

MINUTES OF THE MEETING OF THE JOINT APPROPRIATIONS
SUBCOMMITTEE ON LONG RANGE BUILDING
March 27, 1981

The meeting was called to order by JACK K. MOORE, CHAIRMAN, at 1:35 p.m. in Room 108, Capitol Building, Helena, Montana. All committee members were present except Senator Etchart and Sen. Himsl. Also in attendance was BOB ROBINSON, Fiscal Analyst.

Testimony was given by Dr. Alex Volborth, Professor at Montana Tech; Dr. Fred W. DeMoney, President at Montana Tech; Jerry Youngblood, Manager of Montana Energy Research and Development; Roger Rice, Vice President of Western Energy Co.; Jim Fergus, geologist; J.D. Lynch, lobbyist; Bill Robinson, Montana Alumni Organization; Dr. Roy Turley, Vice-President of Academic Affairs; Dr. John Richardson, Commissioner of Higher Education; Dr. Bob Thomas, President at WMC; Ed Ayers, Director of the Physical Plants at Montana Tech.

The CHAIRMAN stated the topics to be discussed would be in the following order: House Bill 841; Montana Tech Science Building Completion; Remodeling of the Crafts Building at Western Montana College; and Montana Tech Petroleum Building.

House Bill 841

PROPONENTS

REP. BROWN read Exhibit A to the committee regarding the appropriation of \$96,830 to Montana Technology in acquiring a neutron activation and gamma radiation detection and analysis equipment. He asked the committee to consider Exhibit B regarding an amendment to this bill which would change the wording of "the Purchase" to "Installation and Upgrading."

DR. VOLBORTH, Professor of Chemistry at Montana Tech, read Exhibit C to the committee.

DR. S.L. GROFF, Director of Bureau of Mines and Geology, explained they use the fast neutron principal in logging coal drill holes. He noted Dr. Volborth's instrument is more complicated and more competent than what they have presently in that it can be turned off on a switch, which makes it safe. It can be, especially in the identification of light elements particularly in oxygen analysis, and Dr. Volborth is one of the nation's experts. He noted coal is the interim source of energy, and he feels some of the coal tax money should be put back into coal research. This program can help solve a lot of problems and at this time there is no duplicating equipment in the state of Montana and he feels it is important to initiate studies to improve the clean utilization of this black coal, which is in the state of national interest.

DR. DEMONEY stated he would like to state his support for this proposal. He feels they are very fortunate to have a person like Dr. Volborth on their staff as a person who can not only teach but do research. He feels it should be stressed that they are being

appropriated around \$285,000 in indirect costs which they have to get one way or another. He feels this if it is appropriated will be one way part of this will come about. If this cannot be put in the budget, then this cannot come about, and he feels the state would capitalize on this type of venture.

MR. YOUNGBLOOD, Montana Energy Research and Development in Butte, stated they have presently subcontracts at MSU and Montana Tech. The program at Montana Tech is funded this year at \$310,000, and of that \$240,000 is devoted to the coal characterization task at Montana Tech. Montana Tech is the only organization in the MHD program specializing in the coal characterization. He wanted to emphasize at this time the facility that is planned will contribute to the well-rounded capabilities at Montana Tech in characterizing and using Montana coal.

ROGER RICE, Vice-President of the Western Energy Company, stated as an alumnus of the Montana Tech, he sees a strengthening of the technical capabilities of the students and the college by this curriculum. As a member of industry he sees a better tool for analyzing coal, and this will make Montana one of three places in the United States where this is being conducted.

BILL HAND, Montana Mining Association, stated with this appropriation the college can complete a valuable package for the state of Montana. He feels it is important to keep the people here, and utilize for its resources and research, so he fully supports this HB 841.

JIM FERGUS, geologist at Missoula, stated this work will lead to an advanced knowledge of fossil fuels, and since 2/3 of the equipment and space is here, he feels it is certainly prudent to fund the remaining amount for this project.

J.D. LYNCH, lobbyist for building and construction trades, stated this is obviously a good bill that all sides support this vital project.

BILL ROBINSON, representative of the Montana Tech Alumni Organization, stated the alumni is proud of their alumni that have hit the industry, because they are so qualified. They see this project as better qualifying them to meet the demands of the job market.

The CHAIRMAN asked about the total cost for this project.

DR. DEMONEY stated what the \$96,830 requires is to construct an underground structure to house this unit. After getting the equipment on campus, the equipment does not have all parts that it should have. In order to get the equipment operating they would need \$111,830.

DR. VOLBORTH stated this is the latest accelerator equipment built by the company. The electronic part and the transfer part are the older part of the equipment that was partially broken during shipment. General Foods have given away the best available equipment on the market, and the reason they gave it away is they found it was costing them too much to operate to just test the nitrogen content in grain. They decided to do it by another method, and notified him that he could have this unit since he was the expert in the field. He stated they have an exact estimate as to how much the parts will cost.

MONTANA TECHNOLOGY SCIENCE BUILDING COMPLETION

DR. DEMONEY handed out Exhibit D, regarding the Montana Tech Enrollment over the past 15 years and he referred to Pages 3 and 4 in regard to construction of the buildings on campus. He stated they have recognized it has been difficult to get new buildings built especially at Montana Tech, and last session the legislature authorized the construction of a new classroom laboratory building to be built with private funds. He reported they now have \$750,000 of a \$2,500,000 building pledged from private sources.

DR. TURLEY read Exhibit E to the committee.

REP. BARDANOUVE asked Dr. Richardson that last session they were given figures showing the declining enrollment up to 4,500 students by the year 1985, and he wanted to know what has happened to those figures.

DR. RICHARDSON stated their report was based on a study with the 13 western states, and he does not know what has happened with the enrollment. All projections across the country, were for declining enrollments to begin this year, and that has not occurred. Here in Montana, and the national literature indicates that admissions for next year are above this year. He feels we are witnessing a phenomena that occurred during the Viet Nam war, when certain social factors are impinging upon enrollment. During the war, it was a desire to avoid the draft, now it is based on the national economy. He thinks the enrollments next fall in all six units are going to be well above what they are funded in HB 500. He wanted to make the point that the estimates used for enrollment have always been low. He related the increase in enrollment as related to Montana Tech, is the interest in the worldwide energy problems, and they anticipate Montana Tech's enrollment will continue to grow. He stated in regard to this state's University system, he does not feel we are an overbuilt system. We will have to look at buildings that are structurally sound, and need remodeling, rather than begin new construction.

Dr. Richardson stated that this year, they experienced an enrollment of over 2,500 students than what was projected, and only 3% were firsttime incoming freshmen. What is being found is that students often start school, drop out and return. The age pattern of the enrollment is steadily increasing, and the average age at some campuses is 28. Adults are coming back for retraining. All of the factors are affecting their enrollment figures and cannot be predicted.

WESTERN MONTANA COLLEGE - REMODELING THE CRAFTS BUILDING

DR. THOMAS stated it was his understanding that this was left out of HB 666, and the reason he was present today. The Crafts building is an expansion of the Industrial Arts curriculum, and there is a critical need for space in this program. The building was originally the P.E. building built in 1922. The floor space around 7,000 square feet is in good shape, and they do not have the operating money to expand this program without further consideration. The roof is also in good shape.

