Collider-Accelerator Department

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Memo

Date: *April 2, 2016*

To: *RSC, C. Folz, K. Kusche, and M. Palmer*

From: *D. Beavis*

Subject: *UED Status Update*

The UED is preparing to undergo an IRR on April 7, 2016 and will begin operation shortly thereafter. The intent of this memorandum is to update the committee on some changes and suggest that they review the materials. Any issues or concerns should be brought to my attention, otherwise the plans as presented here and in other reports will be presented to the IRR.

The RSC discussed[1] the overall shielding goals. At that time the intent was to have close in shielding[2] to the UED with personnel allowed inside the environmentally controlled room. The needs of the experiment required the design to be changed to a shielded area. An update on the detailed shield design was provided[3] to the RSC and after that report the dose rates were examined for the changes in the end wall. A summary of the estimated dose rates given in Footnote 3 is presented here:

Table 1: Summary of UED Dose Rate at Location near the UED

Location description	Dose rate (mrads/hr)
Entrance gate	0.029
Laser port	Less than 0.500
ATFII shielding roof	0.500
ER roof (two feet above)	1.
Through south wall 30 cm away	0.010
Max. in Radiation Area	6.
Laser room 30 cm from concrete wall	0.016
General area skyshine from UED	0.008-0.015
Over top of side wall (south)	1.0
Through end wall	0.032
Over top of end wall (10 feet above floor)	0.8

[1] RSC Meeting Minutes of July 22, 2015; http://www.c-ad.bnl.gov/esfd/RSC/Minutes/07_22_15Minutes.pdf
[2] D. Beavis, Radiation Issues for the UED, July 22, 2015; http://www.c-ad.bnl.gov/esfd/RSC/Memos/7_17_15_UED.pdf
[3] D. Beavis, "Update on UED Shielding Design", Feb. 12, 2016; http://www.c-ad.bnl.gov/esfd/RSC/Memos/2_12_16_UED.pdf

The dose rates outside the shielding are quite small as desired by the facility. There is a small Radiation Area on the north and west side of the environmental room. After initial operations it may be possible to change the posting to a Controlled Area—TLD Required. Access will be allowed to the roof over the UED via a vertical ladder located on the north side of the environmentally controlled room.

Members of the committee are encouraged to go into building 912 and examine the UED and obtain a first-hand view of the area. Access to the UED is controlled with a locked gate. The key to the gate lock is permanently attached to the key that is used to enable the Klystron to operate, as given in the RSC minutes, Footnote 1. Personnel from Light Source involved with the project have requested that a door "interlock", or sensor, be added. I have allowed one to be added but it is not a credited control, although we will test and document it like it is one. In the past the committee has been against adding unnecessary controls for comfort. This was deemed an appropriate compromise for personnel from another directorate. Personnel sweeping and locking the area will be trained that locking the gate is the action that provides the protection against radiation exposure.

The chipmunk has been added to the area with computer readout, as per RSC. It will be moved during early operations to provide radiation levels close to the machine. At some point in time it will be placed in its final position and eventually removed if deemed appropriate. Initial radiation measurements may indicate that it is safe to allow an RCT to conduct measurements inside the locked UED area. This will only be done if the machine is stable and external measurements are completed.

The dose rates external to the shielding are low. It is proposed that there be three baseline radiation surveys documented as fault studies. The three studies are:

1. Beam lost on the aperture.
2. Aperture removed and all beam lost at the end of the transport.
3. Solenoid off as a fault condition and aperture not in place.

If nothing unexpected is detected then it is proposed that no other "fault" studies be conducted.