EA-0931; Environmental Assessment Center for Molecular Electronics University of Missouri, St. Louis, June 1994

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1.0 DOCUMENT SUMMARY

The Department of Energy (DOE) proposes to authorize the University of Missouri, St. Louis (UMSL) to proceed with the detailed design and construction of the proposed Center for Molecular Electronics (hereinafter referred to as "the Center"). The proposed Center would consist of laboratories and offices housed in a three-story, 21,000 square foot (ft2) building on the University campus.

The affected environment is a developed university campus. The proposed site is an uncontaminated parcel of land with no previous structure. The neighborhood around the proposed site is urban in character with predominantly residential land use.

In addition to the production of conventional solid waste, sewer discharges, and air emissions from natural gas consumption, the project would generate a range of hazardous wastes regulated under Resource Conservation and Recovery Act (RCRA), and would release some toxic substances to the air. All discharges would be within the standards established by federal and state environmental regulations. X-ray and laser equipment posing radiation hazards would be subject to the University's Radiation Control Program, which is conducted in compliance with applicable federal and state regulations. Accident risks include exposure of personnel to hazardous material, release of hazardous material or waste to the environment, and the operation of X-ray and laser equipment.

2.0 PURPOSE AND NEED

Congress has provided funds to DOE to assist in construction of the Center at UMSL. DOE's purpose is to carry out this congressional intent (described below) and to contribute to its own mission by supporting research programs such as the Center.

3.0 DESCRIPTION OF ALTERNATIVES INCLUDING THE PROPOSED ACTION

3.1 Description of the Proposed Action

The DOE proposes to authorize the UMSL to proceed with the detailed design and construction of the proposed Center. Conference Report 102-177, accompanying the Energy and Water Development Appropriations Act of 1992 (Public Law No. 102-104), indicated that $10 million had been included in DOE's Fiscal Year 1991 appropriation to assist UMSL with construction of the proposed Center. A grant was executed with the University on May 21, 1992, and grant funds are available to UMSL for the limited purpose of performing preliminary studies, including analysis necessary to prepare this Environmental Assessment (EA). However, under the terms of the grant, the grantee may not initiate construction or take any other action that would affect the environment or limit alternatives until the DOE NEPA process has been completed and DOE has determined that such action should proceed.

3.2 Project Description

3.2.1 Construction Activities

The UMSL campus is comprised of 177 acres, and the quadrangle for the proposed Center would be 150 feet by 250 feet. The Center would be situated on the north side of Benton Hall, completing the quadrangle development plan that was begun with the science building in 1987. The new building would be connected to Benton Hall. The nearest residence is 500 feet from proposed site and an existing pond is 100 feet away.

The vicinity of the UMSL campus is shown in Figure 1. The proposed site in relation to the UMSL campus is shown in Figure 2. The site plan for the proposed Center is provided in Figure 3.

The proposed multi-story Center would have a 7,000 ft2 footprint and be approximately 21,000 ft2 in area consisting of laboratories and offices. Project equipment would include high technology equipment such as electron microscopes, diffraction spectrometers and various laser devices. The building would be constructed of reinforced cast-in-place concrete supported on drilled piers bearing on rock. The roof structure would be steel frame. Walls would be supported on grade beams. Exterior walls would be brick-veneer masonry on metal-stud backdrop with precast stone accents. Windows would be aluminum thermal frames and entry doors would be painted aluminum storefront design. Skylights would be double-glazed aluminum. A single-ply membrane roofing system would be installed on insulated metal deck. Sanitary sewer, storm water, and water, would be connected to the existing utility services, which run along the West Drive. A new sidewalk would extend toward the north, away from Benton Hall (Ref 1).

Construction of the proposed Center is estimated to take about 21 months. Normal construction hours would be from 8 a.m. to 5 p.m., Monday through Friday, with occasional skeleton-crew work on Saturdays. Typical construction equipment for erecting reinforced, cast-in-place concrete buildings with steel frame roof design would be used. Only equipment meeting local ordinances with respect to noise levels at the nearest existing occupied areas would be used.