Dr. Thomas stated he wanted to make three points regarding the Industrial Arts program. (1) The Industrial Arts program has been a viable and important function to WMC. They have approximately 100 graduates in this program serving through the state as instructors. (2) This project was reviewed by the Commissioner, Board of Regents, and the accrediting team and was recommended to the legislature, and the Executive branch as the No. 3 priority in the university system. He stated he was stunned when he realized that this project was omitted in the Executive Branch list. (3) The present Industrial Arts was built some years ago when they had an enrollment of approximately 300 students. It shares both the metal shop and the woodworking shop, and they have had repeated violations from the Fire Marshall on this. They are requesting that the woodworking shop be moved to the Crafts building so that remodeling can be done to the existing interior. He noted there has been an increase of 28% in one year's time in the Industrial Arts enrollment. He introduced two students who attend the Industrial Arts program and asked for brief comments from them.

LEANN JENKINS stated the main problem in the shop is the safety hazards. She noted she found out there is square footage requirements necessary for a safe shop, and WMC does not meet these standards. She would like to see the upcoming students have the advantage of enlarged working area, so the teachers can do even a better job than they are doing now.

LES CELLER, student, stated he had been laid off from the Milwaukee Railroad, and chose WMC as the school to attend to get into Industrial Arts. He sees one of the main problems in the

class is the overcrowding. He explained that some of the students get flash burns from the welding outfits, and get burned due to someone being bumped with hot metals. Another problem was due to the noise of the woodmaking tools, they would have to shut down while something was going on in the theater. He noted that many of the high schools are better equipped than the college, and could affect future enrollment.

MR. VANTEYLINGEN stated the \$200,000 requested for remodeling of the old gym would allow a separation of the woodworking shop. What would need to be done is partitions used for separating individual spaces, and installing facilities for removing the dust from the saws, plus an entryway to haul the materials in and out, plus some needed wiring.

REP. BRIGGS, Dillon, stated his support for this project, and the town of Dillon supports WMC very much, and any consideration that can be given will be greatly appreciated.

MONTANA TECHNOLOGY regarding Priorities not included in the Executive Budget

DR. TURLEY stated there were two items listed in the Capital Construction books are Page 5, Item 4 and Item 14. He noted they have also requested \$165,000 to remodel the space vacated by the Engineering Science Department. He gave background information regarding the student enrollment in 1953 at 383 students. In 1981 this enrollment expanded to 1,730 students. The vacated space is needed to provide laboratory space, which all students must have at least two courses in laboratory work. When the equipment in the Science laboratory is moved, the building will be bare. The curriculum in the Engineering area is changing rapidly, and they need \$165,000 to provide the needed facilities. This amount will provide four in the basement conversion of the current engineering science lab into a mud lab, which will require lab benches, water, electricity and compressed air outlets. He further explained the other type of labs that would be used in this remodeled space. He feels this usable space will be necessary to meet the accreditation requirements for the Petroleum Engineering Department, and they have been given a show cause rating. This must be corrected by the Fall of 1983, and they need the help of the committee at this time.

REP. BARDANOUE asked when the last time Montana lost their accreditation on any course in the University system, and he would like to have the answer.

DR. RICHARDSON stated he was not able to respond on this. He explained he is trying to defend the University of Montana's business school in May due to a complaint. He noted this is particularly serious that if a student does not graduate from an

accredited program, this affects his job opportunities. He noted several years ago there was a problem with the School of Law at U of M, and this was corrected.

DR. DEMONEY stated this is a serious problem and the first step to losing an accreditation is the Show Cause, or the warning. He noted that that department has been put on a 3 year period, one of the reasons was lack of facility and the other complaint was due to the turn over problem of the faculty because of the unattractive faculty surroundings.

DR. AYERS, Director of the Physical Plant, stated he was asking for \$20,000 that was approved by the Board of Regents, but not approved by the Executive. This request would be to study problems that have become evident in the Main Hall Building. This building has 38,000 square feet built in 1900 and housed the entire college. The building is of historical significance, but the major consideration is this building appears to be a basically sound building but there are questions regarding its structural soundness. He noted there was a study done by a firm from Billings and they recommended that a more detailed study be done, in particular soil analysis and monitoring of the lack of movement of this building. They are concerned if this building can be used to help solve the Tech's space crunch problems. At this time the building is primarily used to house the Bureau of Mines. It was designed as an academic building and would be suitable for that, but first it is needed to be determined if the cracks have stopped, or will it cause too unsafe conditions in the future. He stated if they can get the \$20,000 to determine the problem, and when the time comes for the next step, they would be able to make an intelligent decision regarding its use.

There being no further discussion or comments the meeting was adjourned at 3:00 p.m.



JACK K. MOORE, Chairman



The Big Sky Country

MONTANA STATE HOUSE OF REPRESENTATIVES

Representative Dave Brown
District 83
3040 Ottawa
Butte, Montana 59701
406-733-0104

Committees
Natural Resources,
Judiciary

March 27, 1981

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE

FOR THE RECORD MY NAME IS DAVE BROWN, REPRESENTATIVE FROM DISTRICT 83, BUTTE-SILVER BOW.

HB 341 IS AN ACT TO APPROPRIATE \$96,830 TO AID THE MONTANA COLLEGE OF MINERAL SCIENCE AND TECHNOLOGY IN ACQUISITION OF NEUTRON ACTIVATION AND GAMMA RADIATION DETECTION AND ANALYSIS EQUIPMENT. LET ME EXPLAIN:

NEUTRON ACTIVATION ANALYSIS IS A NON-DESTRUCTIVE METHOD OF OBTAINING ELEMENTAL COMPOSITION INFORMATION FOR SAMPLES OF SOLID MATERIAL. THE BASIC SCHEME INVOLVES SPRAYING NEUTRONS (ONE OF THE NORMAL CONSTITUENTS OF ATOMIC NUCLEI) AT THE SAMPLE. MOST OF THESE NEUTRONS ARE ABSORBED BY THE NUCLEI IN THE SAMPLE, AND THESE NUCLEI SUBSEQUENTLY EMIT GAMMA RADIATION. THIS GAMMA RADIATION LEAVES THE SAMPLE AND CAN BE DETECTED BY EXTERNAL APPARATUS.

NUCLEI OF DIFFERENT ELEMENTS RESPOND DIFFERENTLY DURING THIS PROCEDURE. THE FOLLOWING CHARACTERISTICS ARE ESPECIALLY RELEVANT TO NEUTRON ACTIVATION DETERMINATION OF SAMPLE COMPOSITION:

1. THE AVERAGE TIME DELAY BETWEEN NEUTRON ABSORPTION AND AND GAMMA EMISSION IS DIFFERENT FOR EACH ELEMENT.
2. THE ENERGY OF THE GAMMA RADIATION EMITTED IS DIFFERENT FOR EACH ELEMENT.

Exhibit A

THESE TWO CHARACTERISTICS ALLOW ELEMENTAL CONSTITUENTS OF THE SAMPLE TO BE DETERMINED BY EXAMINING THE EMITTED RADIATION, ALBEIT WITH SOME COMPLEXITIES IN THE ANALYSIS NOT NECESSARY TO DISCUSS HERE.

