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September 24, 1993

United States Nuclear Regulatory Commission
Office of Nuclear Material Safety and Safeguards
Washington, DC 20555

Attn: Dr. Donna-Beth Howe

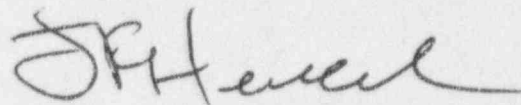
Dear Doctor Howe,

In response to our telephone conversation of August 30, 1993, I met with Dr. Katherine Parker and Dr. Tom Thorne to gather the additional information you have requested. Enclosed is the summary of the results of those meetings, as supplied to me by Dr. Parker. Experimental procedures and design have been modified to minimize potential release of tritium to the holding tank and the environment and to minimize exposures to the general public. Dr. Parker has also supplied information on the location and geology of the drinking water wells, as well as tests to determine migration of water through area soils. Photographs are enclosed showing the pronghorn research pens, the passageway and the weighing area. The enclosed maps show the approximate locations of the wells, the holding tank and the numbered locations and direction of the photographs.

To clarify the intentions of returning the six pronghorn used for breeding to Colorado, Dr. Parker has told me that it is her current intent to return two of the Colorado pronghorn in 1994, after tests have determined sufficient clearance of the tritium to release them. The other four will stay at Sybille. The best animals will be chosen from the entire population available for breeding in 1995. If the two pronghorn scheduled for return to Colorado are among the best candidates, they could possibly be retained for another year.

I hope this information is helpful in your environmental assessment of this research project. As always, if you need any further assistance don't hesitate to give me a call.

Sincerely,



Jim Herrold
Radiation Safety Officer

TO: Jim Herrold

FROM: Kathy Parker *KLP*

RE: Sybille Environmental Assessment

DATE: 22 September 1993

To summarize our discussion with Dr. Tom Thorne on 8 September:

- 1) The general public will be restricted from using the alley through the animal handling barn during the duration of isotope administration (June through September) and for several months following the experiments.
- 2) Animals will be weighed at the end of the week following tritium injection in order to have the lowest amount of tritium in the body when leaving the outdoor pasture and coming into the barn area.
- 3) Wipe tests will be performed weekly in the alley and other areas that the animals may come in contact with in the barn facility.
- 4) The drainage ditch passing through the barn area where animals have access to food and water will be covered during the duration of the study to prevent any contamination of the holding tank at the research area.

You requested information on the geology of the soils at the Sybille Research Unit, as well as the location and depth of the water wells at the facility. The soils are technically known as "azonal lithosols derived from the anorthosite parent material and its associated rocks (Joint Publication by Western Land Grant Universities 1964). Generally, they are a cross between sand and loam. There are 6 wells at the facility, of which 5 are located across Sybille Creek from the experimental area. One well, approximately 30 feet deep) is near the handling area, but uphill from any areas that the animals will encounter (see enclosed maps).

After talking with a soils physicist, Dr. Renduo Zhang, I collected soil samples from the pasture where the pronghorns will be contained and conducted a small experiment to determine the approximate depth of water (urine) infiltration. I assumed that an average urine sample was 25 ml based on data from deer and caribou and

that a single sample might contaminate a circular area with a radius of 5 cm when voided by the animal. I determined the initial mass water content (w_i) of an average of 6 soil samples, which is about 7%. I then added 25 ml water samples to determine a final water content (w_f) averaging 23%. These values were then used to calculate a gravimetric water content (\bar{f}) with corrections for the bulk density of soil and water ($\bar{f} = w \times 1.6$). Using the formula to calculate depth of penetration (h) based on the initial (\bar{f}_i) and final water content (\bar{f}_f), where $h = (25 \text{ ml} / \pi r^2) / (\bar{f}_f - \bar{f}_i)$, I determined that an average 25-ml urine sample will penetrate only 1.25 cm. It is, therefore, very unlikely that any wells on the property will ever have any likelihood of being contaminated. Obviously, it is possible that 2 animals could urinate in the exact same location one after the other, causing further penetration, but not probable. Rainfall is so minimal in this region during summer that the tritium contamination will likely stay in the top 2 cm of soil, most evaporating quickly.

