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Arizona Department of Mines and Mineral Resources Mining Collection

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PART 1 OF 2

PRINTED: 01/06/2003

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: CAT'S PAUSE

ALTERNATE NAMES:
RHYOLITE 1-12

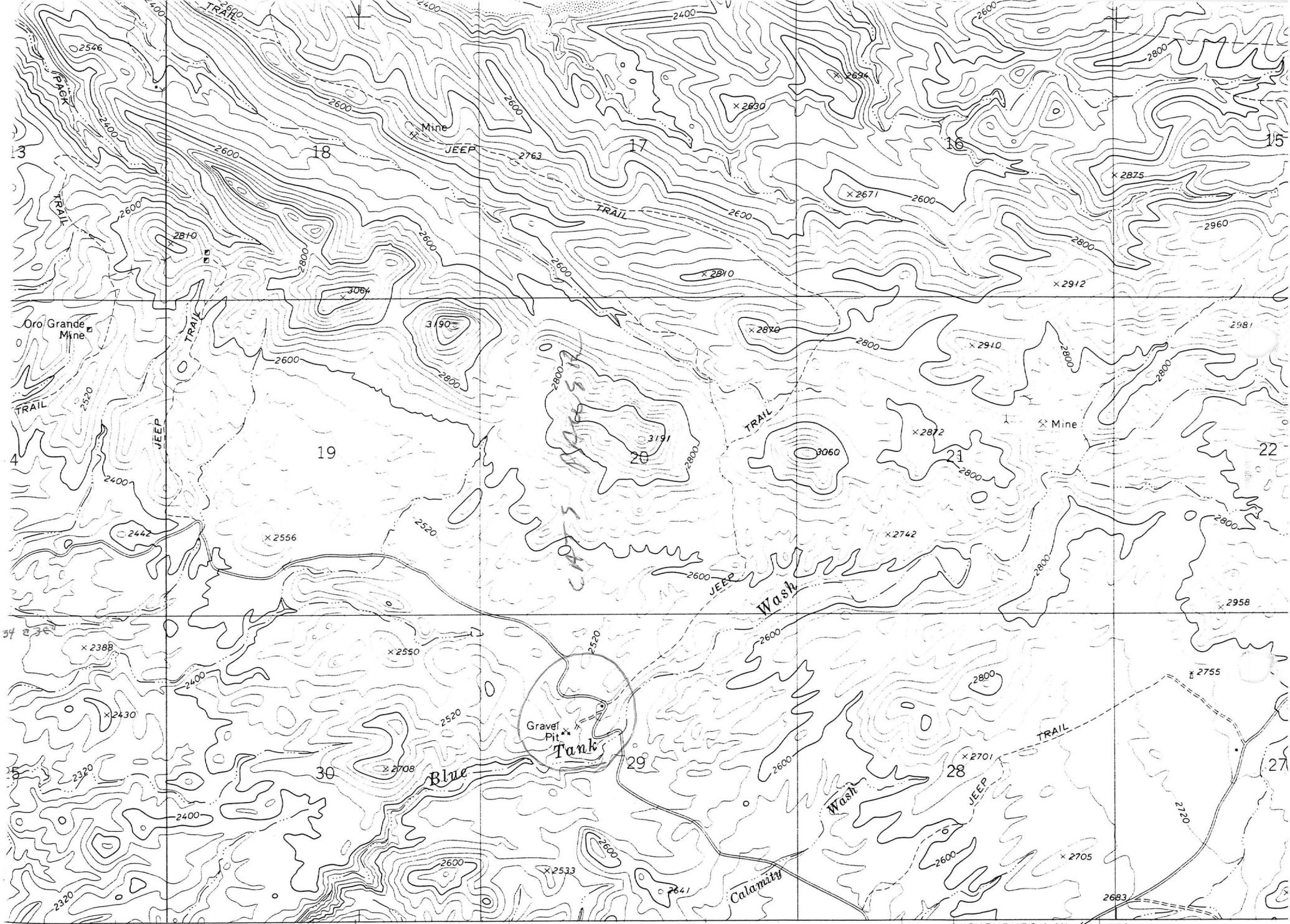
YAVAPAI COUNTY MILS NUMBER: 329

LOCATION: TOWNSHIP 8 N RANGE 4 W SECTION 29 QUARTER NE
LATITUDE: N 34DEG 00MIN 31SEC LONGITUDE: W 112DEG 41MIN 49SEC
TOPO MAP NAME: SAM POWELL PEAK - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
ZEOLITES CLINOPTILITE
PUMICE TUFF

BIBLIOGRAPHY:
USGS SAM POWILL PEAK QUAD
ADMMR CAT'S PAUSE MINE FILE
CLINOPTILOLITE IN ZEOLITE VOLCANIC TUFF USED
FOR KITTY LITTER AND AMONIUM ABSORBANT


Oro Grande Mine
Mine
Mine
Gravel Pit
Tank
Blue Wash
Wash
Wash
JEEP
TRAIL
PACK TRAIL
18
17
16
15
19
20
21
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2800
2320
R. 5 W.
R. 4 W.
42'30"
112° 41' 50"
(WICKENBURG)
3451 I NW
WICKENBURG 4 MI.
40'
SCALE 1:24 000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
MN

JUL02-9K

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

1. Mine file: CAT'S PAUSE
2. Mine name if different from above:
3. County: Yavapai
4. Information from: "Nonscents" Inc.

   Company:

   Address:

   Phone: 713-847-0281

5. Summary of information received, comments, etc.:

The above company reported their zeolite odor absorber does not come from the Texas-Arizona Mining Company's Cat's Pause Mine.

It comes from an unknown Arizona locality through a supplier named Robert Houston. The phone number of Robert Houston would not be provided. Instead they would ask him to call me. He has not contacted me yet and 2 requests were made during the last 3 months.

Date: July 31, 1989

Ken A. Phillips, Chief Engineer

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

1. Mine file: CAT'S PAUSE
2. Mine name if different from above: Rhyolite 1-12
3. County: Maricopa & Yavapai (Yavapai MILS 329)
4. Information from: A number of out-of-state callers

   Company:

   Address: Mississippi, Alabama, Texas

   Phone:

5. Summary of information received, comments, etc.:

Within the last month the Department has received 5 calls from companies in the Southeastern U.S. inquiring about where to buy "zeolite" in Arizona. These calls for "Nonscents", an odor absorbing "zeolite" mined by Texas-Arizona Mining Company at the Cat's Pause Mine. Reports are that the material retails for about $15 a pound.

Date: March 9, 1989

Ken A. Phillips, Chief Engineer

VIS9.16

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

1. Information from: James Muirhead and Louis Mehr
2. Address: 2103 Arthur Street, Wichita Falls, Texas 76309
3. Phone: (817) 723-7420
4. Mine or property name: Rhyolite Claims
5. ADMMR Mine file: Cat's Pause Mine
6. County: Yavapai
7. MILS number: 329
8. Operational Status:
9. Summary of information received, comments, etc.:

Messrs Muirhead and Mehr were in to discuss the status of the Cat's Pause mine. They are not supplying any material to "Non Scents". They are working to find market for their material for odor and smoke absorbants.

They provided copies of considerable data for the file.

Date: Sept. 24, 1990 Ken A. Phillips

FVDS.02

Department of Mines and Mineral Resources

MINE AND PROSPECT FIELD VISIT DATA SUMMARY

Sheet 1 of 2

COMMODITIES: **"Zeolitized" white tuff**

MILS ID No.: **Yavapai 329** DATE: **March 23, 1989**

ENGINEER: **Nyal Niemuth and Ken Phillips**

INFORMATION FROM:

PROPERTY SUMMARY

I. MINE NAME: **Cat's Pause** OTHER POSSIBLE NAMES **Rhyolite**
INCL. ANY CLAIM NAMES NOTED:

II. LOCATION: T R SEC(S): MINE DISTRICT

ELEV.: COUNTY TOPO QUAD.

DIRECTIONS:

MAP ATTACHED

III. OWNERSHIP: NAME **Sunup or Texas-Arizona** PHONE:

ADDRESS:

COMPANY NAME IF ANY:

PERTINENT PEOPLE:

IV. PROPERTY AND HOLDINGS: **See ADMMR Cat's Pause File**

V. PAST PRODUCTION-NOTED, KNOWN, PROBABLE, UNKNOWN, NONE: **Small tonnage produced for speciality products.**

VI. CURRENT STATUS: **Intermittant production of small lots.**

VII. WORKINGS: **Production pit 100' X 25' deep, additional dozer cuts and backhoe trenches. Mined down dip 30 to 50 feet. A few tons appear to have been loaded from stockpiled materials at the north east side of pit, stockpile 25-75 tons.**

VIII GEOLOGY AND MINERALOGY: DEPOSIT TYPE: **Sedimentary ash bed**

LENGTH: **Approx.1000** THICKNESS **2-10'** VEIN STRIKE **N 30 deg W** DIP **40 deg NE**

HOST ROCK: **Tuffs**

ECONOMIC MINERALS: **"Zeolityzed" white tuff, reported to be a few percent clinoptilolite.**

COMMENTS: **Pictures 8, 9 + 10. Future reserves likely available by stripping to the northeast. Deposit partly covered by basalt. Angular pieces of basalt are included as clasts of ¼" to 18" in tuff.**

IX. EQUIPMENT ON SIGHT: **None**

X. SAMPLING: NOTE TYPE IF ANY, DRILLING? **Selected sample collected**

XI. REFERENCES AND REMARKS:

CAT'S PAUSE

YAVAPAI COUNTY

KAP WR 5/22/87: Louis G. Mehr and James Muirhead were in to discuss mining claim problems. Their company, Texas-Arizona Mining Company (card), Tarpley Court, Katy, Texas 77449, phone (713) 391-1221 reportedly owns the Rhyolite 1-12 Claims (Cat's Pause - file) Yavapai County. They report they have an ownership conflict with Sunup Corporation, Tulsa, Oklahoma. Apparently both Texas-Arizona and Sunup are mining the zeolitized tuff deposit; each for only a few weeks annually and not simultaneously. Mr. Muirhead explianed that he supervises production of a product referred to as "Nonscents" made from the zeolitized tuff. The product supposedly absorbs ordors and is packaged in a variety of ways and sold for that use. It is composed entirely of the ground tuff. Mr. Muirhead's address is 1300 Wilcrest, #608, Houston, Texas 77042, phone (713) 789-1072.

James Muirhead
Plaza Oil & Gas (713) 697-4145 Phone # now (713) 347-1221

KAP WR 8/21/87: Louis G. Mehr and James Muirhead, Texas-Arizona Mining Company, Tarpley Court, Katy, Texas 77449, phone (713) 391-1221 were in to discuss activity on their Rhyolite 1-12 Claims, Cat's Pause - file) Yavapai County. They report they have been shipping 25 tons a month of the zeolitezed tuff to their Texas plant for use in manufacturing their product known as "Nonscents." They expect to increase that to 25 tons a week shortly. They are going to drill a few shallow holes to make sure the deposit is as big as they think.

NJN WR 10/30/87: Denver Hopkins, 603 Sweet Briar, Lafayette, Louisiana 70506 visited and reported that he has been buying a zeolite material from Texas Arizona Mining Corp (card) operators of the Cats Pause Mine (file) Yavapai County, but believes there is a dispute regarding ownership of the property and only a 50,000 ton reserve there. He has met with Ted Eyde and plans to acquire and produce from his own deposit, a product for hospital urea absorbents.

KP WR 8/31/78 - Pat Kirsky is going to market a kitty box and wanted to have more information on the Cat's Pause zeolitic tuff deposit. 6/6/79 a.p.

KP WR 4/24/79 - The zeolitic tuff deposit once operated as the Cat's Pause Mine, Wickenburg District, Maricopa County, was discussed with Ralph F. Lafferty Jr., President of Sunup Corp., 4308 E. Pine Place, Tulsa, Oklahoma 74115, Phone: (918) 836-0122. He has relocated the ground as the Rhyolite Mine with six claims Rhyolite No. 1-6. The ground was originally located by Dick Sardou. Sardou was the principle of a company; Texas Arizona Mining Company. Apparently the Gulf American Mining Enterprises Inc. of Phil Reinhardt, et. al. had leased the claims from Texas Arizona Mining Co. Sardou had originally, circa 1975, located 12 claims the Rhyolite 1-12. Lafferty of Sunup feels that since no assessment work had been filed for the last two years and Gulf American has apparently abandoned their Cat's Pause operation, the ground is open to location. Lafferty is particularly interested in the amonium adsorption properties of the zeolitic tuff's major zeolite constituent, clinoptilolite. The deposit has limited surface extent and quality material is not abundant. Lafferty hopes to hand sort and ship up to 100 tons of the material to his Tulsa plant. 6/19/79 a.p.

RRB WR 2/20/81: Rick Lafferty and Harold Ericksen of the Sunup Corp., 4308 E. Pine Place, Tulsa, Oklahoma 74115, phone (918) 836-0122, owners of Cat's Pause Mine near Wickenburg on Maricopa-Yavapai county line, report that they plan to start drilling program. Gave them the rules for operation on BLM land.

KAP WR 10/18/85: A call was received from a Kansas company regarding zeolite occurrences in Arizona. They are interested in obtaining a deposit. He promised a letter with more information and plans to purchase a copy of our zeolite publication. He did state that the clinoptilolite deposit near Wickenburg operated by Sun-Up Industries (Cat's Pause Mine - file) Yavapai County, was for sale for $250,000. He hoped to be able to find one for himself for much less money.

KAP WR 6/12/87: Provided information on the current status of the Rhyolite 1-12 Mine (file) Yavapai County, with Ted Eyde, GSA Resurces Inc(card), an industrial minerals consultant. He explained that he had done some work on the deposit in 1981 and that the material was primarily montmorillonite with a small amount of clinoptilolite. He further felt that the odor absorption properties might be less than those from other possible zeolite properties. Old reports in the file mention that the zeolite mineral is heulandite. Mr. Eyde explianed that the two minerals were often missidentified in zeolitized tuffs.

SARDOU CLAY

MARICOPA COUNTY

Dick Sardou owns deposit northeast of Wickenburg about 6 miles on Constellation Road. Guy Barnhardt interested. FTJ WR 4-22-66

Mr. Harry Kerr, Houston, Texas, called and talked with FPK re this property. 8-15-69

Mr. Sardou, Houston, came to announce his company, Texas-Arizona Mining Co., will start digging a clay deposit about six miles northeast of Wickenburg on the road to Constellation. This clay is to be used for filtering purposes, at first in the Houston area where he says experiments have indicated it removes 80% of cyanide from water issueing from the Armco Steel Co. plant. According to Mr. Sardou, it is also an effective deodorizer and removes bacteria from refrigerated produce. Mr. Sardou was raised in Wickenburg and attended the University of Arizona; he is a mechanical engineer. GW WR 4-19-71

Went to the former camp of Mr. Sardou 6 miles NE of Wickenburg where he stated he had a kaolin deposit. No one was in camp so no samples were taken. GW WR 1/9/75

Larry Johnson, son of William Johnson, Grants Pass, Oregon, and former owner of the sink-float mill north of Wickenburg, came in to discuss markets for tuff. He said he and a Mr. Reinhardt of Texas, had taken over the so-called kaolin deposit of Mr. Sardou, about 5 miles NE of Wickenburg. GW WR 4/28/76

