Nov-99	MW #3	10.51	15.00	475	960	7.2		9.9	3.5	75.0	154.6
21-Feb-00		10.61			700	7.7		ND	ND	ND	ND
SULLIVAN FRAME A #1 - BLOW PIT											
03-Nov-99	MW #2	6.34	15.00	5,100	10,220	7.0		9.9	3.7	1.0	1.8
22-Feb-00		6.60			2,100	7.3		ND	ND	ND	ND

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March 7, 2000

Sampling event Categorization and Permanent Closed Site Listing
(Based on telecom with Bill Olson of NMOCD)

Quarterly Sampling - utilizing current data

1) McCoy GC C # 1 - sample MW # 3 ASAP, if below standards, sample one more quarter for below standards results, then request permanent closure.
2) Stedje GC # 1 - sample MW # 2 ASAP, if below standards, sample one more quarter for below standards results, then request permanent closure.
3) Frost, Jack B # 2 - sample all MW's next quarter, if all are below standards, then request permanent closure.
4) Johnson, E.J. C# 1E - sample all MW's next quarter, if all are below standards, then request permanent closure.

Requesting Permanent Closure for the following Sites - utilizing current data

1) Hare GC B # 1E
2) Prespentt GC # 1
3) Sullivan Frame A # 1 - after verifying the TDS levels in all MW's and chloride content in MW #2.

CROSS TIMBERS OPERATING COMPANY

GROUNDWATER MANAGEMENT PLAN
(for groundwater encountered during pit closure activities)

Cross Timbers Operating Company (**CTOC**) may undertake unlined earthen pit closures for well locations in the San Juan Basin (including vulnerable areas, expanded vulnerable areas, and Area III). These closures may include removing contaminated media from the pit area (**source**), soil sampling (when accessible), and groundwater sampling. Groundwater may be encountered during pit closure activities at some locations. This Remediation Plan addresses cases where groundwater has been or may be encountered during initial closure activities. Pits where groundwater has been or may be encountered will be assessed and remediated according to the following options.

1.0 Preliminary Investigation and/or Remediation of Impacted Groundwater

1.1 A preliminary investigation will be conducted. This typically entails excavation of source contamination, sampling of soils (*when accessible*) and groundwater within the pit area. Sampling will be in accordance to the New Mexico Oil Conservation Division (**NMOCD**) Pit Closure Guidance. All initial groundwater samples from the excavated pit area will be analyzed for benzene, toluene, ethylbenzene, total xylenes (**BTEX**), and anion/cation. If a product sheen is present, samples may also be analyzed for polynuclear aromatic hydrocarbons (**PAH**) .

Note that the regulatory standards for only BTEX, anion/cation, and possibly PAH (if a product sheen is present) constituents will be addressed as discussed below.

1.2. If the initial groundwater samples from the excavated pit area are below regulatory standards prior to any remedial action to the groundwater (i.e. pumping, skimming, etc), remedial action will be terminated and the pit considered permanently closed unless otherwise stated on the pit closure verification form.

1.3 If the initial groundwater samples from the excavated pit area exceed regulatory standards, a determination of lateral extent in the suspected down gradient direction will be attempted. This will be conducted by advancement of a test hole(s) via trackhoe/backhoe or other means of acceptable subsurface advancement.

1.4 The contaminated portion of groundwater within the excavated area pit may be removed using various methods **(i.e. skimmer, pumps, air injection, natural attenuation, etc)**.

1.4.1 The following categories will determine what action to undertake if remedial action has been conducted prior to the initial sampling of the excavated pit area or after subsequent samples have been collected.

1.4.1a If the laboratory results are below regulatory standards from both the excavated pit area and suspected down gradient samples, then the pit area will be monitored only.

1.4.1b If the laboratory results exceed regulatory standards from the excavated pit area but are below from the suspected down gradient samples, then the pit area will be further remediated and/or monitored only.

1.4.1c If the laboratory results exceed regulatory standards from both the excavated pit area and the suspected down gradient samples, then a determination of the lateral extent will be established and the pit area will be further remediated and/or monitored only.

1.4.1d If the laboratory results are below regulatory standards from the excavated pit area but are exceeded from the suspected down gradient samples, then a determination of the lateral extent will be established and the delineated area will be remediated and/or monitored only.

1.5 If the site conditions are unsatisfactory for further remedial actions and groundwater cleanup standards are not achieved, then *drive points and/or monitor wells* **(sampling point)** may be utilized to delineate lateral extent and monitor the groundwater impact area. The number of sampling points installed will depend on such conditions as the size of the source area, availability of space at the work site, and any surface obstructions that may hinder potential sampling point locations.

1.5.1 Figure 1 displays a typical drive point construction and completion that may be applied.

1.5.2 Figure 2 & 3 display typical monitor well construction and completion that may be applied.

1.6 During installation of the sampling point(s), a soil sample from immediately above the water table may be collected and field screened using an Organic Vapor Meter (**OVM**). Boring logs for each sampling point will be completed and filed within the pit closure records for each well site.

