IDAHO
STATE
UNIVERSITY

Office of Research
921 South 8th Avenue,
Stop 8130
Pocatello, Idaho
83209-8130

Physical Address:
1010 South 5th St.
Bldg 11, Room 205

February 27, 2009

Mr. Christopher Ryder, Project Manager
Division of Fuel Cycle Safety and Safeguards
Mail Stop EBBB 2 C40M
11555 Rockville Pike
Rockville, MD 20852-2738

Re: Docket No. 70-1374, License No. SNM-1373
Subject: **REVISED REQUEST FOR LICENSE RENEWAL**

Dear Mr. Ryder:

Enclosed please find the revised application for renewal of Materials License SNM-1373, which expired on September 30, 2008. The application is in response for your request for a re-submission of the license renewal document sent in August 2008. Receipt of that application satisfied the requirements for submission with regard to the "timely renewal" provision. The request is that the license be renewed for a period of ten (10) years.

This revised application has been prepared in accordance with Title 10, Code of Federal Regulations, Part 70. The format of the application is similar to the license amendment request submitted August 2008, but has been substantially shortened as well as restructured. The use of the material at the Idaho Accelerator Center has been deleted from this revised application.

Please note that Safeguards Information is being sent under a separate cover. If you have any questions or require further information, please contact the Reactor Administrator at (208) 282-4147.

Thank you for your extension of time to make appropriate revisions and modifications to the license renewal application.

Sincerely,

Pamela L. Crowell

Pamela L. Crowell, Ph.D.
Vice President for Research

PLM:jfk

Enclosures:
(1) Application for License Amendment, Materials License SNM-1373
(2) Appendices

cc: Document Control Desk, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001

CONNIE M. TILLOTSON
NOTARY PUBLIC
STATE OF IDAHO

Subscribed and Sworn before me
This 24 day of Feb. 2009
by Connie M Tillotson
State of Idaho, Bannock County

exp. 4-13-2011

Phone: (208) 282-2714
Fax: (208) 282-4529
www.isu.edu/research

APPLICATION FOR LICENSE RENEWAL
MATERIALS LICENSE No. SNM-1373
February 26, 2009

License Re-Application - Idaho State University, Pocatello ID 83209

Table of Contents: **Page**

Attachment (III) contains sensitive, unclassified information. When separated from Attachment (III), this document is decontrolled.

APPLICATION FOR LICENSE RENEWAL
MATERIALS LICENSE No. SNM-1373
February 26, 2009

1. Information about the Applicant, Plans and Qualification [ref. 10 CFR 70.22(a) (1)]

Name:	Idaho State University
Address:	Pocatello, ID 83209
Description of Business or Occupation:	Institution of Higher Learning

The Idaho State University (ISU) is operated by the State of Idaho with its principal office at Pocatello, Idaho. The Idaho State Board of Education provides oversight and direction of the higher education institutions in Idaho and is located in Boise, Idaho, (P.O. Box 83720-0037).

University officers are currently:

President of the University
Administration Building
Idaho State University

Vice President for Research
Administration Building
Idaho State University

Vice President for Finance and Administration
Administration Building
Idaho State University

Dean of the College of Engineering
Lillibridge Engineering Laboratory Building
Idaho State University

Radiation Safety Officer
Technical Safety Office
Idaho State University

The current President of the University has designated the Vice President for Research as the university official who has overall responsibility for this license. A roster of current university officials with complete contact information is provided in Attachment (I). The information given in this attachment may be subject to change due to personnel reassignments. Such changes will require that only the information in Attachment (I) be updated as necessary by notification of

NRC. There is no control or ownership exercised over the applicant by any alien, foreign corporation, or foreign government.

2. Activity for Which the Material Will Be Used [ref. 10 CFR 70.22(a) (2)]

The Special Nuclear Material (SNM) in this license is used for education, research, and training programs. This license re-application specifies the same total mass of [redacted] gm of U-235 as was specified in the previous license: [redacted] gm of U-235 are contained in [redacted] uranium-aluminum fuel plates and the remaining U-235, rounded up to 1 gm, is contained in one fission counter and 74 uranium-aluminum foils.

2.1 Principal Location of Use

The fuel plates will primarily be used in the Lillibridge Engineering Laboratory (LEL) building where they will be loaded in various lattice arrangements in a water-filled tank to produce a subcritical assembly (SCA). Attachment II is a more detailed description of the SCA. The fuel plates may be used singly for a quasi-homogeneous assembly or in groups of two or more to produce a more heterogeneous configuration. The uranium-aluminum foils will be used as neutron monitors in some experiments performed with the subcritical assembly or at the nearby (50 ft distance) AGN-201 nuclear reactor, in Room 20 of the Nuclear Engineering Laboratory complex.

The materials are used primarily for instructional purposes in senior and graduate-level laboratory courses. In addition, research programs utilizing the materials in the subcritical assembly will also be encouraged. No experiments or activity involving the use of the SNM will be performed without the prior approval of the Reactor Administrator or Reactor Supervisor.

Some of the experiments to be carried out with the subcritical assembly are:

(1) Approach to critical.
(2) Flux distribution measurements.
(3) Exponential pile measurements.
(4) Fermi age determination.
(5) Determination of optimal cell dimensions in a heterogeneous subcritical assembly.
(6) Effect of fuel-plate thickness on multiplication factor.

The SNM may be used as sources of fissile material for research into improved nondestructive interrogation techniques for detecting fissile materials or transuranic waste in various simulated sealed shipping containers.

2.2 Alternate Locations of Use

Small amounts of the SNM, consisting of some of the U-Al foils and/or up to ten (10) of the fuel plates may be transported to adjacent nuclear facilities for temporary one-day use. These alternate locations are:

1) The AGN-201 nuclear reactor Room 20. (Figure 2)
2) The Particle Beam Laboratory in the adjacent Physical Science Building (See Figure 4)

During such one-day use, the material will continuously be in the custody of one of the Nuclear Engineering Department personnel cleared for safeguard information access and control. (These include the Reactor Administrator, Reactor Supervisor, Nuclear Engineering Department Chair, or a cleared reactor operator.)

Up to 10 fuel plates and/or up to 25 uranium-aluminum foils may be used occasionally at Particle Beam Laboratory in the Physical Science Building or at the AGN-201 Nuclear Reactor in Room 20 of the LEL building . In this capacity, the fuel plates and/or foils may be used as sources of fissile material for research and development of advanced methods for the nondestructive assay and evaluation (NDA/NDE) of fissile material content in various configurations. The U-Al foils would be used to monitor flux levels, and the fuel plates would be used to represent fissile material in various shipping arrangements in test to investigate effectiveness of NDA/NDE interrogation techniques.

When small amount of the licensed material is used at these two alternate locations, the material will be in the custody of an authorized custodian. The material will not be stored overnight at either of these alternate locations, but will be returned at the end of each day to the CAA, Room 23, for overnight storage.