Arizona Department of Mines and Mineral Resources

INFORMATION FROM MINE CARDS IN MUSEUM

ARIZONA
Yavapai
~~Maricopa~~ County

Wickemburg

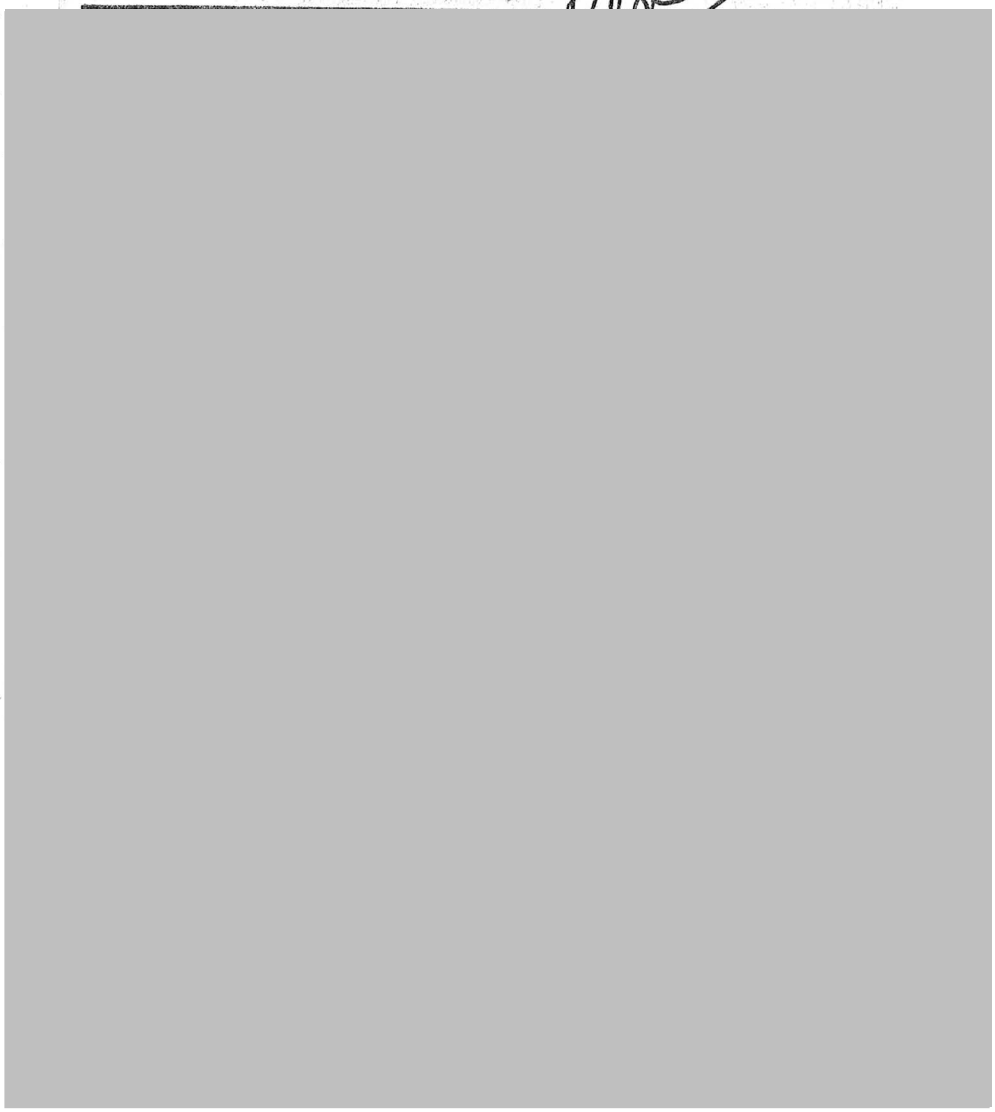
Cat's ~~Pause~~ Mine
Prop

MILS #329
1-AKA
CAT'S PAUSE(field)

MM-6160	Tuff
6162	Tuff
6163	Tuff
6165	Tuff, crushed

ZEOLITE COMMODITY FILE

RHYOLITE 1-12 (File)



The material is produced from the Rhyolite 1-12 (file) property. Also previously known as the Cat's Pause Mine

SUNUP
CORPORATION

12 June 1979

Mr. Glenn A. Miller
Department of Mineral Resources
Mineral Building, Fairgrounds
Phoenix, Arizona 85007

Dear Glenn:

Work is progressing on our project. We brought out 10,550-pounds last month and are underway. I thought, to bring your file up-to-date, I'd pass on some test results Anaconda ran. Cities Service, here in Tulsa, is using the ore in some testing. I will be happy to inform you as to the results.

Sincerely,

SUNUP CORPORATION

Ralph F. Lafferty, Jr., President

RFL,Jr.:mb

4308 EAST PINE PLACE / TULSA, OKLAHOMA 74115 / (918) 836-0122

THE [illegible] COMPANY, U.S.A.

Geology Department Laboratories

Mineralogical Report

Lab. Ref. No. Z-79-96 To: R. W. Knostmen

Proj./Chg. No. 02922

Proj. Location Wickenburg, Az.

Date 5/22/79

SAMPLE NO.	MINERALS	ESTIMATED PER CENT: Major (50–100)	Moderate (20–50)	Minor (3–20)	Trace (0–3)	REMARKS
A – (hand Specim. – fine lithic tuff)	Heulandite	✓				RECEIVED MAY 23 1979 INDUSTRIAL MINERALS
	Quartz			✓		
	Feldspar			✓		
	Cristobalite		✓			
	Calcite			✓		
	Glass (Amorphous material)		✓			
	Montmorillonite			✓		
	Other				✓	
B – (Coarse Crush. altered Vitric tuff)	Heulandite			✓		
	Quartz			✓		
	Feldspar			✓		
	Montmorillonite		✓			
	Glass (Amorphous material)	✓				
	Cristobalite		✓			
	Other			✓		
C – (1/4 – 1/2" Crush. altered Vitric/ lithic tuff)	Heulandite		✓			
	Quartz			✓		
	Feldspar			✓		
	Calcite			✓		
	Cristobalite		✓			
	Montmorillonite		✓			
	Glass (Amorphous material)	✓				
	Other			✓		

METHODS

1 – X-Ray Diff. ✓
2 – Optic ✓
3 – X-Ray Flu
4 – Heat treatment ✓
5 – DTA & TGA
6 – Spec. Ana.
7 – Other

By: H. Falk

Date: 5/22/79

Notes: Copies to G. Secor and H. Vincent

Ca "Pause Mine (File)

June 15, 1979

Cards All Made before a.p.

Ralph F. Lafferty, Jr., President
SunUp Corporation
4308 East Pine Place
Tulsa, Oklahoma 74115

Dear Mr. Lafferty:

Thank you for the test report on the zeolitic tuff from your Rhyolite claims. I would suspect that material similar to sample A would be best for odor adsorption.

We appreciate your courtesy in keeping us informed about your operations. We will keep you informed as to any inquiries regarding possible markets for your mineral production.

Sincerely,

Ken A. Phillips

Ken A. Phillips
Mineral Resources Engineer

KAP:mw

SUNUP
CORPORATION

12 June 1979

Mr. Ken Phillips
Department of Mineral Resources
Mineral Building, Fairgrounds
Phoenix, Arizona 85007

Dear Ken:

Work is progressing on our project. We brought out 10,550-pounds last month and are underway. I thought, to bring your file up-to-date, I'd pass on some test results Anaconda ran. Cities Service, here in Tulsa, is using the ore in some testing. I will be happy to inform you as to the results.

Sincerely,

SUNUP CORPORATION

Ralph F. Lafferty, Jr.

Ralph F. Lafferty, Jr., President

RFL,Jr.:mb

4308 EAST PINE PLACE / TULSA, OKLAHOMA 74115 / (918) 836-0122

THE ANACONDA COMPANY R.M.D.

Geology Department Laboratories

Mineralogical Report

Lab. Ref. No. Z-79-96 To: R. W. Knostman

Proj./Chg. No. 02922

Proj. Location Wickenburg, Az.

Date 5/22/79

SAMPLE NO.	MINERALS	ESTIMATED PER CENT: Major (50–100)	Moderate (30–50)	Minor (10–30)	Trace (0–10)	REMARKS
A- (hand Specim. -fine lithic tuff)	Heulandite		✓			RECEIVED MAY 23 1979 INDUSTRIAL MINERALS
	Quartz			✓		
	Feldspar			✓		
	Cristobalite			✓		
	Calcite				✓	
	Glass (Amorphous material)		✓			
	Montmorillonite			✓		
	Other				✓	
B- (Coarse Crush- altered Vitric tuff)	Heulandite			✓		
	Quartz			✓		
	Feldspar			✓		
	Montmorillonite		✓			
	Glass (Amorphous material)	✓				
	Cristobalite		✓			
	Other			✓		
C- (1/4 - 1/2" Crush. altered Vitric/ lithic tuff)	Heulandite		✓			
	Quartz			✓		
	Feldspar			✓		
	Calcite			✓		
	Cristobalite		✓			
	Montmorillonite		✓			
	Glass (Amorphous material)	✓				
	Other			✓		

METHODS

1 – X-Ray Diff. ✓
2 – Optic ✓
3 – X-Ray Flu
4 – Heat treatment ✓
5 – DTA & TGA
6 – Spec. Ana.
7 – Other

By: H. Falk

Date: 5/22/79

Notes: Copies to G. Secor and H. Vincent

SUNUP
CORPORATION

April 30, 1979

Mr. Glenn A. Miller
Department of Mineral Resources
Mineral Building, Fairgrounds
Phoenix, Arizona 85007

Dear Glenn:

My apologies for missing base with you in Wickenburg. Lang and I were running very late in getting back to Tulsa. The help you extended us was very beneficial.

Thank you again for your help. I look forward to visiting with you in the near future.

Sincerely,

SUNUP CORPORATION

Ralph F. Lafferty, Jr.

RFL,JR:mb

4308 EAST PINE PLACE / TULSA, OKLAHOMA 74115 / (918) 836-0122

June 15, 1979

Ralph F. Lafferty, Jr., President
SunUp Corporation
4308 East Pine Place
Tulsa, Oklahoma 74115

Dear Mr. Lafferty:

Thank you for the test report on the zeolitic tuff from your Rhyolite claims. I would suspect that material similar to sample A would be best for odor adsorption.

We appreciate your courtesy in keeping us informed about your operations. We will keep you informed as to any inquiries regarding possible markets for your mineral production.

Sincerely,

Ken A. Phillips
Mineral Resources Engineer

KAP:mw

Geology Department Laboratories

Mineralogical Report

Lab. Ref. No. Z-77-42

Proj./Chg. No.

Proj. Location Wickenberg, Az.

Date 2/19/77

SAMPLE NO.	MINERALS	ESTIMATED PER CENT (Major / Moderate / Minor / Trace)	REMARKS
Wickenberg Az. North Pit	Heulandite	✓	
	Clinoptilolite		A possible trace to minor amount.
	Tridymite/Cristobalite	✓	
	Quartz	✓	
	Feldspar	✓	
	Montmorillonite	✓	
	Fluorite	✓	
	Other		

METHODS

1— X-Ray Diff. ✓
2— Optic
3— X-Ray Flu
4— Heat treatment ✓
5— DTA & TGA
6— Spec. Ana.
7— Other

By: H. S.

Date: 2/22/77

Notes:

XC to H. A. Vincent

LABORATORY ANALYSIS
RHYOLITE

COMPOSITION ANALYSIS:

Silica as S_1O_2	59.73% by wt.
Alumina as Al_2O_3	14.27%
Iron as Fe_2O_3	2.46%
Calcium as CaO	2.75%
Magnesium as MgO	0.01%
Sulfate as SO_4	0.04%
Loss to ignition	15.34%
Ph	8.85
Water soluble solids	0.92%
Water in soluble solids	2.57%
Residual solids	96.51%
Bulk density (6 cm. dia.)	1.239 g/cc
Bulk density (150-200 mesh)	1.406 g/cc
Dissolved solids---	
Sodium	780 ppm
Potassium	246 ppm
Calcium	50 ppm
Magnesium	8 ppm
Silicate (SiO_3)	1 ppm
Chloride	332 ppm
Carbonate	31 ppm
Sulfate	15 ppm
	8 ppm
Water content	8.44%/wt.

PHYSICAL PROPERTIES:

Permeability (Nitrogen)	.35 millidarcies
Surface area	3.83 m^2/g
Porosity	35.9%/volume
Pore radius	.33 microns

Swell rate--	
Deionized water	11% volume
Tap water	5% volume
Saturated sodium chloride solution	1% volume
Thermal stability to	850 C/1560 F
Water absorption	70.89% (dry wt.)
Ammonia adsorption	.39 mg/g

One g rhyolite will adsorb .39 mg ammonia--

1 minute	74% removed from solution
60 minutes	92% removed from solution
720 minutes	98% removed from solution

given to me & typed June 7 95

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine: Gulf American Mining Co. (Cat's Pause) Date: January 8, 1976

District: Wickenburg, Yavapai County Engineer: Ken A. Phillips

Subject:

Former name: Texas-Arizona

Owner: Gulf American Mining Enterprises, Inc. (GAME), P.O. Box 1867, Wickenburg, 85358, 253-6930. Philip E. Reinhardt is President and Lawrence F. Johnson is General Manager

Employees: Seven at time of visit.

Mineral Tuff. The material was apparently at one time called "Rhyolite" and the name has more or less stuck. A detailed analysis of the material was performed by the Institute for Research in Houston, Texas (copy attached). In summary, that report showed the material to be "...primarily a clay-like alkali alumnosilicate similar to montmorillonite. In addition, small amounts of quartz, muscovite, iron oxides, mixed feldspars as orthoclase, microcline, etc., were detected." The material is chalk white with ½-3% dark specks of basalt by volume.

Location: NW¼, Sec. 29, T8N R4W (Sam Powell Peak, Ariz., 7½ min. quad)

Operation: Here volcanic tuff is mined from a pit with a D-8 ripper and loaded into a 5 ton ore bin with a 1½ yard cat front end loader. The bin feeds a 9x21 jaw crusher. Minus 2 inch is fed to a 22 inch cone crusher. Cone output is screened to remove fines which are presently discarded, middlings go directly to a 5 ton dump truck and the oversize is fed through a set of rolls to the dump truck. Final product is -1/8+1/16. Product is hauled to a bagging plant and packaged in 10 pound plastic bags to be marketed as cat litter. Total capacity is estimated to be 25 tons per day.

Deposit: The volcanic tuff occurs interbedded with basalt in a surface exposure of about 300 by 1200 feet striking almost due north and dipping 50-70 degrees west. Reinhardt reports one geologist's estimate of reserves to be 5 million tons but no drill holes to verify that estimate were seen at the time of this visit. Approximately 30' of tuff is exposed by Blue Tank Wash 200' south of the present working pit.

Future plans: In addition to cat litter, GAME hopes to sell the material for specialized industrial and chemical uses. Their present cat litter production capacity well exceeds their orders.

INSTITUTE FOR RESEARCH, INC.
8330 WESTGLEN DR. • HOUSTON, TEXAS 77042 • 713/783-8400

October 2, 1973

c.

tical Report

SUBJECT: Composition analysis of "Rhyolite" material.

METHODS: Gravimetric analysis
Atomic absorption spectrophotometry
Infrared spectrophotometry
X-ray powder diffraction spectrometry

RESULTS: A. Soxhlet extraction (water solvent):

1) Water soluble solids = 0.92% by weight
2) Water insoluble solids = 2.57% by weight
3) Total removed solids = 3.49% by weight
4) Residual solids = 96.51% by weight.

The soxhlet extraction was performed on material which was ground to an average particle size of 2 mm diameter.

B. A determination of bulk density was performed on a piece of material approximately 6 cm in diameter. The density was found to be 1.239 g./cc. A portion of the sample was then ground to a fine powder, and sieved to yield a fraction ranging from 150-200 mesh (106 microns - 74 microns). The specific gravity of that sample was found to be 1.406 g./cc.

C. Analysis of the soxhlet extraction solution was performed to determine the composition of the dissolved solids. The results are presented as follows:

Parameter	Value
1) pH	8.85
2) Total dissolved solids	780 ppm
3) Sodium	246 ppm
4) Potassium	50 ppm
5) Calcium	8 ppm
6) Magnesium	1 ppm
7) Silicate (as SiO_3)	332 ppm
8) Chloride	89 ppm
9) Bicarbonate	31 ppm
10) Carbonate	15 ppm
11) Sulfate	8 ppm

D. Water content (determined from weight loss @ 103°C for 24 hours):

Water content = 8.44% by weight

E. Structural identification of the Rhyolite material was performed by infrared and x-ray diffraction techniques. The infrared spectrum revealed major absorptions corresponding to silicon-oxygen bonding typical of clay-like alumnosilicates. There is also evidence of inorganic sulfate; however, no carbonate was detected. Absorptions at 1640 cm^{-1} and 3600 cm^{-1} indicate that the material is hydrated. Lack of absorptions in the regions of 1350-1450 cm^{-1} and 2800-3000 cm^{-1} indicates that the Rhyolite does not contain significant amounts of organic material.

X-ray powder diffraction analysis of Rhyolite shows the material to be primarily a clay-like alkali alumnosilicate similar to Montmorillonite. In addition, small amounts of αquartz (SiO_2), Muscovite ($KAl_2Si_3AlO_{10}(OH)_2$), γ & ϵ iron oxides (Fe_2O_3), and mixed feldspars as orthoclase, microcline, etc. were detected. The low degree of x-ray beam scattering indicates that the Rhyolite does not contain significant amounts of amorphous material.

