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REPORTS

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ENVIROTECH INC.

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OIL CONSERVATION DIV.
SANTA FE

PIT CLOSURE PLAN

WOOD WN FEDERAL COM #1
(B) SECTION 21, T29N, R10W, NMPM
SAN JUAN COUNTY, BLANCO, NEW MEXICO

PREPARED FOR:
NEW MEXICO OIL CONSERVATION DIVISION
BUREAU OF LAND MANAGEMENT

COMMISSIONED BY:
ARCO OIL & GAS COMPANY

January 1994

Project: 93183

5796 U.S. HIGHWAY 64 - 3014 • FARMINGTON, NEW MEXICO 87401 • PHONE: (505) 632-0615

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(B) SECTION 21, T29N, R10W, NMPM
SAN JUAN COUNTY, BLANCO, NEW MEXICO

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BUREAU OF LAND MANAGEMENT: FARMINGTON DISTRICT

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PROJECT No: 93183

JANUARY 1994

ENVIROTECH, INC.
Environmental Scientists & Engineers
5796 U.S. Highway 64-3014
Farmington, New Mexico

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JANUARY 1994 **PROJECT NO: 93183**

PIT CLOSURE PLAN
WOOD WN FEDERAL COM #1
(B) SECTION 21, T29N, R10W, NMPM
SAN JUAN COUNTY, BLANCO, NEW MEXICO

INTRODUCTION

Arco Oil & Gas Company has retained Envirotech, Inc. to develop a pit closure plan for the Wood WN Federal Com No: 1 well location (refer to Sheet 1). The well is currently operated by ARCO. This closure plan is for the reclamation of hydrocarbon contamination of soil and groundwater identified in the area of a previously unlined separator pit.

A limited site assessment was performed by Envirotech to define the extent of contamination in September 1993. The findings of the assessment were documented in a report prepared by Envirotech and titled "Limited Site Assessment: Wood WN Federal COM #1, (B) Section 21, T29N, R10W, NMPM. San Juan County, New Mexico". Copies of this report were provided to the Mr. William Olson of New Mexico Oil Conservation Division (NMOCD) and Ms. Illyse Gold of the Bureau of Land Management: Farmington District (BLM).

The findings of the assessment and comments from the NMOCD and BLM have been incorporated with this closure plan. Additionally, this plan has been developed to follow current NMOCD and BLM guidelines for surface impoundment closures.[1,2]

SUMMARY OF FINDINGS

The following conclusions were drawn from the September 1993 site assessment:

1) Hydrocarbon contamination of soil and groundwater above current regulatory action levels is present in the area of the unlined earthen separator pit. This hydrocarbon contamination appears to have originated from the normal E & P operation of the separator equipment on the location. Given the well's production, the hydrocarbons are most probably condensate.

2) The contamination appears to be limited to the well location, involving an area of 5000 square feet. Refer to the Site Plan (refer to Sheet 2).

3) In the area of the pit, soil contamination extends from the pit bottom to groundwater (approximately 27.5 feet

below the ground surface). Beyond the pit area, only the vadoze zone soils immediately above the groundwater are contaminated (Refer to profile on the Site Plan, Sheet 2).

5) No free product was observed. Significant dissolved phase contamination of groundwater appears to be limited to the immediate area below the pit.

6) Groundwater slopes toward the south-southwest at approximately 0.010 feet/foot.

7) Subsurface soils are typical alluvium, predominately sands with interbedded silt and clay horizons.

8) The vertical and lateral extent of contamination appears to be relatively limited as noted previously. Therefore, impacted groundwater does not appear to pose an eminent threat or risk to human health or the environment.

REMEDIAL ACTION PLAN

Based on the previously cited information and discussions with the NMOCD and BLM, ARCO proposes to remediate the hydrocarbon contamination by excavation of soil hydrocarbon contamination in the immediate area of the separator pit (source area), off-site landfarm treatment of the soils, and nutrient augmentation of the groundwater to enhance the indigenous hydrocarbon degrading microbial environment. The pit closure plan will consist of the following tasks:

Task 1: REMOVAL OF HEAVILY CONTAMINATED SOILS: Remove the heavily hydrocarbon contaminated soils in the immediate area of the pit. Excavation to be continued until visible soil discoloration and/or field screening by OVM is below an action level of 100 ppm, or the original pit area has been removed, and vertically until groundwater is reached.

