

FORM NRC-313 I (3-80) 10 CFR 30		U.S. NUCLEAR REGULATORY COMMISSION		
APPLICATION FOR BYPRODUCT MATERIAL LICENSE INDUSTRIAL		1. APPLICATION FOR: <i>(Check and/or complete as appropriate)</i>		
<i>See attached instructions for details.</i> Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.		X	a. NEW LICENSE	
			b. AMENDMENT TO: LICENSE NUMBER	
			c. RENEWAL OF: LICENSE NUMBER LEL 23534	
2. APPLICANT'S NAME <i>(Institution, firm, person, etc.)</i> Terra Engineering Laboratories Inc. TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION 307-672-2221		3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION Jerome M. Mark - President TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION 307-672-2221		
4. APPLICANT'S MAILING ADDRESS <i>(Include Zip Code)</i> <i>(Address to which NRC correspondence, notices, bulletins, etc., should be sent.)</i> 196, W. 5th Street Sheridan, Wyoming 82801		5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED <i>(Include Zip Code)</i> At the address listed in item 4 and at temporary jobsites, throughout the U.S. Anywhere the U.S.N.R.C. maintains jurisdiction over by product materials.		
(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)				
6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL <i>(See Items 16 and 17 for required training and experience of each individual named below)</i>				
FULL NAME		TITLE		
a. Jerome M. Mark		President		
b.				
c.				
7. RADIATION PROTECTION OFFICER <input checked="" type="checkbox"/> Jerome M. Mark		Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15. (See attached resume)		
8. LICENSED MATERIAL				
L I N E NO.	ELEMENT AND MASS NUMBER A	CHEMICAL AND/OR PHYSICAL FORM B	NAME OF MANUFACTURER AND MODEL NUMBER <i>(If Sealed Source)</i> C	MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTI- VITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME D
(1)	Cesium - 137	Sealed Source	CPN Corporation Model MC-1 or MC-3	10 m Ci
(2)			Porta probes.	
(3)	Americium-241/Be	Sealed Source	same as above	50 m Ci
(4)	(see pages IV,	V, VI & VII for appropriate information).		
DESCRIBE USE OF LICENSED MATERIAL E				
(1)	One or more of the above described gages can be used to measure moisture and			
(2)	density of construction materials.			
(3)	<div style="display: flex; justify-content: space-between;"> <div> 8510240306 850930 REG4 LIC30 49-23534-01 </div> <div> PDR </div> </div>			
(4)				

9. STORAGE OF SEALED SOURCES

LINE NO.	CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED. A.	NAME OF MANUFACTURER B.	MODEL NUMBER C.
(1)	CPN Corporation Model MC-1 or MC-3 Porta Probe	C.P.N. Corp. 130 South Buchanan Circle Pacheco, California 94553	MC-1 and/or MC-3
(2)			
(3)			
(4)			

10. RADIATION DETECTION INSTRUMENTS

LINE NO.	TYPE OF INSTRUMENT A	MANUFACTURER'S NAME B	MODEL NUMBER C	NUMBER AVAILABLE D	RADIATION DETECTED (alpha, beta, gamma, neutron) E	SENSITIVITY RANGE (milliroentgens/hour or counts/minute) F
(1)	NONE					
(2)						
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

<input type="checkbox"/> a. CALIBRATED BY SERVICE COMPANY NAME, ADDRESS, AND FREQUENCY NOT APPLICABLE	<input type="checkbox"/> b. CALIBRATED BY APPLICANT <i>Attach a separate sheet describing method, frequency and standards used for calibrating instruments.</i> NOT APPLICABLE
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12. PERSONNEL MONITORING DEVICES

TYPE <small>(Check and/or complete as appropriate.)</small> A	SUPPLIER <small>(Service Company)</small> B	EXCHANGE FREQUENCY C
<input type="checkbox"/> (1) FILM BADGE Type G <input type="checkbox"/> (2) THERMOLUMINESCENCE DOSIMETER (TLD) <input type="checkbox"/> (3) OTHER (Specify): _____ _____ _____	R.S.Landauer Jr. & Company Glenwood Science Park Glenwood Illinois 60425	<input checked="" type="checkbox"/> MONTHLY <input type="checkbox"/> QUARTERLY <input type="checkbox"/> OTHER (Specify): _____ _____ _____

13. FACILITIES AND EQUIPMENT (Check where appropriate and attach annotated sketch(es) and description(s).)

- ☐ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS *(Include filtration, if any), ETC.*
☐ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING *(fixed and/or temporary), ETC.*
☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.
☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

See Attached Sheets VIII

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

b. IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE.

Source(s) will be returned to the manufacturer also see attached sheet IX

INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17

Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. **RADIATION PROTECTION PROGRAM.** Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures (if needed), day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.
16. **FORMAL TRAINING IN RADIATION SAFETY.** Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc.
 - a. Principles and practices of radiation protection.
 - b. Radioactivity measurement standardization and monitoring techniques and instruments.
 - c. Mathematics and calculations basic to the use and measurement of radioactivity.
 - d. Biological effects of radiation.
17. **EXPERIENCE.** Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

(No previous experience other than Troxlers school)

18. CERTIFICATE

(This item must be completed by applicant)

I Jerome M. Mark hereby certify that this application was prepared in conformity with Title 10, code of Federal Regulations, Part 30 and that all information contained herein including supplements attached hereto is true & correct to the best of my knowledge & belief.

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

Jerome M. Mark

Jerome M. Mark P.E. & L.S.

WARNING.—18 U.S.C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

a. LICENSE FEE REQUIRED
(See Section 170.31, 10 CFR 170)

b. CERTIFYING OFFICIAL (Signature)

c. NAME (Type or print)

(1) LICENSE FEE CATEGORY:

d. TITLE

(2) LICENSE FEE ENCLOSED: \$

e. DATE

CPN CORP.