COMMENTS: It is recommended that additional tests be conducted to fully characterize the gross physical properties of Rhyolite so that accurate comparisons may be made between Rhyolite and activated charcoal. Such tests should include the determination of total surface area by nitrogen adsorption, and the measurement of total pore volume in cc./g. The mean pore radius may also be calculated if needed, along with the fluid and gas permeability.

In addition, several tests may be devised to evaluate the efficiency of Rhyolite in removing airborne contaminants as particulate matter, bacteria, and trace gases and vapors. The precise nature of each test will depend upon the anticipated commercial use of the material.

Respectfully submitted,

INSTITUTE FOR RESEARCH, INC.

Dan E. Posey

Dan E. Posey
Laboratory Manager

DEP/ab
Enc.

CAT'S PAUSE MINE YAVAPAI

Gulf American's Cat's Pause cat litter plant is idle awaiting more orders. KAP WR 5/26/

Went to the tuff deposit of Larry Johnson and Phil Rhinehardt 5 miles east of Wickenburg where they say they have more requests for cat litter than they can fill. However, they are starting to expand the open-cut both in depth and length. GW WR 8/6/76

Phil Reinhardt, Cat's Pause plant of Gulf American Mining, is still producing cat litter for an increasing number of orders. They are still well below capacity and in bad need of more orders. They have been contacted by a couple of prospective bulk buyers but cannot agree on a price. KAP WR 8/17/76

Western Prospector & Miner Jan, Feb. 1977

KP WR - 9-9-77 - Phil Reinhardt, President, Gulf American Mining Enterprises, operators of the Cat's Pause mine near Wickenburg is continuing to promote his material. He is disappointed in their small but steady production of cat litter and is hoping for someone to appear with an offer to buy out his operation and provide him with a high paid position. The material has potential for a number of industrial uses of higher unit value than cat litter. The material's primary constituate, according to one usually reliable report is the zeolite mineral clinoptilolite which may be an important part in future sewage treatment plants.

10-6-77 - SANTA FE R.R. CALLED FOR DATA. G.A. HAS Applied for special shipping rates as adsorbent MATERIAL (MR BILL HARGROVE of S.F RAILROAD)

KP WR 2/7/78 - Phil Reinhardt, Gulf American Mining Enterprises, 201 E. Camelback, Phoenix (new address) phone 265-7300 is still involved in promoting the zeolitic tuff from his Cat's Pause Mine. He has staked some additional claims on additional outcrops of the material adjacent to his existing claims. 4/18/78 a.p.

GM/WR 4/11/79 - Visited Gulf American's Cat's Pause Cat Litter Mine about five miles north-east of Wickenburg. (Phillip E. Reinhardt, Innovations, Inc., A Contemporary Marketing Co., 221 E. Camelback Road, Suite 23, Phx., Az. 85012, phone (602) 274-3390. Former operator of the property is now interested in gold placering operations. There is no activity at the property. The main residence was burned. All that remained in the area where the bag plant was operated is a concrete pad, some busted bags of product (I brought one as a sample to the office) and a steel tower which was part of the bag plant. A gutted trailer house, an abandoned car and other material is still about the area. At the mine site the only equipment was the remnants of the crusher and conveyor system. They cut a 20' deep trench striking S35E 200' long. The trench exposed "ore" material for about 150'. I brought some sample back to the office. 4/26/79 a.p.

INSTITUTE FOR RESEARCH, INC.
8330 WESTGLEN DR. • HOUSTON, TEXAS 77042 • 713/783-8400

October 2, 1973

c.

tical Report

SUBJECT: Composition analysis of "Rhyolite" material.

METHODS: Gravimetric analysis
Atomic absorption spectrophotometry
Infrared spectrophotometry
X-ray powder diffraction spectrometry

RESULTS: A. Soxhlet extraction (water solvent):

1) Water soluble solids = 0.92% by weight
2) Water insoluble solids = 2.57% by weight
3) Total removed solids = 3.49% by weight
4) Residual solids = 96.51% by weight.

The soxhlet extraction was performed on material which was ground to an average particle size of 2 mm diameter.

B. A determination of bulk density was performed on a piece of material approximately 6 cm in diameter. The density was found to be 1.239 g./cc. A portion of the sample was then ground to a fine powder, and sieved to yield a fraction ranging from 150-200 mesh (106 microns - 74 microns). The specific gravity of that sample was found to be 1.406 g./cc.

C. Analysis of the soxhlet extraction solution was performed to determine the composition of the dissolved solids. The results are presented as follows:

Andy Zierdt

Parameter	Value
1) pH	8.85
2) Total dissolved solids	780 ppm
3) Sodium	246 ppm
4) Potassium	50 ppm
5) Calcium	8 ppm
6) Magnesium	1 ppm
7) Silicate (as SiO_3)	332 ppm
8) Chloride	89 ppm
9) Bicarbonate	31 ppm
10) Carbonate	15 ppm
11) Sulfate	8 ppm

D. Water content (determined from weight loss @ 103°C for 24 hours):

Water content = 8.44% by weight

E. Structural identification of the Rhyolite material was performed by infrared and x-ray diffraction techniques. The infrared spectrum revealed major absorptions corresponding to silicon-oxygen bonding typical of clay-like alumnosilicates. There is also evidence of inorganic sulfate; however, no carbonate was detected. Absorptions at 1640 cm^{-1} and 3600 cm^{-1} indicate that the material is hydrated. Lack of absorptions in the regions of 1350-1450 cm^{-1} and 2800-3000 cm^{-1} indicates that the Rhyolite does not contain significant amounts of organic material.

X-ray powder diffraction analysis of Rhyolite shows the material to be primarily a clay-like alkali alumnosilicate similar to Montmorillonite. In addition, small amounts of αquartz (SiO_2), Muscovite ($KAl_2Si_3AlO_{10}(OH)_2$), γ & ε iron oxides (Fe_2O_3), and mixed feldspars as orthoclase, microcline, etc. were detected. The low degree of x-ray beam scattering indicates that the Rhyolite does not contain significant amounts of amorphous material.

INSTITUTE FOR RESEARCH, INC.

COMMENTS: It is recommended that additional tests be conducted to fully characterize the gross physical properties of Rhyolite so that accurate comparisons may be made between Rhyolite and activated charcoal. Such tests should include the determination of total surface area by nitrogen adsorption, and the measurement of total pore volume in cc./g. The mean pore radius may also be calculated if needed, along with the fluid and gas permeability.

In addition, several tests may be devised to evaluate the efficiency of Rhyolite in removing airborne contaminants as particulate matter, bacteria, and trace gases and vapors. The precise nature of each test will depend upon the anticipated commercial use of the material.

Respectfully submitted,

INSTITUTE FOR RESEARCH, INC.

Dan E. Posey

Dan E. Posey
Laboratory Manager

DEP/ab
Enc.

INSTITUTE FOR RESEARCH, INC.
1714 RICE BOULEVARD • HOUSTON, TEXAS 77005 • JA 6-4093

June 1, 1971

SUBJECT: Bacteriological examination of Rhyolite material.

PURPOSE: The intent of these experiments is to determine whether of not the rhyolite material is capable of filtering airborne bacteria from the air and holding them for a short length of time. In order to obtain correlateable results, the rhyolite material is compared to both activated charcoal and a Fuller Brush Co. product known as "Ful-Aire."

METHOD: Three (3) identical glass tubes were packed with equivalent amounts of each product; that is, one (1) tube containing the rhyolite, one (1) containing the "Ful-Aire", and a third containing activated charcoal. Each tube was them attached to the inlet port of a biologically sterile Millipore monitor, using sterile tubing to make the attachments. The exit ports of each packed tube-Millipore monitor apparatus were then commonly joined to a suction pump. Ambient laboratory air was then simultaneously sucked through these devices for a period of one (1) hour. It is estimated that approximately 10 cubic feet of air passed through these devices during this period of time.

After exposure, each Millipore monitor was inoculated with a growth media suitable for airborne bacteria and incubated for a suitable length of

time. After incubation, the Millipore monitors were opened and microscopically examined for bacterial growth.

RESULTS:

Sampling Procedure	Total Colony Count
(1) Air drawn through rhyolite	1
(2) Air drawn through charcoal	1
(3) Air drawn through "Ful-Aire"	1
(4) Air drawn through no filter	10

COMMENTS: As may readily be seen from the data; rhyolite, charcoal, and "Ful-Aire" all effect approximately 90% efficiency in removing bacteria from the air. It is significant that rhyolite is capable of filtering with the equivalent efficiency of activated charcoal. It is difficult, however, to justify the filtering ability of rhyolite based on any micromolecular structure.

It is assumed that the rhyolite removes bacteria from the air in much the same manner as does activated charcoal; that is, simply by filtering out the dust particles on which the bacteria travel. In such a case, the molecular structure is not as significant as the macroscopic structure and properties of the granule. These macroscopic properties include such quantities as porosity, total surface area, permeability, grain size distribution, etc.

I shall be more than happy to consult and/or experiment further on this matter at your request.

Respectfully submitted,
INSTITUTE FOR RESEARCH, INC.

Dan E. Posey
Laboratory Manager

DEP/gb

PART 2 OF 2

PRINTED: 06-21-2006

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: CAT'S PAUSE

ALTERNATE NAMES:
RHYOLITE 1-12

YAVAPAI COUNTY MILS NUMBER: 329

LOCATION: TOWNSHIP 8 N RANGE 4 W SECTION 29 QUARTER NE
LATITUDE: N 34DEG 00MIN 31SEC LONGITUDE: W 112DEG 41MIN 49SEC
TOPO MAP NAME: SAM POWELL PEAK - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
ZEOLITES CLINOPTILITE
PUMICE TUFF

BIBLIOGRAPHY:
USGS SAM POWILL PEAK QUAD
ADMMR CAT'S PAUSE MINE FILE
CLINOPTILOLITE IN ZEOLITE VOLCANIC TUFF USED
FOR KITTY LITTER AND AMONIUM ABSORBANT

TEXAS AIRZONA MINING COMPANY INC.

ZEOLITE PROJECT

TABLE OF CONTENTS

RHYOLITE TUFF

JAMES A. MUIRHEAD — GEOLOGIST — OIL — GAS — MINERALS — DOMESTIC — LATIN AMERICA

(817) 723-7420 • 2103 ARTHUR STREET • WICHITA FALLS, TEXAS 76309

Rhyolite Tuff

Introduction: Texas Arizonia Mining Company owns several mining claims in Arizonia. These claims consist of a rhyolite tuff derived from a volcanic ash fallout, due to vulcanism in the general area. The nearest city to these properties is Wickenburg, Arizonia better known as the dude ranch capitol of the West.

Material: The tuff is known as a rhyolite tuff, which means it is a very light Quartz rich rock and has numerous amounts of biotite flakes present. The tuffs were deposited in a lake like environment and toward the end of the ash fallout, the source of chunks were lithified basalts or lava, which were deposited on top of the tuff deposit.

Reserve calculation indicate a minimum of 5,799,123 tons of tuff reserves. This is based on an outcropping thickness of 20', that is exposed on the surface. The thickness underground is probably 100' to 200' thick, and would increase reserves from 57,791,123 tons or 86,686,848 tons respectively. (See Geologic Report, EXHIBIT B).

Chemical Composition: The material has been chemically analyzed several times. (See EXHIBIT C) The analysis varies according to the location of material and sampling techniques. Generally it is alumina-silicate.

This material is a clay type and is classified as an industrial material.

Research: Several research labs have tested this material and attempted to determine its many uses. The most recent research work was conducted by RAMTECH LABS, that are located in California. (See EXHIBIT A).

Marketing: Two companies are actively engaged in marketing this material at this time.

The first company, Rock out, is located in Arkansas and they are marketing commercial filters to restaurants and flower shops. They have been actively testing and installing their filters for approximately six months. The filters have been very successful in removing odors and airborne bacteria.

The second company is Non Scents and is located in the Houston metroplex. They are specializing in home use and are organizing a multilevel direct marketing sales organization. This organization is approximately two months old, and is too young to equate its success or failure rate.

Additional uses are available to market at this time. Commercial and industrial market have not been exploited. A couple of areas of interest include water purification, and water softener.

Also, hospitals and nursing homes should be marketed to reduce odors and airborne bacteria problems.

Conclusion and Recommendation: In conclusion, this rhyolite tuff deposit has a multitude of uses and current research for applications is in its infancy; however marketing the product is the key to success.

There is an ample supply of material deposited to meet packaging requirments at this time. Initially, the material can be mined as an open pit operation with minimal equipment, personnel etc.

It is the recommendation of this writer that the property be cored to a minimun of 300' on all claims to verify the tonnage of material in reserve before expending a large amount of funds on a major marketing undertaking.

Also, recommend immediate action to initiate research and testing the material as a water softener and for water purification applications.

The material should be tested for all applications in hospitals and nursing homes for absorption of odors and control of airborne bacteria.

Respectively Submitted.

10 April 57

James Muirhead

Geologist

Texas Rio Grande Mining Co

10 Apr. 1957

RAMTECH LABORATORIES

RAMTECH LABORATORIES

14104 ORANGE AVENUE, PARAMOUNT, CALIFORNIA 90723 • TELEPHONE (213) 633-4824

MATERIALS ANALYSIS OF
PARROT MINING CORP.
MINERAL SAMPLE

August 21, 1979

Laboratory Number 5095-79

Prepared for:
Parrot Mining Corp.
P.O. Box 1167
Aspen, Co 81611

Attention: Mr. Larry Vandling

Prepared by:
RAMTECH LABORATORIES, INC.

Dr. Gary J. Ewell

Approved by:
RAMTECH LABORATORIES, INC.

Ronald A. Macey, Laboratory Director

Parrot Mining Corp.
Lab. No. 5095-79

RAMTECH LABORATORIES

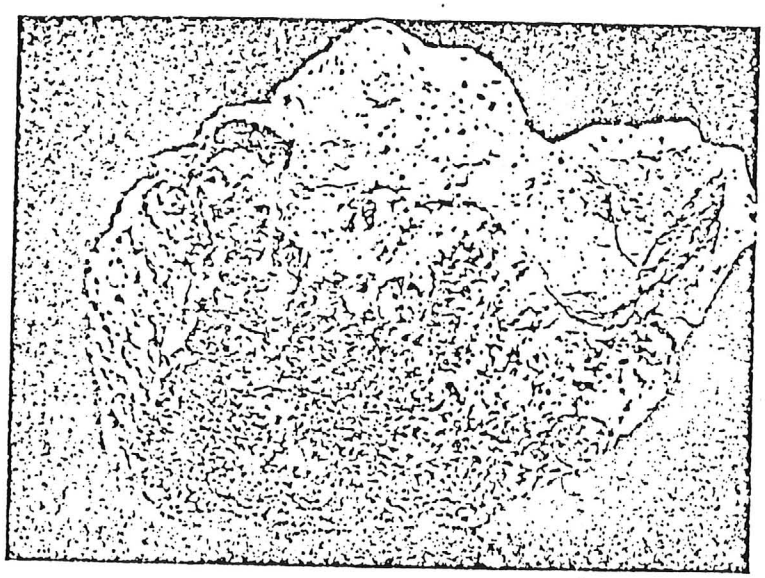


FIGURE NO. 1

SAMPLE NO. 1

MAGNIFICATION 2x

COMMENTS: Overall view showing white matrix, dark, orbicular inclusions and fine inclusions.

RAMTECH LABORATORIES

CONTENTS

TEST OR ANALYSIS DESCRIPTION

RAMTECH LABORATORIES

SUMMARY OF RESULTS

TEST PARAMETER		RESULTS FOUND
1.	Mohs Hardness	2.5 to 3
2.	Compressive Strength (2" x 2" cubes)	Oven Dry: 3,670 psi Saturated: 3,215 psi
3.	Zeolite Activity Analysis	The mineral is a classic type natural Zeolite
4.	Specific Gravity	1.52 grams/cm^3
5.	Microscopic Petrographic Analysis	See photographic data
6.	Pozzolanic Index	The material does have Pozzolanic properties
7.	Complete Chemical Analysis	$Na_2O \cdot CaO \cdot Al_2O_3 \cdot n\ SiO_2 \cdot xH_2O$ Also see complete tables of analysis
8.	High Temperature, Pyrometric Cone Equivalent	Orton Cone #13 2410°F to 2455°F
9.	Thermal Conductivity	Solid Material: 3.92 k factor #5 Mesh loose granules: 1.18 k factor
10.	Water Absorption	2 hrs. 16.2% 24 hrs. 25.7%
11.	G.E. Reflectometer (reflectance)	Light Material: 71% Dark Material : 14%
12.	Dielectric (conductivity)	7.5 x 10^5 Ω/ft. @ 500 V dc
13.	Odor Adsorption (retention)	High adsorption, excellent retention
14.	Ion, exchange (efficiency)	Natural form : 85% Regenerated form: 98%

Results:

1. Mohs hardness

The mineral was tested with standard Moh hardness scratch pencils, the hardness was found to be between 2.5 to 3.0 on the Moh hardness scale, this is equivalent to Gypsum or Calcite in hardness.