Task 2: TREATMENT OF CONTAMINATED SOIL: Offsite landfarming by transporting the removed contaminated soils to Envirotech's Soil Remediation Facility located at Hilltop, New Mexico. This facility is permitted and regulated by the NMOCD for landfarming treatment of E&P non-hazardous wastes. A copy of the NMOCD permit is attached.

It is anticipated that the excavated soils will pass a paint-filter test (USEPA Method 9095: SW-846). Therefore, soils will be loaded into commercial 20 cubic yard tractor-trailer transports, covered and hauled offsite to the ERSF facility. Transported soils will be manifested by Bill of Ladings, and the final disposition documented as required by the NMOCD permit.

Task 3: FIELD ASSESSMENT: To verify the remediation effort, field assessment will be provided by qualified and experienced persons. Field assessment will include soil sampling and field screening of volatile organic vapors by the Field Headspace Method and testing of Total Petroleum Hydrocarbons (TPH) by EPA Method 418.1. No groundwater samples will be collected.

Task 4: GROUNDWATER TREATMENT: Following excavation and if groundwater is encountered, the groundwater will be treated as follows to minimize and abate any residual hydrocarbon contamination:

1) initial removal of visibly contaminated water in the final excavation by vacuum truck or similar method. Removed water to be treated at an approved NMOCD disposal facility.

2) spray application of 10 gallons of a microbial nutrient mixture [ie. Nitrogen (16%), Phosphorus (16%), and Potassium (16%)] on the excavation sidewalls and at the groundwater. Based on the estimated age of the hydrocarbon release, published literature(3), and Envirotech's experience with similar sites in the area, it is believed that an indigenous population of hydrocarbon degrading microbes are present in the vadose zone. Addition of the suggested nutrients is anticipated to accelerate the degradation of any residual hydrocarbon contamination of the soils and groundwater. Material Safety Data Sheet (MSDS) attached.

Task 5: CLOSURE & MONITORING: Once the excavation, field assessment and any necessary groundwater treatment have been completed, closure for this site would consist of the following:

SOIL: 1) Backfill of the excavation with clean fill material either borrowed onsite or imported from an approved source. The final excavation area will be crowned to prevent ponding and encourage surface runoff away from the effected area.

2) No further action will be taken for the remediation of soil contamination, and the pit will be classified as **CLOSED**.

GROUNDWATER: 1) Installation of an additional groundwater monitor well in the pit area following backfill of the excavation. Monitor well installation, construction and development to follow applicable NMOCD/BLM guidelines.

2) Semi-annually, water samples will be collected from all four monitor wells following applicable NMOCD/BLM guidelines.

3) Water samples will be analyzed for target contaminates [specifically: benzene, toluene, ethyl-benzene and total xylenes (BTEX)] per EPA Method 8020.

4) An annual report will be provided to the NMOCD and BLM summarizing the monitoring results.

Monitoring will be conducted for one year. Closure will be recommended if the results of the groundwater monitoring show substantial decrease in contamination levels, or contaminates are found to be below current NMOCD/BLM standards.

5) Once monitoring and sampling is completed, all monitor wells will be destroyed by removal of the PVC casing and plugged with a 5% bentonite cement grout, following applicable NMOCD and BLM requirements.

SUBSEQUENT REPORT: A final Subsequent Report (using Sundry Form 3160-5) will be submitted addressing the actions taken to close the unlined pit.

LIMITATIONS AND CLOSURE

This pit closure plan has been developed using the findings of a prior site assessment, information provided by Arco Oil & Gas, and the NMOCD and BLM pit closure guidelines.

All soil and groundwater contamination is believed to have originated from the normal E & P operation of the separator equipment on the location. No hazardous wastes are believed to be present or involved with the subject contamination as defined per RCRA (40 CFR 261).

Full implementation of this plan will need the concurrent approval of both NMOCD and BLM.