Transport of the small amounts of material between the LEL building and the Particle Beam Lab in the Physical Science Building will require the approval of the Technical Safety Office, which administers the transportation of all radioactive materials in or out of ISU.

All materials will be surveyed for radiation emission and surface contamination prior to transport and transfer of the materials back to the Nuclear Facility. Records of material transfer and use at the Particle Beam Laboratory will be maintained in the activity log in Room 23, and shall include the date and time of transfer, material inventory information, responsible user, and pertinent radiological survey information.

3. The Place and Plan for Carrying Out the Activity [ref. 10 CFR 70.22(a) (2)]

The SNM will be used primarily in Room [redacted] in the basement of the LEL building. The material will be stored in a locked storage container in Room [redacted]. A map of the ISU campus showing the location of the LEL Building is shown in Figure 1, as Building #7. The LEL basement floor plan is shown in Figure 2. Room [redacted] is 20-feet by 20-feet square with a 12-foot ceiling. The floor is a 4-inch-thick reinforced concrete slab. The floor will safely accommodate the weight of the entire SCA. Room [redacted] is a controlled access area (CAA). Only safeguards-approved ISU personnel in the College of Engineering have authorized access to CAAs in the Nuclear Engineering Complex.

4. Period of Time for License [ref. 10 CFR 70.22(a) (3)]

This license is requested for a period of 10 years, from the starting date of October 2008. . It is expected that a request for renewal will be submitted at the end of that period.

5. Specification of the Special Nuclear Material [ref. 10 CFR 70.22(a) (4)]

(a) Uranium-aluminum fuel plates.

The fuel plates were fabricated in 1960 by M & C Nuclear, Inc., for Rutgers University, New Brunswick, New Jersey. The manufacturer's specifications for the plates are as follows:

Total number of plates	150
Total mass of uranium	[redacted] gm
Enrichment of U-235 isotope	[redacted]%
Total U-235 content	[redacted] gm
U-235 loading per plate	[redacted] gm
Overall dimensions of plate	(26±0.015 in) x (3.0±0.015 in) x (0.080±0.006 in)
Dimensions of uranium bearing portion of the plate	(24 in x 2.75 in x 0.04 in)
Cladding thickness	0.020 in

(b) Fission counter and uranium-aluminum foils.

(i) Fission counter.

Total uranium mass	0.002 gm
U-235 enrichment	93%
Total uranium mass	0.002 gm

(ii) Uranium-aluminum foils.

Total number of foils	74
Total uranium mass	0.3 gm (0.004 grams of U-235 per foil)
U-235 enrichment	93%
Total uranium mass	0.3 gm

(iii) Neutron Source (either Pu-Be or Cf-252, authorized under the ISU Broad Scope NRC License #11-27380.

Specifications for the above items were taken from the U.S. Atomic Energy Commission's Nuclear Material Transfer Report.

6. Technical Qualifications of the Applicant and Staff [ref. 10 CFR 70.22(a) (6)].

Responsibility for the supervision and operation of licensed activities will reside with the Reactor Administrator, the Reactor Supervisor, and the ISU Radiation Safety Officer.

Biographical data listing qualifications for those members of the ISU faculty who have responsibility for the supervision and operation of the SNM are included in Attachment (I).

7. Equipment and Facilities to Protect Health and Minimize Danger to Life and Property [ref. 10 CFR 70.22(a) (7)]

Attachment II is a description of the Sub-Critical Assembly, including figures.

(a) Handling procedures.

(i) Fuel plates.

Disposable plastic gloves or other hand coverings will be used by personnel while handling the fuel plates.

(ii) Uranium-aluminum foils.

Tongs, disposable plastic gloves, or other hand coverings will be used by personnel while handling the foils.

(b) Working area.

See Section 3 above: "The Place and Plan for Carrying Out the Activity."

(c) Measuring and monitoring instruments.

Beta, gamma, and neutron dosimeters provided by an NVLAP (National Voluntary Laboratory Accreditation Program) certified vendor are issued to all students and staff working with the special nuclear material.

Electronic equipment for measuring and detecting radiation with the following generic characteristics will be available for use during SCA operations:

Hand-held survey instruments:
- Ludlum Model 14A Geiger Counter with beta/gamma probe (or equivalent).
- Ludlum Model 2A Geiger Counter with thin-window pancake probe (or equivalent).
- Thermoelectron ASP2e Geiger Counter with beta/gamma probe (or equivalent).
- Ludlum Model 3 Survey Meter with ZnS alpha probe (or equivalent).

In addition, all available portable radiation monitoring equipment described in the renewal application for the Broad Scope By-products Materials License 11-27380-01 may be used by College of Engineering personnel.

All radiation detection instruments used in connection with this license shall be calibrated annually by the ISU Technical Safety Office at intervals not to exceed 15 months.

Beta/gamma and neutron portable survey instruments will be available to personnel to determine radiation fields during and following experimental operations. The types of instruments available to personnel are equivalent to the instruments described above. Surveys will be performed upon entry to the experimental chamber and shall include beta/gamma surveys. Survey data will be recorded in the log book for the SCA in Room 23.

Water samples will be analyzed for gross activity following each experimental series to detect possible damage to or defects in the fuel plates. Water samples will be analyzed by the Technical Safety Office using a liquid scintillation counter.

An energy compensated criticality detector, Eberline DA1-6C, or equivalent, connected to a RMS-II area radiation monitor system, shall be mounted near to (within 6 feet) the SCA tank with readout at the control console. The control console is adjacent to the SCA tank. This RMS-II system will provide direct radiation readings during experiments and subsequent post-irradiation decay of short-lived fission products and induced activity.

(d) Waste disposal.

There will be very little waste contaminated by radioactive materials resulting from the handling, storage, and use of materials under this license. Contaminated material will be controlled and disposed of by ISU Technical Safety Office personnel in accordance with written procedures.

(e) Storage facilities and security measures.

(This information is provided in Attachment (III).)

(f) Water handling system.

Deionized water will be used as the moderating medium in the SCA. The deionized water will be stored in three 53-gallon polyethylene drums. The drums will be connected to each other by a ½ inch pipe in such a manner that water can flow freely between the tanks.

At the beginning of each experiment deionized water will be pumped from the storage tanks to fill the assembly tank. At the end of each experiment the water will be drained out of the assembly tank and into the storage tanks through a 3/4-inch drain line near the bottom of the tank. An alternative experimental approach would be to pump the water into the tank after the SNM material is loaded with the desired SCA lattice. As the water level increases, the neutron multiplication (k_{eff}) can be measured as a function of moderator height.

