CONTACT INFORMATION
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Arizona Geological Survey
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Tucson, Arizona 85701
602-771-1601
http://www.azgs.az.gov
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M E M O R A N D U M

TO: Ron R. Short

FROM: Dale H. Allen

DATE: August 6, 1990

RE: Vulture Progress Report

DETOXIFICATION

The cyanide content in the solution has remained steady at around 0.3 pounds per ton for the last couple of weeks. The pH has dropped a little at a time since we started spraying the solution in the air to absorb the carbon monoxide which will eventually lower the pH and thereby enhance the destruction of cyanide. If the pH continues to drop and there is significant loss of cyanide, we should continue circulating solution until it appears to be of no benefit to do so. On the other hand, if there is no improvement in the near future or at least by the end of the bioremediation project, then the plant should be shut down to allow the natural degredation of the cyanide in the heaps to take place.

Our ultimate goal is to reach a .02 pounds per ton of cyanide in the return solution, which will not be achieved by circulating the solution alone. At some point the heaps will be rested to allow nature to take its course. After a reasonable period of time (six months to a year), the heaps will be sampled to see if any residual cyanide remains. If the free cyanide does not meet with ADEQ approval then we will consider an alternative method of detoxification.

BIOREMEDIATION PROJECT

Attached is the most recent report from Western Tech. giving results up to the last sampling period last week. Looking at the graph, it is evident that we are near the completion of the project. Our goal is to attain under 100 ppm hydrocarbon--most of the samples have achieved this. The engineer in charge of our project, Glenn Turny, has indicated that the next series of samples, to be taken in three weeks, should demonstrate that we have reached our target. In September we can dispose of the decontaminated Korn Kob material.

DHA

WESTERN TECHNOLOGIES INC.

P.O. Box 21387 85036
3737 East Broadway Road
Phoenix, Arizona 85040
(602) 437-3737 • 470-1341 FAX

August 3, 1990

Mr. Dale Allen
A.F. Budge (Mining) Limited
4301 North 75th Street
Suite 105
Scottsdale, Arizona 85251

RE: PROJECT UPDATE OF SOIL REMEDIATION SERVICES AT VULTURE MINE, WICKENBURG, ARIZONA. WT REF. NO. 7120K028.

Dear Mr. Allen:

Western Technologies Inc. (WT) is pleased to provide A.F. Budge (Mining) Limited (A.F. Budge) with a project update on the soil remediation services currently being performed at the Vulture Mine in Wickenburg, Arizona. A summary of the progress of the remediation process to date is as follows:

WT began remediation of approximately 125 cubic yards of petroleum hydrocarbon contaminated soil on May 31, 1990. Soil samples collected from the soil treatment cell on that date indicated an average total petroleum hydrocarbon concentration of 2772 parts per million (ppm). Following standard soil sampling procedures, the soil was inoculated with hydrocarbon consuming bacteria. WT resampled the soil again on June 28, 1990. The average total petroleum hydrocarbon level had decreased to 98 ppm. The soil was then re-inoculated with bacteria. The most recent WT sampling was performed on July 31, 1990. The average total petroleum hydrocarbon levels were analyzed to be 127 ppm. The associated analytical data is plotted on the attached graph and represents a typical biological degradation pattern for petroleum hydrocarbon contaminated soils.

The project is progressing on schedule and within the proposed budget. WT estimates the project will require 1 to 2 months to complete. The next soil sampling is scheduled for August 28, 1990. WT will contact you upon receipt of the soil sample analysis. If you have any questions or comments regarding this summary, please call me at (602) 437-3737.