1.7 If auger refusal is encountered prior to reaching groundwater and contamination appears at the refusal depth, a risk based assessment will be implemented.

1.8 After installation of the sampling point(s), development and sampling of each point(s) will be conducted. Sampling will include observation of the initial bail, field testing for Total Dissolved Solids (**TDS**), and testing for appropriate constituents by laboratory analyses.

2.0 Groundwater Monitoring Program

This section addresses subsequent sampling of attempted remediated groundwater employing the sampling points previously mentioned. Please note that the options listed below are categorized into three distinct scenarios that may be experienced during the initial sampling event for each individual sampling point. The scenarios are defined as follows; 1) non detects or low concentrations (**defined as levels below 25 % of the regulatory standards** [i.e. benzene < 2.5 ppb]), 2) below regulatory standards (i.e. benzene < 10 ppb but > 2.5 ppb), and 3) those exceeding regulatory standards.

2.1 Four consecutive sampling events demonstrating results below regulatory standards for any individual sampling point will achieve permanent closure for that particular sampling point unless otherwise stated.

2.2 If the initial sampling event results reveal below standards for the anion/cation (or a statistical equivalence to the natural conditions utilizing the furthest up gradient sampling point) and/or PAH constituents, then sampling of those constituents will be discontinued.

2.3 If the initial up gradient samples reveal non detects or low concentrations for the appropriate constituents, then sampling of that sampling point(s) will be terminated.

2.4 If the initial pit area samples exceed regulatory standards and the down gradient(s) reveals non detects or low concentrations for the appropriate constituents, then the down gradient sampling point(s) will be terminated and the pit area sampled on a quarterly basis.

2.5 If the initial pit area and down gradient samples are below regulatory standards but exceed low concentrations for the appropriate constituents, then those sampling points will be sampled on a quarterly basis.

2.6 If the initial pit area samples exceed regulatory standards and the down gradient(s) reveals non detects or low concentrations for the appropriate constituents, then the down gradient sampling point(s) will be terminated and the pit area sampled on an annual basis.

2.7 If the initial pit area samples exceed regulatory standards and the down gradient(s) is below regulatory standards but exceed low concentrations for the appropriate constituents, then the pit area sampling point(s) will be conducted annually and the down gradient(s) on a quarterly basis.

2.8 If the initial pit area and down gradient samples exceed regulatory standards, then those sampling points will be sampled on an annual basis. Afterwards, a determination of lateral extent will be undertaken.

2.9 In residential areas, if the TDS level at any sampling point is less than or statistically equivalent to the background up gradient sampling point, then the site will be considered meeting the allowable TDS concentration for closure.

2.10 All sampling and analysis activities will utilize approved US EPA procedures.

3.0 Risk Assessment of Impacted Groundwater

3.1 At sites near residential areas where regulatory standards have been exceeded for the appropriate constituents in groundwater, a water well survey will be conducted. If this survey indicates that a water supply well is within 1000 feet, then the potential risk to water supply well(s) will be considered, and appropriate actions will be recommended to NMOCD.

3.2 If potential water well(s) are not present, and if concentrations of the previously addressed constituents exceed regulatory standards, CTOC may petition for closure. Such a petition might include an evaluation of risk demonstrating that the remaining contaminants do not pose a threat to nearby fresh water supplies due to geochemical equilibrium, public health and the environment.

4.0 Scheduling

Groundwater investigation and remediation activities will begin as soon as practical at each site. Priorities will be assigned based upon the results of site and/or risk assessment and field considerations. The NMOCD will be notified at least 48 hours in advance of all scheduled field related activities. All documents submitted for approval will be submitted to the NMOCD Santa Fe Office with copies provided to the NMOCD Aztec Office.

5.0 Reporting

Notification will continue to be made to NMOCD when impacted groundwater is encountered during pit remediation.

On a annual basis commencing January, 1999 or upon written notification from NMOCD, a summary of groundwater remediation activities for each individual well site will be submitted to the Santa Fe and District Office. This summary will include:

5.1 A description of all activities which occurred during the investigation, interpretations or conclusions, and possible recommendations.

5.2 The laboratory analytic or field reports of soil and water sampling including copies of the laboratory or field quality assurance / quality control data.

5.3 Summary tables listing historical and current groundwater laboratory analytic results.

5.4 A site map and a water table elevation map using the water table elevation of the groundwater in all pertinent sampling points.

5.5 A lithologic and completion diagram for each sampling point.

5.6 The disposition of all wastes generated.

5.7 Any risk analysis and type of remediation method used if remediation is required for each location at which contaminated groundwater has been encountered.

6.0 Plug and Abandonment of Sampling Points

Upon notification from NMOCD that permanent closure has been achieved at an individual well site, each sampling point will be plugged and abandoned as follows:

6.1 Drive points will be removed from the subsurface and boring grouted with 5% bentonite concrete slurry to ground surface.

6.2 Those monitor wells whose tops are above surface grade will be cut down to grade and grouted with 5% bentonite concrete slurry to ground surface.