This pit closure plan has been developed for the exclusive use of Arco Oil & Gas Company as it pertains to the Wood WN Federal Com No:1 well site located in (B) Section 21, Township 29N, Range 10W, NMPM, San Juan County, New Mexico.

Respectfully Submitted,
ENVIROTECH, INC.

Michael K. Lane, P.E.
Geological Engineer

Reviewed By:

Jeffrey C. Blagg, P.E.
Petroleum Engineer

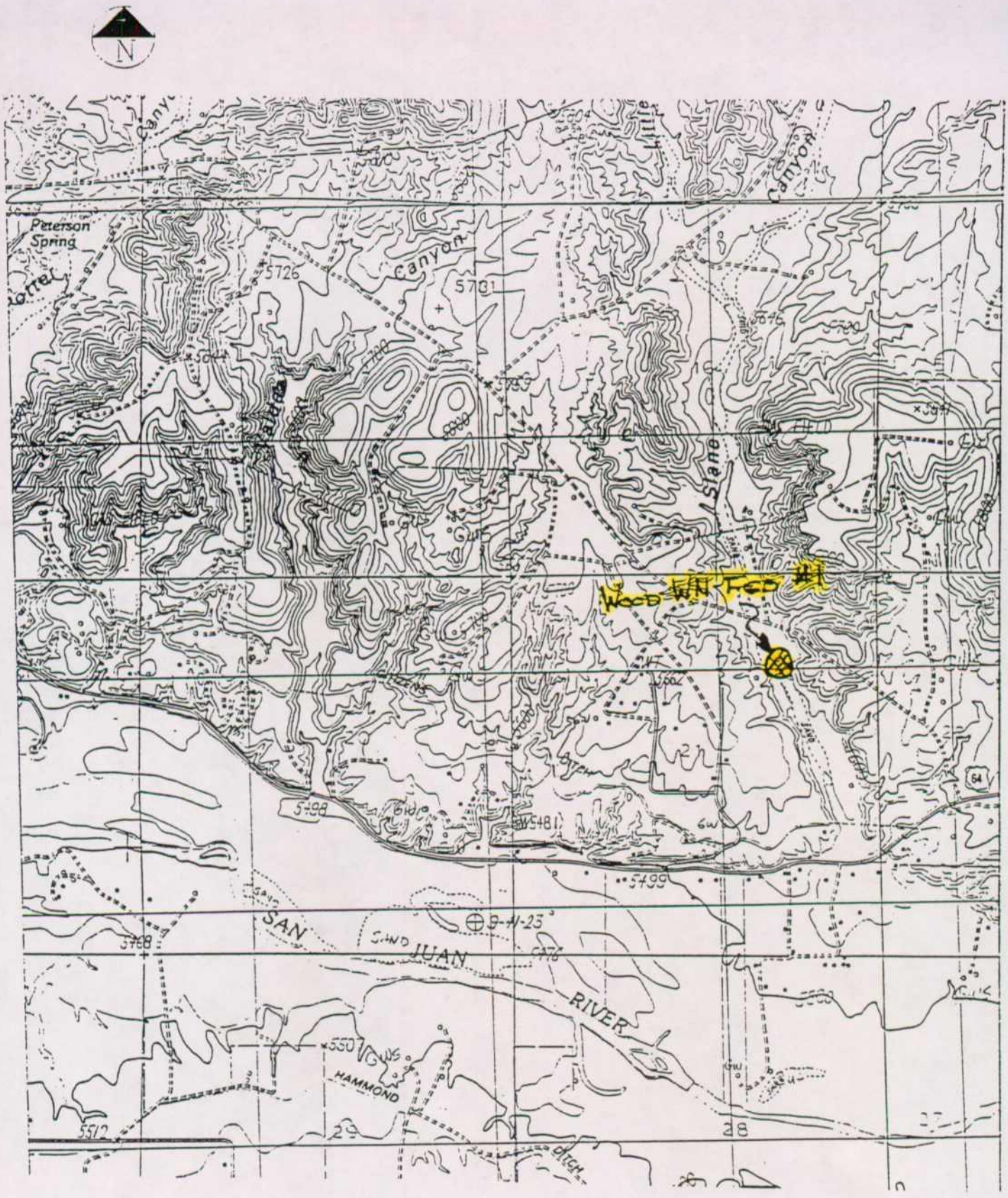
REFERENCES:

(1) "UNLINED SURFACE IMPOUNDMENT CLOSURE GUIDELINES," New Mexico Oil Conservation Division, February 1993.