Respectfully submitted,

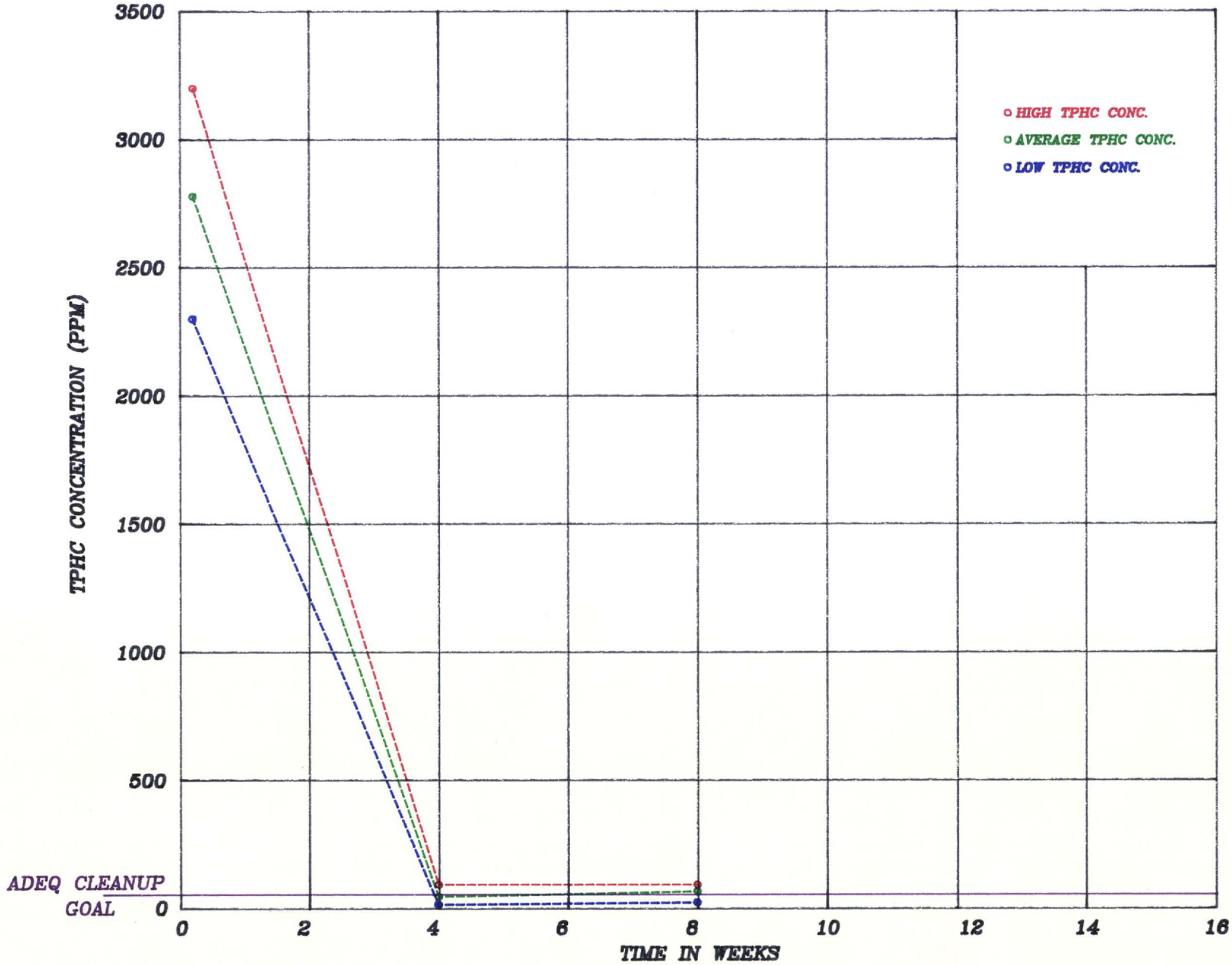
WESTERN TECHNOLOGIES INC.

Glen R. Turney, Ch.E.
Senior Remediation Engineer
Environmental Engineering Services

Attachment:

A.F. BUDGE

Soil Treatment Cell
JOB NO. 7120K028



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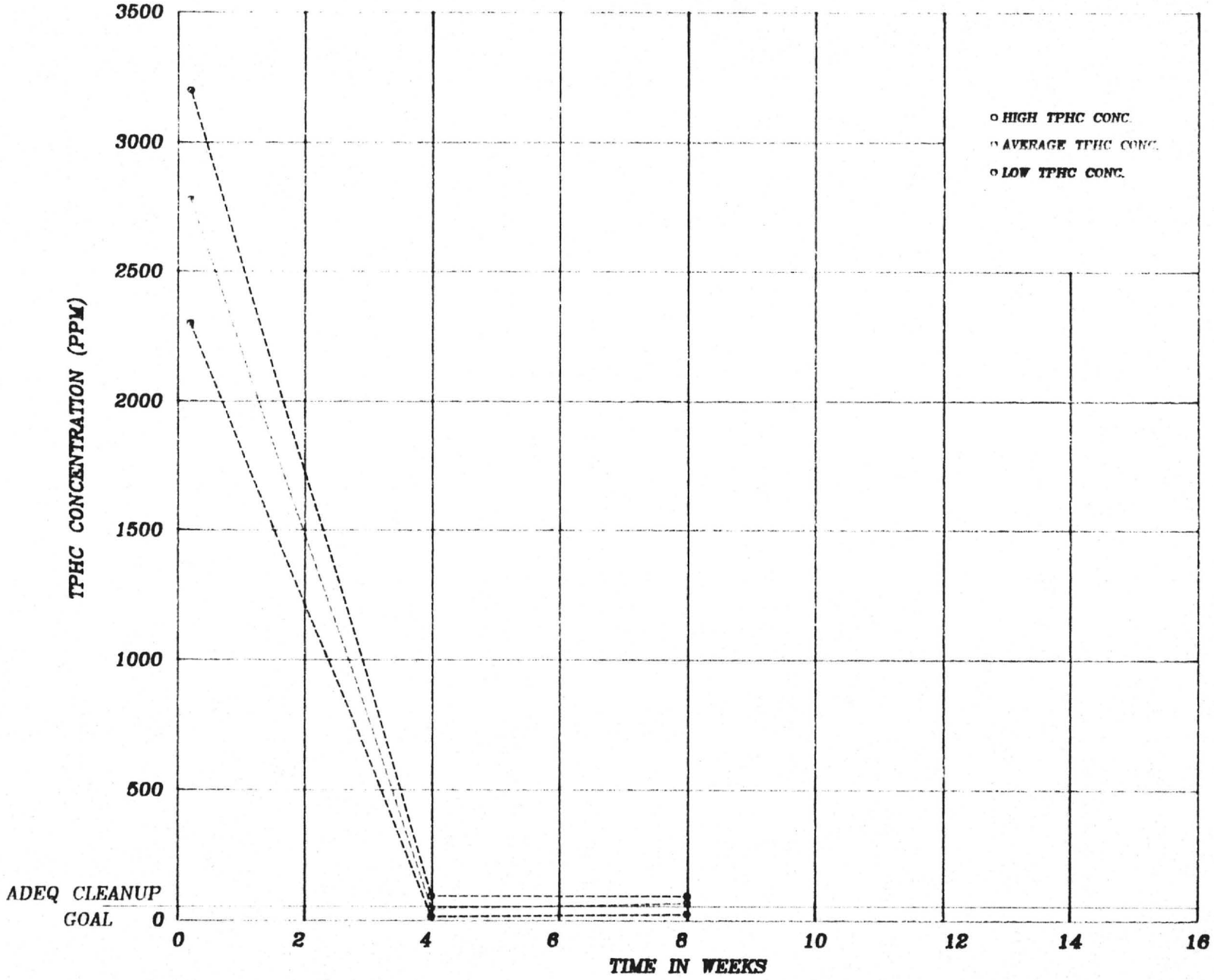