I enclose photos of the facility to be sent to Dr. Mary Beth Howe. Captions are as follows:

- 1) Looking from handling facility to L-shaped animal pasture.
- 2) Observation tower in pasture and adjacent natural vegetation enclosure.
- 3) Looking from L-shaped pasture into feeding area of handling facility.
- 4) Door from feeding area into main alley of handling facility.
- 5) Antelope coming from feeding area into main alley.
- 6) Antelope in alley en route to scale.
- 7) Door across alley directing animals into chute leading to scale.
- 8) Chute system leading onto metal platform scale.
- 9) Scale viewed from outside chute.
- 10) Leading out of scale into containment area, before animals return back through alley into L-shaped pasture.

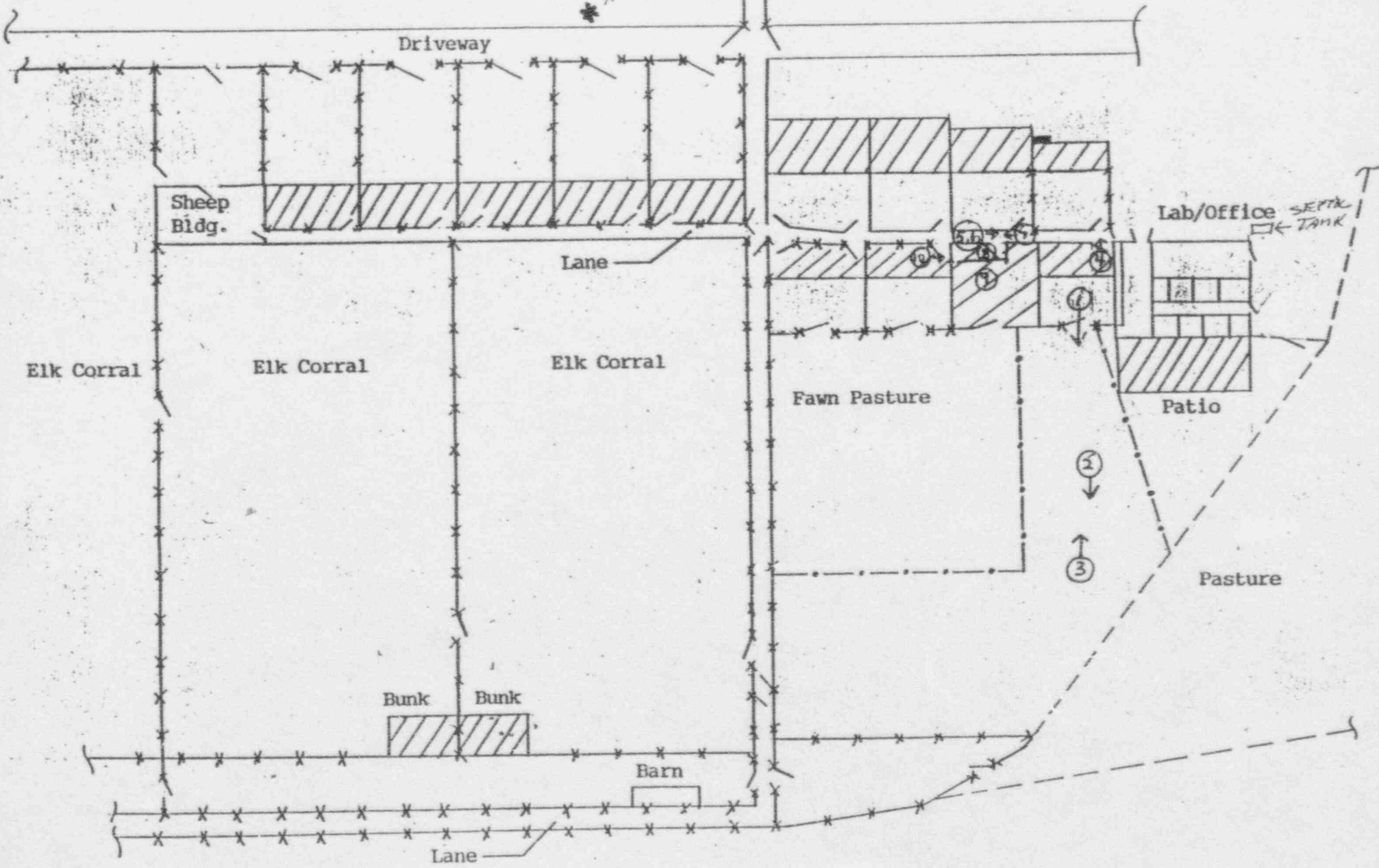
Need location of wells
and septic tank

Wildlife Holding/Handling Facilities