3.2.2 Operations Activities

The proposed modular laboratories would be adaptable for research activities principally related to physics, chemistry, and electrical engineering. Proposed research would include the development and application of thin-film materials, semi-conductors, electronic sensors and devices, and high-performance polymers. Specific research for the proposed Center has not yet been formulated, therefore, specific procedures for any particular process or study cannot be described at this time. Equipment used in existing laboratories, if still in operable condition, would be moved and used in the proposed new Center. Any obsolete equipment would be replaced with state-of-the-art models and additional equipment would be added to expand the capabilities of the new facility. In particular, some lasers already in existence would be used, but since new technology is rapidly being developed for other uses of lasers, new units would be added for the proposed Center's operation. Existing relevant research operations at other campus locations would be relocated and expanded in the new facility (Ref 1). All laboratories described below are existing laboratories that would be relocated to the new building.

Figure 1.

Figure 2.

Figure 3.

On the first floor would be: a microscopy suite, containing a transmission electron microscope (metal shielding for x-rays), a scanning tunneling microscope, an atomic force microscope, and a scanning electron microscope; a plasma diagnostics laboratory that would house argon ion and dye lasers, and a monochromator; and an amorphous semiconductor laboratory consisting of argon ion and nitrogen lasers, and a plasma deposition system.

On the second floor of the proposed Center, there would be: an x-ray laboratory containing x-ray diffraction spectrometers; a computer modeling laboratory with work stations; and a self-assembling polymer laboratory containing optical and Brewster angle microscopes.

The third floor would house: a polymer characterization laboratory utilizing a gel permeation chromatograph, an electron spectrometer for chemical analysis, and an electron spin resonance spectrometer; and polymer fiber optics fabrication and characterization laboratories which would have a sputter deposition system, a mask aligner, and a fiber optic spectrum analyzer.

3.3 The No Action Alternative

Under the no-action alternative, DOE would not authorize the University to proceed with construction or any other action that would affect the environment or limit alternatives. Construction and operation of the proposed facility would occur as a result of other funding mechanisms, would be delayed or would not occur.

3.4 Site Alternatives

In 1987 prior to DOE involvement, the University considered alternate sites and locations for the proposed project. Other, non-quadrangle sites were contemplated for the proposed facility, but none was considered to be a feasible alternative. The proposed site had advantages since it was adjacent to existing facilities performing similar research and the proposed project would complete the quadrangle in which it was to be sited. Because of the need to place

comparable operations adjacent to each other, the University determined the proposed site would be the only feasible alternative (Ref 1).

4.0 THE AFFECTED ENVIRONMENT

The environment of this proposed site on the University campus is a grass-covered open space with some trees, bushes, asphalt walks, and driveways. Fauna and flora are typical of a developed campus environment, e.g., common birds, insects, and grass and weed species. The University has two listings in the data base of the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) under U.S. Environmental Protection Agency (EPA) ID Nos. MOD981723638 and MOD071999783. The first ID number identifies the hazardous waste storage facility; the data base indicates that a preliminary assessment and screening site inspection were initiated in 1988 and completed in 1989. The site was identified as requiring "no further action." At the site indicated by the second ID number, a preliminary assessment was conducted in 1991. It is assumed that this site also involves the hazardous-waste storage facility because the CERCLIS ID number is the same as the facility's treatment, storage, and disposal permit number. According to the UMSL Environmental Health and Safety Office, the storage facility, which is located in the north-central portion of the campus, would have no impact on the proposed Center, which would be located approximately 1,600 feet to the south-southwest in the southwest portion of the campus (Ref 2, 3).

The University campus is in an urban area in proximity to several residential communities, including Bridgeton, St. Ann, Hazelwood and Bellerive (see Figure 1). The nearest park is St. Louis's Forest Park, a city area, maintained by St. Louis, which is about 4.25 miles south-southeast of the project site.

The campus is characterized by hills and contains a pond (Bugg Lake) approximately 100 ft. northeast of the proposed site. The pond existed before the development of the University, when the area was occupied by a golf course. The pond attracts ducks and geese and is currently maintained for its aesthetic value.

5.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION AND ALTERNATIVES

5.1 Construction Impacts

5.1.1 Sensitive Resources

5.1.1.1 Historic, Archeological, and Cultural Resources

The Missouri Department of Natural Resources (MDNR) has determined that the proposed project would not impact any historical, archeological, or cultural resources (Ref 2).

5.1.1.2 Federal/State-Listed or Proposed Protected Species or Critical Habitats

The U.S. Department of Interior's Fish and Wildlife Service has determined that the project area does not include federally protected or proposed plant and wildlife species, critical habitats, or federal fish-and -wildlife management facilities.

The Missouri Department of Conservation, based on a review of their heritage database map and computer files, identified 3 species historically known for subject area which are unlikely to be present (Ref 4, 5). An on site inspection has been performed and documented and a letter to that effect is attached (Ref 16).