WESTERN TECHNOLOGIES INC.

The Quality People

STATEMENT OF ENVIRONMENTAL ENGINEERING SERVICES

WESTERN TECHNOLOGIES INC.
The Quality People

ARIZONA

Phoenix
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Phoenix, Arizona 85040
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Mesa
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(602) 926-2113

Sun City
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Sun City, Arizona 85372
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Flagstaff
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Flagstaff, Arizona 86004
(602) 774-8708

Lakeside
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Lakeside, Arizona 85929
(602) 368-5568

Tucson
3480 South Dodge Boulevard
Tucson, Arizona 85713
(602) 748-2262

Sierra Vista
1827 South Paseo San Luis
Sierra Vista, Arizona 85635
(602) 458-0364

Laughlin / Bullhead City
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Bullhead City, Arizona 86442
(602) 758-8378

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Concord, California 94520
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Riverside, California 92504
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Golden, Colorado 80401
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Las Vegas
3611 West Tompkins Avenue
Las Vegas, Nevada 89103
(702) 798-8050

Environmental Services
4085 Nevso Drive, Suite G
Las Vegas, Nevada 89103
(702) 252-0580

NEW MEXICO

Albuquerque
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Albuquerque, New Mexico 87113
(505) 823-4488

Farmington
400 South Lorena Avenue
Farmington, New Mexico 87401
(505) 327-4966

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ENVIRONMENTAL ENGINEERING SERVICES

New environmental legislation and regulations continually challenge property owners, commerce, and government with increased legal and financial liabilities. The key to managing these liabilities is the development, implementation, and monitoring of effective regulatory compliance programs.

The work of the engineers, scientists, and technicians at Western Technologies Inc. (**WT**) is focused on helping our clients manage their current liabilities and to anticipate future ones. This help is provided through cost-effective and technically sound solutions to environmental problems tailored to each client's specific needs.

Western Technologies develops solutions to environmental problems that are built on realistic site appraisals, proven conventional and advanced engineering practices and technologies, effective communications with regulatory agencies, strict quality assurance practices, and strong project budget and schedule controls.

WT offers the following environmental management services.

- **Regulatory Affairs**
- **Environmental Evaluations and Assessments**
  - -- Environmental Property Evaluation
  - -- Environmental Impact Analysis
- **Underground Storage Tank Management**
- **Hazardous Waste Management Services**
  - -- Site and Waste Characterization
  - -- Groundwater, Surface Water, and Soil Contamination Studies
  - -- Resource Conservation and Recovery Act Part B Permit Application Preparation and Closure Plan Development and Implementation
  - -- Site Remediation Management

ENVIRONMENTAL ENGINEERING SERVICES

- **Industrial Hygiene**
  - -- Asbestos Management
  - -- Health and Safety Plans and Programs
  - -- Noise Surveys
  - -- Indoor Air Quality Assessments
  - -- Radon Testing
  - -- Industrial Air Pollution Monitoring
- **Sampling and Analytical Chemistry**
  - -- Field Analytical Services
  - -- Analytical Chemistry

REGULATORY AFFAIRS SERVICES

Because effective environmental management programs often involve the participation of government agencies, Western offers expert testimony, negotiation, permitting, and compliance reporting services. Depending on client needs, these services are integrated with all of the programs described below or are provided separately.

ENVIRONMENTAL EVALUATIONS AND ANALYSES

WT provides two basic environmental assessment services: environmental property evaluations and environmental impact analyses. The environmental property evaluations provide financial and real estate firms and their clients with environmental information that can be used to determine liabilities in property transfers. The environmental impact analyses provide project sponsors and public agencies with decision-making information on the likely adverse effects of proposed land use changes and feasible mitigating options.

ENVIRONMENTAL ENGINEERING SERVICES

Environmental Property Evaluations

The Superfund Amendments and Reauthorization Act of 1986 established a new meaning for the term, environmental liability. Since only one defense, the innocent purchaser defense, may reduce or preclude liability, specific actions must be taken to substantiate innocence. To do this a purchaser must prove that: due care has been exercised with respect to hazardous substances; and precautions have been taken against foreseeable acts or omissions from a third party.