2. Compressive strength (2" x 2" cut cubes)

Two inch cubes were diamond sawn from the material and were tested in compression. The tests were conducted in both the oven dry and water saturated conditions.

Test condition	Average of 3 tests compressive strength
Oven dry	3,670 psi
Saturated	3,215 psi

RAMTECH LABORATORIES

3. Zeolite Activity Analysis

Element	Oxide Form	% by Weight, Oxide Form
Aluminum	Al_2O_3	41.7
Iron	Fe_2O_3	1.2
Silica	SiO_2	40.0
Magnesium	MgO	3.4
Sodium	Na_2O	2.1
Potassium	K_2O	1.2
Titanium	TiO_2	0.7
Calcium	CaO	9.7
Total		100.0

Metallic elements (less than 1% of the total) were also found.

(See table of complete analysis)

Discussion

1. From the spectrographic analysis, the Rhyolite has the basic chemical elements present to be chemically the same as a classic type natural Zeolite. This formula is $Na_2O \cdot CaO \cdot Al_2O_3 \cdot n\ SiO_2 \cdot x H_2O$. The magnesium, iron and titanium are considered as mineral impurities. The primary constituent is the hydrated silicate of aluminum.

4. Specific Gravity (bulk)

The sample was weighed in air and then weighed suspended in water, and the specific gravity was calculated.

Bulk sp.gr.	=	1.52 grams/cm³
Solid Bulk Weight	=	94.85 pounds/cu.ft.

5. Microscopic Photographic Analysis

A number of mineral samples, varying in size from 4 to 5 inches to one-half inch in diameter, were provided for a materials analysis. Various samples were examined for surface topography, microstructure, and chemical composition. After a preliminary visual examination to group the supplied samples by surface color, texture, and apparent reflectivity, a thorough examination was given eight (8) specimens which incorporated the range of extremes of color and texture variation (chalky-white, granular to brown-black reflective).

The results of the examination are shown in Figures 1 through 70 which include both optical color photographs and scanning electron microscope (SEM) photographs.

5. (con't)

Sample 1 (Figures 1 through 25) show orbicular inclusions overlaid with a brown-black dendritic pattern over the chalky-white matrix. The matrix contains inclusions of a rope-like nature and a microstructure indicating slow-coloring. The inclusions and matrixes are both of a complex silicate, having minor amounts of alumina, phosphate and iron oxide. The orbicular inclusions have much the same texture as the matrix, but are appreciably higher in calcium, with traces of titania and sulphur (Figure 12). The material is fairly dense, but contains microcracks and a significant amount of porosity (Figure 17 and 18).

Sample 2 (Figures 26 through 30) shows a dark grey deposit over the white matrix. The grey shows a texture typical of hydrothermally deposited material (Figure 28), which is very rich in calcia; this material may be a complex of calcite and a silicate in which iron has partially replaced the silica (Figures 29 and 30).

Sample 3 (Figure 31 through 39) is a reddish brown area overlaying the white matrix. Two areas (Figure 32) were selected for analysis.. One (Figures 33-35) shows a very fine textured deposit, a silica containing appreciable amount of magnesia and iron oxide; the cavity (Figures 37-39), where an inclusion has probably fallen out is even higher in magnesia and iron oxide; the color of the deposit - black to reddish brown, reflects the varying amounts of iron oxide and magnesia.

5. (con't)

Sample 4 (figures 40-48) is typical of dark brown deposits. Fine flakes of iron oxide, fibers of calcia, and a silicaceous matrix with large amounts of iron are all present. The iron oxide is responsible for the brown color, and may indicate the presence of siderite, $FeCO_3$, which is formed by replacement of Ca with Fe in limestone.

Sample 5 (Figures 49 through 52) shows a deep, rust-red color in a black deposit. The topography is that of fine, blocky crystals, and as before, the color comes from iron oxide.

Sample 6 (Figures 53, 55 through 56) is of pink-rose crystals within a cavity of the white matrix. The crystal morphology indicates hydrothermal deposition and the chemistry (Figure 62) shows a calcite with a number of minor elements.

Sample 7 (Figures 54, 57 through 62) is of the near-pure white matrix. The matrix has very fine inclusions and is a silicate with varying amounts of impurities.

Sample 8 (Figures 63 through 70) several crystalline inclusions. Fibers (Figure 67) with alumina as a major impurity in silica and flakes which show near perfect inclusion and a composition close to Feldspar, $KAlSi_3O_8$ with iron replacing the K and Al, exist.

The samples examined appear to be from a silicaceous deposit in which hydrothermal fluids have formed a variety of calcites and replaced the silica with a range of impurities. Some deposits are rich in iron or manganese. The samples all appear quite dense and friable.

RAMTECH LABORATORIES

6. Pozzolanic Activity Index

A representative sample of the material was ground in a ball mill to obtain a fine powder for testing the pozzolanic properties.

The fine powder was used in a pozzolanic activity index test with portland cement, and also in a pozzolanic activity index with lime. The tests were conducted in accordance with ASTM C618 and ASTM C311.

Test Parameter	Requirement	Results Found
Chemical Analysis	(SiO_2 + Al_2O_3 + Fe_2O_3)=70% min.	82.9%
	Magnesium Oxide (MgO) = 5% max.	3.4%
Physical Properties		
Pozzolanic activity index with portland cement	75% min. of control	78.5%
Activity index with lime	800 psi min.	955 psi

Note: To the extent tested the material complies with the specification requirements for a Class N, mineral admixture for portland cement concrete. Class N is a raw or calcined natural pozzolan.

7. Complete Chemical Analysis

The submitted sample was prepared and then tested by atomic absorption and emission spectrographic analysis. The major metallic elements detected are as listed below:

Element	Oxide Form	% by Weight, Oxide Form
Aluminum	Al_2O_3	41.7
Iron	Fe_2O_3	1.2
Silica	SiO_2	40.0
Magnesium	MgO	3.4
Sodium	Na_2O	2.1
Potassium	K_2O	1.2
Titanium	TiO_2	0.7
Calcium	CaO	9.7
Total		100.0

The metallic elements (less than 1% of the total) were found to be the following:

Element		%, In The Elemental Form
Copper	(as Cu)	0.002
Vanadium	(as V)	0.01
Zirconium	(as Zr)	0.07
Nickel	(as Ni)	0.002
Strontium	(as Sr)	0.13
Barium	(as Ba)	0.12
Boron	(as B)	0.008
Chromium	(as Cr)	0.006
Gallium	(as Ga)	0.009
Manganese	(as Mn)	0.11

Discussion:

1. From the spectrographic analysis, the Rhyolite has the basic chemical elements present to be chemically the same as a classic type natural Zeolite. This formula is $Na_2O \cdot CaO \cdot Al_2O_3 \cdot n\ SiO_2 \cdot x\ H_2O$. The magnesium, iron and titanium are considered as mineral impurities. The primary constituent is the hydrated silicate of aluminum.

2. The minor elements were numerous and typical of trace elements found in naturally occurring mineral deposits.

8. High Temperature, Pyrometric Cone Equivalent

The sample submitted to RAMTECH was crushed to pass a number 4 sieve, and that fraction was quartered down to a manageable size, and was further ground to 70-mesh. Specimen cones were made from the 70-mesh material in general compliance with the provisions of ASTM C26. The comparison was made to large Orton Cones in the series #10 to #14, with an average heating rate of 350°F./hr.

Your tuff material was found to fuse at a temperature equivalent to cone #13. While the fusion temperature as determined in this manner is time-sensitive, cone #13 represents a range of about 2410°F to 2455°F.

9. Thermal Conductivity ASTM (C177)

The tuff material was prepared by diamond sawing and lapping flat specimens as to have intimate contact with the hot plates of the test apparatus. The samples were tested in the oven dry condition, in a vertical plane, with a mean temperature of 75°F and a Δ_t of 40°F.

(k factor) = Btu/in./hr./sq.ft./°F.

Type of Specimen	Thermal Conductivity k factor	1/k = R factor
Solid (cut material)	3.92	0.26
#5 Mesh loose granules	1.18	0.85

10. Water Absorption

Specimens were oven dried, weighed and then immersed in distilled water.

The specimens were removed and reweighed after 2 hours, 8 hours, and 24 hours. The percent of water absorption is as follows:

Immersed Time	Percent Absorption by Weight
2 hrs.	16.2
8 hrs.	24.7
24 hrs.	25.7

11. Reflectance (G.E. Reflectometer)

Type Specimen	Percent Reflectance
Lightest color (solid section)	70.6
Dark material (not inclusions)	14.3

12. Dielectric Conductivity

The solid mineral was tested after drying with a 500 Volt dc current and was found to have a resistance of 750,000 ohms/ft. The findings indicate the material is a conductive mineral in its natural state.

13. Odor Retention (Adsorption)

The mineral was ground to an 8 mesh size (approximately 1/8 granules) and was subjected to several strong odors and gases. The results are detailed as follows:

Odor Media	Odor Adsorption	Odor Retention
Cigarette Smoke	Excellent	Excellent
Onion	Excellent	Excellent
Animal Urine	Excellent	Excellent
Sulphur Dioxide Gas	Good	Good
Methane Gas	Good	Good

14. Ion Exchange Potential

Background

To determine if the submitted Rhyloite Tuff mineral would remove the total hardness from typical hard domestic water, a dynamic experiment was set up.

Procedure

1. The Rhyolite was washed with deionized water to remove the residual fine dust like particles. The Rhyolite was of a uniform grain size such that it would all pass through a 20 mesh screen, but be retained on a 50 mesh screen. This size was to simulate that which would be used in a typical water softener operation.
2. The washed Rhyolite granules were regenerated (removal of absorbed Calcium and Magnesium) by agitating in a 30% sodium chloride solution for two hours. (500 cc of Rhyolite + 500 cc of 30% NaCl Solution)
3. The regenerated Rhyolite was washed with deionized water until all of the sodium chloride was removed. Zero residual chloride was verified by test.
4. The wet cleaned regenerated Rhyolite was packed into a vertical column twelve inches high by two inches in diameter. The volume of granular Rhyolite was under cation gauze to retain the granules and yet allow the water to free flow through the column.
5. Hard tap water with an average hardness of 193 mg/l (11.3 grains/gallon) was monitored for levels of hardness. The water was passed at a rate of one liter every three minutes.
6. The hardness values were plotted and the area within the plot curve was calculated as the total hardness removed. Testing was stopped when the effluent hardness reached 17 mg/l or 1 grain/gallon of $CaCO_3$.

Ion Exchange Potential (con't)

TEST PARAMETER	QUANTITY VALUES
Water total hardness removal capacity, grains/cubic foot of material, as $CaCO_3$, of material in 20/50 mesh size	3,488
Minimum mineral hardness level achieved when used to soften domestic water, mg/l as $CaCO_3$.	4.0
Elemental chemical conformation to natural zeolite mineral composition, by emission spectrographic analysis	Conforms
Density of mineral as submitted in agglomerate form, lbs. per cubic foot	78.0
Apparent density of packed material with a particle size of 20/50 mesh, Lbs. per cubic foot.	56.5
$CaCO_3$ hardness removal efficiency, in the natural form (as received), %	85
$CaCo_3$ hardness removal efficiency, when mineral is fully regenerated with sodium chloride, %	98

GEOLOGICAL REPORT

TEXSTAR CLAIM GROUP

INTRODUCTION

The services of Gene C. Carpenter, consulting geologist, were retained by Filter Clean Industries, Inc., to evaluate the potential reserves in a claim group known as "The Texstar" group, 1-12. The purpose of this evaluation is to determine the extent to which Tuff deposits underlie the claims and make an estimate as to the amount of material potentially available for development. No investigation is made, in this report, as to the ultimate market for the mined materials, the minerology of the materials, nor the specific application of mining and development techniques.

The Texstar claim group is located northeast of Wickenburg, Yavapai County, Arizona. Figure 1 shows the general layout of the claims and the major features associated with the area.

INVESTIGATION

A personal field inspection trip of the group was made by this writer in the company of Mr. Richard Sardou. The claims were located in the field and the various aspects of the general geology of the Tuff materials and the other rock materials present in the area were determined.

After a study of the outcrops in the field and the determination of the general geologic history of the area, all data was analyzed and reduced in the office with the aid of analytical projections and calculations derived from computer formulated techniques.

GENERAL GEOLOGY

The Tuff deposits are what are known geologically as a non-welded tuff, that is a material in which the individual particles have not been fused tightly together. This property adds

greatly to the absorpant qualities of the material and is one of the important factors making this deposit somewhat more unique than other tuff deposits in the country.

The tuff is what is known as a rhyolite tuff, which means that it is a very light quartz rich rock and has numerous amounts of biotite flakes present. The rhyolite tuff was deposited originally in a lake environment on top of an old undulating granite erosional surface. The underlying granite is a very coarse grained biotite granite with phenocryst (large crystals) of orthoclase feldspar.

Examination of the tuff indicates that the material is of quite uniform quality and very fine grained. There is a small percentage of bentonitic clay in the tuff which is primarily the result of partial devitrification of the material.

The tuffs were deposited in a lake environment from a volcanic ash fallout, probably due to volcanism west of the area of study. Somewhat toward the end of this ash fallout, the source of chunks of already lithified basalts or lava. These chunks appear as boulders and cobbles in the upper portion of the tuff.

There is a major fault running through the area, as indicated in Figure 1, and noted as Fault AA. The east side of this fault is upthrown with the west side being downthrown. In addition to this fault there is a minor cross-fault (BB) as shown in Figure 1. This fault is more of a strike-slip fault in which the movement has been to the east on the north side and to the west on the southside. This movement is relatively minor and of little concern to this project. The fault AA, however, is of major importance in development of this property. The Tuff deposits outcrop along a line as shown in Figure 1, and dip easterly at a dip of approximately 24° until encountering AA. After fault AA is encountered, determination of the dip on the east side of fault AA cannot be made as all tuff deposits are underground at that point, however, this fault does allow the tuff deposits to be brought closer to the surface in this portion of this area which would, of course, make easier mining due to its shallower depth. West of

the line of out-crop as shown in Figure 1, no tuff deposits will be encountered either in the surface or sub-surface. The "dips", as noted, are created by orogenic or mountain building movements west of the general area which uplifted that area and caused folding and faulting to occur.

There is twenty (20) feet of thickness indicated and measurable on the surface of these tuff deposits. There is probably more thickness to these deposits with depth since the erosional history of this area has been rather difficult to determine. A drill hole near the pit area, drilled in 1958, indicated that approximately 550' of tuff deposit was drilled below the surface, at a depth of about 80'. This thickness has not been completely verified, due to the lack of drilling records on this hole; however, assuming the report to be thoroughly accurate, the 550' of total thickness would reduce to 300' when corrected for the true thickness of the formation.

RESERVE CALCULATIONS

The calculation of true reserves of the tuff material under this property are somewhat difficult to make without additional drilling, however, minimal reserves can be calculated with great certainty. The reserve figures as shown on Table 1, are calculated by utilizing only the strictly known thicknesses of the tuff deposits as observed in out-crop, and the specific areas underlain by these tuff deposits. It is probable that considerably greater reserves would be evidenced upon proving that the tuff deposits are of greater thickness than that assumed for the primary calculations.

The figure utilized for the primary calculations is 20', which is the figure observed in out-cropping in the field. This figure, according to some preliminary drill information is considerably thinner than that observed on the sub-surface, however, the 20' thickness will be utilized for the primary calculations.

The bulk density of the material in place has been determined by an independent testing laboratory and a figure of 1.36 is hereby utilized as the specific gravity figure in all calculations. Table 1 is a summary of the calculations and the results derived from the calculations for reserves.