A schematic diagram of the water handling system is provided in Figure II-4 of Attachment II. The drain pipe will be opened and closed by a "normally opened" solenoid valve. In the event of a power failure, the pump will shut off and the drain valve will open so that any water in the tank will necessarily drain out of the assembly tank. Without water acting as moderator the neutron multiplication factor of the assembly will be extremely small. Power feeding the solenoid drain valve and the pump will first go through a double-pole normally-open solenoid switch. This switch will be held open if a signal is generated by the criticality alarm. In the event of an inadvertent criticality (an extremely improbable event), or a high radiation alarm (≥12 mrem/hr), power will be automatically cut off to the pump and the solenoid drain valve, causing water to drain out of the assembly tank. Further, the solenoid switch will be wired in such a manner that any attempt to disconnect the solenoid switch from the criticality alarm will result in loss of power to both the pump and the solenoid drain valve. The wiring diagram for this installation is shown in Figure II-5 in Attachment (II).

8. Proposed Procedure to Protect Health and Minimize Danger to Life and Property [ref. 10 CFR 70.22(a) (8)]

(a) Radiation hazard.

(i) Radiation hazard from subcritical assembly during operation with the Pu-Be source and all 150 plates in the assembly. Calculations and measurements taken with a Bonners Sphere neutron detector gave the following:

	Direct Calculations	Bonner Sphere Data
Fast neutrons	0.16 mrem/hr	<4.6 mrem/hr
Thermal neutrons	---	0.21 mrem/hr
Gamma photons	5.0 mrem/hr	2.6 mrem/hr

These dose equivalent rates are not expected to constitute a hazard to personnel for the following reasons:

(1) The dose equivalent rates listed above are given at the surface of the assembly tank. Personnel are rarely that close to the assembly for any extended period.

(2) Personnel will only spend a few hours a week in the vicinity of the SCA while it is operating.

(3) Personnel are required to actively pursue the ISU ALARA policy.

Operation of the SCA to date has not revealed any radiation hazard to personnel. However, a criticality alarm is installed in Room 23, as required by 10 CFR 70.24. Furthermore, all personnel involved in the operation of the SCA shall wear ISU-issued personal dosimetry capable of measuring beta, gamma, and neutron dose equivalents. Visitors will be issued self-reading pocket dosimeters while in Room 23. In the event that the number of visitors exceeds the number of available self-reading pocket dosimeters, a minimum of 1 dosimeter will be issued for every 4 visitors, so that at least one-quarter of the visitors to the facility are monitored for exposure to ionizing radiation. In addition to the fixed criticality alarm, an independent portable gamma detector will be in operation at all times that personnel are in Room 23 while fuel is located in the SCA tank.

Operation of the SCA to date at the LEL has not revealed any residual radiation levels above background after the fuel is put into the storage container.

(b) Fire hazard.

No materials or chemicals will be stored in Room 23 which could present a fire hazard. Normal fire rules will be observed. There is a dry-chemical, "ABC"-class fire extinguisher located next to the door of Room 23. Two other fire extinguishers are located nearby in the Nuclear Engineering Laboratory complex section of the basement of the LEL. A heat-rise sensor is located in the ceiling in Room 23 above the assembly tank. Activation of the sensor by a fire will sound the building fire alarm and energize an indicator light on a fire location annunciator panel, which is located at the east main entrance to the Lillibridge Engineering Laboratory Building. In the event of a fire which may cause damage to the fuel plates or foils, a subsequent leak test (swipes) will be performed on all fuel plates and foils.

(c) Inadvertent criticality.

The SCA has been designed to be subcritical by at least 13% (k-effective < 0.87) under all conditions using ordinary water as the moderator and as the radial and top reflector. Operational measurements have verified the design calculations. Criticality, however, might be possible by the deliberate and unauthorized use of superior moderator or reflector materials with the licensed material arranged in an optimal geometric configuration. Prevention of inadvertent criticality is accomplished by prohibiting the use of superior moderator or reflector materials in the SCA room. Specifically, beryllium, beryllium oxide, and heavy water are not permitted in the SCA room. The use or storage of graphite in the SCA room is restricted. Approximately 4,500 lb of graphite blocks make up the thermal column beneath the SCA tank. This graphite is stacked in layers within a metal framework and will not be disassembled or otherwise disturbed during operation of the SCA except as to allow for the insertion of suitable neutron sources required for the operation of the SCA or fission foils for flux mapping or neutron diffusion experiments. Additional graphite will not be allowed within 4 feet of the SCA or the thermal column, without prior approval of of the Reactor Administrator and an analysis of the intended use and its potential effect on the reactivity of the most reactive system. The Reactor Safety Committee must approve the results of the analysis.

In addition to the restrictions placed on the use of the superior moderating and reflecting materials to guard against inadvertent criticality, restrictions shall be in place for the use of other fissile materials in conjunction with the operation of the SCA. Small quantities (not to exceed 3 gm total, but not including the Pu-Be neutron sources) of fissile nuclides (i.e., U-235 and/or Pu-239) may be used as approved by the Reactor Administrator as neutron monitors for flux mapping experiments. The only special nuclear materials that may be used or stored in Room 23 are the fuel plates, the U-Al foils, and fission counters, the latter representing small quantities (not to exceed 3 gm) of fissile materials.

Accordingly, the following administrative control notice will be posted at the entrance to the SCA room:

> "NOTICE The following materials are not to be taken into or stored within the subcritical assembly room, #[redacted]: beryllium, beryllium oxide, heavy water, or fissile nuclides (i.e., ^{235}U and/or ^{239}Pu) exceeding 3 gm of any one isotope or combination of isotopes except for the Pu-Be sources necessary for facility operation. Graphite may be taken into the subcritical assembly room only with the approval of the Reactor Administrator."

A fixed criticality alarm system is installed in Room 23, as described below in Section 10 (a).

(c) Leakage testing and surveys.

Ten percent of the fuel plates will be leak tested using standard swipes for alpha contamination following each experiment and at normal inventory periods. Ten percent of the uranium-aluminum foils will be leak tested in conjunction with the fuel plates following use or when performing the inventory. For the purposes satisfying the requirements of this section, a leak test will be assumed to have been performed satisfactorily if the test was performed within a week following the completion of the experiments.

A general area and contamination survey will be performed in conjunction with the leakage testing. In addition, a bi-annual general contamination survey and radiation survey will be performed in Room 23, under direction of the Technical Safety Office.

(d) Fuel integrity.

The fuel plates have been used for laboratory experiments at the SCA in Room 23 for two decades, with approximately two sets of experiments per year. The careful handling of the plates during this period has resulted in no detectable leakage of fission products, based on swipes following the experiments, and analysis of the tank water.

(d) Transportation.

Transport of the small amount of material permitted to be used in the Physical Science Building Particle Beam Laboratory will be done by personnel using containers approved by the TSO. The TSO will be informed when such transport is to occur.

9. Material Control and Accountability [ref. 10 CFR 70.22(b)]

(a) Inventory procedures.

Inventory of the material will be performed at least twice each year. It is anticipated that all fuel plates will be used in most experiments conducted in Room [redacted], and conclusion of such a total plate-use experiment may serve as an inventory check. This fact, along with assembly procedures, will reveal any missing material. An approved emergency plan establishes procedures to be followed in the event of loss or theft of special nuclear material.