Western Technologies' environmental staff has developed assessment and reporting techniques that clearly define liabilities associated with property transfer transactions. Western's clients are well prepared to defend their innocent purchaser status.

Environmental Analysis Services

Western provides complete environmental analysis services for the production of environmental impact statements and other documents used in project decision making processes under the National Environmental Policy Act (NEPA) and similar state and local legislation.

Western's multi-disciplinary assessments are performed by specialists in: geology, hydrology, geohydrology, and geotechnical engineering; water and air quality; pollution control engineering; biology and natural resource management; socio-economics, public policy, and urban, rural, and regional planning; cultural resources; and traffic engineering.

UNDERGROUND STORAGE TANK MANAGEMENT SERVICES

Volatile liquids have long been stored in steel underground tanks as a fire prevention measure. While they are protected from one risk they are subjected to others -- corrosion caused by natural soil chemicals and undetected mechanical failure. As a result, leaking underground storage tanks (UST) are one of the most common sources of soil and groundwater contamination.

Western Technologies offers a range of UST services including: leak risk assessments; tank integrity testing; tank removal, disposal, and replacement; chemical and geohydrological contamination characterization; soil and groundwater remediation; tank monitoring programs; and regulatory agency liaison.

ENVIRONMENTAL ENGINEERING SERVICES

HAZARDOUS WASTE MANAGEMENT SERVICES

WT provides an integrated range of hazardous waste management services to characterize and remediate groundwater, surface water, and soil contamination.

Site and Waste Characterization

Western Technologies provides waste characterization services needed for closure or modernization of municipal and hazardous waste landfills, surface impoundments, and mine waste dumps. These studies are used to produce waste transportation, hydrogeological assessment, and solid waste assessment test reports.

Groundwater, Surface Water, and Soil Contamination Studies

Supporting the environmental property evaluation, underground storage tank, and RCRA compliance projects are Western's geoscience and analytical staffs. Western's civil engineers, geologists, geohydrologists, and chemists develop surface water, groundwater, and soil sampling programs that produce analytical data used to define the nature, extent, and degree of contamination.

While soil-gas monitoring is used to indicate the general presence of some contaminants, Western's in-house drilling and analytical chemistry capabilities are used to obtain definitive data on all contaminants.

When required, two- and three-dimension computer modeling techniques are available to define the extent of contamination in large, complex situations. The data produced by these studies are the bases for remediation plan development.

Resource Conservation and Recovery Act (RCRA) Part B Permit Application Preparation and Closure Plan Development and Implementation

Facilities involved in the treatment, storage, and disposal of hazardous wastes are required to apply for and obtain permits to operate under Part B of RCRA. These facilities must also prepare for the eventual cessation of hazardous waste operations through the development and regulatory acceptance of closure plans.

Western's environmental engineers and scientists work with the facilities to bring them into regulatory compliance, prepare permit applications and plans, and to negotiate on their behalf with state and federal agencies. Once the plans are approved, Western

Technologies develops appropriate engineering designs, manages their implementation, and monitors their performance.

Site Remediation Management

Western's integrated approach to site remediation offers clients optimum technologies in consideration of technical effectiveness, costs, time constraints, and regulatory mandates. Using site assessment study findings, Western's engineers and scientists develop and evaluate feasible remediation program alternatives involving groundwater, surface water, and soil cleanup. Working with the client and the responsible agencies, a remediation program is selected and a detailed project management plan is developed.

The complexity of projects ranges from the manual removal and disposal of contaminants to the installation and operation of small treatment systems to the management of large-scale, multi-phased remediation programs involving several specialty subcontractors.

The extensive range of technologies offered by Western includes: on-site closure cells, when appropriate, for the closure or modernization of existing facilities; in-situ and above ground biotreatment systems; soil and sludge extraction systems; and physico-chemical processes, such as air stripping, carbon adsorption, on-site incineration, in-situ vitrification, and solidification.

INDUSTRIAL HYGIENE SERVICES

WT provides an extensive range of industrial hygiene services to minimize exposures to hazardous physical and chemical conditions in homes, schools, workplaces, and communities.

Asbestos Management

Western Technologies provides complete asbestos management consulting services. Western's certified asbestos inspectors and management planners conduct hundreds of building inspections each year to identify asbestos-containing materials (ACM).

Supporting the inspection program is an EPA-certified, in-house asbestos laboratory using light microscopy for bulk sample analyses. Asbestos fiber concentrations are measured by phase contrast microscopy.

ENVIRONMENTAL ENGINEERING SERVICES

Western's asbestos group specializes in the development of management plans mandated by the federal Asbestos Hazard Emergency Response Act (AHERA) for public and private elementary and high schools. Western supports the schools' implementation efforts with ACM training programs.

Western's asbestos group also develops and supervises ACM abatement programs and specifications. Under these programs Western monitors contractor adherence to specifications and health and safety regulations. Asbestos air monitoring is conducted to establish baseline conditions, abatement personnel exposure levels, and post-abatement clearance levels.

Health and Safety Plans and Programs

Western Technologies' industrial hygienists develop, implement, and monitor health and safety plans for hazardous material remediation projects. They also develop and administer hazardous material worker health monitoring programs that include records maintenance systems and annual respiratory fit testing.