5.1.1.3 Floodplain/Wetlands

The pond would be minimally affected by the proposed construction due to siltation/erosion engineering controls. Other features of the campus are shown on Figures 2 and 3 (Ref 1). The proposed site, including the nearby pond, is neither a designated floodplain nor wetland. The Federal Emergency Management Agency (FEMA) has not prepared a Flood Insurance Rate Map, which would encompass the campus and the village of Bellerive. FEMA lists communities, that are not in the program, but have been designated special flood hazard areas; Bellerive is not a designated area (Ref 6, 7).

5.1.1.4 National Forests, Parks, Trails

The U.S. Geological Survey map does not indicate any national forests, parks, or trails on the campus or in the vicinity.

5.1.1.5 Prime Farmland

The vicinity's soil types are not included in the St. Louis County Prime Farmland list provided by the U.S. Department of Agriculture's Soil Conservation Service (Ref 8). Therefore, no prime or unique farmland would be impacted.

5.1.1.6 Special Sources of Water

The proposed site is not part of a supply watershed, the groundwater underlying the site is not a sole-source aquifer, and the project would not use wells (Ref 9).

5.1.2 Erosion/Runoff

The construction contractor would be required to control siltation and soil erosion resulting from construction activities by such engineering controls as installation of water-diversion structures, seeding, mulching, and sodding. Staked straw bales will be used around the clearing and grading limit to minimize run-off during construction. Minor grading of existing top soil would be required (Ref 1).

5.1.3 Demolition/Construction Waste Disposal

5.1.3.1 Asbestos

The area of Benton Hall to be affected by the proposed construction was recently renovated and all asbestos was removed then. There would not be any asbestos involved in the proposed project (Ref 16).

5.1.3.2 Excavation Waste/Disturbance of Contaminated Soil

There are no indications of soil contamination based on recent subsurface boring data (Ref 17).

5.1.3.3 Demolition Waste/Construction Waste Disposal

Approximately 100 cubic yards of demolition waste would result from removal of various portions of Benton Hall to provide new exterior wall openings and exit doors. The expected volume of construction waste over the 21-month construction period would be about 800 cubic yards, consisting of masonry, brickbats, wood scraps, miscellaneous trimmings and scraps, finish material, cardboard, paper, polyethylene sheeting, and various packaging materials typical of building construction (Ref 1). This would be removed and disposed of by the general contractor in a landfill approved for construction waste, with adequate capacity.

5.1.4 Air Quality Impacts (Dust, Equipment Emissions)

Air-quality impacts of construction would be those routinely resulting from construction traffic and on-site diesel- or natural-gas driven machinery. These would be low-level intermittent and transient impacts (Ref 1).

5.1.5 Noise

The highest level of construction noise would come from bulldozers used for site grading, drill rigs used for pier installation, and trucks used in concrete placement. The peak noise would be from concrete trucks with mixers; approximating 108 decibels (dB) at the source, 85 dB at 50 ft, 79 dB at 100 ft, and 67 dB at 400 ft. These levels fall within the "annoyance range" of 65 to 128 dB (the "pain threshold"). Receptors would include persons on the street and in buildings within a 400-ft perimeter. This annoyance range would be transitory for passersby and would be abated to meet local noise ordinances for people in adjacent buildings because of the acoustical effects of the walls and windows (Ref 10). The noise impacts from construction would be minimized by limiting construction hours to 8 a.m. to 5 p.m., Monday through Friday.

5.1.6 Transportation Impacts

Construction traffic would not likely exceed 25 trips per day at peak activity levels. This level would not be expected to affect the local flow of neighborhood and street traffic. There would be no impact on existing parking, because parking for contractor personnel would either be made available on a portion of the on-site parking area or be directed to off-street parking sites. The construction process would not eliminate any existing parking spaces (Ref 1).

5.1.7 Polychlorinated Biphenyls (PCBs)

No PCB or PCB contaminated capacitors or transformers exist within the construction area for the proposed project.

5.2 Operation Impacts

5.2.1 Domestic Waste (Trash)

The proposed project would add approximately 132 cubic yards per year of domestic waste to the University's annual load of 11,000 cubic yards, representing a 1.2% increment. The University's waste is compacted on site and hauled to a permitted landfill by a licensed disposal contractor (Ref 1). The proposed 1.2% increment would be within the University's present permitted capacity.