DR. ALEXIS VOLBORTH IS PROPOSING THE INSTALLATION OF A "FAST-NEUTRON ACTIVATION" ANALYSIS SYSTEM AT MONTANA TECH. (THE "FAST" PART OF THIS REFERS TO THE SPEED OF THE INGOING NEUTRONS. THE PRIMARY EFFECT OF THIS IS TO SELECT THE SET OF ELEMENTS FOR WHICH THE METHOD IS MOST SENSITIVE.) THE FACILITY AT TECH WOULD BE USED TO DEVELOP MEANS OF RAPID ANALYSIS OF COAL SAMPLES, AND WOULD SUPPORT THE DEVELOPMENT OF A COAL RESEARCH CENTER AT THE SCHOOL. DR. VOLBORTH'S PRIMARY INTEREST SEEMS TO BE MEASURING OXYGEN CONCENTRATIONS; HOWEVER, VERY MODEST ENHANCEMENT OF HIS PROPOSED CONFIGURATION WOULD PROVIDE MUCH BROADER ANALYSIS CAPABILITY. COMMITMENTS FOR A TOTAL OF \$215,000 IN EQUIPMENT AND FACILITIES HAVE BEEN OBTAINED SO FAR; THE MAJOR CONTRIBUTION WAS FROM GENERAL FOODS, INC. OF CHICAGO FOR \$180,000 IN EQUIPMENT NOW ON-SITE. AN ADDITIONAL \$96,830 IS REQUIRED FOR GAMMA RADIATION DETECTION/ANALYSIS EQUIPMENT.

THE BUDGET FOR THE \$96,830 IN EQUIPMENT APPEARS TO REPRESENT A REASONABLE AND FRUGAL SUM FOR THE EQUIPMENT AS REQUESTED BY DR. VOLBORTH. THIS EQUIPMENT IS REQUIRED TO ESTABLISH A FIRST-RATE FACILITY.

THE NEUTRON-ACTIVATION TECHNIQUE IS ALREADY IN USE WITHIN THE COAL INDUSTRY. FACILITIES TO ALLOW USE OF THIS METHOD OF ANALYSIS AT MONTANA TECH SHOULD PERMIT THE SCHOOL TO ESTABLISH A RESPECTABLE STATE-OF-THE-ART CAPABILITY IN COAL ANALYSIS RESEARCH. SUCH CAPABILITY WOULD BE OF SIGNIFICANT ASSISTANCE TO THE COAL INDUSTRY IN TERMS OF

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INCREASING THE USEABILITY OF COAL.

THIS RESEARCH IS LIKELY TO BE OF EVEN GREATER IMPORTANCE FOR NEW OR NOVEL USES OF COAL, SUCH AS MHD POWER PLANTS. COAL ANALYSIS REQUIREMENTS FOR MHD SYSTEMS ARE LIKELY TO BE MUCH MORE STRINGENT THAN FOR CONVENTIONAL GENERATING PLANTS. THIS WOULD MEAN THAT THE SUCCESS OF COAL FUELED MHD PLANTS MIGHT DEPEND TO AN IMPORTANT DEGREE ON COAL ANALYSIS TECHNIQUE DEVELOPMENT.

DR. VOLBORTH HAS BEEN INVOLVED IN THIS AREA OF RESEARCH SINCE 1962, WHEN HE ORIGINATED AND SUCCESSFULLY USED THIS TECHNIQUE AT THE OAK RIDGE NATIONAL LABORATORIES, AND HAS SINCE PUBLISHED SOME 40 PAPERS ON THIS SUBJECT. HE HAS HAD MAJOR SUPPORT FROM THE NATIONAL SCIENCE FOUNDATION, DEPARTMENT OF ENERGY AND THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. DR. ALEXIS VOLBORTH IS PRESENTLY AT MONTANA TECH AS A FULL PROFESSOR OF CHEMISTRY AND GEOCHEMISTRY.

MR. CHAIRMAN, I RECOGNIZE THAT THE APPROPRIATIONS COMMITTEE HAS BEEN GOOD TO THE UNIVERSITY SYSTEM IN ACTION THUS FAR AND IT WAS WITH RELUCTANCE THAT I INTRODUCED THIS BILL. THE COAL INDUSTRY, VARIOUS ELEMENTS OF LABOR AND FRIENDS OF MONTANA TECH CONVINCED ME OF THE UNIQUE OPPORTUNITY PROVIDED FOR MONTANA TECH AND MONTANA BY ESTABLISHMENT OF THE FAST-NEUTRON ACTIVATION SYSTEM. I'M ALSO AWARE OF THE TIME AND EFFORT THAT HAS BEEN SPENT IN ATTEMPTING TO ACQUIRE THE ADDITIONAL PRIVATE FUNDS NEEDED TO COMPLETE THE INSTALLATION OF THE SYSTEM---ALL ATTEMPTS HAVING FAILED. I THEREFORE AM HERE BEFORE THE COMMITTEE AS A LAST RECOURSE AND HOPE YOU'LL AT LEAST GIVE THIS PROPOSAL YOUR MOST SERIOUS CONSIDERATION.

THERE ARE SEVERAL WITNESSES AND THEY WILL ALL KEEP THEIR TESTIMONY BRIEF.

MONTANA STATE HOUSE OF REPRESENTATIVES



Representative Dave Brown
District 83
3040 Ottawa
Butte, Montana 59701
406-792-3604

Committees:
Natural Resources,
Judiciary

Proposed amendments to House Bill 841:

1. Title, line 5.
Following: "FOR"
Strike: "THE PURCHASE"
Insert: "INSTALLATION AND UPGRADING"
2. Page 1, line 13.
Following: "for"
Strike: "the purchase"
Insert: "installation and upgrading"

EXPLANATION: In the rush to introduce this bill and my lack of coordination with Legislative Council in the process, I failed to catch the use of the word "purchase." In fact, the equipment is presently all at Montana Tech. The funds requested are needed for "installation and upgrading" of the equipment so an operating system can be put in place.

TESTIMONY

Helena, MT, March 27, 1981

LONG RANGE BUILDING COMMITTEE

In 1979, the General Foods Corporation of Chicago has donated to the Montana College of Mineral Science and Technology a Fast-Neutron Generation System used for the determination of nitrogen in foods and grain. The system is valued at \$150,000. The replacement cost today is about \$300,000.

The accelerator part of this system consists of the latest Kaman Nuclear 711-A generator and spare head. The electronics and the transfer system are old and require replacement. The installation of this equipment is a major effort and also requires major funds. The system is programmed for nitrogen determination only. It needs to be restructured for general use to be able to determine also oxygen, silicon and several trace elements.

When fully operable, such a system would be unique in the Northwest; the only comparable systems being at the University of California at Irvine and at the University of Kentucky in Lexington.

The main advantages for the Montana Tech in possessing such a system would be:

1. The ability to conduct innovative research in characterization of coal and coal products.
2. The ability to initiate and conduct cooperative college-industry projects financed by industry.
3. The ability to conduct stoichiometric research with minerals, ores and rocks -- especially on sulfide ore minerals.

4. The ability to offer upper division courses in dealing with radioactivity, radiation detection and neutron activation.
5. The ability to offer first-hand experience in problems of environmental radiation protection and better understanding of the issues involved in Occupational Safety and Health.
6. The ability to conduct on-campus, up-to-date research in fast-neutron activation and thus assurance of future major support from the Government agencies.
7. The unique nature of this equipment would place Montana Tech in a more competitive position regarding funding in general.
8. Our research may also be expanded in the area of food grains, their nitrogen and oxygen content, and the content of nitrogen in organic ash.