Noise Surveys

Western Technologies conducts several types of noise surveys, including noise ordinance compliance surveys of construction sites for local agencies, and airport and highway noise surveys.

In addition to outdoor noise surveys, Western conducts OSHA workplace regulation compliance surveys, time-weighted noise assessments for worker hearing conservation programs, and building acoustic surveys to test the effectiveness of soundproofing.

Western also conducts comparative testing of proposed sound attenuation mitigation measures.

Indoor Air Quality Assessments

Western Technologies' industrial hygienists conduct indoor air quality assessments to identify any airborne contaminants, to evaluate the health risks they pose, and to recommend mitigation measures to protect worker health.

Indoor air quality assessments are typically focused on formaldehyde, chlordane, carbon monoxide, hydrogen sulfide, methane, explosive gases, and related volatile organic compounds.

ENVIRONMENTAL ENGINEERING SERVICES

Radon Testing

Because chronic exposure to radon gas increases risk of cancer, its' presence is an increasingly important environmental health concern in the citing, design, and use of buildings. Western Technologies, in association with the American Radon Corporation, provides radon gas testing in compliance with EPA protocols.

The principal services are pre-development open land characterizations and assessments, continuous indoor exposure level determinations, and specialized project design and mitigation development.

Industrial Air Pollution Monitoring

Western Technologies has provided air pollution monitoring services throughout the western United States for more than 20 years. These services include: traffic emission monitoring; odor investigations; and ambient high-volume air sampling to establish baseline conditions at new facilities.

SAMPLING AND ANALYTICAL CHEMISTRY SERVICES

Because analytical data often provide the basis for potentially expensive environmental management decisions, the methods used in their development must be technically accurate and legally defensible. **WT**'s field sampling specialists and laboratory personnel operate under strict quality standards to produce accurate information using industry-standard sampling and analytical protocols.

Field Analytical Services

Western Technologies provides field analytical services teams to develop and conduct sampling and analysis programs for: hazardous waste transportation, storage, and disposal facilities; chemical production and use facilities; and refineries. These programs are managed in support of existing facility use permits and other environmental studies and compliance activities.

Analytical Chemistry Services

Supporting **WT**'s environmental management services is **WT**'s analytical laboratory located in Phoenix. The laboratory, which is certified in Arizona, California, Colorado and Nevada, is fully equipped to provide the analytical requirements of the Federal Water Pollution Control Act, the Safe Drinking Water Act, the Resource Conservation and Recovery Act, and the Comprehensive Environmental Response Compensation and Liability Act/Superfund Amendments and Reauthorization Act of 1986. The laboratory works closely with field analytical services teams to develop and implement cost-effective sampling and analysis programs. Strict quality assurance protocols and a contemporary data management system enable the production of accurate analytical data within the time constraints required for environmental management projects.

(Paul) Smith)
272-6848 - (Ralph Weaks) Sargent & Hartman

NATIONAL
42-381 50 SHEETS 5 SQUARE
42-382 100 SHEETS 5 SQUARE
42-389 200 SHEETS 5 SQUARE
Made in U.S.A.

March 28, 1990

Bill Lewis
Coronado National Forest
Santa Catalina Ranger District
5700 N. Sabino Canyon Road
Tucson, AZ 85715

Dear Bill:

Thank you for sending me copies of the letters to A.F. Budge Mining and Ken Rait regarding the Korn Kob Mine. The mining company has previously shown disregard for the conditions of their permit and need to be monitored more closely. I'm glad to see that the Forest Service has taken some action on correcting the problems at this project.

Concerning the clean up of the diesel spills, I understand that the intent of the mining company is to remove the contaminated soil from the site as the method of clean up. I am aware that a permit is required for the removal of any resources from Forest Service land, and since soil is in fact a forest resource. we request that a permit be required for this action detailing exactly how the soil is to be removed, contained, transported, disposed of, and where and how it is to be de-contaminated. At the very least an EA should be done to assess the impact.

I would appreciate receiving a copy of the permit (when available) and any future correspondence concerning this project.

Sincerely,

Lainie Levick

Lainie Levick
Earth First!
12120 E. Snyder Rd.
Tucson, AZ 85749

cc: Department of Environmental Quality

United States Department of Agriculture
Forest Servi
Coronado NF
Santa Catalina RD
5700 N. Sabino Canyon Rd.
Tucson, Arizona 85715

Reply to: 2810

Date: March 29, 1990

Ken Rait, Conservation Chair
Sierra Club - Grand Canyon Chapter
1321 E. Lee St.
Tucson, AZ 85719

Dear Ken:

Thankyou for your letter dated March 6 and 14, 1990, regarding the Korn Kob project. I'm sorry our response to your letters have been tardy, but Bill Lewis was not at work the first two weeks in March and I have been busy with other issues. We have continued to work on the problems, though. Lou Leibbrand, Forest Engineer, made a final visit with the Arizona Department of Environmental Quality on March 13, 1990, to assess the problem.