SUMMARY AND CONCLUSIONS

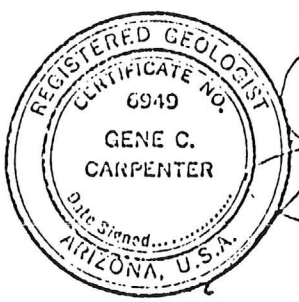
IN CONCLUSION, It appears that tuff deposits underlie the entire group of claims east of the line of out-crop, as shown in Figure 1. The depth under the property, will vary depending on the location in the claims because of the dip of the formations, as shown in Figure 2. It is felt, however, that most areas will be within mineable reach; however, some areas are logically developed later in the development scheme. Assuming that there is a market for the mined products of this group of claims, there should be little concern given as to adequate reserves being present in the area.

The following statements may be made pertaining to the reserves on the property.

1. There is a minimum reserve of 5,779,123 Tons of Tuff available for development underlying the claims. This would be considered an absolute minimum value for this group of claims and is based upon the out-crop thickness of 20'.
2. If a calculation is made, utilizing a figure of 200', which is not an unrealistic figure based on the preliminary drill hole information, reserve figure immediately jumps to 57,791,232 short tons of Tuff available.
3. Calculations based upon the drill hole, reported near the pit, would indicate the formation thickness at depth to be at 300'. If this were the case over the entire area, 86,686,848 Tons of Tuff would be available for mining.
4. The exact determination of thickness will only be made by more detailed drilling in the area and it is certainly recommended that such be accomplished sometime during the

developmental phase of these claims. The actual amount of tonnage available for utilization will vary between the minimal amount shown for the 20' thickness, and the calculated maximum potential thickness of the tuff deposit of 300'. Only after more detailed drilling can this be determined to be of a specific thickness.

IN SUMMARY, It is the conclusion of this writer that ample reserves of easily mineable tuff are available throughout the general extent of the twelve claims. It is highly recommended by this writer that a drilling program be undertaken to specifically pinpoint the thicknesses of these Tuff beds sometime during the preliminary developmental stages of this operation.



Respectfully submitted,
CARPENTER DEVELOPMENT, INC.

Gene C. Carpenter
Consulting Geologist/Geophysicist

August 29, 1969

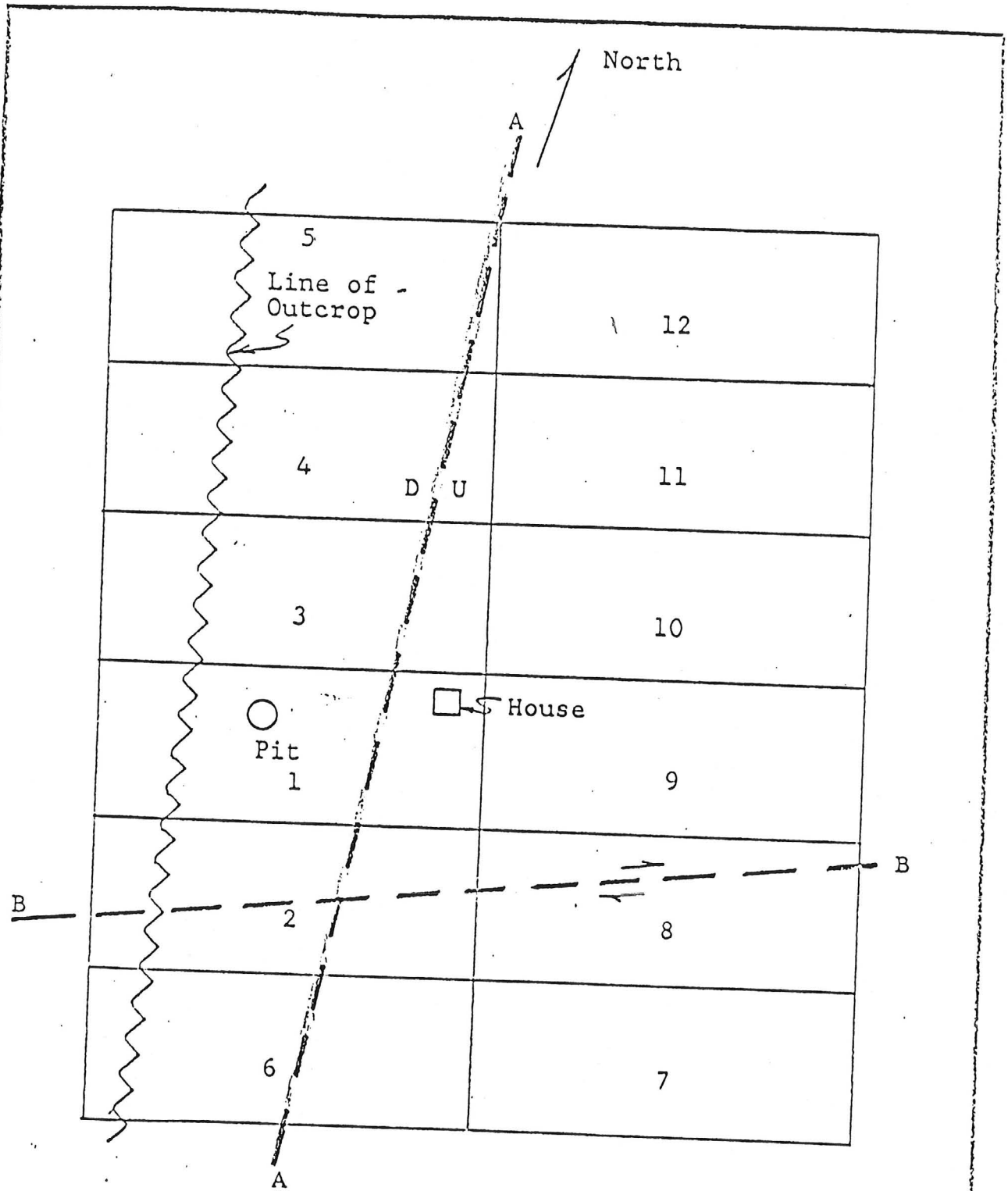


Figure One - General Location Map

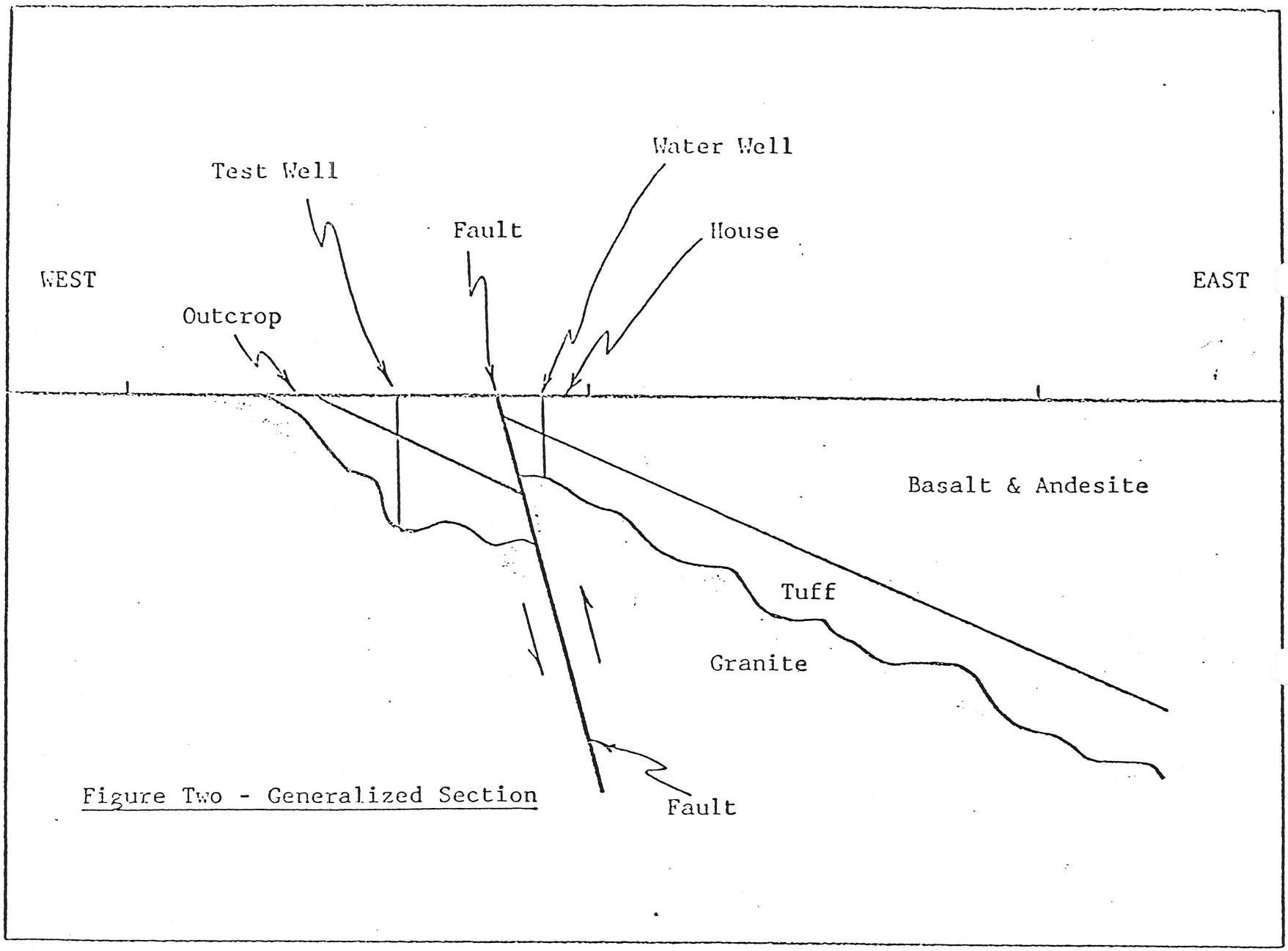


Figure Two - Generalized Section

TABLE 1

RESERVE CALCULATIONS

2,160,000	Sq./Ft. - Area between outcrop and Fault AA.
6,480,000	Sq./Ft. - Area east of Fault AA.
8,640,000	Sq./Ft. Total area underlain by TUFF in claim area.
x 20	Outcrop thickness of TUFF
172,800,000	Cubic Feet of TUFF
x 83.61	Lbs./Cu.Ft. (Weight of TUFF)
14,447,808,000	Lbs. of TUFF or:
7,223,904	Short Tons of TUFF
x .80	Use Factor for Formation
5,779,123	Tons of TUFF Reserve (minimum)
57,791,232	Tons of TUFF if thickness is 200'.
86,686,848	Tons of TUFF if thickness is 300'.

CHEMICAL COMPOSITION

MICROBIOLOGICAL AND BIOCHEMICAL REPORT

MICROBIOLOGICAL AND BIOCHEMICAL
ASSAY LABORATORIES, INC.

1615 BINZ STREET HOUSTON, TEXAS 77004

TEL. 713/524-9610

LABORATORY TEST REPORT

Sample Submitted By: Filter-Clean Industries, Inc.

Date Received: April 3, 1969

Date Completed: April 10, 1969

Laboratory Report Number: #124

Sample Identification: Sample of product from Filter-Clean Industries

RESULTS

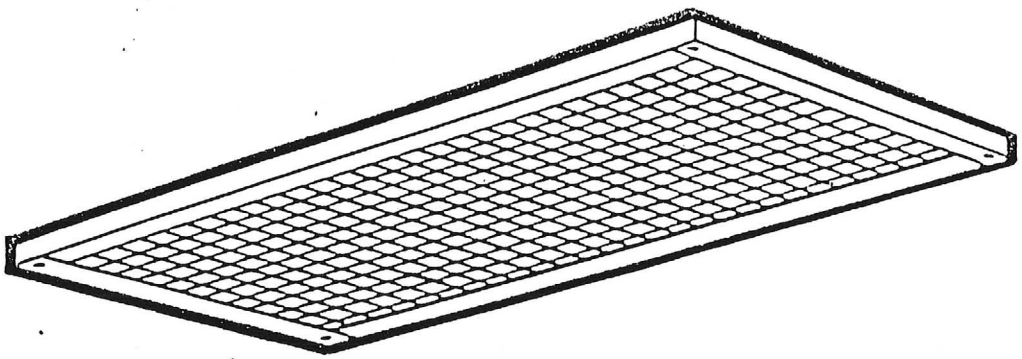
Samples of the product were placed in 4 open containers in a room containing approximately 100 mice. The room has no exhaust fan and the only flow of air is through the air conditioning system and into the rest of the laboratory.. The disagreeable oddr of the mice was reduced by approximately 50% within 24 hours and controlled the majority of the odor for one week.

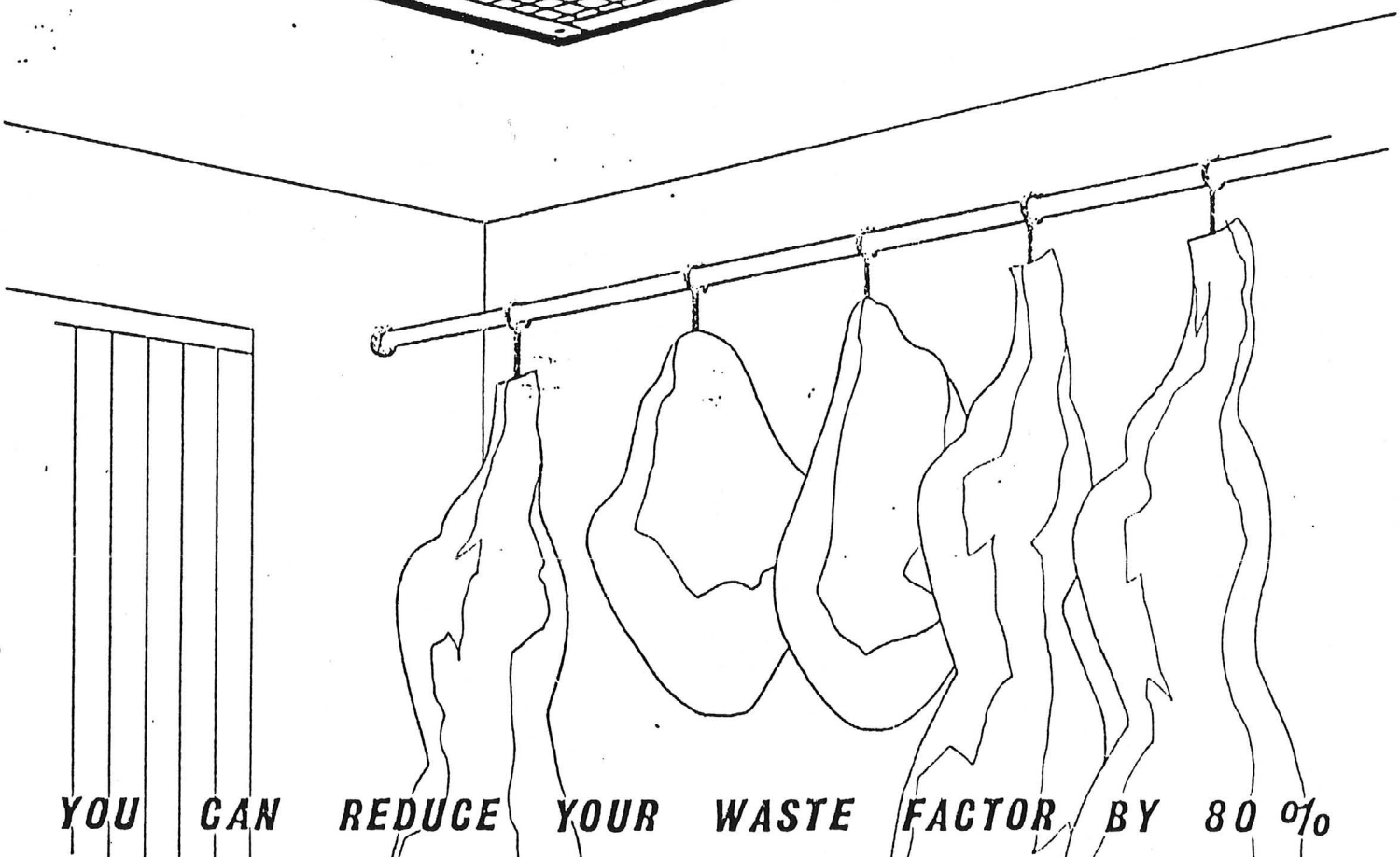
Reported By: C. Langford

FILTRO II

Introducing Filtro - 2

Natures answer to odor, climatic & bacterial control in the refrigeration of meats, vegetables & all food products !