It is nearly impossible to obtain Government funds for installation and restructuring of a dismantled major accelerator facility. This demands weeks of specific test work, overhaul, mounting and computer dedication with parts replacement, conduit work, heavy shielding purchase and installation, and several trial runs. Unfortunately, some of the transfer and electronic equipment is no longer built and being obsolete is best replaced by new up-to-date equipment.

The exact budget estimate consists of the following:

Funds Provided by Montana Tech:

Sealed Underground Tunnel	\$ 15,000
Renodel the O'Leary Building	3,000
First-Year Operating Costs	<u>38,700</u>
	\$ 56,700

Estimated Value of Equipment to be Installed
as donated by the General Foods Corporation

\$150,000

TOTAL AVAILABLE

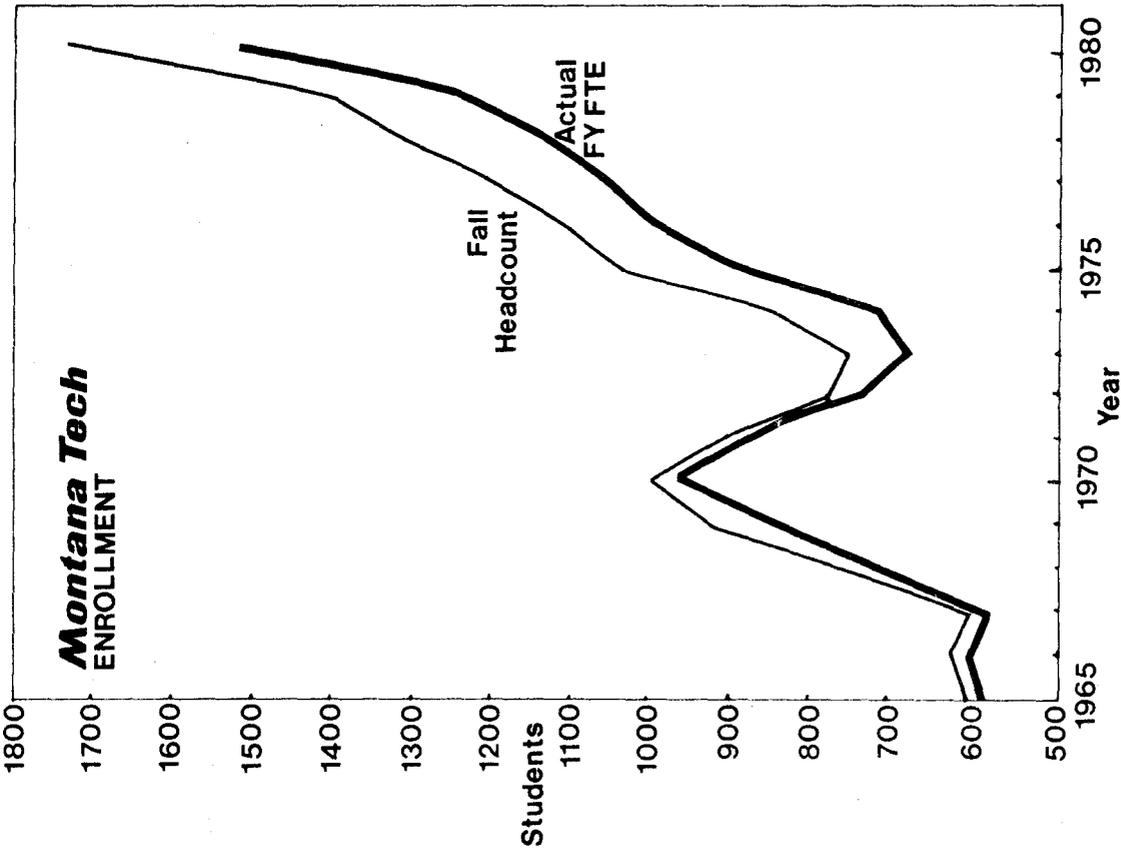
\$236,700

Total Minimum Funds Needed to Put the System
Into Operation

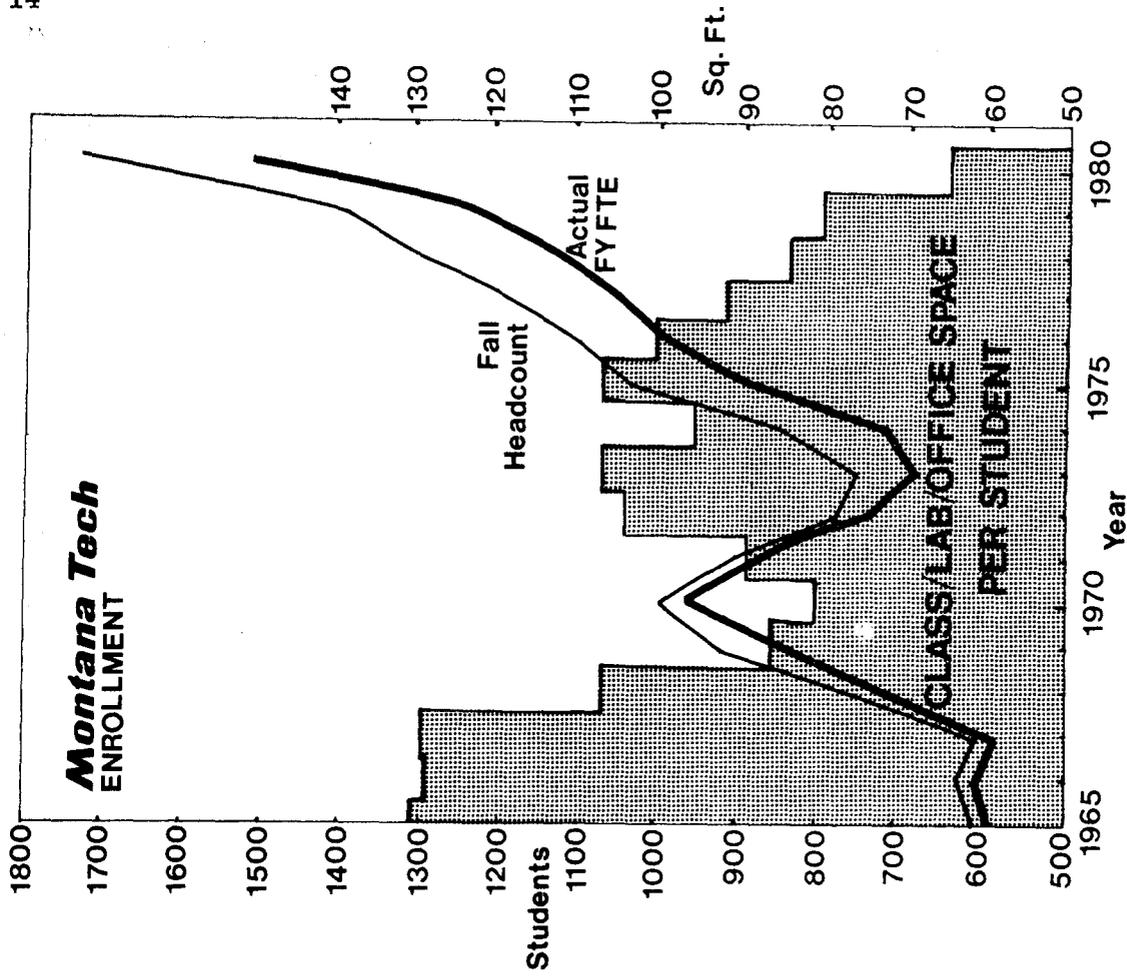
\$ 96,830

Itemized:

1. Overhaul and Replacement of the Transfer System	\$ 20,000
2. Program Timer-Computer	11,500
3. Rebuilt A-711 Head	7,200
4. Multi-channel Gamma-Ray Detection System	37,000
5. Overhaul, Installation in Butte (One nuclear engineer - 14 days @ \$480/day)	6,720
6. Horizontal Mount	1,710
7. Shielding, Lead, Cadmium, Water Tanks	11,500
8. Air fare for Nuclear Engineer (two trips)	<u>1,200</u>
	<u>\$ 96,830</u>



ENROLLMENT HAS EXPLODED AT MONTANA TECH For the past seven years, Tech enrollment has been setting new records. In 1980, enrollment was 2 1/4 times that recorded in 1973.

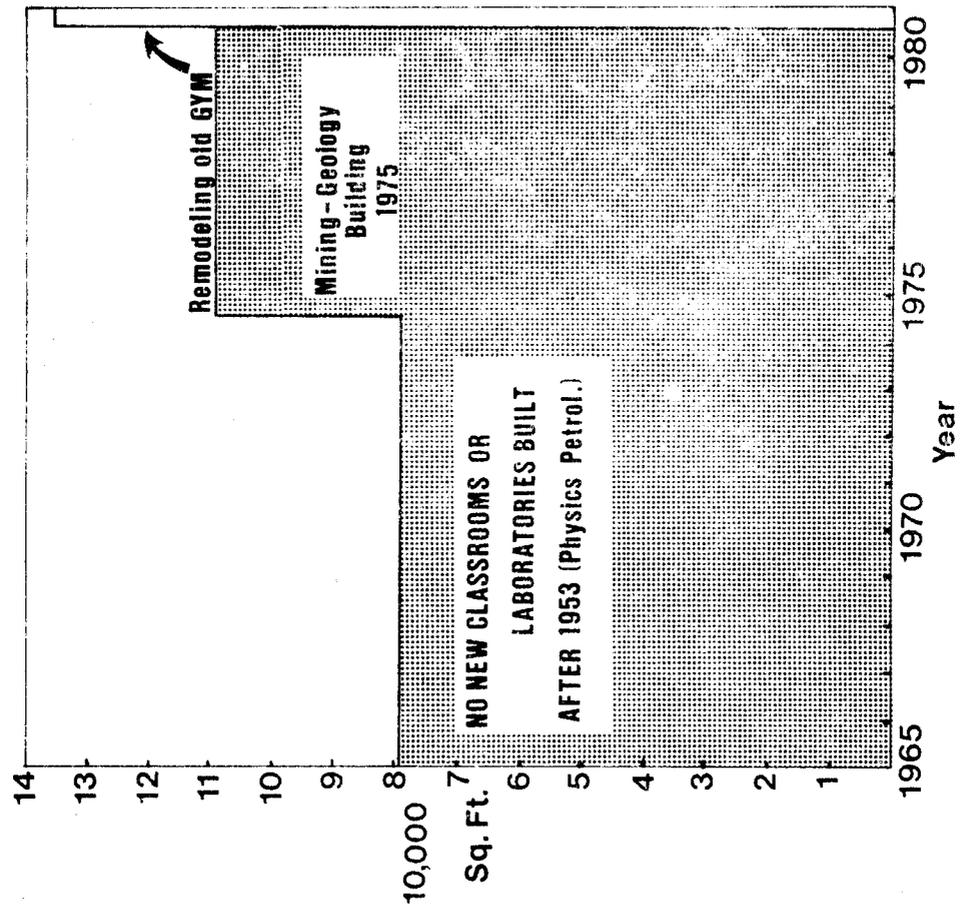


SPACE PER STUDENT HAS SHRUNK DRASTICALLY Despite the addition of a new classroom-laboratory building in 1975, today's students have only 60% of the space allotted to 1973 students.

LAST APPROPRIATION FOR NEW CLASSROOM/LABORATORY CONSTRUCTION AT MONTANA TECH WAS IN 1972

Mining-Geology Building, occupied in 1975, was last new classroom/lab facility. Other new construction since then was built for non-classroom use, largely without State appropriation.

- Library (Occ. 1978) Legislative Appropriation
- Auditorium (Occ. 1979) EDA Grant, College budget, Public gifts
- HPER (Occ. 1980) Land Grant Income, Student Fees



MONTANA TECH
Butte, Montana

CONSTRUCTION OF BUILDINGS AND OTHER IMPROVEMENTS

<u>NAME OF BUILDINGS</u>	<u>YEAR OF START OF CONSTRUCTION</u>	<u>SQUARE FEET</u>	<u>COST</u>	<u>MEANS OF FINANCING (Tax Funds, Revenue Bonds,)</u>
Main Hall	1896	37,000 Gross 22,953 N.A.*	\$219,000	Legislature authorized issue & sale of 30 yr. bonds to the amount of \$120,000. Donations.
Mill Building & Heating Plant	1908	26,276 Gross 18,854 N.A.	97,300	Legislature appropriated \$59,000.
Metallurgy Building	1920	31,700 Gross 25,316 N.A.	447,400	Tax Funds (Univ. Bond Issue)
Engineering Building (old, old gym)	1923	12,880 Gross 9,282 N.A.	85,100	Tax Funds (Univ. Bond Issue)
Gymnasium	1925	23,600 Gross 19,101 N.A.	207,000	Tax Funds (Univ. Bond Issue)
Residence Hall	1935	46,905 Gross 31,961 N.A.	606,100	Revenue Bonds
President's Residence	1935	5,805 Gross 5,133 N.A.	34,800	Bond Issue, Self Liquidation Part of PWA, Project 812
Library-Museum Building	1940	32,552 Gross 18,790 N.A.	439,300	Tax Funds (Univ. Bond Issue) Donations.
Shop, garage, campus foreman's apartment	1948	5,020 Gross 4,964 N.A.	111,500	Tax Funds (Univ. Bond Issue)
Physics-Petroleum Building	1953	18,363 Gross 21,670 N.A.	284,000	Tax Funds (Univ. Bond Issue)
Student Union Building	1958	47,452 Gross 37,821 N.A.	250,000	HHFA (Univ. Bond Issue)
Alumni Coliseum	1965	360,000 Gross	700,000	Private donations.
Heating Plant & Garage	1969	8,600 Gross	200,000	Legislative appropriation
Mining-Geology Building	1972	48,930 Gross 29,331 N.A.	1500,000	Legislative appropriation
Library	1977	32,240 Gross 29,217 N.A.	1381,917	Legislative appropriation
Auditorium	1978	7,512 Gross 6,471 N.A.	559,675	EDA Grant \$500,000 College, Public Gifts.
HPER Complex	1978	57,280 Gross 46,400 N.A.	2685,415	Land Grant Income Student Fees