In your March 6, 1990 letter, you raised several concerns that I need to address. The first issue dealt with capping the holes and possible pollution of groundwater. Andrew Rendes, Arizona Department of Environmental Quality (ADEQ) mentioned to Lou Leibbrand that he did not see a problem with this. That oil is a common occurrence in drilling operations and floats to the top if any ground water is encountered. At this time, all the holes have been plugged. The second issue deals with the illegal roads (see the letter from Budge Mining dated March 14, 1990). We feel the appropriate action was taken and the threat of closing down the operation is a very hard slap on the wrist. The third issue dealt with the scum on the spring in Buehman Canyon. We have heard from several sources that this may be a natural phenomenon. Budge Mining has requested Dames & Moore to test the spring and determine if it came from a petroleum product.

The last paragraph requested we halt operations and write an Environmental Impact Statement. We do not believe that this is needed and that Budge Mining has been responsive to investigate or correct problems.

JOHN:

- OUR RESPONSE TO SIERRA CLUB'S LETTERS OF 3/6, 14/90.

- New Letter from earth first!!! Will send you response, you are probably finished removing this valuable resource.

Bill

In your March 14, 1990 letter, the concern was with the decontamination process for the diesel fuel spills. Budge Mining is removing all the contaminated soil from the site and is working with the ADEQ so this can be accomplished according to their standards. At this time, they are about two-thirds completed. The Forest Service feels that this does not need any type of NEPA documentation.

If you have any questions, please contact myself or Bill Lewis, 749-8700.

Sincerely,

STEVE R. PLEVEL
District Ranger

WESTERN TECHNOLOGIES INC.

P.O. Box 21387 85036
3737 East Broadway Road
Phoenix, Arizona 85040
(602) 437-3737

April 20, 1990

Mr. Dale Allen
A.F. Budge (Mining) Limited
4301 North 75th Street
Suite 101
Scottsdale, Arizona 85251

RE: SOIL REMEDIATION WORK PLAN, VULCHER MINE, WICKENBURG, ARIZONA. WT REF. NO. 7120A073.

Dear Mr. Allen:

In response to your April 19, 1990 request, Western Technologies Inc. (WT) is pleased to submit this work plan to A.F. Budge (Mining) Limited to provide soil remediation services for the diesel fuel and oil-contaminated soil at their facility near Tucson, Arizona.

1.0 INTRODUCTION

1.1 BACKGROUND

The project is to be performed on approximately 100 cubic yards of soil, which currently is contaminated with petroleum hydrocarbons.

1.2 SCOPE OF WORK

WT will oversee the treatment of the petroleum contaminated soil (PCS) on-site. WT will conduct a biological treatment process to reduce hydrocarbons in the soil to acceptable levels. This will be accomplished through a land farming procedure using naturally occurring microbes and specialized microorganisms. The specialized microorganisms will be added by WT. The procedures are described in Section 2.0.

2.0 WORK PLAN

2.1 AGENCY PERMITTING

WT will submit the required information to the Arizona Department of Environmental Quality (ADEQ) Solid Waste Unit in order to obtain temporary PCS Soil Treatment Site Registration Permit. This will be performed concurrently with preparation of the site containment.

2.2 STAGING OF CONTAMINATED SOIL

The petroleum hydrocarbon-contaminated soil will be placed on an impermeable plastic liner for biological treatment. The plastic liner will be placed within a bermed containment pit to isolate the soil. An area with the approximate dimensions of 25 feet long and 28 feet wide will be set aside on site for the treatment area. The contaminated soil will be spread as a 12-inch thick layer on a buffer layer consisting of 6 inches of clean granular fill. A WT engineer will perform sampling beneath the containment area to provide baseline concentrations. Samples will be collected following treatment to confirm that no discharge from the pit has occurred.

2.3 BIOLOGICAL TREATMENT

Biological media will be introduced by WT into the soil and WT will oversee a land farming program. The program will include the addition of microorganisms, nutrients, and oxygen through soil aeration using a rotarytiller. The microorganisms and nutrients will be added one time during the project. Soil aeration and moisturizing will be performed three times per week. Monthly and weekly tasks can be performed by A.F. Budge personnel. WT will train A.F. Budge personnel on proper soil aeration and moisturizing procedures. WT will monitor the land farming program to see that these procedures are being followed. Process efficiency depends upon the land farming program and WT will not be responsible for delays caused by deviations in the outlined program.

2.4 SAMPLING AND TESTING

The soil will be sampled and tested prior to, monthly during, and after completion of the program to assure that the concentration of total recoverable petroleum hydrocarbons (TRPH) in the soil is less than the ADEQ cleanup goal level of 100 ppm for TRPH. Samples will be analyzed for TRPH by modified EPA method 418.1. Chain-of-custody records will be maintained.

2.5 NON-HAZARDOUS WASTE DISPOSAL

Following treatment of the contaminated soil and the subsequent reduction of the average TRPH concentrations to levels below ADEQ cleanup goals, the soil can be placed into an approved landfill facility or left on the site.

2.6 REPORT PREPARATION

WT will evaluate the collected information to prepare a report summarizing our work. The report will include:

- An executive summary
- Proper documentation of program effectiveness including analytical results obtained during the project
- WT's conclusions and recommendations for further action, if these are necessary.

