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APPLICATION OF REACTOR

SAFEGUARD COMMITTEE FORMULA

TO

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FROM

J. M. Smith

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April 22, 1952

APPLICATION OF REACTOR SAFEGUARD COMMITTEE FORMULA

The Reactor Safeguard Committee formula for the allowable minimum distance between a reactor and the public domain is expressed as:

$$r = 0.01\sqrt{P}$$

where r = radius from reactor in miles

and P = reactor power level in kilowatts

It is not clear at this time as to whether P is the power level of an individual reactor, or the additive power levels of all reactors within one plant area.

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The six plates in this report illustrate the application of this formula for Hanford Works, both for individual reactors and all reactors in an area.

Plate #1 shows distances for existing reactors with the highest power levels attained during March 1952. Individual reactor distances are essentially within the secondary control zone, but the D plus DR distance includes inhabited areas north of the Saddle Mountains including the town of Corfu.

Plate #2 shows distances for existing reactors with C pile also operating at its design power level. The B plus C radius includes territory west of the reservation boundaries.

Plate #3 illustrates distances for existing reactors, C reactor, and Program X, Case I (two large reactors at Coyote Rapids). Considering individual reactors, the territory included is not augmented by the Coyote Rapids reactors. With the Program X reactors considered additive, their effective distance is controlling in all directions and includes large areas north of the Saddle Mountains and west of the reservation.

Plate #4 shows distances for existing reactors, C reactor, and Program X, Case II (large additional reactors in the F and H Areas). The effective distance of the HX reactor includes a significant area north of the Saddle Mountains, and H plus HX includes a larger area including the town of Smyrna.

Plate #5 illustrates the effect of ultimate power levels for existing reactors (inferred from document HW-23068, Limits of Pile Operating Level, GE McCullough and RO Mehan, dated 12/19/51), C reactor, and Program X, Case I. Both the individual reactor, and total area reactor distances are set by circles from Coyote Rapids and include significant areas north and west of the presently controlled area.

Plate #6 shows distances considering ultimate levels with Program X, Case II. Large areas north of the Saddle mountains are included, as is essentially all of the eastern portion of the secondary zone originally proposed for irrigation from the Potholes East Canal.

The objective of this report is to make this information conveniently available to interested personnel for evaluation.

MSmith

RADIOLOGICAL SCIENCES DEPARTMENT

JM SMITH:VSB

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APPLICATION OF REACTOR SAFETYBOARD
COMMITTEE FORMULA Y-ORZ
CONDITIONS SHOWN

REACTOR	POWER (MW)	THICKNESS (INCHES)	REACTOR	POWER (MW)	THICKNESS (INCHES)
B	5.8x10 ³	7.5	F	5.3x10 ³	7.3
C	5.3x10 ³	8.1	FX	1.3x10 ³	10.2
D	5.3x10 ³	7.3	B+C	1.2x10 ³	11.0
DR	5.7x10 ³	7.8	D+DR	1.0x10 ³	10.5
H	5.9x10 ³	7.7	H+HX	1.8x10 ³	12.8
HX	1.3x10 ³	10.2	F+FX	1.8x10 ³	12.6

GRAPHICAL INDEX
RADIOLOGICAL SCIENCES DEPARTMENT
EXISTING REACTORS PLUS CURRENT
CONSTRUCTION & PROGRAM X
CASE II
DRAWN BY *A. J. Olson* PLATE NO. 4

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APPLICATION OF REACTOR SAFETY BOARD
COMBATIER FORMULA 7-DRP
CONDITIONS SHOWN

REACTOR	PKW	(MILES)	REACTOR	PKW	(MILES)
B	6.0×10^5	7.8	F	6.0×10^5	7.8
C	9.78×10^5	9.9	FX	2.0×10^6	14.2
D	6.0×10^5	7.8	B+G	1.578×10^6	12.8
DR	7.0×10^5	8.4	D+DR	1.3×10^6	11.4
N	7.0×10^5	8.4	H+HX	2.7×10^6	16.4
HX	2.0×10^6	14.2	F+FX	2.6×10^6	16.2

GRAPHICAL INDEX
RADIOLOGICAL SCIENCES DEPARTMENT
ULTIMATE POWER LEVELS
INCLUDING PROGRAM X (CASE II)
DWS BY *P. J. Allen* PLATE NO. 6

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