MC-3 PORTAPROBE

NEW

4995.00

DIRECT READOUT DENSITY/MOISTURE SURFACE GAUGE

The Model MC-3 provides fast accurate measurement of the density and moisture of soils and/or construction materials for compaction quality control. Complies with ASTM D2922, D2950, and D3017

SINGLE SCREEN DISPLAY

Measurement units of pcf and gcc
Percentage of maximum values
Precision of measurement

MAJOR FEATURES

FULL-DIRECT-READOUT-----160 character liquid crystal display (8 lines by 20), displays on one screen data in direct engineering units including: pounds per cubic foot (pcf), grams per cubic centimeter (gcc), and counts per minute (cpm).

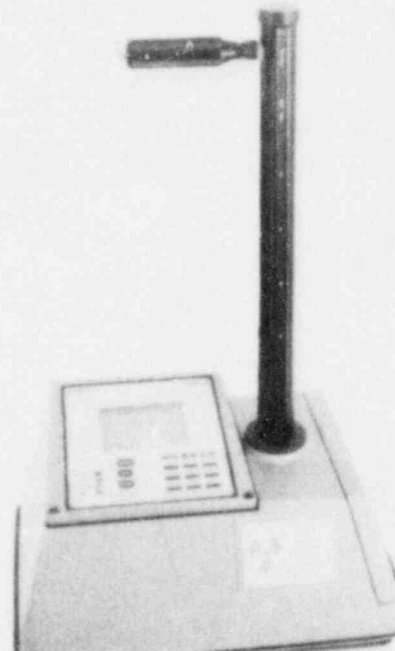
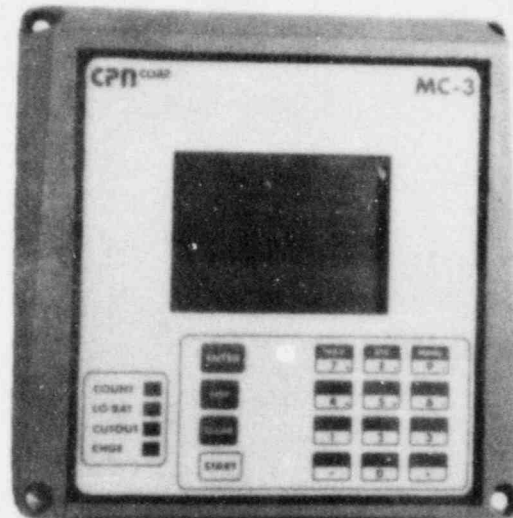
PROGRAMMABLE-----Programmable: maximums (Proctor for soils, Marshall or Rice for asphalt).

CALIBRATION-----Calibration coefficients can be entered from keyboard. Offline determination of calibration coefficients for 6, 5, 3, and 2 block standards. Density and moisture biases for special field calibrations.

DIRECT-SELECTION-----Easy keyboard selection of gauge functions for counting, self test, calibration, and units selection.

MEMORY-----Storage of 100 readings in memory. Upload to PC computer.

RUGGED-----Water and shock resistant.



THOMPSON/QUILL ASSOCIATES
of Colorado

Steve Thompson

CPN CORP. 130 South Bug
Pacheco, Cal
(415) 687-6477

12445 East 39th Ave., Suite 210, Denver, CO 80239
(303) 373-8595

1/802-624-0996

CPN CORP.

MODEL MC-3 PORTAPROBE SPECIFICATIONS

PERFORMANCE

FUNCTION-----Surface density/moisture measurements for compaction control of soil subbase and asphaltic concrete.

RANGE:Density-----70 to 170 pcf (1.12 to 2.73)
Moisture-----0 to 40 (0 to 0.64)

PRECISION:AC-----+/- 0.50 (0.008) one minute at 125 pcf
Transmission-----+/- 0.25 (0.004)
Moisture-----+/- 0.25 (0.004)

CHEMICAL-ERROR:BS-----+/- 1.00 (0.016)
Trans-----+/- 0.75 (0.120)

ROUGHNESS-ERROR:BS-----4.00 (0.064)
Trans-----0.50 (0.008)

COUNT-TIME-----Constant Precision or 15, 30 seconds, 1, 2, or 4 minutes fixed time.

TEMP-----0 TO 60°C operating.

POWER-----Battery Pack of 3 ea welded AA NICADS.

BATTERY-LIFE-----500-1000 Charge discharge cycles.

CONSUMPTION-----10 mA avg. (allows more than 3000 each 1/2 min counts).

RECHARGE-----14 hours at C/10 via wall charger.

DISPLAY-----160 character 5x7 dot matrix Liquid Crystal Display (8 line by 20 characters). Easily readable in direct sunlight.

CALIBRATION-----User enterable coefficients.

UNITS-----User selectable: pcf, gcc, and cm.

MEMORY-STORAGE-----100 readings of all displayed information. May be uploaded to a PC computer via RS232C serial interface.

RADIOACTIVE

GAMMA SOURCE: 10 mCi Cesium-137
NEUTRON SOURCE: 50 mCi Americium-241/Be
ENCAPSULATION: Double Sealed Capsule, CPN-131
SURFACE: Less than 10 mRem/hr
SHIPPING: Radioactive Material, Special Form, N.O.S., UN2974
Transport Index 0.1
YELLOW II Label
USA DOT 7A, Type A

SPECIAL FORM
APPROVAL:

USA/0150/S

An NRC or agreement state license is required for domestic use. Contact CPN Corp. for assistance in obtaining the operator training required for a license.