(b) Administrative controls.

The Reactor Administrator is responsible for the safe storage and use of the special nuclear material. The Reactor Safety Committee (RSC) has reviewed and approved all plans and procedures for the usage of the materials in the SCA. The Reactor Safety Committee shall review and approve all new experimental plans and procedures for the use of the licensed material prior to implementation. The Reactor Safety Committee shall review and approve all changes to existing experimental plans and procedures that may affect safety. The RSC was formed at the request of the NRC in 1968 to review and approve experimental procedures performed with the ISU AGN-201 reactor (License R-110, Docket No. 50-284). The Radiation Safety Officer shall review radiation dose data annually to ensure that doses are maintained ALARA and shall report the findings of the assessment to the Radiation Safety Committee.

There must be a minimum of two persons in Room [redacted] whenever operations involving special nuclear material in the assembly are in progress. Access to Room [redacted] and the fuel storage containers will be controlled by the restricted distribution of keys. This distribution will be as follows:

> The Reactor Administrator, and the Reactor Supervisor will each hold one key to Room [redacted] (the subcritical facility room). Other personnel, authorized by the Reactor Administrator and who have undergone a background check, may have access to a key to Room [redacted] as needed. The Reactor Supervisor and Reactor Administrator will control keys to the locks securing the fuel storage container and the assembly access cover.

Prior to working or handling licensed nuclear material, all personnel shall have received training or shall be under the supervision of persons who have received training in radiation protection from the ISU Technical Safety Office. .

The Reactor Administrator and/or the Reactor Supervisor will consider all requests for the transfer and use of materials covered under this license at the Accelerator Center. The usage and transfer of the licensed material will not occur until approval has been granted by the Reactor Administrator or his/her designee. Records will be maintained of the date and time of transfers, and of the responsible user to whom the materials were transferred.

Statements of qualification for personnel responsible for the use of the special nuclear materials under this license are attached in Attachment (I).

10. Additional requirements [ref. 10 CFR 70.24]

(a) Criticality alarm.

The criticality alarm in Room [redacted] is a Ludlum Model 300 remote area monitor, or equivalent system. It is currently installed on the wall less than six feet away from the assembly tank. The criticality alarm system meets the radiation level criteria stated in 10 CFR 70.24(a)(2).

(b) Emergency evacuation procedure.

The procedures given below will be carried out under the direction of the person responsible for the assembly at the time the emergency occurs. Detailed emergency procedures are provided in the approved facility Emergency Plan.

All power to the pump and solenoid drain valve will be shut off by placing the drain valve and pump power switch in the OFF position.

The portable gamma survey meter will be taken from Room [redacted] by the evacuating personnel.

Once all personnel are out of Room [redacted], the door will be closed and a radiation survey will be performed in all areas adjacent to Room [redacted]. If radiation levels exceed 10 mrem/hr outside of Room [redacted] the building fire alarm will be activated to evacuate the entire building. Pull stations for activating the fire alarm are located in the main corridors near the stairs as shown in the basement building floor plan in Figure 2. Exits and access routes to and from the basement are shown on the building basement floor plan and in the first floor plan (Figure 3).

Building ventilation will be secured by pushing the "Penthouse Power Emergency Trip" switch located on the wall facing Room 15 about 6 feet inside the door entrance #14 to the Nuclear Engineering Laboratory complex.

The Reactor Administrator, the Nuclear Engineering Department Chairperson, the Radiation Safety Officer, and the Reactor Supervisor or their designated alternates are all on an emergency call list and will be notified of the emergency. Building reentry will be directed by the Reactor Administrator and/or the Reactor Supervisor in consultation with the Radiation Safety Officer (or their alternates).

Emergency equipment and communication and alarm systems will be tested annually. Emergency procedures will be reviewed with permanent staff and personnel who work with the SNM. Periodic review of these procedures will be accomplished by annual instruction and drills.

NOTE: Cancellation of Plans to Use SNM Materials at the Idaho Accelerator Center (IAC)

A previous license amendment included authorization for the SNM to be used at the Idaho Accelerator Center, which is located 1.2 miles from the LEL Building, yet on the ISU campus. This amendment was approved on September 22, 2005 by the NRC as a result of response to the Request for Additional Information (TAC No. L31845, dated January 11, 2005), which was submitted to NRC with a letter dated February 18, 2005.

However, use of the SNM at the Idaho Accelerator is not requested as part of this license renewal. The facility "White Room" at the Idaho Accelerator Center which was used for experiments involving the prior SNM license amendment is no longer alarmed or monitored, and there are no plans to use the SNM at the IAC within the foreseeable future.