(2) "Unlined Surface Impoundment Remediation and Closure for Approximately 47,175 to 62,900 Unlined Surface Impoundments (Under the Jurisdiction of the Farmington and Albuquerque Districts)," Environmental Assessment: NM-070-93-3004, U.S. Department of the Interior, Bureau of Land Management, Farmington and Albuquerque District Offices, Farmington and Albuquerque, New Mexico, December 1993.

(3) "Bioremediation of Hazardous Waste," ECOVA Corporation Seminar Series, May 17, 1991.

APPENDIX



REFERENCE: USGS 7.5 min QUAD BLOOMFIELD 36107-F8-TF-024

ARCO OIL & GAS COMPANY

WOOD WM FEDERAL COM No. 1
LEASE No. SF-078068
(B) SEC 21, T29N, R10W, NMPM

SITE ASSESSMENT

ENVIROTECH INC.

ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO 87401
PHONE 505 632-0615

VICINITY MAP

DRAWN BY: M. LANE

SCALE

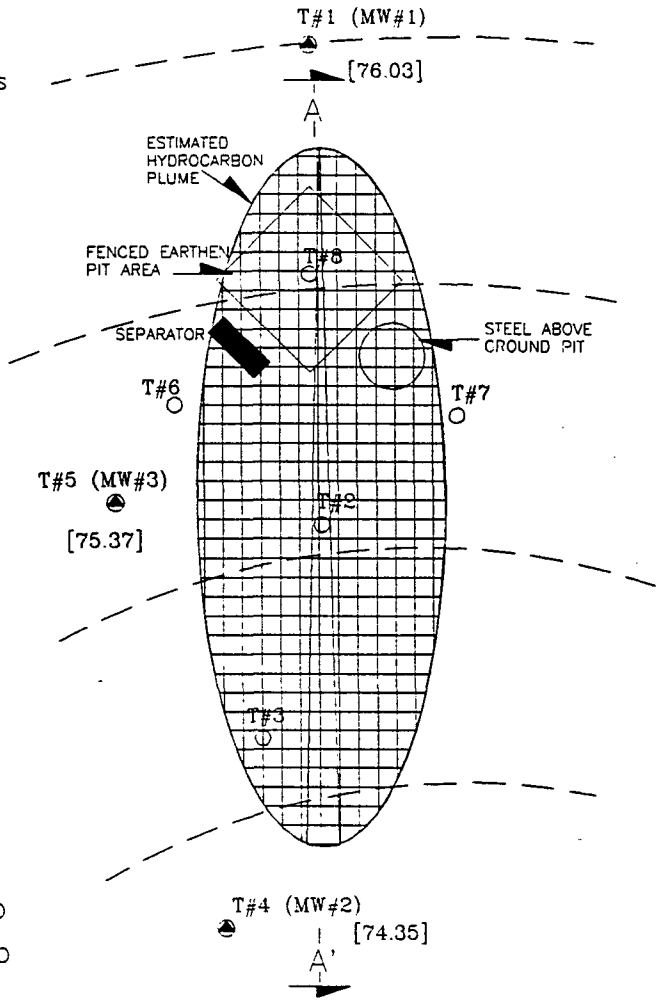
20 0 50 ft

[75.00']: GROUNDWATER DEPTH MEASURED ON 9/26/93, ELEVATIONS RELATIVE TO WELLHEAD FLANGE (100.00').