5.2.2 Sanitary Waste (Lavatory Waste)

The University is serviced by a main sanitary sewer with a capacity of 13.5 cubic feet per second. The proposed project would generate a maximum (design capacity) of 0.27 cubic feet per second. The University reports that there have been no flood events owing to excess flow, and it is estimated that utilization is approximately 25-50% of capacity based on conventional design. The proposed Center sewage flow would be connected to the main sanitary sewer via an existing 10 inch diameter sewer line along West Drive. This 10 inch line has a capacity of 1.0 cubic foot per second and is estimated at approximately 25-50% of capacity. Accordingly, it is estimated that adequate capacity exists in the sanitary system to accommodate the project flow (Ref 1, 15).

5.2.3 Hazardous Waste (Laboratory Chemical Waste)

Hazardous waste would consist of chemical waste products from sample preparation areas, the chemistry laboratory, and microscopy laboratories. Wastes projected for the proposed project are categorized in Table 5-1 (Ref 1).

Table 5-1. Waste Projections (in kilograms per year) for the Proposed Project

Waste Type	Current University Generation	Generation of the Proposed Project	Projected Combined Total
Corrosives	125	2	127
Heavy Metal	100	5	105
Halogenated Solvents	714	55	769
Non-Halogenated Solvents	1000	17	1017
Photochemical Waste	270	100	370
Other Toxic Wastes	100	1	101
Total	2,309	180	2,489

The overall increase over current University generation of 180 kg/year would be approximately 7%. Hazardous waste

would be managed by the University's Environmental Health and Safety Department, in compliance with RCRA and MDNR regulations. The University has applied for a part B permit as a hazardous waste generator and has operated under interim status under RCRA since 1981. Corrosives generated by the proposed project would be minimized by neutralization at the permitted campus waste facility. All other hazardous wastes would be transported and disposed of by contractors licensed under RCRA. Empty gas cylinders would be returned to suppliers (Ref 1).

5.2.4 Biological/Medical Waste

Biological and/or medical wastes would not be generated by the proposed project (Ref 1).

5.2.5 Radioactive and Mixed Hazardous/Radioactive Waste

Radioactive and radioactive-mixed wastes would not be generated by the proposed project (Ref 1).

5.2.6 Radioactive Exposures

The proposed project would involve the following sources of radiation exposure and laser exposure: an X-ray diffraction unit manufactured by Siemens, Inc., which uses a molybdenum anode to generate K-alpha radiation; and laser devices, which have not yet been specified. The University's Radiation Control Program would apply to these sources. Radiation control at the University is the responsibility of the University's Radiation Safety Office, which would monitor the potential for excess X-ray, laser exposures, and encapsulated sources. The requirements of Title 10 Code of Federal Regulations, Part 34 (10 CFR 34), Subpart B, Radiation Safety Requirements, would continue to be followed for exposure control of radiography equipment. The use of lead shielding, and personnel badges that would be monitored monthly, would be used to essentially minimize and control employee risk (Ref 1).

Radiation exposure limits (10 CFR 20) for licensed facilities are as follows in roentgen equivalent man (rem) units of dose per calendar quarter:

Whole body, head and trunk; active blood-forming organs, lens of eyes or gonads: 1.25

Hand and forearms, feet and ankles: 18.75

Skin of whole body: 7.5

At a distance of 5 centimeters from the x-ray enclosure the dose to the individual would be 0.05 millirem per hour (mrem/hr) according to Siemens Inc. At this distance the number of hours required to reach the exposure limits above would be 25,000, 469,000, and 150,000, respectively. Exposure is reduced in proportion to the cube of the distance between the individual and the point source of radiation. At one meter from the enclosure the rate of exposure would be 0.00003125 mrem/hr. The number of hours of exposure required to reach the limits above at a distance of 1 meter from the enclosure would be 40,000,000, 600,000,000, and 240,000,000, respectively. Only two personnel sitting in a control room approximately 4 meters from the x-ray machine would be involved in the operation of the equipment.

These potential doses would be too small to monitor using standard badging methods. Actual exposures would not create an increased cancer risk.

The X-ray diffraction unit is fully shielded and is designed to produce zero radiation outside of the sealed container. The unit has an automatic shutdown and other safety features to minimize the risk of accidental X-ray exposure if the shielding system malfunctioned. Operation of the unit would be restricted to personnel specifically trained in safe operation under the University's Radiation Safety Program (Ref 1).