MECHANICAL

GAUGE: Aluminum with epoxy paint or hard-anodize finish.

-82,-81: 34 lbs, 14"W x 19"D x 22"H (16), (356x483x560)

-122,-121: 36 lbs, 14"W x 19"D x 26"H (17), (356x483x660)

CARRYING & SHIPPING High Density Polyethylene.

CASE: -82,-81: 80 lbs, 25.6"W x 15.4"D x 16.1"H (35), (650x390x410)

-122,-121: 82 lbs, 29.5"W x 15.4"D x 16.1"H (40), (750x390x410)

EQUIPMENT SUPPLIED

Gauge	Sign Kit
Lock & 2 keys	Wipe Test Certificate
Plastic Shipping Case	Wipe Test Kit
Reference standard	Charger, 115/230 VAC
Guideplate/scrapper	Operator Manual
Drill pin	Internal factory calibration
Lubricant	

FACTORY OPTIONS

MC-3-82	8 inch depth of measurement in 2 inch increments (-250)
MC-3-81	8 inch depth of measurement in 1 inch increments (-225)
MC-3-122	12 inch depth of measurement in 2 inch increments (-350)
MC-3-121	12 inch depth of measurement in 1 inch increments (-325)

ACCESSORIES

- 1) Campbell Hammer (impact type)
- 2) Hand computer with calibration program
- 3) 12VDC Charger Cable with cig-lighter conn, 6 ft
- 4) 12VDC Charger Cable with battery clips, 6 ft
- 5) Survey Meter (GM)
- 6) RS232C/DP25P upload cable, 6 ft
- 7) RS232C/DP25S upload cable, 6 ft
- 8) RS232C unterminated upload cable, 6 ft
- 9) RS232C connector only

WARRANTY

one year materials and workmanship.
() Indicates SI units of kg, mm or gcc.
Specifications subject to change.

CPI[®] Portaprobe

Model MC-1 Simul-Test

With Liquid Crystal Display

WHAT IT IS:

The PORTAPROBE MODEL MC-1 SIMUL-TEST is an advance design meter, representing a new generation of field instrumentation.

WHAT IT DOES:

The PORTAPROBE MODEL MC-1 SIMUL-TEST (with Liquid Crystal Display) simultaneously and accurately measures density and moisture of fills, embankments, bases and asphaltic concrete with savings in operator time.

The MC-1 SIMUL-TEST, replacing the old-fashioned, inaccurate sandcone and balloon tests, provides non-destructive, statistical testing with speed and accuracy.

The MC-1 SIMUL-TEST is easily used by field operators with a minimal amount of training. Meticulous laboratory work associated with old test methods is eliminated and the new simultaneous counting substantially reduces field time as compared to previous nuclear methods.

The MC-1 SIMUL-TEST can also be used for measurement of asphalt content, in the field; and for measurement of roof moisture.

SPECIAL FEATURES

- Both standard counts are statistically averaged and stored for instant recall at any time in the field. A keyboard interlock prevents accidental erasure of the standard count.
- Internal chemical compensation eliminates air-gap requirements.
- Fully enclosed radioactive source rod combined with careful shielding insures maximum operator safety.
- A brisk tone tells the operator when the test is finished, permitting him to perform other tasks during counting.
- AUTOMATIC STANDBY stores all measurements with so little current demand that the gauge does not need an ON/OFF switch.



- INSTANT-ON circuitry permits instant recall of any stored measurement; plus instant start of any test at any time. No warmup required.
- Single-chassis electronics permits rapid field service requiring only a single screwdriver.
- Rechargeable NICADS provide more than 1000 one-minute counts per charge or equivalent. Optional Alkaline flashlight cells (available at any supermarket) will last normal user a complete season.
- Small (1/2 sq. ft.)—seating area requirement makes site preparation easier... a Portaprobe design feature.
- DUAL-BACKSCATTER provides two backscatter positions for deep and shallow measurements.

CPI[®] CORP.

CAMPBELL PACIFIC NUCLEAR
130 South Buchanan Circle
Pacheco, California 94553 USA
(415) 687-6472 - Telex 17-1289



KEYBOARD:

The environment-proof keyboard is carefully designed for ease of use. Touchkeys are organized by function, location, size and color to permit instant, correct selection of the desired operation.

- LEFT:** Program grouping including Standard Count and Test keys with interlock to prevent accidental actuation, and Density/Moisture Only limits.
- CTR:** Start block with four "time options." Gauge will automatically count both Density and Moisture simultaneously unless D-Only or M-Only program limits are pressed.
- RIGHT:** Display block reading Density and Moisture field count, as well as both stored standard counts. Larger size lends importance to field count keys.
- COLORS:** Density functions are brown; Moisture functions blue; Special Program functions are red.

SERVICE:

Lift out the electronic module and you may remove any printed circuit card, display, battery, or detector with a screwdriver. No special extender card or other tools required. The CPN warranty permits removal of parts in the field to minimize downtime.

Standard flashlight batteries will serve in emergencies. (Alkaline cells will last many users an entire season.) Size D cells available anywhere. Test points permit individual cell test under operating load.

CPN's West Coast location permits us to ship parts after your end-of-day phone call for next day arrival.

In addition, Service Agencies are available in convenient geographic locations.

RADIATION SAFETY:

Careful engineering using strong, lightweight, cast aluminum construction permits heavy shielding for maximum operator safety. Surface radiation is less than 10 MREM.

The tungsten shutter retracts automatically when the gauge is lifted.

The lightweight, strong fiberglass shipping/storage case meets D.O.T. Yellow Label II requirements, yet weighs less than 77 lbs. when full packed with gauge, charge cable and guideplate.

