UIC-I - 8

PERMITS, RENEWALS, & MODS

RE ENTRY VOL I

WELL #1

ENVIROCORP®

REENTRY AND COMPLETION REPORT
WASTE DISPOSAL WELL NO. 1

NAVAJO REFINING COMPANY
ARTESIA, NEW MEXICO

Envirocorp Project No. 70A4614

SEPTEMBER 1998

Prepared By:

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EXHIBIT 3.1-1

PROTECTION CASING INSPECTION LOG

NM OIL CONSERVATION DEPT

WELL LOG # Re-entry Well #1

REMOVED FROM FILE

Application For Permits, Renewals + Mods Re-entry Well #1 **. BOX**

NUMBER 34

RETURNED TO CUSTOMER

Exhibit 3.1-1
3.3.1-1
3.3.2-1
3.4-1
3.4-2
3.6-1
3.6-2

EXHIBIT 3.3.1-1

INTERMEDIATE CASING CEMENT BOND/VARIABLE DENSITY LOG

EXHIBIT 3.3.1-2

LETTER OF INTERPRETATION OF THE INTERMEDIATE CASING CEMENT BOND/VARIABLE DENSITY LOG

MEMORANDUM

Date: October 1, 1998

To: Brian Rogers

From: Steve Kelly

Subject: Interpretation of Intermediate Casing Cement
Navajo Refining Company
Chalk Bluff '31' State No. 1, WDW-1
Illinois Camp Field, Eddy County, New Mexico
Envirocorp Project No. 70A4614

Intermediate casing, 9⅝ inch, 36 lb/ft, J-55, ST&C, was set in a 12¼ inch open hole at 2,555 feet and cemented to the surface with 800 sacks of Class C Lite containing ½ lb/sack flocele, 2 lb/sack Gilsonite and 12% salt, followed by 200 sacks of Class C containing 2% calcium chloride. With 133 sacks of lead cement circulated to the surface, the volume of cement placed behind pipe approximated the estimated annular hole volume, which was based on an average hole diameter of 14 inches.

A cement bond log and variable density log were run in the intermediate casing on July 13, 1998 from 2,548 feet to 580 feet. The cement bond log indicated an apparent cement compressive strength of 4,300 psi, and bond index calculations ranged from 25% to 100% and averaged 72%. A summary of the bond index calculations are provided as Attachment A.

From the volumetric analysis of cement placement and the bond index calculations made from the cement bond log, the intermediate casing has sufficient cement quality to provide adequate zone isolation for the entire cased interval. In addition, the variable density log displayed strong formation arrivals across a majority of the logged interval, indicating that a good cement coupling exists between the casing and formation.

ATTACHMENT A

Navajo Refining Company
Chalk Bluff '31' State No. WDW-1
Illinois Camp Field
Eddy County, Texas

Envirocorp Project 70A4614

BOND INDEX CALCULATIONS FOR INTERMEDIATE CASING		
Interval (feet BKB)	**Footage**	**Average Bond Index, %**
Surface - 580	580	Not logged
580 - 775	195	90
775 - 805	30	65
805 - 1,062	257	70
1,062 - 1,112	50	50
1,112 - 1,688	576	80
1,688 - 1,915	227	35
1,915 - 2,022	107	75
2,022 - 2,048	28	50
2,048 - 2,165	117	85
2,165 - 2,300	135	85
2,300 - 2,322	22	30
2,322 - 2,417	95	60
2,417 - 2,442	25	90
2,442 - 2,462	20	65
2,462 - 2,494	32	100
2,494 - 2,548	56	75
	Total Footage = 1,968	Weighted Average = 72

EXHIBIT 3.3.2-1

PROTECTION CASING CEMENT BOND/VARIABLE DENSITY LOG

EXHIBIT 3.3.2-2

LETTER OF INTERPRETATION OF THE PROTECTION CASING CEMENT BOND/VARIABLE DENSITY LOG

MEMORANDUM

Date: October 1, 1998

To: Brian Rogers

From: Steve Kelly

Subject: Interpretation of Protection Casing Cement
Navajo Refining Company
Chalk Bluff '31' State No. 1, WDW-1
Illinois Camp Field, Eddy County, New Mexico
Envirocorp Project No. 70A4614