Laser devices would be operated in accordance with the University's Laser Radiation Safety Manual, which includes hazard identification, analysis, warning signs, labeling requirements, proper eye protection, instruction of personnel, and emergency and injury procedures. Each laser unit would contain an inter-lock protection system as well as warning lights that are active when the laser is used. In view of these routine protective measures, the risk of exposure

over established dose limits for workers or the public would be negligible. A probabalistic estimate is not available (Ref 1, 14).

5.2.7 Air Emissions

5.2.7.1 Radioactive

The proposed project would not involve the potential release of radioactive materials to the atmosphere (Ref 1).

5.2.7.2 Criteria Pollutants

A new natural-gas boiler would be installed to serve the proposed building. The subject site is located in a non-attainment zone for volatile organic compounds. The quantities of carbon monoxide (CO) and nitrous oxide (NOx) produced from the operation of the campus' natural gas boilers were determined based on emission factors in a MDNR Emissions Inventory Questionnaire and a campus-wide usage of 77.75 million cubic feet of natural gas, as recorded in 1991. An annual production of 1,625 pounds of CO and 7,962 pounds of NOx was calculated for the entire campus. The annual increase in usable space volume added by the proposed Center would be 2.5%, producing approximately 41 and 199 pounds of CO and NOx respectively. This increase of 2.5% would not result in criteria pollutants exceeding established limits under existing federal and state guidelines (Ref 3).

5.2.7.3 Other Toxic Compounds Released to the Air

Laboratory activities would involve venting areas containing vapors of silane, chlorinated silanes, methane, phosphine, diborane, arsine, hydrochloric acid, and various other organic compounds used in research. Laboratory ventilation systems would be equipped with wet, recirculating, point-of-use scrubbers capable of removing these chemicals. Any residual entrained particles would be caught on filters. These filters would be changed at a frequency based on analyses of the stack samples and the pressure drop across the filters. The spent filters would be disposed of as part of the appropriate hazardous waste stream. None of these chemicals is listed in the EPA regulations on National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61). Estimated net releases to the atmosphere with threshold limit values (TLV) compiled by the American Conference of Government Industrial Hygienists (ACGIH) are compared in Table 5-2 (Ref. 12).

The time weighted average (TWA) exposure limit is based on eight hours. The TLV emission rate represents the maximum emission that would not exceed the TLV limit based upon dispersion modeling of Geraghty and Miller. The error of estimate introduced by using Geraghty and Miller modeling, instead of a specific dispersion model for the affected site, shows that the TLV limit is not likely to exceed 1 to 2 orders of magnitude. Even with a conservative allowance for error, the projected emissions would be several orders of magnitude lower than rates which would cause the TLVs for listed chemicals to be exceeded. The minimum exposure limit for any listed quantity is 0.1 milligrams per cubic meeter (mg/m3) which yields an approximate 2,700 mg/second limiting emission rate. This suggests that the projected emissions for the chemicals not listed by the EPA, are also likely to be several orders of magnitude below the limiting rate (Ref 13).

Table 5-2 Estimated Net Releases to the Air Compared with the Threshold Limit Values

Substance (See Notes Below)	Quantity Used (ml/min)	Percent Vented To Air	Emission Rate (mg/sec)	TWA Exposure Limit (mg/m3)	TLV Emission Rate (mg/sec)
Silane	<1	60	0.02	6.6	242,000
Chlorinated silanes	<1	0.1	0.00002	*	Not Listed

Methane	<100	100	1.66	*	Not Listed
Phosphine	<0.001	75	0.00001	0.42	15,400
Diborane	<0.001	60	0.00001	0.11	4,000
Arsine	<0.001	85	0.00001	0.16	5,900
Silicon Tetrafluoride	<0.1	60	0.000001	*	Not Listed
Hydrochloric Acid	<0.24	0.1	0.004	7.5	76,000

NOTES: Abbreviations: ml/min = milliliters per minute, mg/sec = milligrams per second, and mg/m3 = milligrams per cubic meter.

***** Without a listed TLV the TWA can not be calculated.

The source for the TLVs is the ACGIH

None of the chemicals discussed in Sections 5.2.3 and 5.2.7.3 are listed as carcinogens by the ACGIH.

5.2.8 Noise

The potential source of noise to the outside environment associated with the proposed building would be roof-top ventilation fans. These would be expected to generate the low-level rushing or hissing sounds characteristic of air flowing in forced conduits.