A license is required for the recommended Cesium/Americium source. The factory will assist in licensing and training.

OPTIONAL CAMPBELL HAMMER:

A recommended option is the Campbell Hammer (illustrated above) for superior preparation of the transmission hole. Weight on the guideplate prevents soil movement during drilling and retraction with assurance of accurate alignment.

DISPLAY:

The LIQUID CRYSTAL display is easily read in bright sunlight. Coded readings indicate Low Battery, Lamp Test, and Overflow Condition.

AUDIBLE SIGNAL:

A slow "BEEP" indicates counting. A rapid BEEP signals end of counting. A steady tone upon start command indicates low voltage shutdown.

SYSTEM INCLUDES:

Standard equipment includes a fiberglass shipping case/reference standard, a cast aluminum guideplate/surfer, a steel drill pin, manual, charger, HI-TEMP 160°F NICADS, and Computer Calibration.



Portaprobe® Model MC-1 Specifications:

MECHANICAL:

Gauge Dim: 14 x 9 x 22 (8") (35.5 x 23 x 56 cm)
 Ship Case Dim: 24 x 13 x 18" (61 x 33 x 46 cm)
 Gauge Wt: 33 lbs. (15 kg.)
 Ship. Wt: 77 lbs. (34.98 kg.)
 Vibration: 24 hrs. @ 0.1" @ 12 Hz. (2.5 mm.)
 Shell: Cast Aluminum
 Shutter: Carbide with snap-out access plate
 Source Rod: Protected in surrounding guidetube
 Guideplate/Surfer: Cast Aluminum
 Drill Pin: Std drill pin or optional Campbell Hammer (Additional cost).
 Source: Model CPN-131 10mc CS 137/50mc AM-241Be, Std.
 Temp: 0-70°C ambient; 150°C Surface Cont.
 Environmental: Dustproof and Water resistant.
 Seating Requirement: 0.5 sq. ft. (456 cm²)

Electrical:

Power: Size D HI-TEMP NICADS operate/charge up to 70°C. AC charger, high and low charge pro-

tection. Non-chargeable alkaline cells optional (can be used in emergency).

Run Time/Chge: +1000 one minute tests (NICADS) and +2000 one-minute tests (alkaline). 2-3 months routine testing (NICADS) or 4-6 months routine testing (alkaline batteries).

Auto/Shutoff: MC-1 automatically stores data and shuts off at end of count cycle. Any command button instantly restarts gauge for test or information recall.

Timer: Crystal $\pm 0.0002\%$ C, 1/2 and 4 min. Standard count automatically four min. avg.

Channels: Den, Moisture, Dual Std., Test.

Detectors: Platinum Cathode GM (Den), BF₃ moisture. Factory option: Helium₃.

Service: All circuitry in modular package, removable in field as single operating unit with screw driver. No circuits left in gauge, no extender cards or special tools required.

PERFORMANCE:

		±PCF	±GCC
Precision:	B/S (AC)	0.50	0080
	Transmission	0.25	0040
	Moisture	0.25	0040
Chem Error: B/S	Transmission	1.00	0160
	Transmission	0.75	0120
Roughness (0.050") B/S	Transmission	4.00	0641
	Transmission	0.50	0080
Range	Density	70-170	1.120 - 0.725
	Moisture	0.40	0.000 - 0.640

CALIBRATION:

Curves and computer charts both furnished.

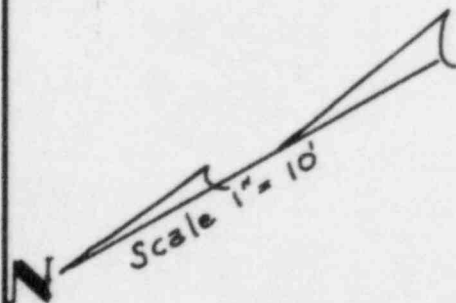
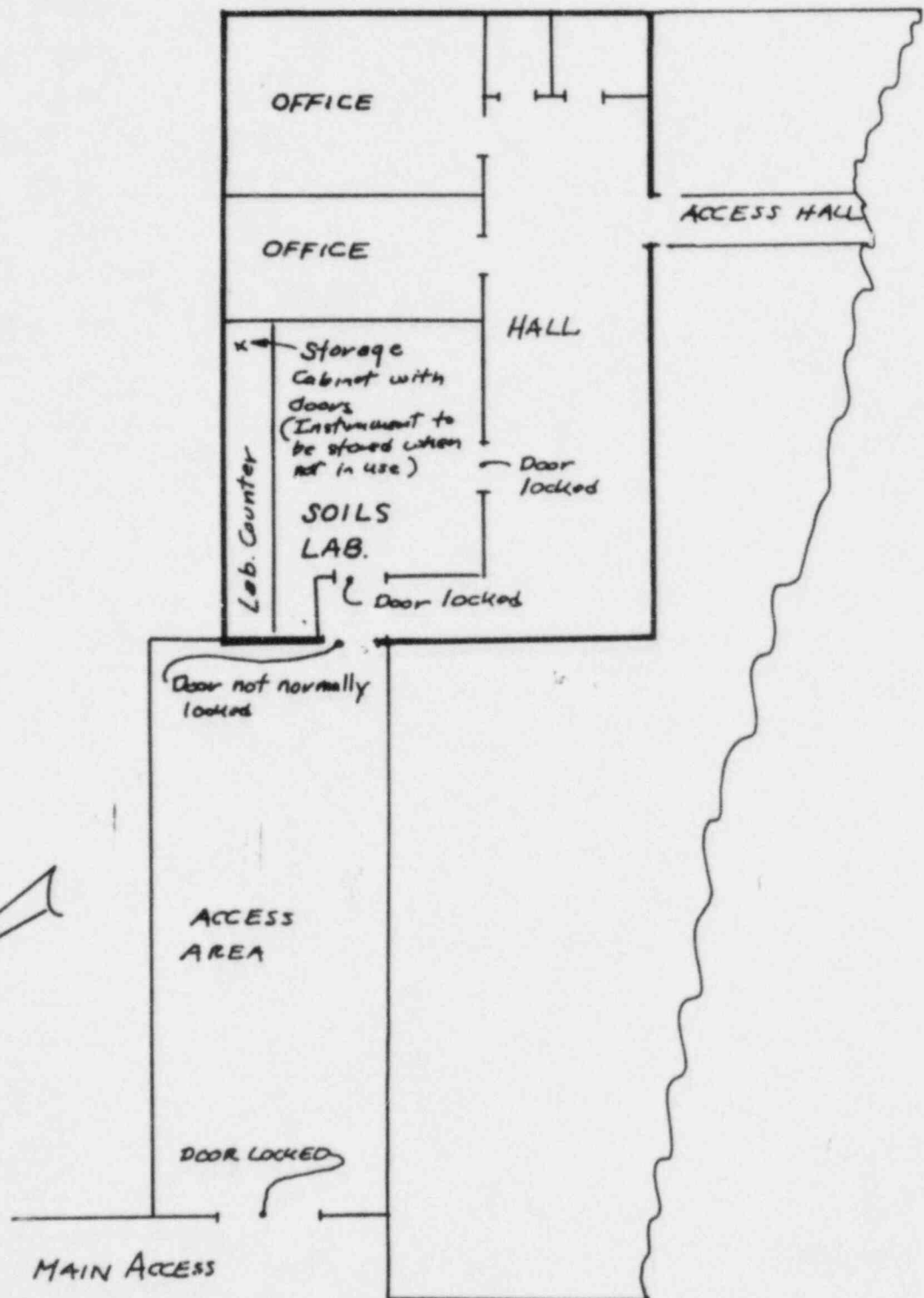
WARRANTY:

One year parts and labor including batteries and detectors. Field replacement of complete modules, batteries or detectors does not void the warranty.

Terra Engineering Laboratories Inc.

Floor plan to accompany

N.R.C. 3131 (5/5/85)



Note: "Door locked" means that the door is locked during non-business hours.

13. Storage Facilities

Please refer to Page VIII which is a drawing showing the floor plan of the Terra Engineering Laboratories Inc. lease space. The porta probe(s), will be stored in the storage cabinet in the soils lab. All doors to both the lab and to the outside are locked during off business hours. No one has keys except authorized Terra personnel. During transport to & from temporary job sites the instrument(s) will be either locked in a car trunk, camper shell or vehicle. While at the job site the instrument(s) will either be with the operator or locked in the vehicle.

14. Diposal

If disposal is required it will be as provided by Title 10 C.F.R. part 20 of the Federal Regulations by either a) return to the factory for disposition, sale to another licensed user or in the event of damage, transfer to an approved burial facility as provided by Federal regulation.

15. RADIATION PROTECTION PROGRAM

1. The responsibility for the radiation protection program shall rest with the radiation protection officer listed in 6. His duties will be as follows:

- a) Know the location of a gauge(s)
- b) Coordinate the safe use of the gauge(s)
- c) Assume compliance with the requirements of Title 10 CFR Parts 19, 20, and all applicable U.S. D.O.T. regulations.
- d) Assure byproduct materials possessed under the license are in conformity to materials listed on the license.
- e) Assure that use of devices in both the office and the field is by persons named as users under the license or persons who have completed acceptable training.
- f) Assure that all users wear personnel monitoring when using gauges.
- g) Assure that gauges are properly secured against unauthorized removal at all times.
- h) Serve as a point of contact & give assistance in case of emergency to insure that all proper authorities are notified promptly in case of accidents.
- i) Assure that terms and conditions of the license are met such as:
 - 1) Periodic leak tests are performed
 - 2) All required records are kept & reviewed periodically for compliance with regulations: These include source certificates, leak test reports, personnel exposure reports and records of transfer of radioactive materials.

II. Handling Procedures

- a) No one shall operate, attempt to operate, or transport the instrument unless authorized by the radiation protection officer.
- b) The source shall be kept in a "safe" or stored position when not in use.
- c) Wear a film badge or ther dose measurement device when using or transporting the instrument.

- d) Keep all unauthorized persons out of the operating area. The general public must not be exposed.
- e) Secure the gauge against unauthorized removal.
- f) Insure the performance of leak tests as required by the Radioactive Materials license.
- g) Instruct all personnel to ask about the use of the equipment.

III. Security

Locks will be maintained on the equipment to prevent accidental exposure of the sealed source when not under the supervision of authorized personnel. In addition storage containers shall be physically secured to prevent tampering or removal by unauthorized personnel.

IV. Personnel Monitoring

If monitoring is required, no person shall use equipment unless he is in possession of the appropriate form of dosimetry.

V. Records & Reports

- a) A biannual physical inventory will account for all sealed sources received & possessed under the license. The inventory shall be maintained for inspections.
- b) Sealed sources shall be leak tested as required by the certificate & shall not be used unless tested.
- c) Reports from the dosimetry service shall be maintained for inspection. All records will be made available to the employee upon request.

VI. Incidents

- a) Immediate notification shall be made to the following in the event of loss of a sealed source, whether accidental or due to theft.
 - 1) Terra Engineering Laboratories Inc. Radiological protection division - if available.
 - 2) U.S. NRC Regional Office.
 - 3) Wyo. State Health Department Radiological protection division - if available.
 - 4) Local police, fire & highway patrol.