YOU CAN REDUCE YOUR WASTE FACTOR BY 80 %

FILTRO-2 IS A BENTONITE TYPE CLAY THAT IS ONE OF THE MOST ABSORBANT MATERIALS THAT HAS BEEN FOUND TO DATE AND HAS HUNDREDS OF APPLICATIONS IN INDUSTRY. ONE OF THE MOST IMPORTANT IS THE REMOVAL OF FOOD AND OTHER ODORS FROM REFRIGERATORS AND WALK-IN BOXES AND REDUCING FOOD LOSSES BY INHIBITING THE MOISTURE AND BACTERIAL CONTENT FROM OUTSIDE AIR.

BY PLACING FILTRO-2 IN ANY REFRIGERATION SYSTEM WHERE FOOD PRODUCTS ARE STORED, IT STOPS ALL OUTSIDE BACTERIA FROM INFILTRATING THE FOOD INVOLVED AND THEREFORE KEEPS THE BACTERIA CONTENT AT A NORMAL LEVEL.

FIND OUT MORE ABOUT FILTRO-2 AND HOW IT CAN REDUCE YOUR WASTE FACTOR BY AS MUCH AS 80%!

INSTITUTE FOR RESEARCH, INC.

AND

BOZELL AND JACOBS INC.

INSTITUTE FOR RESEARCH, INC.
1714 RICE BOULEVARD • HOUSTON, TEXAS 77005 • JA 6-4093

June 1, 1971

Mr. Mike Kotlen
Bozell & Jacobs Advertising Agency
2205 Chamber of Commerce Bldg.
Houston, Texas 77002

SUBJECT: Bacteriological examination of Rhyolite material.

PURPOSE: The intent of these experiments is to determine whether of not the rhyolite material is capable of filtering airborne bacteria from the air and holding them for a short length of time. In order to obtain correlateable results, the rhyolite material is compared to both activated charcoal and a Fuller Brush Co. product known as "Ful-Aire."

METHOD: Three (3) identical glass tubes were packed with equivalent amounts of each product; that is, one (1) tube containing the rhyolite, one (1) containing the "Ful-Aire", and a third containing activated charcoal. Each tube was them attached to the inlet port of a biologically sterile Millipore monitor, using sterile tubing to make the attachments. The exit ports of each packed tube-Millipore monitor apparatus were then commonly joined to a suction pump. Ambient laboratory air was then simultaneously sucked through these devices for a period of one (1) hour. It is estimated that approximately 10 cubic feet of air passed through these devices during this period of time.

After exposure, each Millipore monitor was inoculated with a growth media suitable for airborne bacteria and incubated for a suitable length of

time. After incubation, the Millipore monitors were opened and microscopically examined for bacterial growth.

RESULTS:

Sampling Procedure	Total Colony Count
(1) Air drawn through rhyolite	1
(2) Air drawn through charcoal	1
(3) Air drawn through "Ful-Aire"	1
(4) Air drawn through no filter	10

COMMENTS: As may readily be seen from the data; rhyolite, charcoal, and "Ful-Aire" all effect approximately 90% efficiency in removing bacteria from the air. It is significant that rhyolite is capable of filtering with the equivalent efficiency of activated charcoal. It is difficult, however, to justify the filtering ability of rhyolite based on any micromolecular structure.

It is assumed that the rhyolite removes bacteria from the air in much the same manner as does activated charcoal; that is, simply by filtering out the dust particles on which the bacteria travel. In such a case, the molecular structure is not as significant as the macroscopic structure and properties of the granule. These macroscopic properties include such quantities as porosity, total surface area, permeability, grain size distribution, etc.

I shall be more than happy to consult and/or experiment further on this matter at your request.

Respectfully submitted,
INSTITUTE FOR RESEARCH, INC.

Dan E. Posey
Laboratory Manager

DEP/gb

TURNER, COLLIE & BRADEN, INC. ENVIRONMENTAL LABORATORIES

November 24, 1975

Mr. Richard Sardou
Texas-Arizona Mining Company
242-B East Crosstimber
Houston, Texas 77022

Re: Results Of Pressure Drop Tests
On Filter

Dear Mr. Sardou:

In accordance with a request by Mr. Sardou of Texas-Arizona Mining Company, personnel at Turner, Collie & Braden through its Environmental Laboratory conducted air flow measurements on a filter provided by Mr. Sardou. The air flow measurements were made to determine the pressure drop across the filter.

In order to conduct the air flow measurements, the filter was enclosed in a adapter and attached to a 10 inch duct. A blower was attached to the duct to pull air through the system, (see attached drawing.)

The pressure measurements were made by using a standard pitot tube attached to a micro-manometer. Twelve measurements were made and averaged for each of seven air flow rates with the filter in place and the same number were made with out the filter attached. The difference in the pressure at each air flow was determined and plotted against the volume of air flowing through the duct to establish a curve for the pressure drop, (see attached graph.)

The results of the test show there is minimal pressure drop across the filter at the flow rates investigated. The maximum pressure drop across the filter was 0.070 inches of water at a flow rate of 675.2 cubic feet per minute.

We thank you for the opportunity to perform this test and look forward to being of service in the near future.

Very truly yours,

TURNER, COLLIE & BRADEN, INC.

T. P. Willis

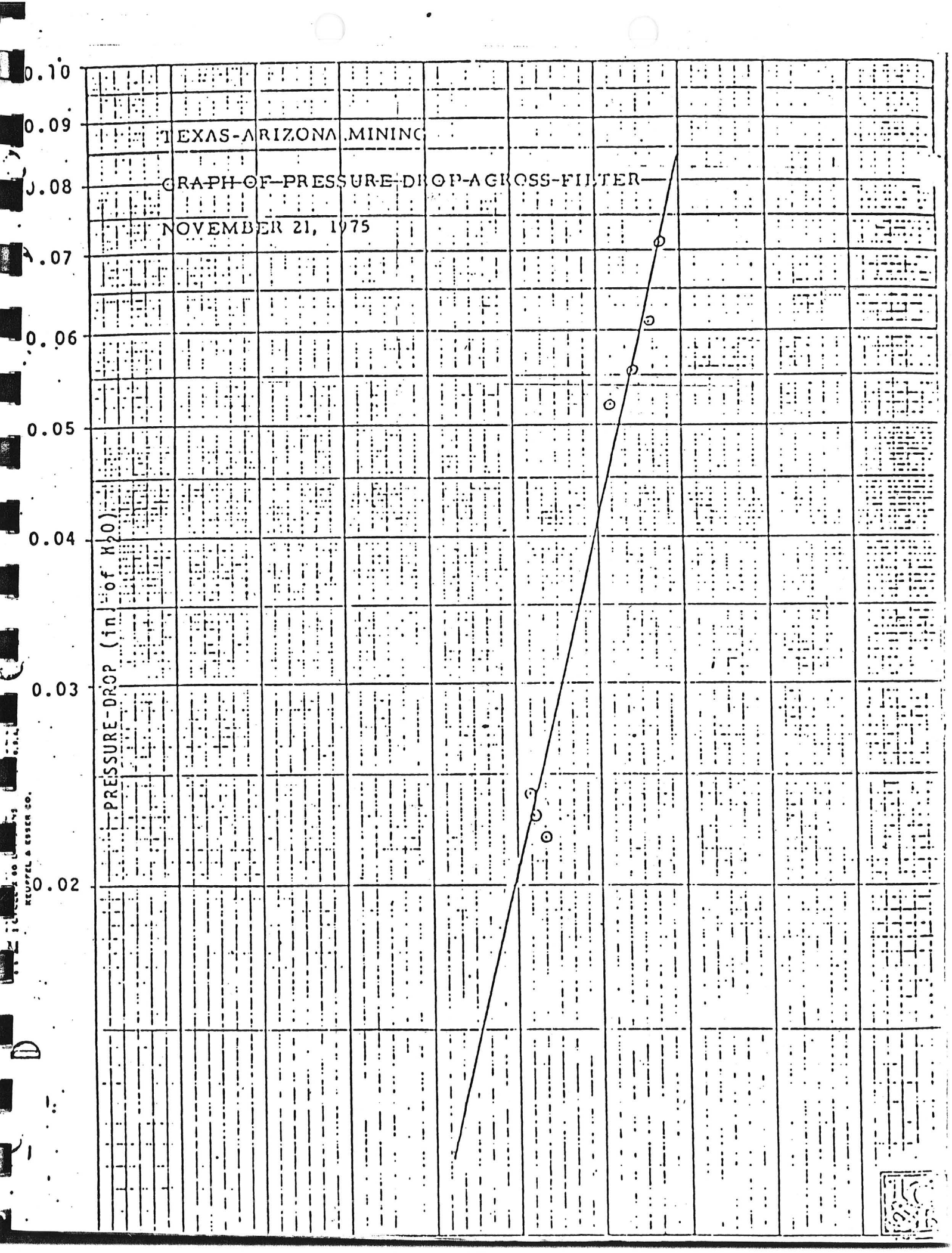
T. P. Willis P.E.
Group Vice President
Chief Engineer

TPW:RAS:sac

EXHIBIT No. 7

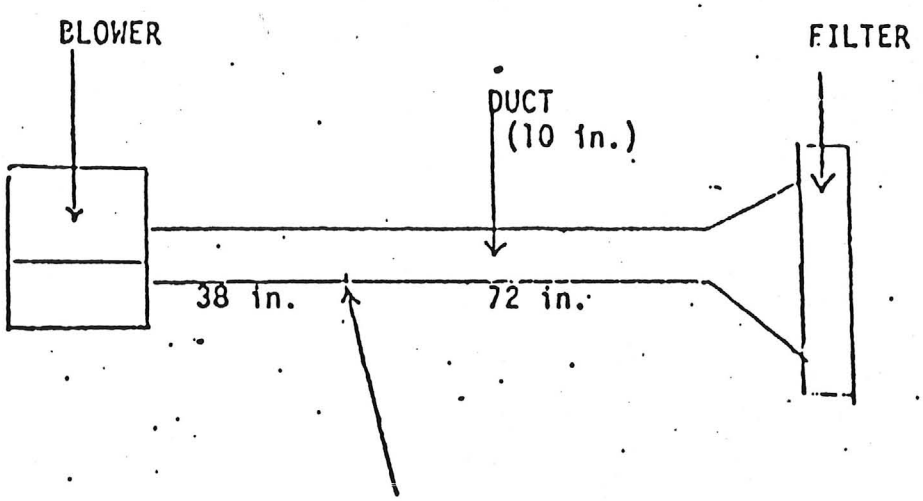
Summary of Results

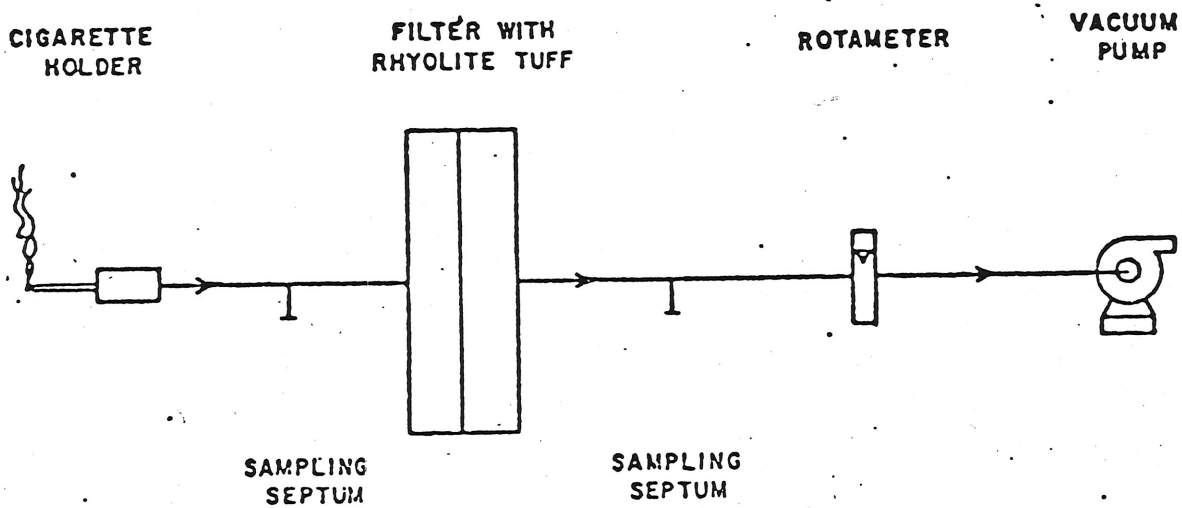
Velocity (ft/sec)	Flow (ft^3/min)	Pressure Drop (in. of H O)
12.82	416.2	0.024
12.99	418.8	0.023
13.32	432.4	0.022
18.95	615.2	0.052
19.84	644.1	0.055
20.38	661.6	0.061
20.80	675.2	0.071


TEXAS-ARIZONA MINING
GRAPH OF PRESSURE DROP ACROSS FILTER
NOVEMBER 21, 1975
PRESSURE-DROP (in. of H2O)
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
KEUFFEL & ESSER CO.

SKETCH OF SYSTEM

USED TO DETERMINE THE PRESSURE DROP OF THE FILTER





EXPERIMENTAL APPARATUS

ROCK-OUT

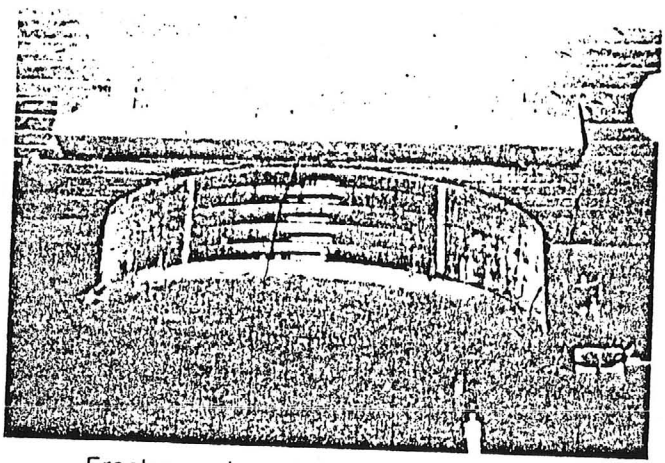
Rock-Out™ Filtration Systems "Your cooler's Best Friend"

The NEW, Efficient Bacteria Filtering System as Good as Activated Charcoal
Gives LOW—COST protection for Non-Frozen perishables
Meats • Poultry • Fish • Vegetables • Fruits • Flowers

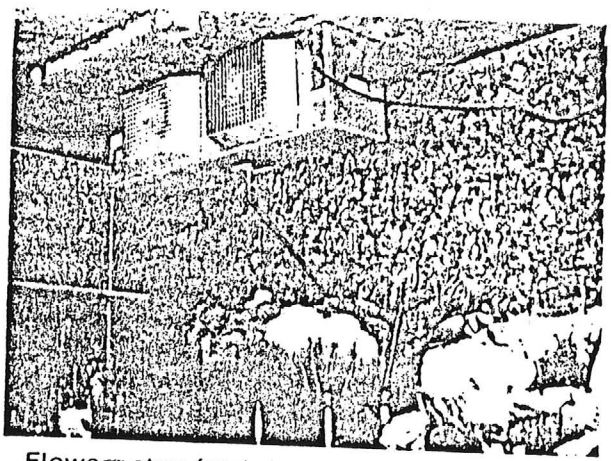
"Zero spoilage...no odor problems! My filters are saving money." Mark Ratte', Chef, Regency Inn

Independent Lab Tests Prove:

- ★ Rhyolite equal to activated charcoal in filtering bacteria from the air (up to 90% efficient)
- ★ Significant reduction of odors possible
- ★ Excellent absorption/retention of harmful gases
- ★ Stays 75% dry; increasing filter efficiency
- ★ See reverse side for more lab detail



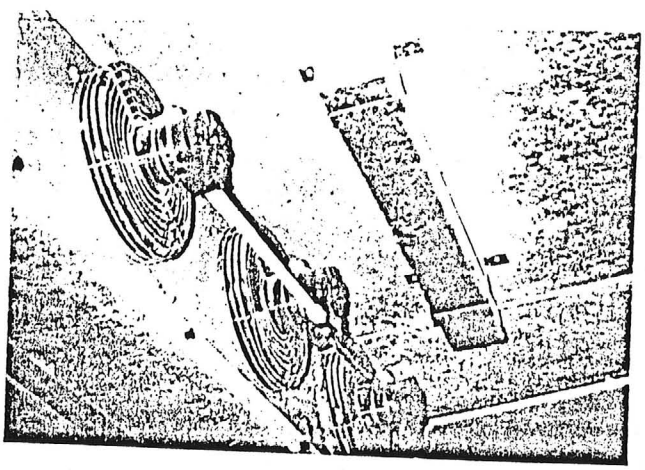
Freshens air-reduces bacteria, odors



Flowers stay fresh longer-spoilage reduced
Absorbs-retains ethelene gas and bacteria

Users Report Excellent Results:

- ★ Significant reduction of spoilage
- ★ Increased shelf-life
- ★ Elimination of odor/odor transfer
- ★ Overall freshness improved
- ★ Florists report stem-rot reduction
- ★ Wilt-losses cut significantly



Typical installation: In front of blowers

LOW—COST Benefits You Can't Afford to be Without

We Install and Maintain Rock-Out™ Filters - No Hassel for Users

Rock-Out™

COLD STORAGE BULLETIN!