Sources of noise inside the proposed facility would include conventional heating, ventilating, and air conditioning machinery and conduits. Pumps, motors, and compressors would be isolated from building working areas. Some of the laboratories would contain noise- and vibration-sensitive equipment such as an atomic resolution transmission electron microscope, which requires an environment more protected from noise and vibration than ordinary room and labs. Accordingly, the level of indoor noise would be typical, or lower than that, of office buildings and well below that which could cause a disturbance to persons (approximately 40-60 Db depending on location, season, time of day, and local indoor-activity level) (Ref 1, 10).

5.2.9 Socioeconomic Impacts

The proposed Center would employ approximately 10 additional persons and generate approximately $228,000 in annual payroll. In addition, the proposed Center would result in the purchase of approximately $122,000 in goods and services. Total University costs and payroll is $45.8 million and other expenditures are $30.8 million (1991-92 fiscal year). Moreover, many of the research projects would involve the participation of industries located in St. Louis and elsewhere increasing the level of investment and expenditures in the local economy. Finally, in the future, it is expected that some of these projects (in the areas of thin-film materials, semi-conductors, electronic sensors and devices, and high-performance polymers) will prove successful, resulting in greater development and production investments with attendant economic benefits (Ref 1, 3).

5.2.10 Off-normal Operations (Accident Analysis)

Research facilities such as the proposed Center for Molecular Electronics may have accident risks associated with spills of hazardous materials, injuries to laboratory personnel from inadvertent chemical or radiological exposure, and various minor incidents such as cuts from glass.

In the past five years there have been some minor motor oil spills and one chlorinated solvents spill, all of which were

contained and cleaned up within buildings and below reportable quantities under the Comprehensive Environmental Response, Compensation and Liability Act (40 CFR 302). During this period there were two minor injuries of employees involving hazardous materials, one of which required medical attention. The University's Environmental Health and Safety Department would respond with properly trained personnel to any incidents at the proposed Center involving radiological or chemical mishaps or spills. Based on the above evidence, accidents associated with the proposed facility would not be likely to threaten the health and safety of workers or the public, or the environment (Ref 1). The proposed project offers virtually no opportunity for causing "very large or catastrophic consequence".

5.2.11 Cumulative Impacts

Cumulative impacts have been considered in the context of each environmental impact discussed in this document. No other construction is anticipated on the campus during the construction of the proposed Center.

5.3 Environmental Impacts of Alternatives

If the University constructed the facility using another funding mechanism, the minor environmental impacts described in this EA would still happen. If the University decided, as a result of no-action by DOE, not to construct the facility, the minor environmental impacts ascribed to this project would not happen. Other alternatives, such as reducing the size of the facility or changing its location, could jeopardize the success of the project, but would not substantially change the impacts of construction and operation.

The environmental impacts of the University selecting another site on the Campus would be similar for virtually all construction and operational aspects.

5.4 Compliance with Regulations

The proposed Center would not require any new or modified permits or licenses to comply with environmental laws and regulations. University licenses and permits pursuant to these laws currently include a RCRA interim generator status and part B permit application for hazardous-waste generation. The X-ray unit would be registered with the Missouri Department of Health's Division of Environmental Health/Epidemiology Services. The boiler does not require an air emissions permit (Ref 1).

6.0 RELATIONSHIP OF THE PROPOSED ACTION TO OTHER ACTIONS

The proposed Center is related to University actions to continue the development of its physics and chemistry programs and its relationship with the local business community. The proposed Center is not related to actions being considered under other NEPA reviews.

7.0 RELATIONSHIP OF THE PROPOSED ACTION TO ANY APPLICABLE FEDERAL, STATE, REGIONAL OR LOCAL LAND USE PLANS AND POLICIES LIKELY TO BE AFFECTED

Land use at, and around, the site is predominantly "institutional" as part of the campus of the University. This use includes classrooms and lecture facilities, laboratories, offices, athletic facilities, and dormitories. Land use surrounding the campus is principally residential with some retail commercial facilities. Construction of the proposed Center is part of a long-standing plan to complete a quadrangle complex of buildings. This action is consistent with, and would not affect, federal, regional, or local land use policies.