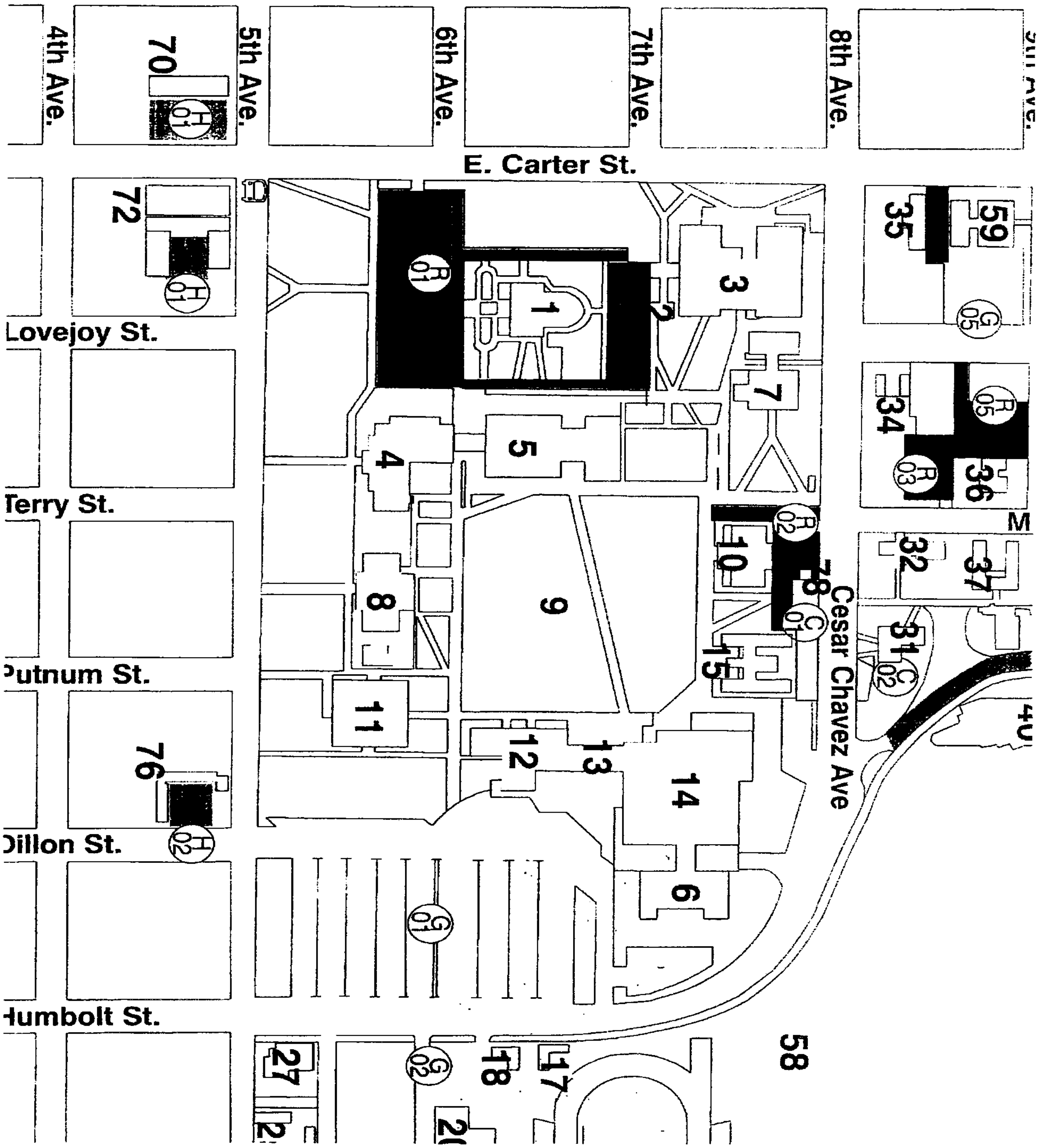

Figure 1 - Campus Map - LEL building is #7, Physical Science Building is #3, and #27 is Campus Security