5) Manufacturer.

b) Within 30 days after the loss, a written report must be filed giving detailed description of the source, circumstances of the loss, statement of disposition, possible radiation exposures of hazard, actions to prevent a recurrence of the loss of theft.

VII. Emergency Procedures

a) In the event of physical damage to a gauge, an exclusion area with a radius of fifteen (15) feet around the gauge shall be maintained until the extent of source damage (if any) is determined. If a vehicle is involved, it must be stopped and remain stopped until the extent of contamination hazard (if any) is determined. If visual examination of the instrument and source indicates damage to the source, including fracture of the weld, the appropriate authorities and manufacturer should be notified. The instrument may be removed from the site by using a shovel or other long handled instrument and placed in a suitable container such as a metal drum.

b) In the event of source leakage or separation (real or suspected) of a source from its normal containment, the 15 feet exclusion area shall be maintained until the arrival of the appropriate authorities.

c) If the rod containing the source becomes separated from the gauge, the rod will be picked up using pliers or tongs and inserted into top of the instrument, thus providing shielding. The rod then be secured in place using tape to prevent accidental unshielding of the source.

VIII. Transport by Private Motor Vehicle

The equipment, in its container, may be transported by motor vehicle under the "YELLOW II" label without placarding the vehicle as required by 49 CFR 177.823.

The device shall be locked and its container placed in a portion of the vehicle which can be locked. When not in transit the equipment shall be stored in a secured area.

Since the container has a Transport Index of 0.1 or greater it may not be stored less than 30 centimeters from passengers per 40 CFR 174.586. It also shall not be stored for more than 8 hours at less than 1 meter from undeveloped film.

IX. Leak Tests

Tests for leakage shall be performed utilizing the manufacturer procedure and equipment.

16. Formal Training In Radiation Safety

Include

- 1) J. Mark Resume
- 2) Richard Beaver Resume
- 3) Mark Certificate

17. Experience

See Resumes Provide in 16.

TROXLER ELECTRONIC LABORATORIES, INC.

HEREBY CERTIFIES THAT

JEROME M. MARK

of

CENTENNIAL ENGINEERING & RESEARCH INC.

HAS SUCCESSFULLY COMPLETED THE TROXLER ELECTRONIC LABORATORIES, INC.
TRAINING COURSE FOR THE USE OF NUCLEAR TESTING EQUIPMENT.

SUBJECTS INCLUDED IN THIS COURSE WERE AS FOLLOWS:

Radiological Safety

- | | |
|--|---|
| 1. Principles and practices of radiation protection. | 5. Radioactivity measurement standardization and monitoring techniques and instruments. |
| 2. Leak testing procedures. | 6. Accident and incident procedures. |
| 3. Mathematics and calculations basic to the use and measurement of radioactivity. | 7. Procedures for nuclear gauge storage and transportation. |
| 4. Biological effects of radiation. | 8. General safety precautions. |

Gauge Operation

- | | |
|-------------------------|----------------------|
| 1. Instrument theory | 4. Field application |
| 2. Operating procedures | 5. Gauge calibration |
| 3. Maintenance | |


INSTRUCTOR

11/9/83

DATE

W.F. TROXLER

PRESIDENT

No 04824

JEROME M. MARK
RESUME

February, 1976

General -

Married with 3 children
Registered Land Surveyor
Professional Engineer
B.S. in Civil Engineering at Colorado State University
OCD Qualified Fallout Shelter Analyst
OCD Qualified Community Shelter Planner

Professional Organizations

The Wyoming Planning Association - Founder.
National Society of Professional Engineers - past secretary

Chronological Work Record

Consultant Harold Hoskins and Associates, Lincoln, Nebraska
July 1956 to September 1957 - Jr. Engineer
Reference - George Underwood, 2021 Clubhouse Drive,
Greeley, Colorado

Work consisted of design of water and sewer systems,
construction staking, materials inspection and
coordination with contractors. Junior engineer on
the Riverton paving.

Wyoming State Highway Department, Cheyenne
September 1957 to November 1957 - Road Designer
Reference - Elwood Bass, Wyoming Highway Department,
Cheyenne, Wyoming

Work consisted of road design - computation of grade
lines, horizontal and vertical curves and computation
of all quantities in a highway project.

*Contractor - Black Construction Company, 1201 West 22nd
Street, Cheyenne, Wyoming - November 1957 to February 1959 -*
Project Engineer
Reference - T. P. Black, Jr., 2201 West 12nd Street,
Cheyenne, Wyoming

Work consisted of drawing and bidding house plans, design
of street and sewer grades, field and office work necessary
to prepare subdivision plans. Design of sewage lift
stations, estimation of costs, inspection of work done by
sub-contractors and supervision of housing construction
projects.

*Wyoming State Highway Department, Cheyenne, Wyoming
February 1959 to January 1961 - Assistant State Traffic
Engineer*

*Reference - R. C. O'Connell, Highway Safety Division
Denver Federal Center, Denver, Colorado*

Work consisted of intersection and channelization design. Supervision of state-wide annual speed study. Design of signing on all primary and interstate roads built during this period. Development of specifications and standards for interstate sign program. This consisted of structural design in aluminum, wood and steel requiring a specialized knowledge of wind loadings. Basic systems research was done to allow computerized design of the entire range of 420 signs with great variance in size. These designs were of the newly conceived breakaway design. The job also consisted of coordination of projects with District Field Offices, road and bridge design sections and our own traffic department staff.