8.0 LISTING OF AGENCIES AND PERSONS CONSULTED

Missouri Department of Conservation, Dan F. Dickneite, Planning Division Chief

United States Department of Interior, Fish and Wildlife Service, Jerry Brabander, Field Supervisor

Missouri Department of Natural Resources, David A. Shorr, Director

U.S. Army Corps of Engineers, St. Louis District, Michael A. Brazier, Chief, Regulatory Branch

St. Louis County Department of Highways, Flood Plain Development Permits, Harry Wissman, Local Administrator

Missouri Department of Natural Resources, Division of Geology and Land Survey, Don Miller

U.S. Department of Agriculture, Soil Conservation Service, Bernie LeFlore

Missouri Department of Conservation, Flora of Missouri Project, George Yatskievych, Botanist

9.0 REFERENCES

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5. U.S. Fish and Wildlife Service, Jerry Barabander, letter of March 9, 1993
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7. National Flood Insurance Program Community Status Book, FEMA, Federal Insurance Administration, Washington, D.C., May 12, 1992
8. U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of St. Louis County and St. Louis City, Missouri, 1981-167-S/105, April 1982
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10. Environmental Impact Data Book, Chapter 8-Noise, Tables 8-1 to 8-4, Anne Arbor Science, 1979
11. Safety Regulations for the Department of Chemistry, University of Missouri-St. Louis, Revised 1992
12. Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Government Industrial Hygienists, 1993-1994.
13. Air Pollution Hazard Analysis for the Institute for Micro-manufacturing at Louisiana Tech University, Geraghty and Miller, Inc., December 15, 1992
14. Laser Radiation Safety Manual, University of Missouri-St. Louis, 1989
15. Additional data supplied by Bernard Feldman, University of Missouri, January 17, 1994
16. Bernard Feldman, University of Missouri, letter of March 25, 1994
17. Shannon and Wilson, Geotechnical and Environmental Consultants, J. Ronald Salley, March 28, 1994

APPENDIX A SUPPORTING DOCUMENTS

U.S. Department of Energy Finding of No Significant Impact Center for Molecular Electronics at University of Missouri, St. Louis

AGENCY: U.S. Department of Energy
ACTION: Finding of No Significant Impact

SUMMARY:

The Department of Energy has prepared an Environmental Assessment (EA) DOE/EA,-0936 - evaluating the construction and equipping of the proposed Center for Molecular Electronics on the campus of University of Missouri at St. Louis, Missouri. The objective of the proposed project is to conduct multidisciplinary research in two of the fastest developing and increasingly commercially significant fields of molecular electronics and synthetic metals. Another very important goal of the proposed project is that of technology transfer.

Based on the analysis in the EA, the DOE has determined that the proposed project does not constitute a major federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969 (NEPA). Therefore, the preparation of an Environmental Impact Statement is not required.

DESCRIPTION OF THE PROPOSED ACTION:

The proposed action is authorization of the University of Missouri - St. Louis to begin constructing and equipping the proposed Center for Molecular Electronics.

The proposed Center would consist of laboratories and offices housed in a multi-story, 27,000 ft.2 building on the University campus. The proposed Center would be situated on the north side of Benton Hall. The building would be constructed of reinforced cast-in-place concrete supported on drilled piers bearing on rock. Proposed project equipment would include high technology equipment such as electron microscopes, diffraction spectrometers and various laser devices.

ALTERNATIVES:

The DOE considered the no-action alternative. The University is committed to implementing the proposed project without the DOE grant.

The impacts of no action would therefore be the same minor effects evaluated in the EA. Prior to federal appropriations, the University considered other sites and locations on their campus for the proposed facility in the early planning for the project, but found none that meet their need to consolidate existing research in an area where similar research was already being performed.

ENVIRONMENTAL IMPACTS:

The EA documents DOE's analyses of the impacts of constructing, equipping, and operating the proposed Center for Molecular Electronics.

Construction impacts evaluated were the effects of erosion, waste disposal, air emissions, noise and construction traffic, and parking.

Operations impacts evaluated were the effects of waste generation (domestic, sanitary, hazardous, medical/biological, radioactive and mixed wastes), radiation exposures, air emissions (criteria, and air toxins), noise, socioeconomic impacts, and off normal events.

No significant environmental impacts associated with the proposed construction or operations are anticipated. This finding of no significant impact for the proposed action is based on the following factors, which are supported by information and analysis in the EA.

Impacts of Construction/Installation

No sensitive resources (historical/archeological, protected species/critical habitats, wetlands/floodplain, national forests/parks/trails, prime farmland and special sources of water) would be affected by the proposed project as they do not occur on or near the site. Routine construction waste would be managed according to appropriate state and local regulations. Air quality impacts associated with delivery trucks and on-site construction machinery, would be low-level and transient. Noise levels would be those conventionally associated with daytime construction activities for a low-rise building and are not likely to disturb residences, workers or outdoor recreation. Traffic impact would not significantly affect local circulation or parking.