Good News for users of Walk-In coolers!

Now you can double shelf life, eliminate "brownout" and drastically reduce spoilage in non-frozen perishables! The secret is elimination of the bacteria growth which causes these and other cold storage woes, such as odors and loss of freshness. These improvements are possible with installation and maintenance of a high effeciency bacteria filter.

Conceived by restaurant owner Harry Schwartz for use in his own restaurant cooler, the Rock-Out™ bacteria filter is certified safe, perfected in form and now available to you for pennies a day! Sites testing the Rock-Out™ filter system for several months report overall freshness improved, odors virtually eliminated and spoilage cut drastically! Laboratory tests have shown a 90% reduction in bacteria growth! **Interested?**

Here's our offer.....We'll install Rock-Out™ filtration system in your business and provide a fresh filter each month for a monthly service charge of only 20^{00} for the first unit and 10^{00} for each additional unit. **Period!** No up-front installation cost - no hidden charges. What's more, if you aren't sold on the value of Rock-Out™ filter service after using it for a month, we'll remove it and you own us nothing. **Zero!**

Please indicate your interest in a No-Obligation "trial run" of Rock-Out™ Bacteria Filter Service by returning the enclosed card to us today. (Or call collect at 501-783-5067).

Sincerely,

Bruce Robertson, Sales & Marketing

Rock-Out™ Filteration Service

YES, we are interested in a 30 day NO—OBLIGATION trial of the **Rock-Out**™ Bacteria Filter. We have _____ coolers in which we want **Rock-Out**™ filters installed. Please have your representative contact:

NAME_____**(your company officer)at**

PHONE _____ **to set up appointment**

Best time to call us is:_____

ZEOLITES

DR. CARMEN, ZEOLITE REPORT

THE USES OF ZEOLITES

by John Carman
Care Man Enterprises
Brenham, Texas 77833-
5372

INTRODUCTORY

This report is written at the request of James Muirhead, 1/7/88, to introduce persons interested in the commercial aspects of zeolites to an appreciation of their known record of utility. The complex structural and chemical picture of zeolites is generalized as much as possible in order to emphasize only those aspects responsible for their use as "molecular sieves" and "ion exchangers". Likewise, uses are attributed to zeolites in general rather than to specific species because often other species may serve as well or better. For specific information of this nature I suggest, MINERALOGY and GEOLOGY of NATURAL ZEOLITES, edited by Fredrick A. Mumpton and published by the Mineralogical Society of America in 1977, which has served as the basic reference for this report.

GENERAL INFORMATION

Zeolite is a general term derived from the Greek words for "boiling stones". This is the earliest identifying property of the zeolite family of minerals as more than 40 different species of various chemical composition and crystal structure can be observed to melt to a boiling glass under the flame of a mineralogists' blowpipe. All economic uses of natural zeolites and more than 100 man-made zeolites stem from several physical and chemical properties; (1) ion exchange or ion sieve properties, (2) adsorption or molecular sieve properties, (3) dehydration and rehydration properties, and (4) their hydrous alkali-earth and/or alkali-aluminum-silicate chemical composition.

The chemical composition of zeolites can most easily be understood as a "stuffed derivative" of ordinary silica, SiO_2. The three-dimensional structures of SiO_2 and the great physical and chemical stability of its various forms are in part responsible for the significant physical and chemical stability of zeolites, in spite of remarkable differences for which they are so valued. The basic building blocks of all three-dimensional silicate structures are silcon tetrahedra in which silcon ions hold four oxygen ions in closest coordination. Aluminum ions are similar enough in size

to do the same job, but they have one less positive change than silicon which is plus four in charge. This means that as aluminum substitutes for silicon other cations of plus one or plus two charge must be "stuffed" into the structure in order to maintain electrical neutrality, the basic law of all crystal structures. For example, the zeolite, $Na^{+}Al^{+3}Si_3^{+4}O_8^{-2}$, analcime may be considered a stuffed derivative of $Si_4^{+4}\ O_8^{-2}$. Likewise, the anhydrous formula for the zeolite heulandite, $Ca^{+2}Al_2^{+3}Si_7^{+4}O_{18}^{-2}$, can be considered the stuffed derivative of $Si_9^{+4}O_{18}^{-2}$ where $Ca^{+2}+2Al^{+3}$ have been substituted for $2Si^{+4}$. In general, the ions which accompany aluminum are in much less strongly bounded positions and therefore are exchangable ions. This means that the more aluminum in substitution for silicon the greater the zeolites' ion exchange capacity, but the ratio of Si to Al is restricted to 1:1, or higher in favor of silicon, and the ratio of (Al + Si) to O is always 1 to 2 as per the stuff derivative ratio in SiO_2.

The water content of zeolites ranges from 10 to 20% weight percent and it mostly occurs as loosely bound spheres of hydration in slightly charged domains within zeolites structures known as "cavaties" and "channels" between cavaties and the exterior of crystals, referred to as "ports of entry". These "void volumns" collectively make up 18 to 50% of zeolite structures and account for the great adsorptive capacity of zeolites which measures in 100's of square meters per gram! As loosely held molecules, the water content of zeolites is a function of temperature, pressure and humidity. A general field test for zeolites in arid regions is to touch the rocks in question with your tongue! If they stick to your tongue and give a burning sensation you have zeolites which are hydrating exothermally! When zeolites are heated slowly at constant pressure and humidity they loose water continuously up to a point when more strongly bound water is driven off. At these temperatures (300-700°C), the zeolite structure collapses irreversibly and tends to form other minerals such as feldspar $\pm$ quartz $\pm$ feldspathoids and water vapor. However, if the temperature of decomposition is not exceeded, zeolites will tend to rehydrate on cooling. Furthermore, zeolites may be recycled without losing capacity regardless of

whether the adsorbed species is water or some other molecular species.

Finally, the crystal structures of zeolites with their "ports of entry", "channels", and "cavities" can be likened to houses of various architectural style - Victorian, Colonial, Provential,...etc., each has a ridgid framework, which is silicon and aluminum-cations bound to oxygen and hydroxal anions in four-fold coordination for zeolites. Likewise, each zeolite has its door way, halls, and rooms, and each has a selection of "trim" materials; the exchangable cations of zeolites. They add to the strength and stability of the overall structure even though substitutions may be made from time to time for various reasons.

ADSORPTIVE OR MOLECULAR SIEVE USES

Under most natural conditions the remarkable adsorptive tendency of zeolites finds them filled with water molecules attached to cations in exchange positions. If the water is largely removed at temperatures of 350^{o} - $400^{o}C$. they may be used again as water adsorbents or an adsorbent for other molecules. However, zeolites can also be effective adsorbents for molecules other than water even without dehydration. In other words, some molecules have such a great affinity for the zeolite adsorption sites that they replace or exchange with water, sometimes even when they are present in minute amounts. This characteristic is of particular utility in many zeolite uses.

1. Zeolites are effective adsorbents of SO_2 and other pollutants from stack gases of oil-and coal-burning power plants. They can be designed to be effective in these acid and high temperature conditions even in the presence of large amounts of H_2O and CO_2. Union Carbide Corp. is reported to be using zeolites to recover SO_2 gas escaping from sulfuric acid plants. In both of these applications, SO_2 could be recovered by heating used zeolites to make sulfuric acid, and they can be reused.
2. Zeolites have been used to clean up oil spills when combined with other useful inorganics in an organic matrix. This mixture generates a product which floats for up to 200 hours of beneficial action.

3. Since 1968, zeolites have been used to extract CO_2, H_2O and H_2S from natural gas. Even more remarkable, in Palos Verde, California, methane bearing gases from a land fill site are being purified to pipeline specifications for utility company use - one million cubic feet per day! This suggests similar use in other areas of low grade methane generation, such as, municipal sewage treatment, solid waste incineration, farms, feedlots, and many others.

4. Adsorption of nitrogen gas from atmospheric air by zeolites to yield oxygen enrich air has many applications. In Japan, it is used to condition air in crowded restaurants in the middle of the city where air quality is poor and oxygen content low. Commercial fish farms use it to increase the oxygen content of air to attain more oxygenated fish water. Even the U. S. Fish and Wildlife Service have found this use of zeolites to allow for a doubling of fish they can transport for stocking. This is especially so if the waters are also filtered with zeolites to abstract NH_4^+ ions from the decomposition of fish excrement and fish feed. Oxygen enrichment by zeolite molecular sieves has also been used to attain increase efficiency in the aeration process for secondary sewage treatment, the oxidation of impurities in metallurgical processes, and in the air supply for cleaner and more complete burning of natural gas and coal (i.e. reduced nitrous gases in stachs and more complete oxidation during combustion). Further, it has great potential use in the feed gases for coal gasification where the use of liquid oxygen is far more costly and more difficult to handle.

Another plus for those adsorbing nitrogen is the fact that during regeneration of zeolites by heat the nitrogen recovered is pure enough for many commercial uses such as spoilage-and mold prevention in the transport and/or storage of fruits, vegetables, grains and alcoholic beverages.

5. Ammonia adsorption is another important use for zeolite. Use of zeolites as air filters in animal confinement operations reduces ammonia and other odors for a healthier and more productive environment for workers and animals. Even mearly suspending boxes packed with zeolite have been found effective to this end. Further benefits are realized when zeolites are

added to the floor, not only in odor abatement but in a drier, more easily handled, waste product with enhanced value as a fertilizer. In other words, zeolite entraps fertile components which are otherwise lost as environmental pollutents to yield a product of higher available nitrogen.

6. The refinement of petroleum products have long relied on the use of zeolites for purification and fractional extraction of desirable and undesirable molecules in their products. In fact, most of the 100 or so man-made zeolites find important uses in this industry. Another important recent use of zeolites is as a carrier of calalysits for the "cracking" of long chains of hydrocarbons and for the "coupling" of others. As a carrier of herbicides, fungicides, pesticides and ammonia molecules, including ionic ammonium, "carrier" zeolites have great potential in agriculture. Their slow but affective release of all these adsorped or exchanged ions into the soil for plant benefication, serves to reduce the cost of these important organic and inorganic constituents and environmental pollution of over and/or too frequent an application is virtually eliminated.

7. Few applications in the home have been made of the adsorbent properties of zeolites. However, the author has noted advertisements for their use to prevent shoe odors and NonScents Inc. of Houston markets zeolitized rocks of rhyolitic volcanic ash in powder form and in small bags for control of odors, tobacco smoke, and even bacteria. I have personally observed its effectiveness in adsorbing ammonia, styrene, benzene, formaldehyde and the elimination of odors from "smoky" rooms, offices, restaurants, bars, cars, garbage pails and restrooms. Direct application of the powder in soiled pet areas, litter boxes and bird cages is rapidly effective and all uses are long lasting (months). Other uses of zeolites in homes are certain to be found.

ION EXCHANGE OR IONIC SIEVE USES

The ions which are substituted along with aluminum for silicon to form natural zeolites are more weakly held to their crystal structures than silicon and aluminum ions and can be replaced by other cations of plus one -, or plus two -, rarely

plus three, charge. This exchange of ions was first used to "soften" "hard" waters due to the presence soap consuming curd formers, Mg^{+2} and especially Ca^{+2} cations. Circulation of such waters through sodium-rich zeolites results in the exchange of these alkali-earths for sodium which effectively softens the effluent water for significant elimination of hard water problems and other cost benefits. Regeneration of the zeolite after use is easily done by flushing with a NaCl-rich solution which exchanges Na^{+} for alkali-earths and allows for reuse. Zeolites remain in use in many homes today inspite of the recent use of organic resins for this purpose. In fact, a synthetic zeolite is added as a water softener to many phosphate-free detergents. In general, zeolites have the highest ion exchange capacity of all known natural substances but there is considerable variation from zeolite to zeolite in the selectivity of various ions. As in the case of adsorption, some ions are exchanged in proportion to their concentration in the filtered solution but in others the affinity for certain ions is so strong that zeolites can pull them out of solution even when present at very low concentration. "Ion traps" is an appropriate descriptive name for such applications.

1. One of the most significant uses of zeolites as ion traps is in the field of radioactive wastes. Certain zeolites have been found extremely effective in trapping low concentrations of radioactive ions such as Cs^{137}, Sr^{90}, Co^{50}, Cr^{51}, Ti^{204}, As^{110} and Ca^{45} to mention a few. Not only are zeolites less expensive and more affective than organic resins in this use, they are far more resistant to nuclear degradation. Further, zeolites used for this purpose are more readily incorporated in concrete or glass for disposal and ultimate isolation from the bioshere. Likewise, zeolites have been proposed as the buffer media about high-level nuclear waste containers to entrap any leakage of radioactive ions which might occur after burial. On the other end of this subject, zeolites have been found to be adsorbent for oxidized uranium to the extent that some zeolite-bearing rocks are considered as ores for uranium. Further, it is suggested that zeolites may be used to extract uranium for commercial purposes from solutions circulated

through areas of low grade uranium deposits or for the leachates from tailings of uranium milles. Similarly, zeolites may extract commercial amounts of other radioactive metals where only traces are present. These uses have obvious ecomonic and environmental benefits and suggests the use of zeolites in spills and other leakages of toxic elements into our environment.

2. Zeolites can also serve as heavy metal traps for non-radioactive metals. They can be used for the clean-up and potential recovery of metals wastewaters of base metal mills and other metallurgical operations. Another use for the heavy metal trapping properties of zeolites is in agriculture. In Japan, the addition of zeolite to fields keep Cu, Cd, Zn and Pb out of the food chain; eliminating their toxic effect on certain plants and to life forms that consume plants that can tolerate them. This offers new hope in the use of municipal and industrial sewage sludge as a fertilizer and soil conditioner, because the discovery that sludge has a high heavy metal content has all but stopped this innovative and beneficial use. Heavy metal trapping by zeolites is especially good news for areas where the early days of strip-mining for coal were being reclaimed for grazing, hay and grain crops. Thousands of acres can be reclaimed if these affects can be eliminated, and a costly waste can be turned into profitable utilization as the acres return to the tax base of many states.

3. Zeolites for the above use may start first as a fertilizer or other such carrier form. As a fertilizer, zeolites can serve as a source of nitrogen, either from adsorbed ammonia gas in molecular form or as ammonium ion in exchangable form. Both are effective slow release sources of nitrogen for crops and neither needs to be specially manufactured for this purpose. Extration of these constituents from zeolite filtration of fish farm waters has already been mentioned as one source. Another source is the final filtration of water effluent of sewage treatment plants. As much as 99% of the ammonium ions escaping from these situations can be extracted by ion exchange on zeolites for a down stream benefit to fish, oysters, shrimp

and the biosphere in general. In fact, many remote and/or small sewage treatment operations use zeolites almost exclusively and more and more zeolites are being used to clean up the run off from feedlots, farms and animal confinement facilities. The used zeolite may be used directly as a fertilizer and heavy metal trap or it can be treated with acid to make either ammonium sulfate- or ammonium nitrate fertilizer.

4. Direct application of zeolites to animal wastes has many benefits. It abates odors, run-off problems, and prevents loss of fertilizer potential, and also reduces moisture content of wastes for easier handling. It has been found effective for cattle, swine and chicken operations to produce a cleaner, healthier and more productive environment for both animals and workers. Needless to say, zeolites act as both adsorbents and ion exchange substances in this application.

OTHER USES OF ZEOLITES

In addition to the uses of zeolites as molecular sieves and ion exchangers, there are uses based on its basic chemical composition, on its physical properties, on its low density and on its tendency to hydrate and dehydrate reversibly. Plus, there are applications where the exact property or combination of properties are unknown.