Protection casing, 7 inch 29/26 lb/ft, N-80/P-110, LT&C, was set in an 8¾ inch open hole at 9,094 feet and cemented to the surface in two stages with a DV tool positioned at 5,498 feet. For the first stage, 600 sacks of 13.0 lb/gal (1.66 ft^3/sack) modified Class H containing 0.4% CFR-3, 5 lb/sack Gilsonite, 0.5% Halad-344 and 1 lb/sack salt were pumped, and cement returns were circulated to the surface after opening the DV tool. The second cement stage was pumped with 220 sacks of 11.7 lb/gal (2.63 ft^3/sack) Interfill C, followed by 550 sacks of 13.0 lb/gal (1.66 ft^3/sack) modified Class H containing 0.4% CFR-3, 5 lb/sack Gilsonite, 0.5% Halad-344, 0.1% HR-7 and 1 lb/sack salt. Seventy-five sacks of lead cement were circulated to the surface during the second stage cementing operation.

An annular hole volume of 887 ft^3 was calculated from a 4-arm caliper survey for the well interval below the DV tool, and 1,143 ft^3 was calculated for the interval above the DV tool. Cement volumes of 996 ft^3 and 1,492 ft^3 were pumped for the first and second cement stages, respectively, and accounting for cement circulated to the surface and cement left in the casing, the protection casing cement was adequately placed.

A cement bond log and variable density log were run in the protection casing on July 23, 1998 from 9,004 feet to 134 feet. For the 6,442 feet of protection casing logged below the base of intermediate casing at 2,548 feet, fast formations arrivals were detected across 94% of this interval, and the cement bond log could not be interpreted quantitatively. Based on the strength of the formation arrivals

recorded on the variable density log, however, the cement bonding was determined qualitatively to be adequate since the detection of formation arrivals requires the presence of a good cement coupling between the casing and formation. For the 371 feet of casing not affected by fast formation arrivals, bond index calculations were made based on an apparent cement compressive strength of 1,400 psi. These calculations, which ranged from 30% to 100% and averaged 78%, are summarized on Attachment A. For the casing interval between 134 and 2,548 feet, the apparent compressive strength of cement was determined to be 800 psi, and bond index calculations ranged from 10% to 100% and averaged 68%.

Based on the volumetric analysis of cement placement and the calculations of bond index, the protection casing cement appears to be of sufficient quality to provide adequate zone isolation. This interpretation is supported by the presence of strong formation arrivals that were recorded on the variable density log in the protection casing below the base of the intermediate casing.

ATTACHMENT A

Navajo Refining Company
Chalk Bluff '31' State No. 1 WDW-1
Illinois Camp Field
Eddy County, Texas

Envirocorp Project 70A4614

BOND INDEX CALCULATIONS FOR PROTECTION CASING INTERVAL BELOW THE BASE OF THE INTERMEDIATE CASING		
Interval (feet BKB)	**Footage**	**Average Bond Index, %**
2,750 - 2,792	42	55
3,390 - 3,426	36	65
3,725 - 3,739	14	100
4,354 - 4,370	16	90
4,530 - 4,610	80	95
4,650 - 4,755	105	90
5,530 - 5,555	25	30
5,555 - 5,596	41	60
5,596 - 5,608	12	90
	Total Footage = 371	Weighted Average = 78

EXHIBIT 3.4-1

RADIOACTIVE TRACER LOG, CONDUCTED ON JULY 31, 1998

EXHIBIT 3.4-2

INJECTION PROFILE ANALYSIS LOG

EXHIBIT 3.6-1

FIRST DIFFERENTIAL TEMPERATURE SURVEY, CONDUCTED ON JULY 23, 1998

EXHIBIT 3.6-2

SECOND DIFFERENTIAL TEMPERATURE SURVEY, CONDUCTED ON JULY 31, 1998