Impacts of Operations

Waste Generation: Domestic and sanitary wastes would meet local requirements and can be readily accommodated by existing municipal services. The increase in hazardous wastes due to the proposed Center would total less than 200 kg per year, consisting of corrosives, heavy metals, solvents, and photochemical wastes. These would be managed in accordance with the University's existing hazardous waste management program under an existing interim RCRA permit.

Radiation Exposure: Radiation exposures to workers may be associated with the presence of an X-ray machine and a laser device under the supervision of the University's Radiation Safety Program pursuant to applicable federal and state regulatory programs (specifically 10 CFR 34, Part B). The use of lead shielding for equipment and the requirement that personnel use badges that would be monitored monthly would mean that exposures of personnel would be within safe limits as established by state and federal criteria.

Air Quality: Toxic air emissions, consisting mainly of silanes and methane, would produce insignificant levels of public exposures in relation to threshold limit values as defined by the American Council of Governmental Industrial Hygienists. Criteria pollutants resulting from operation of a natural gas boiler would not be produced at significant levels.

Other Effects: Noise generated indoors or outdoors would be insignificant. Socioeconomic impacts would be small in the scale of overall University economic activity. Accident risk would be very low as evidenced by zero reportable accidents involving hazardous material spills, and a low rate of minor incidents involving worker injury over the past five years at the University. Overall, the incremental impacts of the project are small in relation to the ongoing impact of the University, and do not constitute significant cumulative impacts.

DETERMINATION:

Based on the analysis in the EA, the DOE has determined that the proposed Center for Molecular Electronics does not constitute a major Federal Action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969. Therefore, an Environmental Impact Statement on the Proposed Action is not required.

PUBLIC AVAILABILITY: Copies of this EA (DOE/EA-0936) are available from:

Dan Bodnaruk

Programs and Facility Management Division
U.S. Department of Energy
Chicago Operations Office
9800 South Cass Avenue
Argonne, Illinois 60439
(708) 252-2823

For further information regarding the DOE NEPA process contact:

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Issued in Washington, D.C., this day of .

Tara O'Toole, M.D., M.P.H.
Assistant Secretary
Environment, Safety and Health

APPENDIX A

Supplemental Documentation

Public Notice

October 31, 1994

REFERENCE: DOE-EA-0931 ENVIRONMENTAL ASSESSMENT (EA) AND FINDING OF NO SIGNIFICANT IMPACT (FONSI) U. S. DEPARTMENT OF ENERGY ENVIRONMENTAL DOCUMENTS AVAILABLE ON CENTER FOR MOLECULAR ELECTRONICS BUILDING PROJECT

Two documents related to construction of the Center for Molecular Electronics on the University of Missouri campus in St. Louis, Missouri, are now available from the U. S. Department of Energy (DOE) for public information.

The Environmental Assessment (EA) and Finding Of No Significant Impact (FONSI) documents relating to the building's construction and operation were prepared by DOE. The EA documents DOE's analysis of the environmental and socioeconomic impacts that might occur as a result of these actions. In the EA, DOE presents its evaluation of potential impacts of building construction and operation on local land use, vegetation and wildlife, water quality, air quality, cultural and historic resources, socioeconomics, and public and worker health and safety.

The FONSI documents DOE's determination that the proposed actions would cause no significant environmental, health and safety impacts.

DOE, in accordance with the wish of Congress, has executed a grant with the University of Missouri at St. Louis to fund the Center for Molecular Electronics. DOE is proposing to authorize the University of Missouri at St. Louis to proceed under the grant with constructing and equipping the Center for Molecular Electronics, which will occupy approximately 21,000 square feet.

The Center for Molecular Electronics would consist of laboratories and offices. Project equipment would include high technology equipment such as electron microscopes, diffraction spectrometers and various laser devices.

The objective of the proposed project is to conduct multidisciplinary research in two of the fastest developing and increasingly commercially significant fields of molecular electronics and synthetic metals. Another very important goal of the proposed project is that of technology transfer.

The EA and FONSI are available to the public for perusal at the University of Missouri Thomas Jefferson Library, on the University of Missouri campus, St. Louis, MO 63121, and at the DOE Chicago Operations Office reading room. Copies of the documents are also available from:

Bohdan Bodnaruk
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Chicago Field Office
Programs and Facilities Management Division
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Argonne, IL 60439
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Questions on the DOE NEPA process should be directed to:

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