APPLICATION FOR LICENSE RENEWAL
MATERIALS LICENSE No. SNM-1373
February 26, 2009

Figure 2 - Basement of Lillibridge Engineering Building

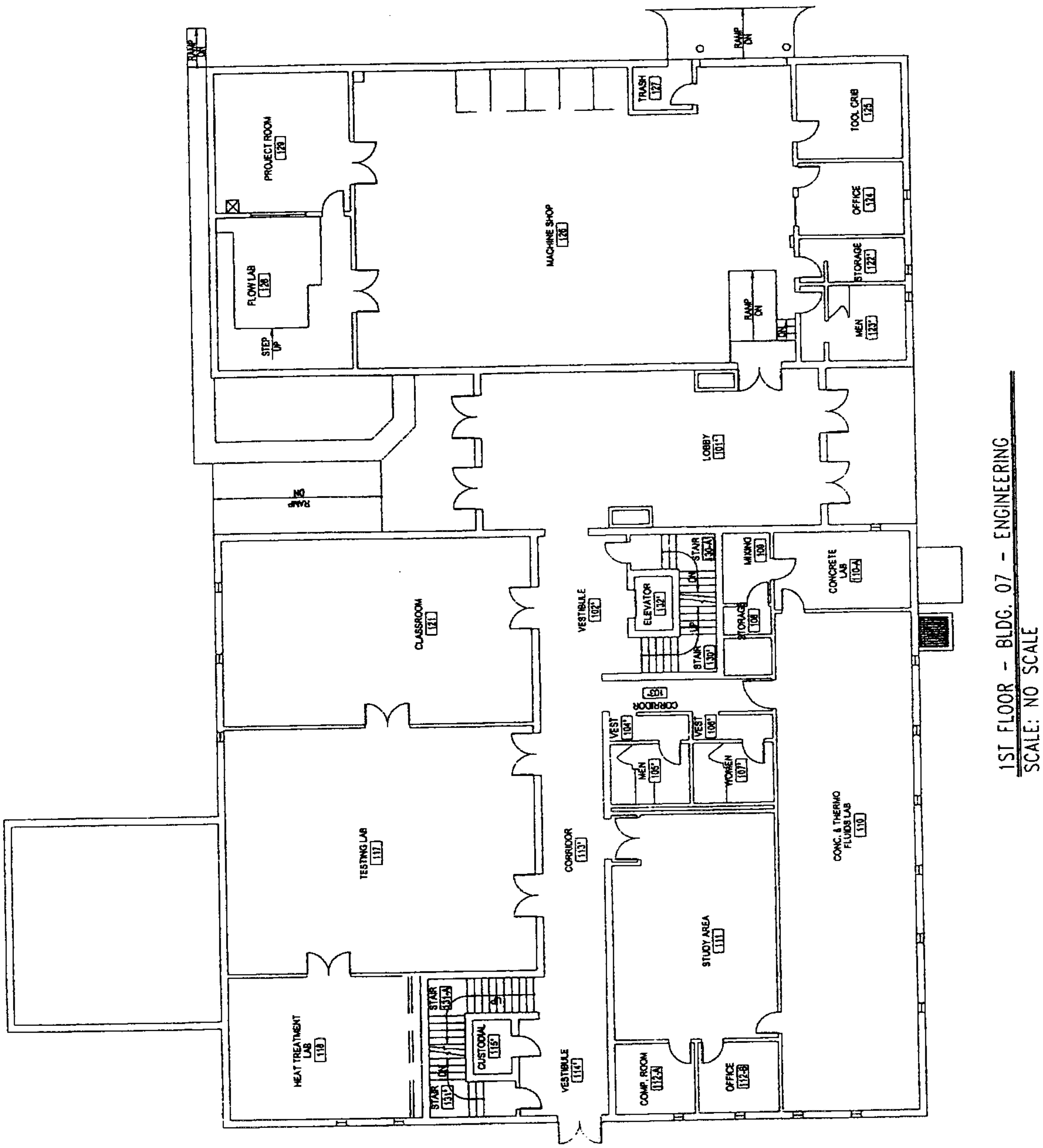

Figure 3 - First Floor of Lillibridge Engineering Building

APPLICATION FOR LICENSE RENEWAL
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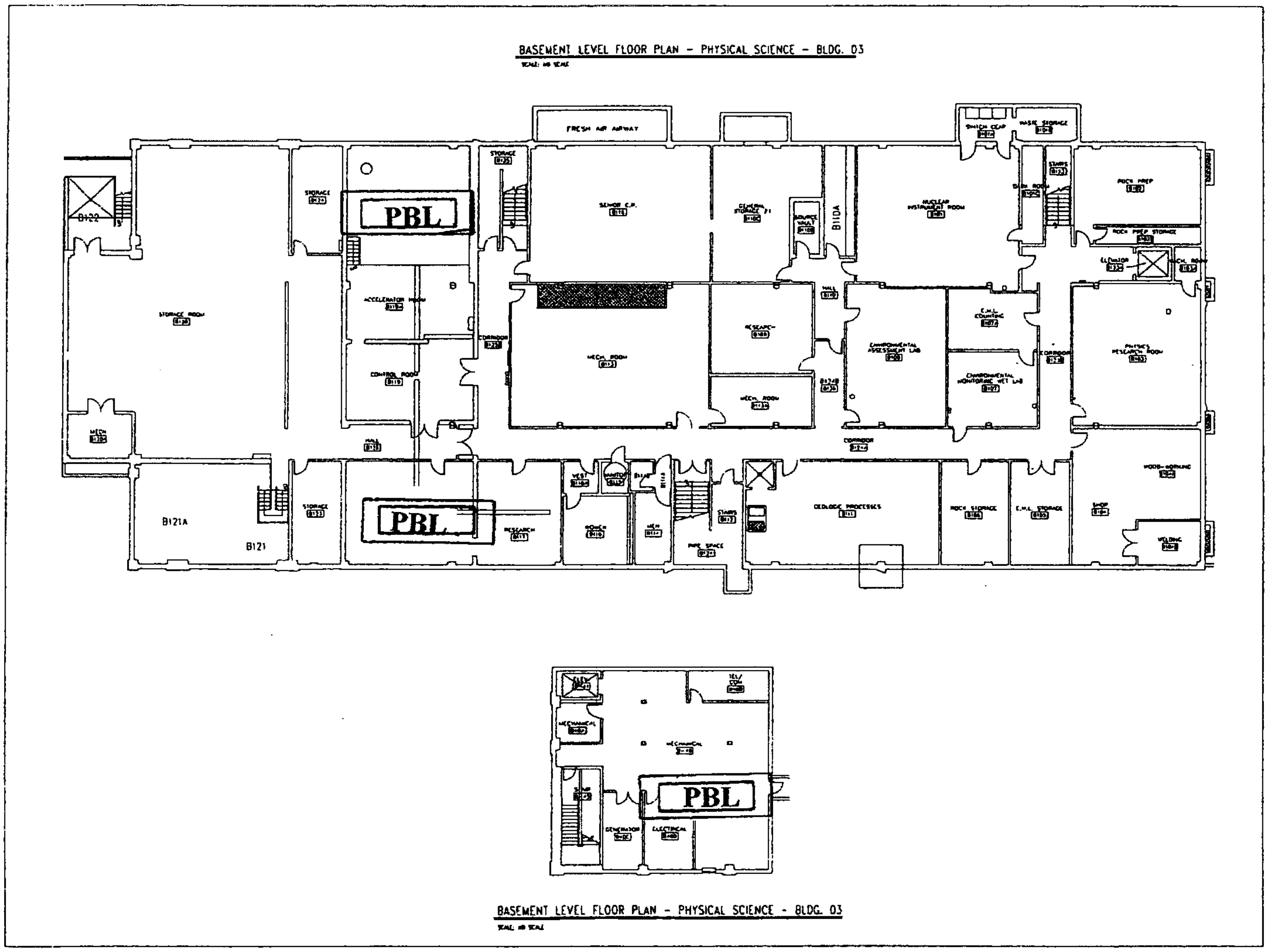

Figure 4 - Basement of Physical Science Building - showing Particle Beam, Laboratory (PBL)

ATTACHMENT I - February 24, 2009

Roster of University Officials and Nuclear Personnel Responsible for Materials License SNM-1373, Docket No. 1374

President of the University
Dr. Arthur C. Vailas
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Vice President for Finance and Administration
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Fax: (208) 282-4538
Email: jacorich@isu.edu
PhD Mechanical Engineering, Washington State Univ., Former Dean of Engineering at Univ. Of Idaho, 3 years at ISU as Professor and Dean of Engineering. Licensed Professional Engineer.

Radiation Safety Officer and Director of Technical Safety Office

Dr. Richard R. Brey, PhD, C.H.P
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Email: brey@physics.isu.edu

PhD in Health Physics, Purdue Univ., Prof. of Health Physics, 15 years at ISU, Certified Health Physicist.

Chair of Nuclear Engineering Department

Dr. George Imel, PhD
Lillibridge Engineering Laboratory, Mail Stop 8060
Idaho State University
Pocatello, ID 83209-8060
Tel: (208) 282-3732
Fax: (208) 282-4538
Email: gimel@isu.edu

PhD Nuclear Engineering, Penn State Univ., 20 years experience in critical and research reactor operation at Argonne National Laboratory, Idaho. Professor of Nuclear Engineering, 3 years at ISU

Reactor Administrator

Dr. Jay F. Kunze, PhD, P.E., C.H.P
Lillibridge Engineering Laboratory, Mail Stop 8060
Idaho State University
Pocatello, ID 83209-8060
Tel: (208) 282-4147
Fax: (208) 282-4538
Email: kunzejay@isu.edu

PhD Physics, Carnegie Mellon Univ., Licensed Professional Engineering (Mechanical), Certified Health Physicist. 20 years in operation and management of critical facilities at the Idaho National Laboratory. 13 years as Prof. of Nuclear Engineering at ISU, 11 of those as Dean of Engineering. 10 years as Reactor Administrator. .

Reactor Supervisor

Kenyon Hart, P.E.
212 Lillibridge Engineering Laboratory, Mail Stop 8060
Idaho State University
Pocatello, ID 83209-8060
Tel: (208) 282-3547
Fax: (208) 282-4538
Email: hartkeny@isu.edu

MS in Electrical Engineering, Univ. of Arizona, 13 years as lecturer and staff engineer at ISU, 3 years as licensed Senior Reactor Operator. Licensed Professional Engineer

Attachment II
SNM License #1373
February 27, 2009

DESCRIPTION OF THE SUBCRITICAL FACILITY

The subcritical facility at Idaho State University was originally designed by and placed in use at Rutgers University in New Jersey in the middle 1950 period. It was declared surplus by Rutgers University about 1975 and purchased by and moved to Idaho State University, Pocatello, Idaho.

The subcritical assembly (SCA) tank is made of aluminum, 1/4" thick side wall, with a 3/8 inch thick base that is welded to the 36 inch diameter cylindrical side wall. A 3/8" inch thick aluminum lid fits on the top of the tank, and can be secured by [redacted]. The tank is 39 inches high, and sits on a base consisting of a stack of graphite blocks, 32 inches in height. The blocks contain some removable pieces that slide out, permitting the insertion of neutron flux monitoring foils.

Inside the tank fits a removable and nearly cubical lattice grid (Figures II-1 and II-2), 23 inches on a side. The lattice contains slots for the fuel plates, the slotted portion of the grid being 18 inches by 15 inches. Spacing between the fuel slots is 0.718 inches, center-to-center. The slots are thick (wide) enough to accommodate up to three fuel plates stacked against each other.

The fuel plates, numbering 150 identical plates, are each 0.080 inches thick, 3.0 inches wide, and 26.0 inches. The fuel bearing region is an aluminum-uranium cermet, 2.75 inches wide, 24.0 inches long and 0.040 inches thick. The cladding is 0.020 inches thick aluminum, on both sides of the fueled region. Figure II-3 shows the structure of these fuel plates.

