

TO: Jeff Mc Rill

FROM: Larry L. Nelson

DATE: July 1, 2009

SUBJECT: 701' Dose Rates Due to FESW Levels Being Lowered to 680' 5"

**COPY**

On June 23, 2009, Alan Hansen performed an underwater survey of the FESW to determine the dose rates present at the 680' 5" level (bottom of transfer canal gate). See attached survey form.

These dose rates will be used to determine the potential rise in dose rate levels at the 701' level due to the FESW water level being lowered for the dry fuel storage project.

The following are the calculations used to determine the 701' level dose rates. It is assumed that the FESW is a plane source.

To determine the dose rate as you move out from a gamma plane source, the following calculation is used:

$$I = (I_0 \ln ((r^2 + d^2)/d^2))/r^2$$

I = dose rate at distance d

I<sub>0</sub> = initial dose rate

r = radius of source

d = distant from source

r = 5.5 feet or 1.68 meters

d = 20 feet 7 inches or 6.27 meters

$$\begin{aligned} I &= (I_0 \ln ((2.82 + 39.36)/39.36))/2.82 \\ &= (I_0 \ln (1.07))/2.82 \\ &= (I_0 6.92 \text{ E-}2)/2.82 \end{aligned}$$

Using the highest dose rate from the 680' 5" level (1.03 R/hr) an increase to the 701' level dose rate would be 25.3 mRem/hr.

LLN: two

cc: Raffety  
Brasel  
Tesar  
Egge  
File F-14e, H-1

ATTACHMENT 1

FESW Underwater Survey

Date 6-23-9

Performed by HANSEN  
print

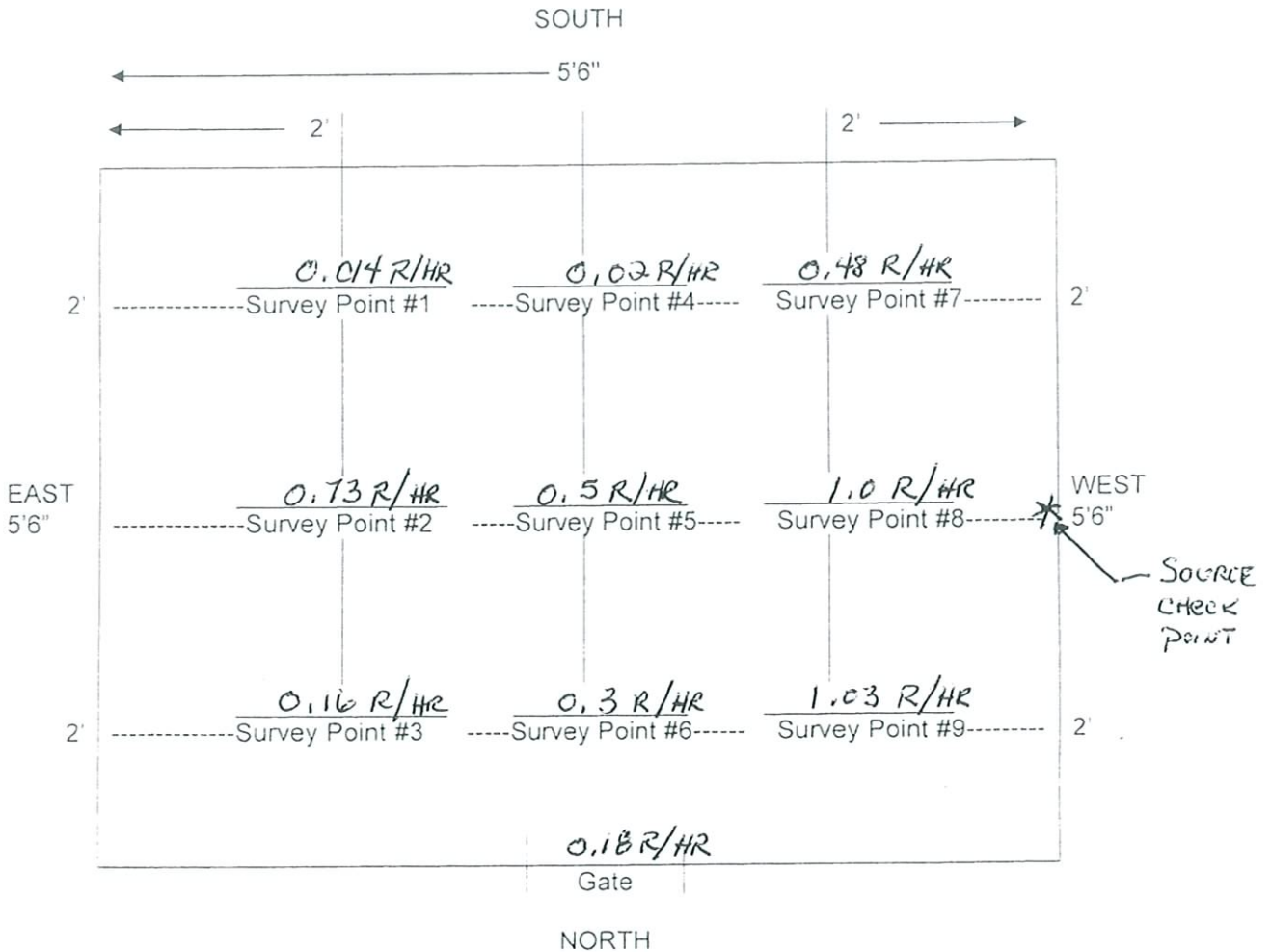
UNDERWATER Probe FIHZ 312 Ser. No. 240

Hansen  
signature

Survey instrument serial# 21020

Depth from 701 feet minus 20 feet 7 inches = 680 feet 5 inches

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SOURCE CHECK BEFORE - 18 R/HR

SOURCE CHECK AFTER - 16.9 R/HR