3.0 TIME SCHEDULE

The time estimate to complete the program is 24 to 28 weeks. WT estimates completion of the final report within 15 working days following collection of the soil samples for cleanup verification.

o Permitting - ADEQ and MCHD	Week 1 - 4
o Soil treatment start-up	Week 4
o Soil sampling	Weekly
o Anticipated project completion	Week 24 - 28
o Final report	15 days following verification samples

4.0 JOB COST ESTIMATE

The estimated charges for the described scope of work are **$8,965.00.** Actual charges will be billed on a time-and-materials basis in accordance with the fee schedule. The estimate does not include client meetings, additional telephone consultation, or other services not specifically stated in this proposal. Charges for such services will be additional. Project charges will be billed monthly.

This proposal is valid for 30 calendar days from the date of issuance. Execution of a work agreement after that date would require review and possible revision of the proposal.

5.0 CONFIDENTIALITY

The relationship between Western Technologies Inc. and A.F. Budge (Mining) Limited and their assigned parties shall be regarded as strictly confidential. All work performed and any reports produced under the proposed scope of work will be treated as strictly confidential property. None of the information generated during this project -- including technical information, experience, or data -- may be disclosed to others without the prior written consent of A.F. Budge (Mining) Limited or assigned parties, unless such disclosure is required by law or subpoena.

Western Technologies Inc. appreciates the opportunity to submit this work plan and looks forward to providing services for A.F. Budge (Mining) Limited.

Respectfully submitted,

WESTERN TECHNOLOGIES INC.

Glen R. Turney

Glen Turney
Project Remediation Engineer
Environmental Engineering Services

for Clifford R. Pollock, R.G., P.E.
Robert S. Livermore
Director, UST/Remediation
Environmental Engineering Services

/bf

Attachments: Cost Estimate
General Conditions
Indemnity Clause

Copies to: Addressee (2)

A.F. BUDGE (MINING) LIMITED
VULCHER MINE, WICKENBURG, ARIZONA

WT REF. NO. 7120A073

COST ESTIMATE

TASK 1

o	Permitting - ADEQ	$ 1,500.00
o	Obtaining and analyzing ambient soils under liner . .	670.00
o	Oversight during building of berms and spreading soil; operation-and-maintenance training concerning watering, tilling, and addition of nutrients	500.00
o	MATERIALS:	
	a. Microorganisms/200 lbs. @ $5/lb.	1,000.00
	b. Nutrients/300 lbs. @ $100/75lbs.	225.00
o	ANALYTICAL CHEMISTRY FOR MONTHLY ANALYSIS:	
	40 samples @ $50/sample	2,000.00
o	BIOREMEDIATION OVERSIGHT AND ENGINEERING:	
	Senior Remediation Engineer - 8 hrs. @ $85/hr. . . .	680.00
	Remediation Technician - 40 hrs. @ $45/hr.	1,800.00
	Clerical - 4 hrs. @ $25/hr.	100.00
	Drafting - 2 hrs. @ $35/hr.	70.00
	Technical Manager/Director - 2 hrs @ $110/hr	220.00
	Equipment/Sampling Jars/Mileage	200.00
	Based on 6 months remediation	**$8,965.00**

April 20, 1990

GENERAL CONDITIONS

Project: A.F. Budge (Mining) Limited **Reference No.: 7120A073**

1.0 **Workmanship**
Western Technologies Inc. (hereinafter called WT) will perform its services in accordance with local generally accepted engineering and testing practices. No other expressed or implied warranty or representation, either written or oral is made, included or intended in our proposals, contracts, or reports.

1.1 **Utilities**
When performing its work, WT will take all reasonable precautions to avoid damage or injury to subterranean structures or utilities. Client agrees to hold WT harmless for any damages to such subterranean structures or utilities which are not called to WT's attention and correctly shown on the plans furnished.

1.2 **Safety**
Work will be performed only under safe conditions. Client may be charged for safety or security measures required by hazardous job conditions.

1.3 **Samples**
WT will discard all samples thirty (30) days after submission of our final report. Further storage or transfer of samples after that time can be made upon written request and at Client's expense.

1.4 **Manner of Payment**
Invoices are due and payable upon receipt and are delinquent thirty (30) days after date of invoice. Work in progress will be billed monthly for portions completed and upon job completion for final balance. If payments are not made in full prior to delinquency, Client agrees to pay interest on the unpaid amount at the highest allowable rate from delinquency date. All payments received shall first be credited to payment of interest, and then to the principal balance.

1.5 **Ownership of Documents**
WT will consider all reports to be confidential property of Client. Upon payment of its charges WT will distribute reports to those persons, organizations or agencies specifically designated by Client or his authorized representative.

All boring logs, field data, field notes, laboratory test data, calculations, estimates, and other documents prepared by WT shall remain the property of WT.

1.6 **Insurance**
For your benefit, WT maintains the following insurance and amounts: Workman's Compensation, statutory limits; General Liability Insurance, $500,000, Blanket Excess Liability, $10,000,000; Automobile Liability, $500,000; Professional Liability, $1,000,000, with $2,000,000 aggregate.

1.7 **Limits of Liability**
WT shall not be liable for loss, damage, injury or harm occasioned by or rising from any acts by the Client, the Client's officers, employees, agents, or subcontractors. Client agrees that WT shall not be liable for any of Client's losses, damages, injury, harm of claims, and costs, regardless of origin, and however caused, beyond the limits and amounts of insurance set forth in 1.6 above.