*Net Available

MONTANA TECH
CONSTRUCTION OF BUILDINGS
AND OTHER IMPROVEMENTS

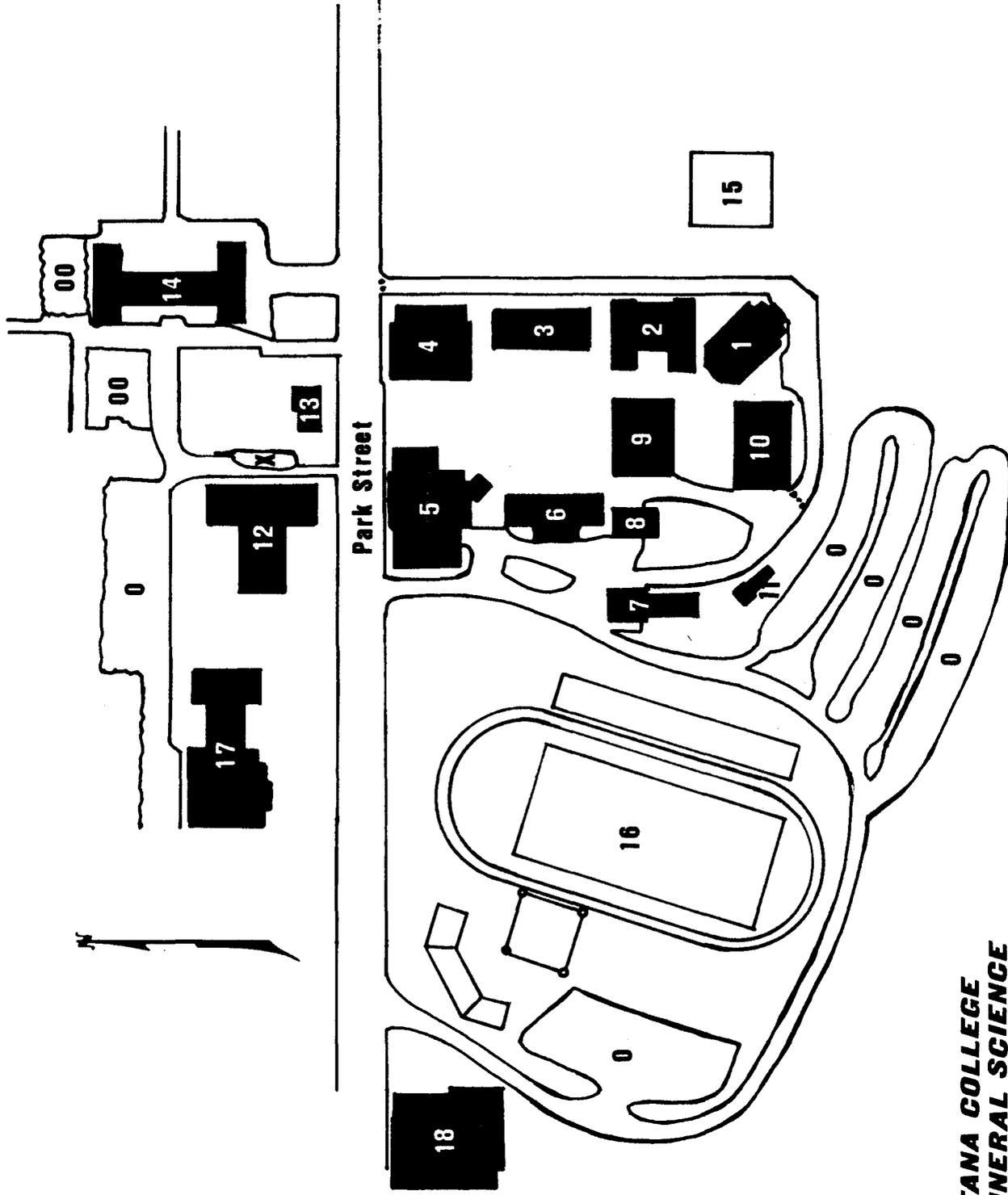
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IMPROVEMENTS

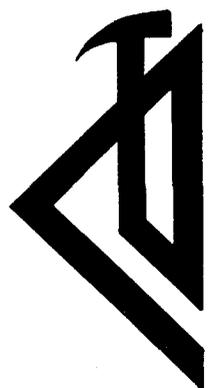
<u>Main Hall</u> Basement	1957-58	Footings; repainted, revamped Coed room; Typing office.
First Floor	1958	Offices
Third Floor	1957	Laboratory, drafting space, office space for MBMG. Cubicles for Graduate students, Dept. of Geology.
<u>Petroleum Engineering Building</u>	1958	Completion of Physics Department section.
<u>Student Union Building</u>	1971	Addition, remodeled.
<u>Old Gymnasium</u>	1980	Remodeled to Engineering/Science Building.

President's Office
September 12, 1980

- 1. Library-Museum
- 2. Main Hall
- 3. Engineering Hall
- 4. Old Gymnasium
- 5. Student Union Bldg.
- 6. Physics-Petroleum Bldg.
- 7. Heating Plant
- 8. Shop
- 9. Mill Bldg
- 10. Metallurgy-Chemistry
- 11. Greenhouse
- 12. Mining-Geology Bldg.
- 13. President's Residence
- 14. Dormitory
- 15. Tennis Courts
- 16. Alumni Memorial Coliseum
- 17. Library-Auditorium
- 18. HPER Complex
- 00. Dormitory Parking
- 0. Permit Parking
- X. Visitor Parking



**MONTANA COLLEGE
OF MINERAL SCIENCE
AND TECHNOLOGY**
Butte, MT 59701



3/27/81

PRESENTATION
OF
ROY H. TURLEY
TO THE
JOINT LONG RANGE BUILDING COMMITTEE

SCIENCE BUILDING

COMPLETION OF THE SCIENCE BUILDING, MONTANA TECH, AT A COST OF \$200,000 IS THE 29TH PRIORITY AS SHOWN ON PAGE 5 OF THE EXECUTIVE BRANCH RECOMMENDATIONS FOR THE 1981-1983 BIENNIUM LONG RANGE BUILDING PROGRAM.

ON PAGE 18 OF THIS REPORT, THE REASON FOR THE REQUEST IS LISTED AS SUPPLEMENTING THE \$1,400,000 APPROPRIATION OF THE 46TH LEGISLATURE TO RENOVATE AN OLD BUILDING INTO AN ENGINEERING AND SCIENCE BUILDING. THE CURRENT PROJECT WOULD ALLOW THE COMPLETION OF REMODELING OF THE THIRD FLOOR.

SPECIFICS OF THE PROJECT ARE LISTED ON PPS. 97 AND 98 .

I WOULD LIKE TO BRIEFLY EXPAND ON THE INFORMATION PROVIDED.

THOSE OF YOU WHO HAVE BEEN TO OUR CAMPUS ARE AWARE THAT WE MOVED INTO OUR NEW HEALTH AND PHYSICAL EDUCATION BUILDING IN JANUARY, 1980. THIS FREED THE SPACE IN OUR OLD GYMNASIUM, BUILT IN 1925, FOR CONVERSION TO OTHER USES. THE 46TH LEGISLATURE

Exhibit E

PROVIDED \$1,400,000 TO REMODEL THIS BUILDING TO HOUSE THE ENGINEERING SCIENCE, ENVIRONMENTAL ENGINEERING, OCCUPATIONAL SAFETY AND HEALTH PROGRAM AND BIOLOGICAL SCIENCES DEPARTMENT. WHEN THIS PROJECT WAS BID, IT BECAME APPARENT THAT INSUFFICIENT FUNDS WERE PROVIDED TO COMPLETE THE BUILDING. THE COMPLETION OF THE THIRD FLOOR WAS LISTED AS AN ALTERNATE IN THE INITIAL PHASE OF THE PROJECT.

