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Jack M. Bell, Radiological Safety Branch

CALL FROM DR. FRANK G. YOUNG, CARBIDE AND CARBON CHEMICAL COMPANY, SOUTH CHARLESTON, WEST VIRGINIA, MAY 1, 1957.

Dr. Young called regarding pending application, Control No. 2190, for water well type irradiation facility. Dr. Young talked to JWH, JMB and RGP in turn.

JMB: JMB questioned Dr. Young and received specific information concerning the following points:

Emergency Procedures:

Ask Dr. Young if he had considered the possibility of radiation, from the Cobalt sources, entering the "pit for elevator drive mechanism" and scattering into the control room. This appeared to be potentially dangerous since an operator might have to lower the source elevator by manually turning the motor shaft. Dr. Young stated that Wright-Patterson Air Force Base is using a similar elevating arrangement which he had observed and specifically examined in order to determine the magnitude of such direct or scattered radiation. He stated that the radiation level in the pit was negligible. He informed JMB that the port for entry of the motor shaft does not at any time "look" at the source.

Ask Dr. Young how he was to "remove elevator platform coupling pin from outside of shield, dropping elevator and source into well." Dr. Young stated that the coupling pin is removable from the outside of the shield by means of a cable which penetrates the shield. He also stated that it was not possible to remove the coupling pin in this way when the elevator is in any position except the extreme raised position. In other words, should the elevator become "jammed" in any position other than the extreme raised position, it is quite possible that the only way in which the source could be lowered into the shielding water would be to flood the cell and manipulate the Cobalt pencils through the roof opening (see emergency procedures). The only other possibility is the lowering of the platform by manually turning the motor shaft as mentioned earlier. "Jamming" might preclude this.

Dr. Young stated that he will send us more detailed drawings concerning the above questions along with confirmation of answers to these questions.

Construction of Facility:

One of the drawings submitted showed a window in the north shielding wall of the facility. The other drawings did not. Dr. Young stated that the window would not be placed in this wall.

Sealing of sources:

It was brought to Dr. Young's attention that AECL pencils are heat-sealed (cold welded) and, therefore, may allow water to enter and surround the enclosed Aluminum clad Cobalt slugs resulting in corrosion of the aluminum cladding with subsequent leakage of Cobalt 60. Dr. Young stated in his letter

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of March 21 that "Mr. Lester R. Rogers, Chief of Byproduct Licensing Branch, has approved these slugs in a letter to Mr. C. H. Hetherington, AECL, dated July 31, 1956." The letter he referred to includes a paragraph: "From the information we now have it appears that unplated metallic Cobalt, sealed in an aluminum jacket, is a satisfactory sealed source." Informed Dr. Young that this should not be interpreted as a blanket approval. It was pointed out that we could not possibly anticipate all such uses and, therefore, had to review each application separately with regard to the specific use of a source. He was quick to agree and ask for our suggestions regarding this matter. It was pointed out that since this is a matter primarily concerning the safety of Dr. Young's facility that he should look into the different possibilities for assuring that no leakage hazard will result from the use of Cobalt sources under water.

RGP mentioned the experience of AEC with corrosion of sealed sources contained in aluminum (this information from Marvin Fox of BNL during ACID meeting in 1956, See CRB telephone conversation to Isbin, University of Minnesota). The possibility of silver soldering the stainless steel pencils was discussed. Dr. Young mentioned the possibility of welding the pencils. RGP also indicated to Dr. Young that an awareness of the possibility of contamination from these sources was of major importance and that possibly the sources could be used in a safe manner, as they are, should provision be made for monitoring to detect any spread of contamination from the sources. Dr. Young stated that they could use deionized water in their well and also indicated a willingness to install a continuous water monitor.

Dr. Young stated that he will contact AEC L concerning the sealing of the sources and/or any experimental evidence which may indicate the adequacy of these sources for use under water. (See RGP write-up below).

Dr. Young will send this information to us in the near future. He requested an estimate of the time required to issue his license. He was informed that our work load is quite variable and that we had no control over handling and mailing time required outside of this office. However, it appeared very probable that the review of his application could be completed in two weeks time from the receipt of this additional information.

RGP:

Dr. Young inquired as to whether AECL pencils had been licensed for use in other facilities in the United States. He was told that they have been licensed for some types of facilities in this country, however, we did not know off-hand of a facility using the pencils under water. We explained that it is possible that such could be the case, however. He was informed that we are presently looking at sealed sources for under water use more closely than we did in the past due to reports which we have received from AEC facilities regarding the Corrosion of aluminum in ionized water. It is now considered that sources for under water use should have a sealing equivalent to silver solder seal. Since we have no experimental evidence from AECL that their cold weld will not offer leakage when used for indefinite periods under water, we feel that the efficacy of the seal for such use should be questioned. We continued that as long as he was aware of the possibility of leakage and had adequate facilities to periodically monitor

the well water, we would consider issuing the license for the pencils even though he may not receive experimental evidence to determine that they will not leak. He explained that they certainly have facilities for making routine contamination tests of the well water, but they did not want to use sources which may leak. Dr. Young continued that he will directly communicate with AECL to determine their recommendation as to under water use and inquire as to experimental evidence sustantiating this claim. If there is some doubt in his mind as to adequacy of sealing he will ask that they silver solder the pencils. In any event he will inform us as to the information received from them in this matter.