The total amount of uranium in the 150 plates is [redacted] grams, enriched to [redacted]% uranium U-235 totaling [redacted] grams. There is a special source holder having the same outer dimensions as the fuel plates, except that it has a 1.25 inch diameter source tube inserted longitudinally at the center of the would-be fuel region.

Filling of the water tank is accomplish from a pump that takes the water from several (presently three) storage tanks, and pumps it into the tank. A normally closed solenoid valve in a separate drain line blocks the water from draining from the tank The controls for the pump and the solenoid are operated from a control console adjacent to the subcritical assembly tank. The wiring diagram for the controls, including the "criticality alarm" (merely an alarm-equipped Geiger-Mueller detector), is shown in Figure II - 4. The piping diagram is shown in Figure II-5. A sight glass (not shown in the figure) is mounted externally on the tank to determine the water level in the tank.

Attachment II
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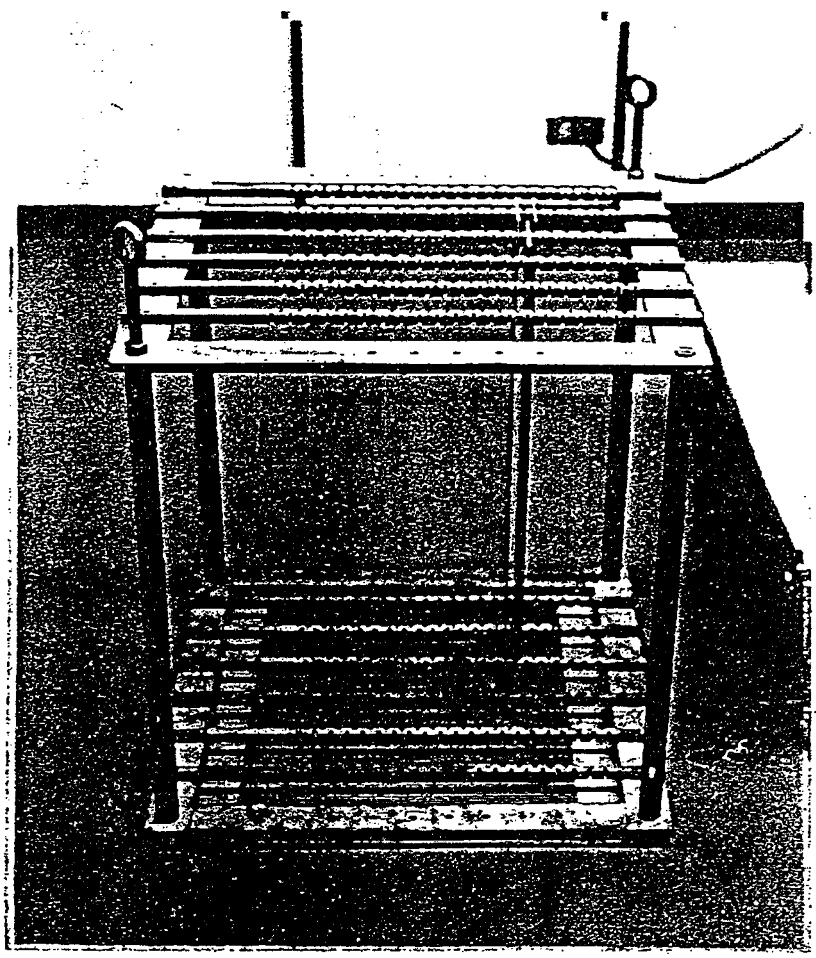

Figure II-1 - Subcritical grid structure for holding fuel plates, showing double spacing of plates

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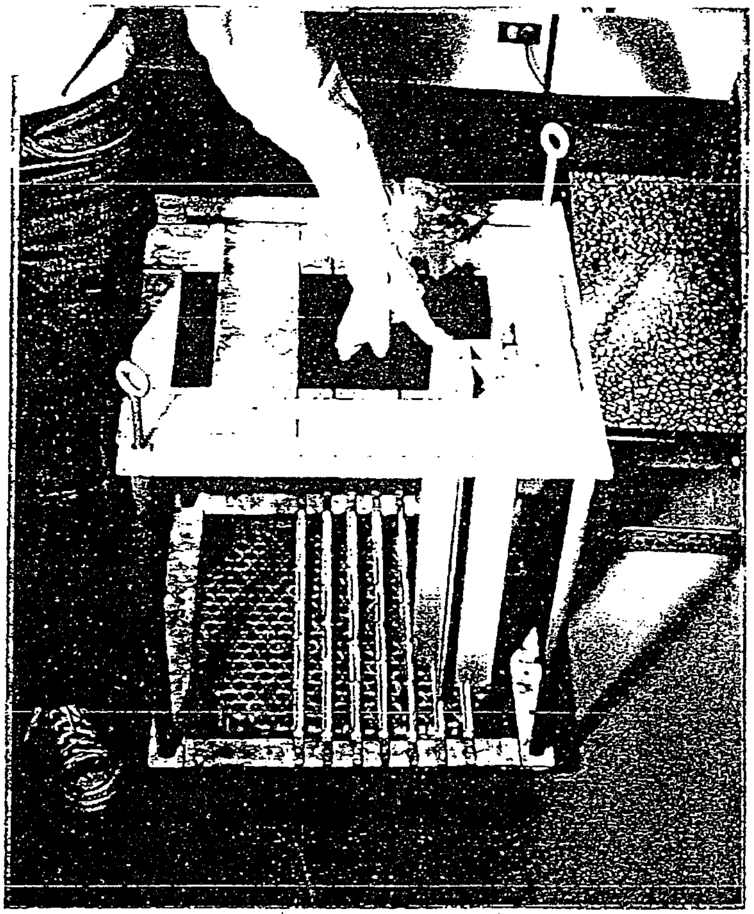

Figure II-2 - Subcritial grid structure showing triple spacing of plates.

