

Office Memorandum • UNITED STATES GOVERNMENT

TO : Isotopes Extension Files

DATE: July 9, 1957

FROM : John G. Davis and William O. Miller

SUBJECT: VISIT TO SINCLAIR RESEARCH LABORATORIES, INC., 400 EAST SIBLEY BOULEVARD
HARVEY, ILLINOIS

SYMBOL: IEB:JGD

Users Visited: Dr. A. I. Snow, Chairman, Isotope Committee;
Mr. L. A. Baillie, Head, Tracer Laboratory;
Mr. R. H. King, Safety Supervisor

Pre-licensing visit, June 27, 1957

Type of License: Broad

An application, dated May 16, 1957, for a broad license had been submitted by the Sinclair Research Laboratories, Inc. The visit was made to determine the need for such a license and to determine if experience, facilities and the radiological health-safety program were adequate to control the radioactivity permitted by a broad license.

The aforementioned items were reviewed with Dr. Snow. The application appears to be in order. Dr. Snow stated that he is the chairman of the isotope committee and all correspondence should be directed to him.

The application requested that the isotopes be authorized for field use. Discussion revealed that this use will be limited to Sinclair owned or leased facilities. Such uses will be under the complete control of the Research Laboratories isotope committee, Dr. Snow, Chairman. Dr. Snow stated that control will be exercised to insure that no activity in excess of the concentration for non-occupational limits (10 CFR 20) will be present in consumer products. Generally, short lived isotopes will be used for field problems.

A possession limit of 1000 millicuries for any byproduct material between atomic numbers 3 and 83, inclusive, except 25 curies each for Cobalt 60 and Iridium 192 and 100 curies of tritium. The necessity for such high limits on the 3 to 83 isotopes was questioned. Dr. Snow stated that the limits were necessary for the program he is planning. He has the facilities and instrumentation to handle

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these isotopes. He agreed that 100 millicuries of Strontium 90 would be adequate (sealed sources). At the present time, nickel, iron, cobalt, sulfur, strontium, carbon, irradiated engine parts, and 4 spent MTR fuel elements are possessed and used at the Sinclair Laboratories.

The program at the Sinclair Laboratories is concerned with the effects of radiation of petrochemical reactions. In addition, it is planned to tag various chemicals to determine reaction mechanisms.

Administrative Control:

The use of radioactive materials at this laboratory and for field uses will be under the supervision of the isotope committee with Dr. Snow as chairman. The membership of this committee and the functions of the committee are considered in detail in the application of May 16, 1957.

At the present time, classes and instructions are being given to all personnel (maintenance, electrical, laboratory technicians, etc) who will come in contact with the radioisotope program. According to Dr. Snow, this instruction program has been quite successful in teaching the employees to work with radioactivity. All radioisotope work within the radiation laboratory will be performed under the direct supervision of Dr. Snow until the operating personnel demonstrate their competence. Prior to establishing a radioisotope program, open meetings were held with the residents of Harvey, Illinois to acquaint them with the program. Dr. Snow stated that these informative meetings had been successful. Rather than look upon the program with suspicion, the residents consider it a manner of civil pride.

Training and Experience:

The training and experience of Dr. Snow, Mr. Baillie, and the members of the Isotope Committee are considered in detail on the application of May 16, 1957, and appears to be adequate. The training of operators will be under Dr. Snow with the assistance of Mr. Baillie. Two members of the laboratory supervision are attending a two week course in the handling of radioisotopes at the University of Michigan.

Facilities and Equipment:

The radioisotope program will be housed in a recently completed radiation laboratory building. The wear tests using irradiated engine parts are conducted in another facility. The radiation laboratory building consists of a tracer laboratory, counting room, radiation laboratory, radiation cave, or hot cell and office

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space. The facilities and equipment are excellent. Dr. Snow stated that numerous facilities were visited before Sinclair constructed the radiation laboratory building. An attempt has been made to incorporate into the Sinclair facility the better features of the facilities which were visited. A detailed description and drawings of the Radiation Laboratory Building is included with the application dated May 16, 1957.

Dr. Snow stated that with a source of 200,000 r/hr exposed in the cave, the radiation level outside and in the immediate vicinity of the cave increases by 0.02 mr/hr. A direct door entrance is provided for the cave. Warning signs are posted on this door. Three dependent interlock systems are provided so that the door cannot be opened if an element is raised. Two persons are required to open the door (interlock mechanism requires this). A Jordon instrument will be installed to provide an additional interlock system whereby the door cannot be opened if the radiation within the cave exceeds a predetermined limit. In order to open the cave door, five keys are required to unlock the door. All five keys must be removed before the door will close. A "buddy system" is required for work in the cave. A minimum of two persons must be present. Procedures for using and opening the cave are posted (large posters, approximately 2 feet x 3 feet). The cave is at a negative air pressure to surrounding facilities. Air is exhausted, through absolute filters, above the roof. Presently, it is planned that the cave will be used for storage and for air irradiation of processes. No isotope work will be performed within the cave in the near future. However, the cave is designed and equipped for such work. Argonne-type manipulators are installed. For storage, an 18 feet deep pool is located in the cave. The pool water is circulated through a filter and a de-ionizing unit. The unit is located in an unshielded area within the radiation laboratory. Dr. Snow said that the radiation level of the de-ionizing unit was quite low and presented no hazard. It is regenerated frequently and the waste stored in drums and identified prior to final disposition. The well water is routinely checked for pH (it is kept slightly acid) and for activity. Alpha activity determination is made to detect leaks in the MTR elements. The entire cave facility is of excellent design and seems quite adequate for the work proposed by Dr. Snow.

At the present time, plans are for low level isotope work. Such work will be done in the Tracer Laboratory under the direct supervision of Mr. Baillie. Any high level isotope work will be done in the cave. The Tracer Laboratory presently is being completed. There are two Kewanee Hoods. The work will be segregated according to activity. One hood will be used for low level work; the other will be used for relatively high level work. A California hood will be used for

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tritium work. Each hood has its own individual filter. Stainless steel working surfaces are used throughout. The floor is of seamless linoleum. Lead bricks are available for shielding. There are seven dry storage wells in the corner of the Tracer Laboratory. The cover of each well is a concrete plug 16 inches thick. A steel cover, which can be locked, covers all seven wells.

Instrumentation:

A listing of the instrumentation is included with the application of May 16, 1957. These instruments are either on order or in possession of the laboratory. A Packard Tri Carb 314-DC counter will be used for tritium counting. Instrumentation adequate.

Control and Personnel Monitoring:

It was brought to the attention of Dr. Snow that warning signs should be posted throughout the facility. Dr. Snow stated that he would post his facility properly. All entrances into the building is controlled through Dr. Snow's office. Here, pocket desimeters are distributed, read, and results recorded. All personnel wear film badges. Film badge service is supplied by Nuclear Instrument and Chemical Company. The weekly exposure limit has been established as 100 mr/week. Any exposure above 50 mr/week is investigated. Bioassay is contemplated. Dr. Snow requested a list of concerns which offer this service. Later, he plans to perform his own analyses (they have suitable equipment).

Records:

The exposure records and the radioisotope records are maintained in the office of the Plant Safety Supervisor, Mr. R. H. King. These records were reviewed and seem to be complete. The date received, amount, form, use, user, disposal and other pertinent information concerning the isotopes are recorded.

The radioisotope program at the Sinclair Research Laboratories appears adequate for a broad license. The facilities are excellent. The control procedures are excellent. Dr. Snow, who personally directs the program, is cautious and conscientious insofar as the handling of radioisotopes is concerned. License issued on 7/9/57.

JGD