*City Planner, Cheyenne, Wyoming, January 1961 to October 1963
Reference - Herbert Kingham, Former Mayor 3070 Dey Avenue,
Cheyenne, Wyoming*

Work consisted of master planning for the Cheyenne Urban area. The following basic studies were completed, population studies, building permit studies, existing land use plan, arterial and collector street plan, community facilities plan and park planning. The planning office was responsible for all annexing subdivisions and determining proper zoning for these. New zoning regulations were proposed for the City and the surrounding county.

*Consulting Business - Mark Engineering Company, Cheyenne,
Wyoming, October 1963 to March 1966 - Owner, Mark
Engineering
Reference - Roger Weidner, Cheyenne National Bank,
Cheyenne, Wyoming*

Work consisted of managing a consulting engineering business. The following projects were done during this period of time:

Preliminary design for master sanitary and storm sewer plan for Cheyenne and environs.
Design of Pine Bluffs Airport.
Design of two paving replacement projects for the Cheyenne Municipal Airport.
Structural design of Coyles Alpine Bar.
Structural design of Mountview Medical Center

Various structural design for large signs, retaining walls, etc.

Numerous land surveys and engineering surveys of various types.

Complete computations and street, sewer, water, paving, FHA exhibits, and engineering supervision of the following subdivisions.

- Sun Valley, 8th Filing - 37 lots
- Sun Valley, 9th Filing - 24 lots
- Sun Valley, 10th Filing - 31 lots
- Sun Valley, 11th Filing - 43 lots
- Villa Park, 1st Filing - 93 lots
- Sun Valley, 6th Filing - 91 lots
- North Gate Shopping Center - Not Applicable
- Texaco Industrial Area - Not Applicable
- Western Hills, 7th Filing - 56 lots
- Expedition Heights Industrial Park - 82 lots

Sanger Ranch Irrigation Project, Saratoga, Wyoming

Black Butte Ranch Irrigation Project, Pinedale, Wyoming

Design and layout of Prairie View Golf Course, Cheyenne, Wyo

Two parking lot layouts and misc. traffic engineering.

City of Cheyenne, Wyoming

City Engineer and Planner

March 1, 1966 to May 1, 1968

Reference - Herbert Kingham, Former Mayor, 3070 Dey Avenue, Cheyenne, Wyoming

Position consisted of the following duties:

Enforcement and administration of the following

Codes and coordination with their corresponding boards:

- Uniform Building Code
- Uniform Plumbing Code
- Uniform Sign Code
- Uniform Dangerous Building Code
- Uniform Mechanical Code
- Uniform Housing Code
- National Electrical Code.

Rules and regulations of the following boards;

are also administered entirely by my office:

- Board of Adjustment - Zoning Code
- City Planning Commission - Subdivision regulations, determining original zoning, checking design of all subdivisions.

The City Engineer sits as an expert or ex-officio member on the following boards:

- Water Board - (C.E. office keeps complete utility records)
- Urban Renewal Board - Provide mapping, information and coordination with the City Council.

The City Engineer and Planner has directed the following programs since March, 1966:

Model Cities Application (Funded 1969)

Central Business District Study - a 701 Consultant-done study costing \$24,000

Laramie County Shelter Plan - A City Engineer's staff-done study contracted with Corps of Engineers costing \$7,000

A study of problems with the Cheyenne Municipal Airport - This study instrumental in obtaining \$980,000 for runway rehabilitation from FAA and National Guard.

Cheyenne Area Transportation Study - A Wyoming Highway Department - U.S.B.P.R. - City of Cheyenne Study. Study cost \$180,000. The City Engineer's office responsible for basic project socio-economic data.

Workable Program - A federally required program preparatory to Urban Renewal projects consisting of the following elements:

Codes and Ordinances

Comprehensive Community Plan

Neighborhood Analysis

Administrative Organization

Financing

Housing for displaced families

Citizen Participation.

Special studies on housing, housing blight, and socio-economic characteristics were made as a part of this program. Much work was necessary to assure that the existing systems fit into program standards.

A comprehensive study of garbage and refuse collection system was done. This was a complex study of the existing collection system.

The study will result in a minimum net savings of \$150,000 per year. This study was done entirely by City Engineer's staff.

Other general duties consisted of:

All general code inspection for the codes listed previously.

Design of all water system improvements

Design of all drainage system improvements.

Subdivisions are checked prior to annexation for the following items:

Conformance to the subdivision regulations

Plat computations and legal ties are checked to assure correctness.

Water system and fire protection system are designed to assure adequacy.

Street sections and grades are checked to secure proper drainage from lots and connections to existing drainage system.

Sewer system is checked for adequacy and structural loads imposed. Ground water and soils condition are analyzed for possible problems.

All curb and gutter and driveway replacements are engineered by city forces.

All parking lots are approved by City Engineer's office.

All demolitions must meet City Engineer's requirements.

General roadway construction standards are being supervised by City Engineer's office.

Many other routine duties are a part of the job and are too numerous to mention here.

*Wyoming Department of Economic Planning and Development
May 1, 1968 - May, 1973- Chief of State Planning
Reference - Stan Hathaway, Cheyenne, Wyoming*

Position consists of initiation of planning in Wyoming in the following areas:

Administration of all 701 planning grants to Wyoming cities and counties--monitoring and fiscal management of all grant programs. Responsible for writing application to Department of Housing and Urban Development and obtaining funding. This is a \$50,000 annual program.

Responsible for doing Wyoming 23 county water and sewer study for towns under 5,500 in population. This was a \$75,000 study financed by Farmers Home Administration.

Responsible for contractual duties and monitoring of the following studies: Mineral Sector Study (a study of the present and future mineral development in Wyoming); A Demographic Study of Wyoming's People; A Study Design for State Planning; A Study of the Agricultural Economy of Wyoming. These studies comprise a \$220,000 package to start state comprehensive planning in Wyoming.