1.8 **Litigation**
In the event of litigation between the parties to this Agreement, WT shall be entitled to all reasonable costs incurred, including staff time, court costs, attorney fees, and other related expenses, if it is found to be the prevailing party.

1.9 **Subpoenas**
The Client is responsible, after notification, for payment of time and expenses resulting from our required response to subpoenas issued in conjunction with our work. Compensation will be based on schedules in effect at the time the subpoena is served.

1.10 **Assigns**
Neither Client nor WT may delegate, assign or transfer his duties or interest in this Agreement without the written consent of the other party.

INDEMNITY

Projects involving environmental hazards, hazardous waste and hazardous materials address an existing problem and possibly an existing liability. Western Technologies Inc., (hereinafter called WT) has neither created the problem nor contributed to it, and, therefore, it is unreasonable to ask or expect WT to assume the liability that has been created. For this reason, standard contracts and indemnification clauses are inappropriate. We will agree to be liable for our own acts, but require the following Indemnity Clause as a part of our contract with all hazardous waste and materials project clients.

It is understood and agreed that, by the terms of this Agreement, the Client is engaging the services of WT on matters involving the presence or potential presence of hazardous chemicals, substances, materials, or wastes, and it is further understood and agreed that WT is not assuming or undertaking any of the Client's obligations or obligations for the Client's benefit. Therefore, Client hereby covenants and agrees to hold harmless, indemnify and defend WT, its Officers, Directors, Stockholders, Employees and Agents, from and against any and all claims, losses, damages, and liability, of whatsoever kind or nature, whether to persons, including death, or property, and costs, including but not limited to attorney's fees and costs of defense, arising out of or in any way connected with the presence, sudden or gradual dispersal, discharge, escape, or release of contaminants of any kind which shall include, but not be limited to, smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids, or pollutants, into or upon land, the atmosphere, or any water course or body of water, arising out of or any way connected with the condition of the property. However, WT does hereby indemnify and hold client harmless from all liability for damages, of whatsoever kind and nature, occasioned by WT's negligent or willful acts, errors or omissions in the performance of its work under this agreement.

NOV 1989
WATER PERMITS UNIT

BIOREMEDIATION

The use of specialized microbial cultures can be an effective tool in an integrated cleanup program involving incineration, chemical treatment, and physical methods of disposal.

This application is really an extension of what has been occurring naturally for millions of years on this planet. Over the eons, microbial lifeforms have developed niches in the environment where they use a wide variety of organic chemicals as food for energy and growth. These microbes include bacteria, fungi, yeasts, actinomycete, and other classes of aerobic and anaerobic organisms (i.e., organisms requiring the presence of oxygen and those that grow in the absence of oxygen).

Researchers have isolated microbes from lakes, streams, and soils contaminated by various hazardous organic chemicals. Many microbes have developed the capability to consume organic chemicals and convert them into protein, water, carbon dioxide, and more microbes.

In this manner, a natural cycle has been established whereby the organic chemicals are removed from the environment and eventually converted into food souces for higher life forms. This natural cycle presents an opportunity to remove wastes spilled into the environment.

Dick Richards

437 3737

SITE ENGINEERING

Engineering plans define site characteristics, consider whether to use biological processes, and specify how to apply them.

A typical example might be a soil contaminated with crude oil over a given area and to a known depth. After first determining the nature of contamination, the extent of contamination must be defined. If the site is relatively small, e.g., 10 feet by 10 feet by 1 foot, it would probably be more efficient to excavate it and take it to a landfill or an incineration system. If, however, the site contamination is large, e.g., 1 acre and 1 foot deep, landfarming may be the most efficient approach.

Other site engineering considerations are:

- Underlying soil structure porosity
- Needs for containment liners to prevent contaminant migration
- Heavy metals presence
- Soil pH
- Nitrogen and phosphorus concentrations.

In addition, bioreactors can be brought on-site to assist in decontamination projects. There are also other techniques, such as composting, which offer unique advantages under certain conditions.

In conclusion, biodecontamination offers the environmental engineer another tool to be used as part of an integrated cleanup project. When it is applicable, it has the advantages of low cost and minimal site disruption. Therefore, it is an important consideration for the environmental engineer interested in cost-effective remediation work.

While selective adaptation approach described earlier depends on the enhancement of enzyme pathways already present in the subject organisms, it does not involve techniques that are commonly used in the production of recombinant organisms. When regulations and regulatory processes are better defined, it may become possible to apply recombinant organisms to the environment to decontaminate certain hazardous chemicals.

SCIENCE

Microbes to the Rescue!

BROWN & ROOT USA, INC.
BUILDING CODE 04 - ROOM 201
POST OFFICE BOX THREE
HOUSTON, TEXAS 77001

FAX: (713) 676-7616

DATE: 17 OCTOBER 1990

TO: DALE ALLEN

COMPANY: A. F. BUDGE (MINING) LTD.

CITY/STATE OR COUNTRY: SCOTTSDALE, AZ

FAX NUMBER: (602) 949-1737

NUMBER OF PAGES INCLUDING COVER SHEET ~~EIGHTEEN (18)~~ SEVENTEEN (17)

FROM: JOE SCHLITT

SUBJECT: KORAN KOB AUDIT REPORT

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THANKS!

JOE SCHLITT