1. Historical records show that zeolitic rocks were used as lightweight dimensional stone, concrete and cement as early as 2000 years ago. So called, pozzolanic cements and concretes are based on the property of pulverized nature siliceous and alumiunums substances to react with slaked lime at ordinary temperatures and pressures, in the presence of moisture, to form cement and mortar. Zeolite rocks apparently serve well for this purpose since they furnish the ingredients one now finds in Portland cement for which only a siliceous sand or gravel plus water are all that is required for modern cements and mortars.

2. As a lightweight aggregate, thermally expanded zeolite tuffs (solidified volcanic ashes) compete with thermally extended volcanic glasses, called perlite. In spite of the higher temperatures required to "pop" zeolite it has been found to produce stronger and more abrasion resistant material, especially

useful for lightweight bricks; some are less than water in density!

3. Two other unusual applications in the construction industry include: as a filler in pastes used to stick layers of plywood together before hot processing, and as an essential ingredient in the production of strong, porous glasses of very low density.

4. Zeolites are used as fillers in the paper industry too. When substituted for clay in kraft paper, the product is lighter, more opaque, easier to cut and less susceptible to diffusion of inks. At least one paper, about 7% lighter than conventional paper, has been patented in Japan. Conductive papers for electrostatic reproduction have been stabilized by use of synthetic zeolites filler, for use over a very wide range of relative humidities. Finally, when zeolites are added to certain dyes, they yield composites in coated copying papers and plastics which are resistant to the harmful effects of acids, heat and light.

5. So far medical applications of zeolites are few, but significant and others are certain to follow based on their use in animals (below). Perhaps the most significant role of zeolites so far is the extraction of ammonical nitrogen in the blood and urine of patients in dialysis.

Zeolites is also used as a highly active fluorination agent and abrasive in toothpaste. It has the advantages of more effective fluoride treatment for teeth and it is no more abrasive than many agents in use.

6. Another application of zeolites in homes and small businesses is as a heat exchanger, in air conditioning as well as a source of hot water, using solar energy. The continuous dehydration of zeolite during sun lit days is an endodermic or heat consuming process which is continuous up to three to four times the temperature for the boiling point of water. The rehydration of zeolite on cooling, at the end of the day, is exothermic, or heat evolving, so that a source of hot water and air conditioning can be sustained at night and during cloudy days. Another plus is that water can be placed in direct contact with zeolite, thus avoiding costly heat transfer agents and

systems.

7. Use of zeolites in animal nutrition is one of its most exciting and innovative uses. As little as 10% in the feed of swine, chickens and cattle has resulted in higher feed-conversion values, generally healthier and more productive animals, and drier animal wastes with less odor. Most important perhaps is the fact that no "down-side" effects have been noticed. The suggestion that zeolites could replace antibiotics now used in disease control, with or without the help of federal regulations, suggests a great potential. In spite of the fact that the actual mechanisms by which zeolites effect these benefits is unknown, there is no question that if ion exchange, molecular exchange, ion entrapment, and carrier properties of food materials are important to life sustaining processes, then there is little question that zeolites (which exceed all other substances in these properties) could be on the forefront of health and nutrition in the near future.

John H. Carman, Ph.D.

RAINBO... ...ATIONAL

CARPET DYEING & CLEANING CO.

July 21, 1987

Mr. Ricky Broussard
P. O. Box 475
Milton, LA 70558

Dear Ricky:

Working in an industry where odors are a big problem has made me skeptical of miracle products with claims of pheromeral "odor eating" capabilities.

Many products are capable of masking odors for short periods of time, but, the odors all seem to return when the "perfume" dissapates.

I was truly surprised to learn that all your claims about Non Scents" properties of odor absorption are true!

I have tried Non Scents in apartments with (bad) smoke and pet odors with terrific results. I have tried it in homes with musky odors, in automobiles with liquor odors, in trash compactors, in my shoes and in countless other places with great results.

The great thing is that not only does Non Scents absorb odors - the odors do not seem to reappear once they have been absorbed!

In short, Non Scents works! I recommend it to all my customers.

Sincerely,

Jimmie L. Dugas, Owner

P.O. Box 821 / Scott, LA. 70583 / 318-234-1723

DEPENDABLE MOTORS, INC.
DATSUN
Dodge

July 24, 1987

Six J Enterprises
P.O. Box 30821
Lafayette, LA 70593-0821

Mr. LeBlanc:

I'm writing to you about your NonScents odor-adsorbing products. A customer recently bought a used Chrysler New Yorker from us. She put a "stop payment" on her check and returned the car because of a bad smell (of unknown origin). We tried different products to get rid of the odor -- without success. We placed two bags of NonScents in the vehicle. The next morning, the odor was gone. The customer came back and bought the car. It works!

Respectfully yours,

Lou Pommier
Used Car Manager

P. O. DRAWER 53207 • 1700 S.E. EVANGELINE THRUWAY • LAFAYETTE, LA 70505 U.S.A. 318/232-1060

L.A. FREY & SONS, INC.

QUALITY FOOD PRODUCTS SINCE 1865

August 3, 1987

Six J. Enterprises
Mr. John Dale Leblanc
P.O.Box 30821
Lafayette, La.70593-0821

Mr. LeBlanc:

IT WORKS! "Non-Scents" makes good scents. Recently I was given a company car complete with three years of cigar smoke smell included with all the other factory options available on my Ford LTD.

After only one week the cigar smell was gone. Fresh air never smelled so good. I would like to recommend your "Non-Scents" for an environmental clean air award.

Sincerely,

Larry R. Williamson

Larry R. Williamson
L.A. Frey & Sons, Inc.
Sales Manager-Lafayette Region

LRW/sst

NONSCENTS

Product Safety Data Sheet

TOXICITY REPORT ON NONSCENTS

I. INTRODUCTION:

NONSCENTS is a naturally occuring hydrated aluminosilicate. The basic elements that make up this material are hydrogen, oxygen, aluminum and silicon.

NONSCENTS is used as an absorbent media for odor, smoke, toxic gases and bacteria.

Independent laboratory tests, as well as industry studies, have shown **NONSCENTS** to be non EP toxic upon oral, dermal and inhalation exposure and a non-irritant of the skin, as defined under the Federal Hazardous Substances Labeling Act.

II. HANDLING AND DISPOSAL:

Even though **NONSCENTS** is non-toxic, **NONSCENTS** can produce some dusting. Therefore, people with allergic reactions to dust, should consider taking appropriate precautions when using **NONSCENTS** powder in confined applications. A dust mask might be appropriate for large applications of powder product.

NONSCENTS is non-toxic and non-flammable and is not harmful to the environment. No special procedure is required for disposing of this product.

10833 West Hardy • Houston, Texas 77076 • (713)691-0228

AUTO RENTAL ®
Bruce's Auto Sales
U-Save Auto Rental Franchisee
1413 Jefferson Street
Lafayette, LA 70501
318-234-3296

7/16/87

I am using Non-Scents in my rented fleet of 75 vehicles and am completely satisfied with the product.

Bruce's U-Save
Nola J. Brown Jr.

COMPTROLLER OF PUBLIC ACCOUNTS
STATE OF TEXAS
AUSTIN, 78774

BOB BULLOCK
Comptroller

21108-DOB

THE STATE OF TEXAS §

COUNTY OF TRAVIS §

I, Bob Bullock, Comptroller of Public Accounts of the State of Texas, DO HEREBY CERTIFY that according to the records of this office

TEXAS ARIZONA MINING COMPANY

is, as of this date, in good standing with this office having no franchise tax reports or payments due at this time.

This certificate is valid until April 30, 1988.

GIVEN UNDER MY HAND AND SEAL OF OFFICE in the City of Austin, this 7th day of January, 1988, A.D.

Comptroller of Public Accounts

Form 05-304 (Rev. 8-84/4)

an equal opportunity employer

In the name and by the authority of

The State of Texas

OFFICE OF THE SECRETARY OF STATE

CERTIFICATE OF INCORPORATION
OF

TEXAS ARIZONA MINING COMPANY

The undersigned, as Secretary of State of the State of Texas, hereby certifies that duplicate originals of Articles of Incorporation for the above corporation duly signed and verified pursuant to the provisions of the Texas Business Corporation Act, have been received in this office and are found to conform to law.

ACCORDINGLY the undersigned, as such Secretary of State, and by virtue of the authority vested in him by law, hereby issues this Certificate of Incorporation and attaches hereto a duplicate original of the Articles of Incorporation.

Dated January 5, 1970

Martin Dies Jr.
Secretary of State

PICTURES OF MINE

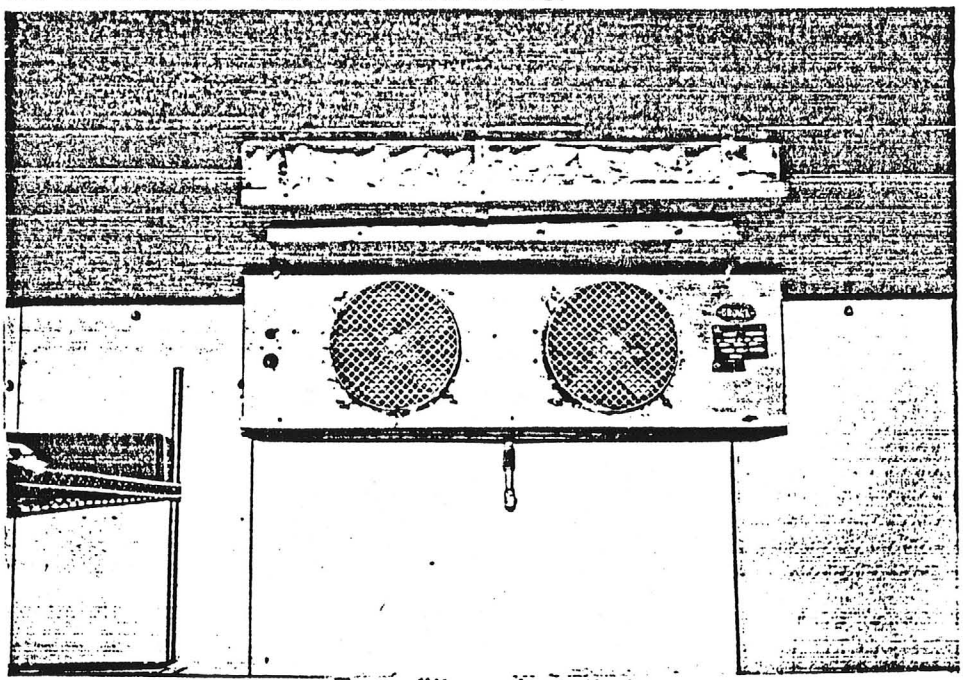
FIGURE I

FIGURE II

FIGURES I AND II ARE PICTURES OF OURCROPS OF RHYOLITE TUFF ON THE MINING OF TEXAS ARIZONIA MINING COMPANY.

WALK IN COOLER FILTER

1. Maintain Fruit, Vegetable, Food Freshness.
2. Extend life of Fruits and Vegetables.
3. 100% Natural Rhyolite Tuffaceous Filter.
4. NO ADDITIVES - NO PRESERVATIVES.



Two filters installed
and working

5. Deter Odor Transfer from one food to another - onion - cantelope - milk
6. Nature's answer to odor, climatic, and airborne bacterial control through ionic-action.
7. Reduces Food Loss - Absorbs Airborne Bacteria.
8. "SAVES YOU MONEY"

Product of ODOR GUARD, INC., HOUSTON, TEXAS

NON SCENTS™

Living in the modern "tight" home with a small pet can be equivalent to sleeping in a barn.

Pet waste is broken down by bacterial decomposition into toxic gasses which pollute your home. The most common pet associated bacterial gas is ammonia. Ammonia is highly toxic in concentration and repeated exposure can seriously effect your health.

Ammonia in detectible concentrations effects your respiratory system, produces difficulty in breathing, red watery eyes and hoarseness. It is possible that allergies attributed to animal hair can be a sensitivity to ammonia, or exasperated by exposure to ammonia.

Ammonia is just one of many common household pollutants. It is also the easiest to identify by smell.

There are 5 types of products sold for handling pet odors. They are: 1.) Deodorizers and air freshners. These are perfumed masking agents that cover up odors. These agents add additional toxic gasses into your home environment.

2.) Bactericides. These products kill bacteria; in concentration they are also toxic. These products do not kill odors.

3.) Bacterial Agents. These products contain live bacteria that break down urine and other waste. They speed up the bacterial process and also speed up the manufacture of ammonia.

4.) Absorbants/Baking Soda. These products are non-toxic, but it would take many pounds of soda to retain the ammonia produced by one cat.

5.) Adsorbents. NonScents [TM] is a natural Zeolite adsorbent that attracts and traps ammonia and other household gasses. Gas molecules are trapped in a vast network of pores and are retained within the mineral.

NonScents is nontoxic and safe. Recently, a NonScents Distributor contracted with the Houston Livestock Show and Rodeo to provide odor control for the 1988 Livestock Show.

As many as 6,000 head of livestock ranging from 2200 pound bulls to llamas were housed in the Astrohall Complex for the 16 day run of the show.

NonScents was placed under the bedding material of the animals. Results were striking. The improved environment was noticed by the 1.2 million visitors, as well as the exhibitors and animal handlers.

NonScents can be applied on dry carpets, cat boxes, bedding material and even directly on the animal to reduce ammonia odor immediately. It also comes in applicator bags for rooms, barns, trailers and cages.

TOXIC GASES

"Sick Building Syndrome" symptoms may be rather severe "influenza-like" effects to some people or may be slight mental aggrivation e.g., confusion, shortened attention span, irritability, or depression, or any combination of those symptoms to some people.

The "synergistic" effect of mixtures of VOCs (volatile organic compounds) appears to be the cause for the Sick Building Syndrome in those cases where a cause could not be attributed to the presence of any one known concentration. The primary cause is Lack of Fresh Air. Fresh Air usually contains:

Approximately	78% volume	Nitrogen
	21%	Oxygen
	0.93%	Argon
	0.07%	Other Gases.

Sources of other gases may be from combustion e.g., gas or oil cookstoves, heaters & furnaces, automobiles & trucks, and may be emissions from building materials, adhesives, caulks, fu rniture, carpets, insullation, cleaning & disinfecting products/residues and room odorants (odorizers), as well as Environmental Tobacco Smoke.

The building's heating/air-conditioning system usually serves to 'tran sport' and 'distribute' gases throughout the building, but can also serve as 'Entry Route' e.g., via outside air intake, or leaking heat exchanger/poorly vented furnace, etc.

Emissions of the extremely wide variety of compounds of extremely wide ranges of concentrations from the numerous sources within any indoor environment present a very complex problem. Currently, the only emmision rate data available is for formaldehyde from pressed wood products. The studies indicate that formaldehyde emission rate increases with increasing temperature, decreasing relative humidity, and increasing air exchange rates. The material tested was low-density particleboard (aged appx 8-mo.) normally used in home construction e.g. flooring. Newer material is expected to have higher rates and medium-density particleboard (e.g. used in furniture) has formaldehyde emission rates 2 to 4 TIMES higher!

DOSIMETER TUBES

1. Record date & time of day on label. Stick label on LOWER END (opposite of Scored end that you break-off) of tube.

2. Break off end of tube by placing thumbs (pointing towards each other) near score and break away from body (e.g. toward floor).

3. Keep tube open in the area to be sampled for the entire sampling time.

4. Recommended SAMPLING TIME is 24-HRS. Average Concentration in parts per million (ppm) is equal to the reading (at the color change) DIVIDED by the HOURS of sampling time.

AMMONIA (NH_3)
(Store in dark place)

COLOR CHANGE - from PURPLE to YELLOW

ODOR THRESHOLD - 0.47 to 54 ppm

Color Change to near middle of range of tube in 24-hrs. is about 1/2 the MAXIMUM ALLOWABLE for 8-hrs in Industry (25ppm).

CARBON MONOXIDE (CO)
(Store in dark place)

COLOR CHANGE - from YELLOW to BLACKISH BROWN

ODOR THRESHOLD - ODORLESS

Color Change to near middle of range of tube in 24-hrs. is about 21 ppm. MAXIMUM ALLOWABLE for 8-hrs in Industry is 35ppm.

FORMALDEHYDE (HCHO)
(Store in refrigerator)

COLOR CHANGE - from YELLOW to REDDISH BROWN

ODOR THRESHOLD - 1ppm

Color Change to near middle of range of tube in 24-hrs. is about 0.42ppm. MAXIMUM ALLOWABLE in Industry - LOWEST FEASIBLE LIMIT, POTENTIAL CARCINOGEN.