T#0 APPROXIMATE TEST BORING LOCATION

MW#0 MONITOR WELL

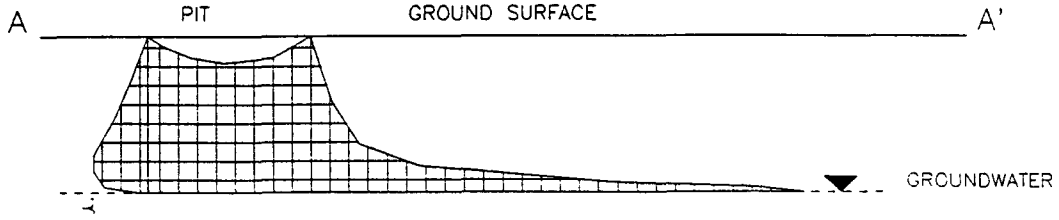
ESTIMATED HYDROCARBON PLUME



ALL DISTANCE AND ELEVATIONS HAVE BEEN DETERMINED BY SIGHTING, PACING, AND CONSTRUCTION SURVEY. MEASUREMENTS ARE ACCURATE TO THE DEGREE IMPLIED BY THE INTENT AND METHOD USED.

WELL HEAD

EAST PROFILE



ARCO OIL & GAS COMPANY

WOOD WM FEDERAL COM No. 1
LEASE No.: SF-078266
(B) SEC 21, T29N,R10W,NMPM

SITE ASSESSMENT PROJECT NO: 93183

ENVIROTECH INC.

ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64-3014
FARMINGTON, NEW MEXICO 87401
PHONE: (505) 632-0615

SITE PLAN

SHEET: A2
DRWN BY: MK LANE
FILE: 3183SHT2

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

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

August 17, 1993

CERTIFIED MAIL
RETURN RECEIPT NO. P-667-242-007

Mr. Morris D. Young
Envirotech Inc.
5796 U.S. Highway 64 - 3014
Farmington, New Mexico 87401

RE: **ENVIROTECH INC. LANDFARM NO. 2 EXPANSION**
OCD RULE 711 PERMIT MODIFICATION APPROVAL

Dear Mr. Young:

The New Mexico Oil Conservation Division (OCD) has received your May 14, 1993, request for a permit modification to expand your current soil remediation facility at landfarm No. 2. The commercial landfarm facility remediates oilfield contaminated solids which are either exempt from the Federal RCRA Subtitle C (hazardous waste) regulations or are "nonhazardous" by characteristic testing. The facility was administratively approved pursuant to OCD Rule 711 by the Director on September 29, 1993, for a period of five (5) years and expires on September 29, 1997. The permit modification is to expand the facility to the south and east an additional two-hundred and sixty-six (266) acres.

The permit modification for expansion of the Envirotech Inc. Commercial Landfarm No. 2 located in the SE/4, Section 6, Township 26 North, Range 10 West, NMPM, San Juan County, New Mexico, **is hereby approved** in accordance with the OCD Rule 711. The modification application consists of the original application dated May 14, 1993, and the materials dated June 28, 1993, and July 26, 1993, submitted as amendments to the application. The construction, operation, monitoring and reporting of the expanded facility shall be as specified in the September 29, 1993 approval, the OCD correspondence dated March 12, 1992, and the following conditions:

1. A fifty (50) foot buffer zone will be maintained around all pipelines and roadways crossing or running adjacent to the landfarm expansion area.

2. Prior to placing any contaminated soil in the expanded portion of the landfarm, one (1) background soil sample will be taken from the center portion of the expansion area, two (2) feet below the native ground surface. The sample will be analyzed for total petroleum hydrocarbons (TPH), volatile aromatic organics (BTEX), major cations/anions, and heavy metals using approved EPA methods.

3. There will be a physical separation maintained at all times between the OCD permitted site and any adjacent disposal/remediation facilities permitted by another regulatory agency. There will be no transfer or mixing of wastes between the OCD permitted landfarm and any other disposal/remediation facilities.

Please be advised approval of this facility expansion does not relieve you of liability should your operation result in actual pollution of surface or ground waters or the environment actionable under other laws and/or regulations. In addition, the OCD approval does not relieve you of liability for compliance with any other laws and/or regulations.

The Division shall have the authority to administratively change this permit to protect fresh water, human health and the environment.

If you have any questions, please do not hesitate to contact Kathy Brown at (505) 827-5884.

