A.J. Stevens

Minutes of meeting: Radiation Safety Committee, sub-committee

Date: Thursday, September 10, 1998

Present: A. Etkin S. Musolino, A. Stevens

Subj: Inspection of RHIC berm

This meeting consisted of a "walk-over" of the RHIC berm, inspecting the berm for possible penetrations etc. representing weaknesses. Sextant 5 had been inspected (and modified) prior to the first sextant test. This inspection was therefore restricted to sextants 3, 1, 11, 9, and 7, listed in the order (counter-clockwise) of the walk-over.

The primary systematic problem with the existing berm had been previously identified as the earth contours over the alcoves and "niches." These are the subject of a separate inspection/restoration program being overseen by George Capetan and Ted Robinson, based on a specification by Alan Stevens which is included as an attachment to these minutes. The adequacy of the berm over these areas was therefore **not** considered in this inspection.

The principal problems identified in the walk-over were associated with survey shafts. These problems are discussed below in some detail. Only two other concerns arose. The first is erosion. An erosion gully several ft. wide and perhaps 2 ft. deep was observed on the ring-center side at the first vent shaft in sextant 3 and several such gullies (within roughly 200 ft. of the B alcove) in sextant 1. The second concern is associated with sextant 7. The sub-committee noted that a part of the berm in this sextant covers the clockwise beam injection structure. It is clear that this geometry is different from the regular tunnel penetrations addressed in the attachment to these minutes. A. Stevens should examine the adequacy of the existing berm cover here in a manner similar to the examination of the corresponding region in sextant 5. (Although not a radiation issue, damage was noted at the Alcove C escape hatch in sextant 11.)

The survey shafts present more problems than had been anticipated The first observation made was that the diameters are not restricted to the 12" or the 18" diameter pipes, which had been thought to be the case. Unfortunately, most of the shafts are 22" in diameter, which increases the expected dose. With two exceptions (noted in a table below), three types of structures covering these shafts were observed. The "most robust" cover, here called Type A, has a small wood structure surrounded by a larger, much taller structure, also made of wood. The second cover, called here Type "B," is only the (about 3 ft. high) inner structure that exists in the Type A class. The third type of structure (called "C") is composed of steel rods, but a person can easily walk through the gaps between them. The sub-committee regarded the Type A structure as a reasonable barrier if the expected fault dose (discussed in the next paragraph) is low enough, but does not consider the Type B or C structures as adequate barriers for any purpose. The diameters and existing covers as encountered in the counter-clockwise direction of the walk-over are shown in the table below. Sextant 5 is also shown for completeness.

Survey Shaft Parameters

Sextant	Diameter (Inches)	Cover Type
3	20	A
3	22	A
1	22	*
1	22	B
1	22	B
11	22	**
11	22	B
9	22	B
9	22	B
7	12	C
7	12	C
5	18	C
5	12	A

* No cover at all.
** Single tall wood structure close to shaft. Not barrier for any purpose.

The sub-committee was not prepared to recommend specific barriers needed in the absence of additional calculations. As the diameter increases, the dose emerging from the shaft not only increases but "fans-out" more in the transverse direction. A. Stevens agreed to perform additional calculations. Many, perhaps all, of the 22" shafts are capped with a simple cover plate after emerging only a small distance (< 1 ft.) from the berm. The calculations should include an estimate the effect of some patio blocks on the cover plates.

Although not making specific recommendations at this time, the sub-committee believes it is **likely** that some combination of blocks and temporary posted barriers will suffice for the first year's run, but chain-link fence will be required thereafter. Following the walk-over, Frank Karl was consulted regarding the need for access to the survey shafts. Frank stated that the most likely re-survey scenario would entail access to all the shafts for perhaps one month's time every few years (during machine down-time of course). Fencing should be at least 8 ft. away from the shaft itself to allow room for maneuvering.

Check List Items

This walk-over does **not** end the RSC's interest in the berm. Additional earth being added over the alcoves and niches must be examined at a later date. Although repair of the most serious erosion observed in this inspection is included as a check list item below, some mechanism of periodic inspection should be instigated at a later date. Finally, barriers remain to be specified based on additional calculations on the survey shafts. The sub-committee's recommendations are as follows:

1. Erosion should be repaired on the ring-center side at the first vent shaft in sextant 3 (**CK-RHIC-3-01**) and at several places (also on the ring-center side) relatively close to the B alcove in sextant 1 (**CK-RHIC-1-01**). This is not needed until after the first year's run.

2. A. Stevens should examine the berm thickness in the 7 o'clock sextant to determine its adequacy (**CK-RHIC-7-01**).

3. A. Stevens should perform LCS estimates of the (DBA fault) dose emerging from survey shafts as a function of shaft diameter. The calculations should include at least some estimate of dose off to the side of the shaft and of the effect of a small patio block cover (**CK-RHIC-0-01**).

[The check list nomenclature adopted here is CK-RHIC-N-MM where N is the sextant or IR (even numbered) region and N = 0 indicates a generic item.]

Attachment: Memorandum from A.J. Stevens to R. Foukal dated 02/27/98, Subj: "Specification of Berm Contours in Regions of Sextant Penetration."

Distribution:
D. Beavis
A. Etkin
W. Mackay
S. Musolino
K. Reece
A. Stevens

cc: RSC file (w/attachment)
RSC (w/o attachment)