THOSE OF YOU WHO VISITED THE CAMPUS DURING THE SUMMER WITH THE EDUCATION SUBCOMMITTEE ARE AWARE OF THE EXCELLENT JOB WHICH HAS BEEN DONE BY THE ARCHITECT IN CREATING A "NEW BUILDING" WHICH TIES IN WELL WITH THE CAMPUS. THE ADDITION OF AN ELEVATOR AND STAIRWAYS EXTERIOR TO THE BACK OF THE "OLD BUILDING" HAS PRODUCED A FACILITY OF WHICH WE ARE PROUD. COMPLETION OF THE FIRST TWO FLOORS ARE SCHEDULED FOR MAY 3, 1981 AND PLANS ARE UNDERWAY TO BEGIN THE MOVE INTO THIS REMODELED ENGINEERING AND SCIENCE BUILDING ON MAY 11 FOLLOWING COMMENCEMENT.

THE FIRST FLOOR CONTAINS 5 CLASSROOMS AND FIVE LABORATORIES FOR THE ENGINEERING SCIENCE DEPARTMENT. THE SECOND FLOOR HAS ENVIRONMENTAL, OCCUPATIONAL SAFETY AND HEALTH AND BIOLOGICAL SCIENCE LABS, PLUS SUPPORTING STOREROOMS AND LAB PREPARATION AREAS.

ONLY AN ENGINEERING GRAPHICS LABORATORY AND MECHANICAL ROOM WERE ABLE TO BE COMPLETED ON THE THIRD FLOOR.

ALL OF THIS SPACE IS DESPERATELY NEEDED AND WILL BE IN USE WITH THE START OF THE

1981-1982 ACADEMIC YEAR.

THE REMAINDER OF THE THIRD FLOOR WILL CONTAIN 25 FACULTY OFFICES, 2 SECRETARIAL WORK STATION AREAS, A CONFERENCE ROOM, A ROOM FOR GRADUATE STUDENTS AND TOILET FACILITIES. APPROXIMATELY 7,000 SQUARE FEET OF UNFINISHED SPACE WILL BECOME USEABLE UPON COMPLETION OF THIS FLOOR.

THE NEED FOR THE 25 FACULTY OFFICES AND SECRETARIAL WORK SPACE IS CRITICAL. WE CURRENTLY HAVE ONLY 59 FACULTY OFFICES ON CAMPUS. HB 500 PROJECTS THE ENROLLMENT FOR 1981-1982 AT 1,565, AND FOR 1982-1983 AT ^{1,565}1,599. THE STUDENT-FACULTY RATIO HAS BEEN SHIFTED FROM 16 TO 1 TO 17.8 TO 1 WITH THE NEW BILL. THIS WOULD MEAN THAT WE SHOULD HAVE 87.9 FTE FACULTY ON BOARD IN AUGUST, 1981.

WE CURRENTLY HAVE 65 FTE FACULTY AND ARE NOW SHORT FACULTY OFFICES. THE 25 ADDITIONAL OFFICES WILL BRING THE TOTAL NUMBER OF OFFICES ON CAMPUS TO 84. WE WILL STILL BE SHORT ON OFFICE SPACE EVEN AFTER THE THIRD FLOOR IS COMPLETED.

BECAUSE OF THE CRITICAL NEED FOR OFFICES, AS SOON AS POSSIBLE, ~~THE PLANS FOR COMPLETION OF THIS AREA WILL BE SUBMITTED TO THE ENGINEER'S AND ARCHITECT'S OFFICE IN THE NEXT TWO WEEKS AND HOPEFULLY WILL BE READY TO REQUEST BIDS AS SOON AS THE~~ ^{we hope} BILL IS SIGNED BY THE GOVERNOR. IT IS HOPED THAT WE WILL BE ABLE TO HAVE THE PROJECT COMPLETED BY NOVEMBER OF 1981 AND PERMIT FACULTY TO MOVE INTO THE NEW QUARTERS BEFORE THE END OF THE FIRST SEMESTER OF THE 1981-82 ACADEMIC YEAR. WE DO NOT WANT

TO HAVE FACULTY IN TEMPORARY AND SHARED OFFICES ANY LONGER THAN NECESSARY.

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PETROLEUM BUILDING

TWO PROJECTS INVOLVING THE PETROLEUM BUILDING ARE INCLUDED UNDER THE UNIVERSITY SYSTEM MAINTENANCE ALLOCATION (ITEM 4, P. 5) AND UNDER THE UNIVERSITY SYSTEM HANDICAPPED ACCESSIBILITY (ITEM 14, P. 5). IN THE MAINTENANCE ALLOCATION, \$95,000 HAS BEEN RECOMMENDED TO REPLACE THE ROOF OF THE PETROLEUM-PHYSICS BUILDING (P. 33) AND \$275,000 HAS BEEN RECOMMENDED FOR VERTICAL TRANSPORTATION AND TOILETS.

WE HAVE REQUESTED \$165,000 TO REMODEL THE SPACE VACATED BY THE ENGINEERING SCIENCE DEPARTMENT AND THE OCCUPATIONAL SAFETY AND HEALTH PROGRAMS. AS BACKGROUND INFORMATION, THE PHYSICS AND PETROLEUM BUILDING WAS OPENED IN 1953 WHEN THE HEAD COUNT ENROLLMENT AT TECH WAS 308. DURING THE 1980-81 ACADEMIC YEAR THIS BUILDING HOUSED NOT ONLY THE PHYSICS AND PETROLEUM DEPARTMENTS, BUT ALSO THE ENVIRONMENTAL ENGINEERING, ENGINEERING SCIENCE AND OCCUPATIONAL SAFETY AND HEALTH PROGRAM, AND THE HEAD COUNT OF THE SCHOOL HAS REACHED 1730 STUDENTS.

THE VACATED SPACE IS NEEDED TO PROVIDE LABORATORY SPACE FOR OUR LARGEST DEPARTMENT,

PETROLEUM ENGINEERING, AND ONE OF OUR LARGEST SERVICE DEPARTMENTS, PHYSICS.

WE PRESENTLY HAVE 285 STUDENTS MAJORING IN PETROLEUM ENGINEERING AND EVERY ENGINEERING, COMPUTER SCIENCE AND CHEMISTRY STUDENT MUST TAKE THREE PHYSICS LECTURE COURSES AND TWO LABORATORY COURSES.

THE NATURE OF THE ENGINEERING SCIENCE LABORATORIES ARE SUCH THAT WHEN THEIR EQUIPMENT IS MOVED OUT, THE ROOMS WILL BE ESSENTIALLY BARE. THESE ARE NOT TYPICAL LABS WITH BENCHES AND UTILITY SERVICES PROVIDED.

THE CURRICULUM OF THE PETROLEUM ENGINEERING DEPARTMENT IS CHANGING TO EMPHASIZE MORE LABORATORY WORK.