Sincerely,

William J. LeMay
Director

WJL/kmb

xc: Denny Foust, OCD Aztec Office
Ms. Ilyse Gold, BLM, Farmington

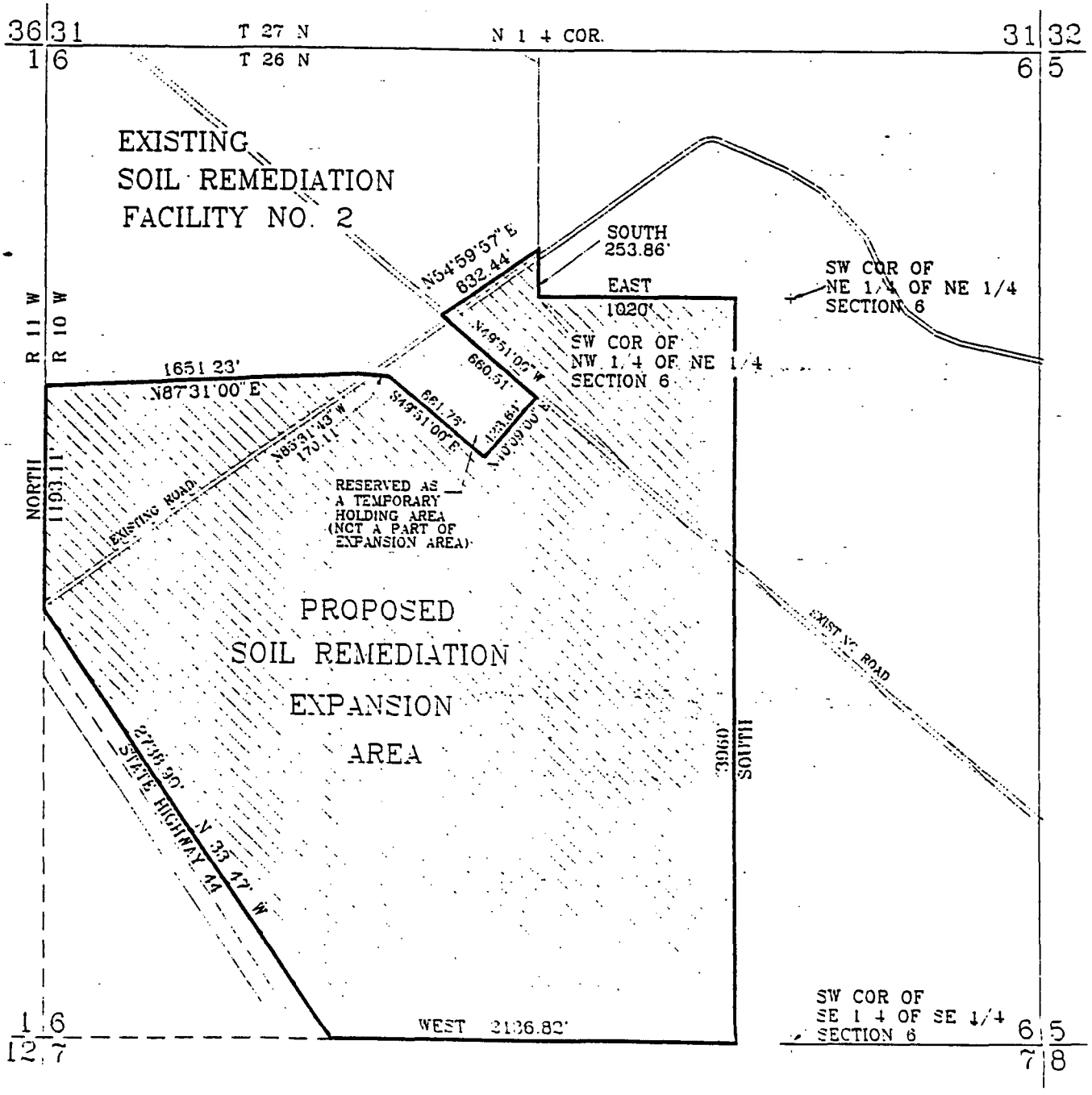
PLAT

TO ACCOMPANY DESCRIPTION FOR

YOUNG ENGINEERING SERVICES INC.

dba ENVIROTECH INC.

SOIL REMEDIATION FACILITY NO. 2 EXPANSION AREA



FRM2EXP.DWG R. YOUNG 7-27-93