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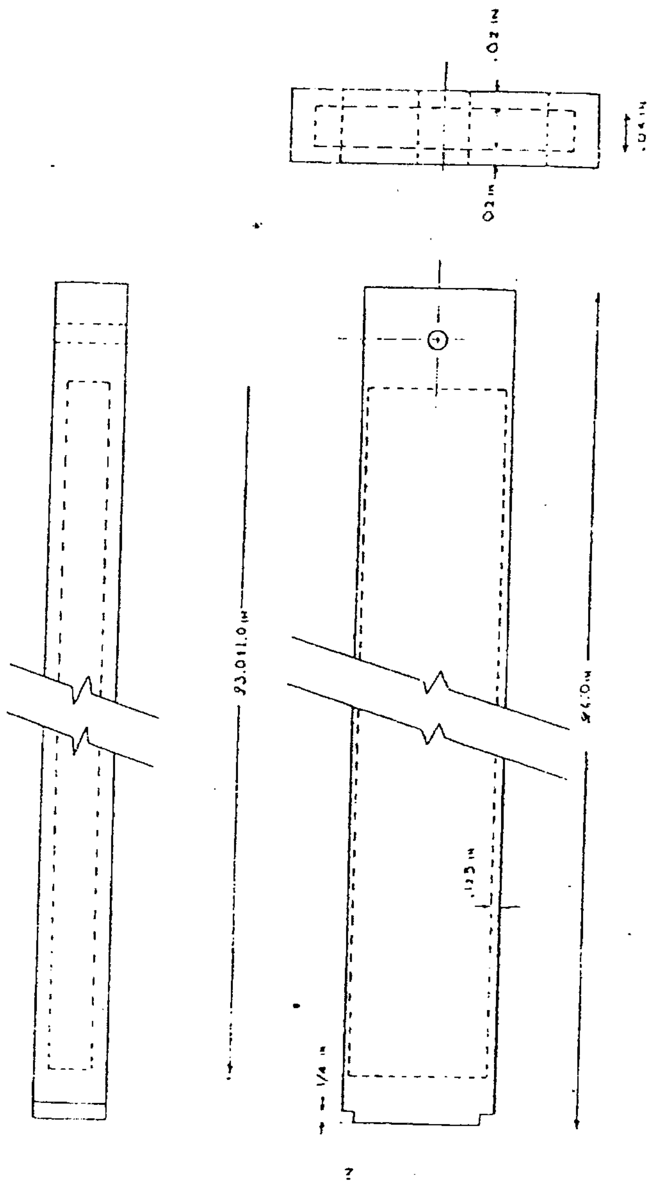

Figure II-3 - Details of fuel plate structure

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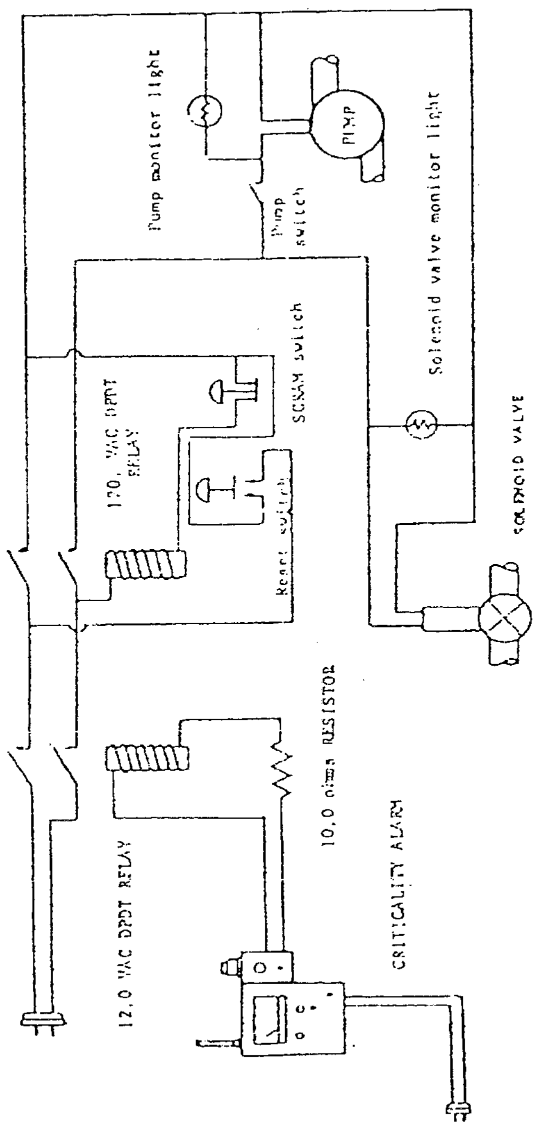

Figure II-4 - Wiring diagram for Subcritical Assembly

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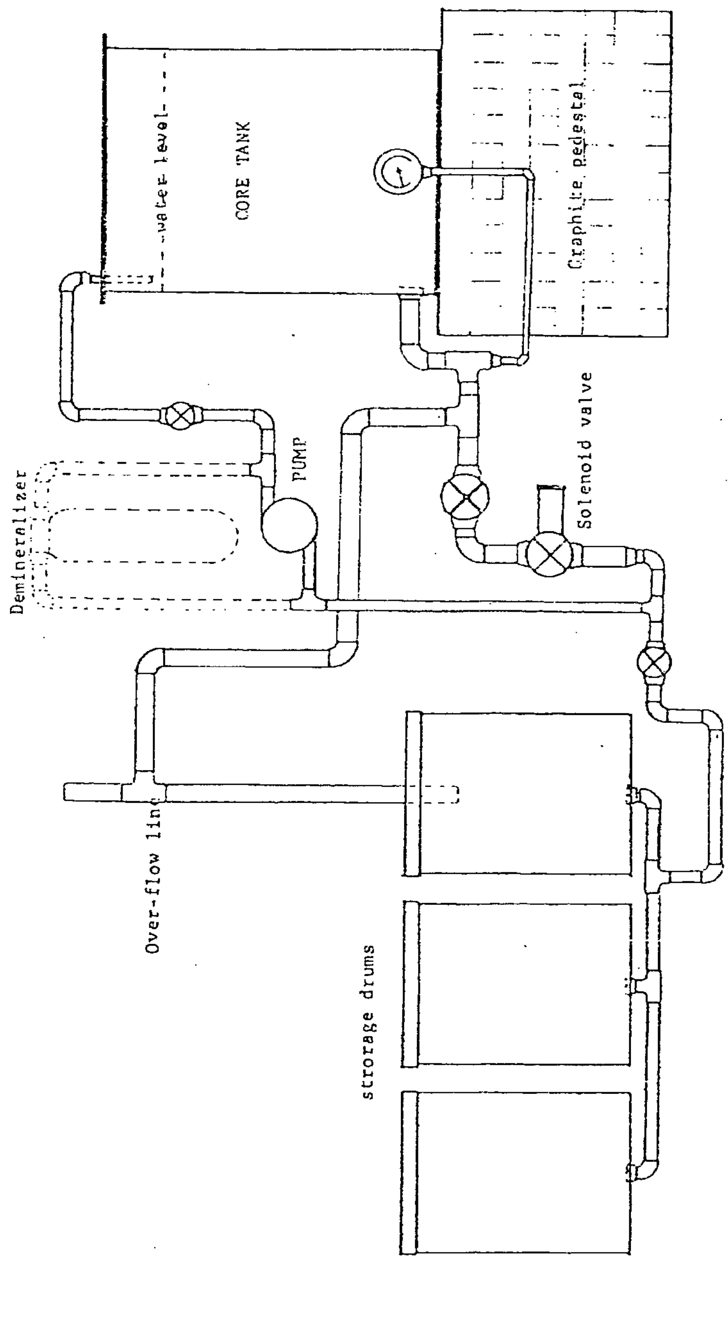

Figure II-5 - Piping Diagram for the Subcritical Assembly