BECAUSE OF THE NEEDS BROUGHT ABOUT BY THE ENROLLMENT PRESSURES, WE REQUEST THAT YOU GIVE CONSIDERATION TO FUNDING \$165,000 TO PROVIDE THESE NEEDED FACILITIES.

THE \$165,000 WILL PROVIDE FOR:

BASEMENT

CONVERSION OF THE CURRENT ENGINEERING SCIENCE FLUIDS LAB INTO A MUD LAB (1100 SQ. FT.)

A MUD LAB IS A MESSY LAB. IN IT VARIOUS DRILLING MUDS ARE MIXED TO STUDY AND MEASURE FLOW PROPERTIES. THIS LAB IS USED WITH COURSES IN WELL DRILLING AND COMPLETION AND PETROLEUM PRODUCTION ENGINEERING. THE LAB IS NEEDED FOR MULTIPLE SECTIONS THROUGHOUT THE YEAR AND REQUIRE LAB BENCHES, AND WATER, ELECTRICITY AND COMPRESSED AIR OUTLETS.

IT WILL BE NECESSARY TO CONVERT THE ENGINEERING SCIENCE ELECTRICAL MACHINES LAB INTO AN ELECTRONICS LAB FOR PHYSICS (1,040 SQ. FT.). THE ENGINEERING SCIENCE STRENGTHS LAB WILL BE CONVERTED TO A STORAGE AREA FOR PHYSICS AND PETROLEUM.

FIRST FLOOR

WE WILL REMOVE THE PETROLEUM ENGINEERING DEPARTMENT HEAD'S OFFICE AND SECRETARY'S WORK STATION FROM THE BACK OF A CLASSROOM. THIS WILL ENLARGE THE CLASSROOM BY APPROXIMATELY 30% (960 SQ. FT. TOTAL). *see plan for graduate student space.*

WE WILL CREATE A NEW PETROLEUM ENGINEERING DEPARTMENT HEAD'S OFFICE, SECRETARY'S WORK STATION AND 3 FACULTY OFFICES IN A SOUTHEAST CORNER ROOM.

WE WILL IMPROVE THE EXISTING PETROLEUM "CLEAN LAB" BY PROVIDING AN EXHAUST HOOD AND INSTALLING AN ADDITIONAL LAB BENCH.

A CLEAN LAB IS USED IN CONJUNCTION WITH RESERVOIR ENGINEERING TO STUDY CORE ANALYSIS TECHNIQUES, INCLUDING THE DETERMINATION OF POROSITY, GAS AND LIQUID PERMEABILITIES AND FLUID SATURATIONS. GAS BEHAVIOR RELATIONS, SUCH AS PRESSURE VOLUME RELATIONSHIPS OF HYDROCARBONS ARE STUDIED IN PETROLEUM THERMODYNAMICS COURSES OFFERED AT THE SENIOR AND GRADUATE LEVELS.

THE CLEAN LABS ARE NEEDED FOR MULTIPLE SECTIONS EACH SEMESTER.

WE WILL CONVERT THE CURRENT STORAGE AREA AND SMALL ELECTRONICS LAB INTO A SECOND PETROLEUM CLEAN LAB.

SECOND FLOOR

WE WILL CONVERT TWO EXISTING CLASSROOMS INTO A SINGLE "PROBLEM SOLVING LAB" WITH 30 TO 40 TABLES 28" X 35" EACH WITH ELECTRICAL OUTLETS AT EACH TABLE. THE SOUTHEAST CORNER ROOM WILL BE CONVERTED INTO A PHYSICS DEPARTMENT HEAD'S OFFICE, SECRETARIAL WORK AREA AND GRADUATE STUDENT SPACE.

Completed work for this project in the summer of 1982
APPROVAL OF THIS REQUEST WOULD PERMIT A SINGLE PROJECT OF \$535,000 WHICH SHOULD PROVIDE FOR BETTER BIDS ON THE CONSTRUCTION WORK. (ROOF, VERTICAL TRANSPORTATION, LAB REMODELING.)

USEABLE SPACE IS CRITICALLY NEEDED IF WE ARE TO MEET THE EDUCATIONAL NEEDS OF OUR PETROLEUM ENGINEERING. APPROXIMATELY 35-40% OF THE INCOMING CLASS FOR 1981-1982 HAS EXPRESSED AN INTEREST IN ENTERING THE PETROLEUM ENGINEERING CURRICULUM.

ON MONDAY OF THIS WEEK WE RECEIVED THE PRELIMINARY REPORT OF THE ACCREDITATION BOARD OF ENGINEERING AND TECHNOLOGY ON THE EVALUATION VISIT FOR THE ENVIRONMENTAL ENGINEERING, ENGINEERING SCIENCE AND PETROLEUM ENGINEERING DEPARTMENTS. WE ARE EXPECTING ACCREDITATION TO BE GRANTED IN ENVIRONMENTAL ENGINEERING AND ENGINEERING SCIENCE. HOWEVER, BECAUSE OF ~~STAFFING~~ AND LAB FACILITIES PROBLEMS, WE ARE EXPECTING A "SHOW CAUSE" RECOMMENDATION FOR THE PETROLEUM ENGINEERING DEPARTMENT. BEFORE ACCREDITATION CAN BE TAKEN AWAY, A SHOW CAUSE DECISION MUST FIRST BE GIVEN. *it will be reinstated from the end of 1983* IF THE PROBLEMS HAVE NOT BEEN CORRECTED BY THE FALL OF 1983, WE WILL STAND TO LOSE OUR ACCREDITATION FOR THIS DEPARTMENT.

WE ARE CURRENTLY ADVERTISING AND FOLLOWING EVERY LEAD POSSIBLE TO HIRE THREE ADDITIONAL PETROLEUM ENGINEERING FACULTY MEMBERS. THIS WOULD GIVE US 6.5 FTE FACULTY, EVEN IF NO GROWTH WERE PERMITTED IN THE DEPARTMENT FROM THIS POINT ON, WE WOULD HAVE A 44 TO 1 STUDENT-FACULTY RATIO IN THE DEPARTMENT. WE ARE EXPECTING THE ENROLLMENT TO RISE. IF WE CANNOT GET ADDITIONAL FACULTY, ENROLLMENT WILL BE LIMITED.

IT WILL BE TOO LATE TO WAIT TILL THE NEXT LEGISLATIVE SESSION TO OBTAIN FUNDING FOR THESE PETROLEUM LABORATORIES, IF WE ARE TO SAVE THE ACCREDITATION OF THIS DEPARTMENT. WE NEED YOUR HELP NOW.

HOUSE BILL NO. 841

David Brown

INTRODUCED BY _____

A BILL FOR AN ACT ENTITLED: "AN ACT TO APPROPRIATE MONEY FOR THE PURCHASE OF NEUTRON ACTIVATION AND GAMMA RADIATION DETECTION AND ANALYSIS EQUIPMENT BY THE MONTANA COLLEGE OF MINERAL SCIENCE AND TECHNOLOGY."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MONTANA:

Section 1. Appropriation. There is appropriated \$96,830 from the general fund to the Montana college of mineral science and technology for the biennium ending June 30, 1983, for the purchase of neutron activation and gamma radiation detection and analysis equipment.

-End-

INTRODUCED BILL
HB 841