Responsible for beginning a planning Advisory Services program to Wyoming counties and communities. This is a \$45,000 annual program in which the state provides professional planning and management people to assist small communities and counties with their planning and management problems.

Involved in instituting state planning in Wyoming government. This effort comprises the institution of a data system, review of a state functional planning effort, coordination of planning and data needs, furnishing of economic projections, design of management mechanisms to accomplish more efficient government, involvement in the Federal Information Exchange System, and setting up of the Wyoming State Clearinghouse. Duties also include original research of population estimating, and functions of state government and state government programs.

City and County Plans completed while at DEPAD

- a) Douglas
- b) Meeteetse
- c) Buffalo
- d) Converse County

Vice President and Manager of VTN Wyoming Inc. Cheyenne office August 1973 to Feb 1976.

Work consisted of managing the Cheyenne office and major promotional efforts within Wyoming. Some of the projects accomplished during this period of time that I had a direct hand in were as follows:

- * Cheyenne, Laramie County Solid Waste Study. This project involved assessing the magnitude of the solid waste problem both in the City of Cheyenne and Laramie County. A complete technical & management review of the existing solid wastes handling & disposal systems were studied in depth.
- * Gillette Wyoming - Update of the comprehensive plan focused on the physical support systems including water supply, water treatment, sewage collection, drainage problems, and access problems from new subdivisions north of the track.
- * Powder River Basin New Communities Study - This study was done for five major mining companies who were attempting to decide where to put a coal gasification plant in the Powder River Basin. Alternate sites

investigated were Gillette, Douglas, & Wright Wyoming as well as sites in the Rochel Hills area. The study consisted of evaluation & costs of community support development at the above alternative locations. Impact on all local systems was evaluated.

- * Cheyenne Central Business District Study- This study evaluated redevelopment alternatives of the Central Business District. The study presented alternative development plans and the means to finance those developments through tax increment financing.
- * Buffalo Wyoming Step 1 Waste Water Study- This study involved assessing the existing Buffalo wastewater system and designing & costing a number of future wastewater alternatives as required by E.D.A.
- * Sheridan Wyoming Waste Water Study - J. Mark authored the final report but was not in charge of the study.

President Centennial Engineering & Research Inc.
Sheridan, Wyoming Feb 1976 to Feb 1985

Work consisted of management, promotion, supervision and performance of engineering & surveying functions. Some of the projects during this period were as follows:

- * Black Thunder Mine - Gillette Wyoming. This project started as a survey to "as-build" existing facilities (tracks, buildings, silo's, utilities) prior to a major expansion phase. The project also moved into a second phase including staking of all major expansion components including new silo's, 3.5 miles of track, new buildings and new utilities.
- * Design of Water facilities for the City of Sheridan, Wyoming. This was an E.D.A. project requiring the design to be completed in six weeks. J. Mark performed all field layout of facilities and all design on 2.5 million worth of line work including pressure reducing stations. He also performed initial data preparation and assembly of

initial data for a Hardy Cross analysis of the entire system. He was also responsible for description & Staking of all required R.O.W.'S.

- * Rojo Caballo Mine - Centennial was hired by W. A. Smith who had the contract to lay the track at the completely new facility. Work involved high precision surveying to align track work on the job.
- * Clearmont Wyoming Water development work consisting of five separate major water development projects.
- * Clearmont Wyoming drainage planning
- * Ranchester Wyoming Water development work
- * Development of an earthwork computation program called Terra byte.

Centennial would have in the order of 200 plus projects of various sizes annually. The above projects are a sampling.

The following geotechnical projects were performed by J. Mark while at Centennial.

- * Crow Tribal Housing Authority, Crow Indian Reservation in Southern Montana. \$1.2 Million 20 unit clustered housing development. \$2.1 Million 36 unit scattered housing development. Overall site evaluation subsurface drilling and recovery of samples, laboratory testing and recommendations for design and construction of foundations and grading. Foundation systems were designed to accommodate a variety of subsurface conditions ranging from very soft surface soils with ground water at a depth of 4 feet to very dense, highly expansive clays. These designs included a pier and grade beam system for the expansive clays.
- * F.C. Stangel Construction Company Salt Lake City, Utah. Construction of J.R. Big Boy Restaurant in Sheridan, Wyoming. Determination of subsurface profile by drilling

and backhoe excavation, recovery of samples, laboratory testing, design of 2,500 cubic yard foundation fill replacement, and construction compaction control. Presence of uncompacted fill on the surface and soft native silts beneath the site prompted analysis of the anticipated load distribution through the soil profile. Calculations revealed insufficient bearing strength which necessitated design of the structural fill.

- * Stan Everitt Sheridan, Wyoming Hill Pond Subdivision development in Sheridan. Compaction control on all phases of construction including sewer and water main installation and preparation of street subgrade and curb and gutter subgrade.
- * Edward Jolley Sheridan, Wyoming; Investigation of landslide and groundwater seeps. Site inspection of premises, monitoring of failed slope.
- * Design Concept Sheridan, Wyoming. Site fill for parking lot and office building for Wy-Mont Beverages of Sheridan. Compaction control in the form of 77 compaction tests on the 2,000 cubic yard site fill for building construction.
- * Bill Phillips Sheridan, Wyoming Failure investigation on premises due to landslide which pushed structure off the foundation. Site survey and inspection, monitoring and expert testimony on a landmark implied warranty lawsuit.

President & Founder of Terra Engineering Feb 1985
to present.

Presently serving as Chief Consulting Engineer to Abandoned Mines Lands program in Crook County Wyoming. Work presently consists of directing design of 61 orphaned bentonite mines. Present efforts include directing engineering efforts and performing special research studies in hydrology and geotechnical engineering.