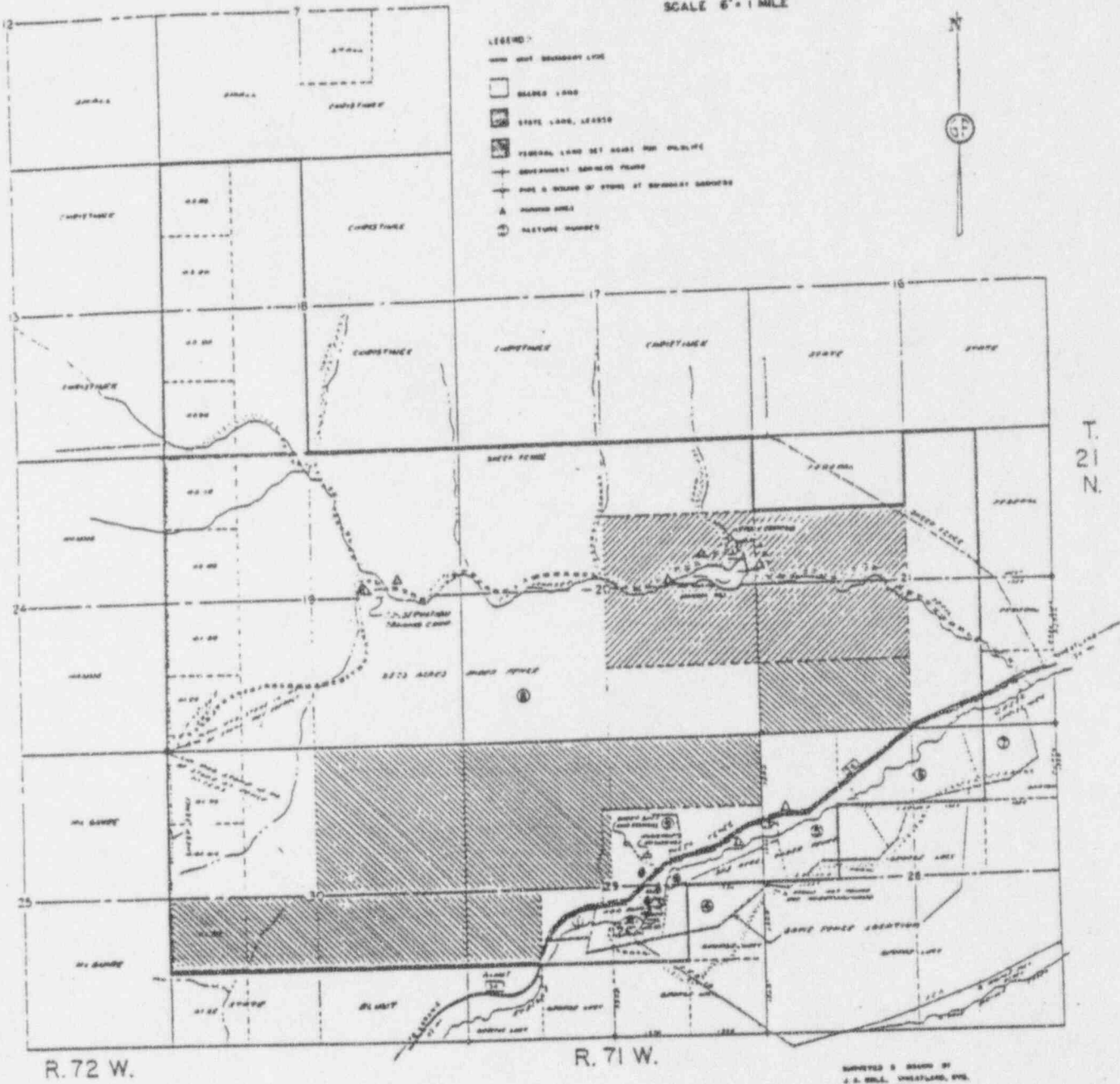
WELL APPROX. 30' DEEP

To Elk Facilities



depth?
geology? 0

SYBILLE GAME and FISH EXPERIMENTAL UNIT
WYOMING GAME & FISH COMMISSION
FEDERAL AID IN FISH AND WILDLIFE RESTORATION
ALBANY COUNTY, WYOMING
SCALE 6" = 1 MILE



R. 17-C-68 No. 2

T. 21 N.

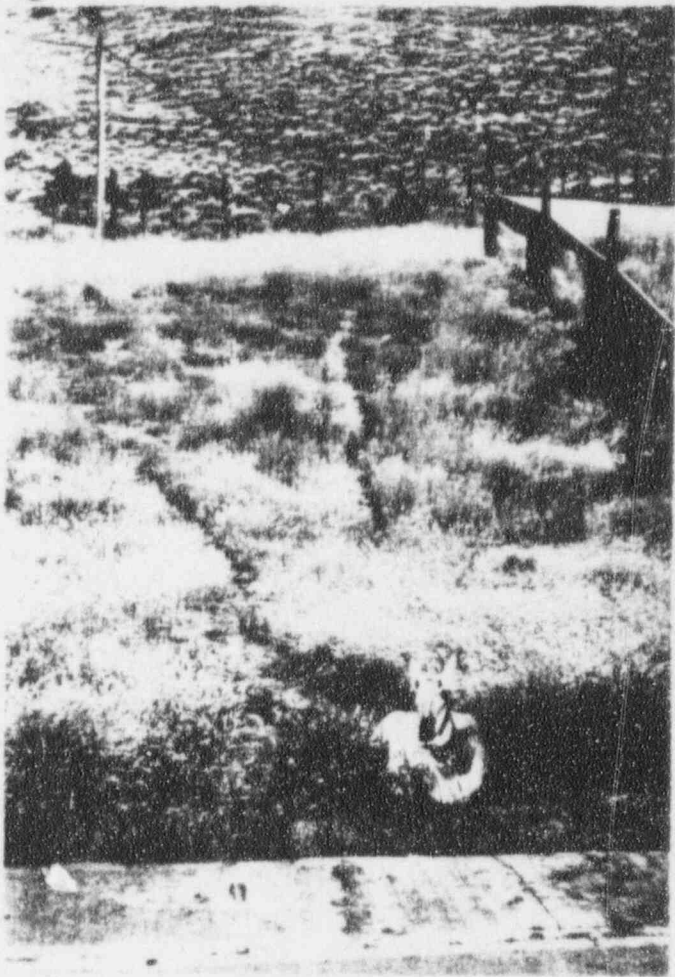
R. 72 W.

R. 71 W.

DRAWN & CHECKED BY
J. S. HILL, CHESTNUT, WYO.
1932

• RED DOTS ARE APPROX. WELL LOCATIONS

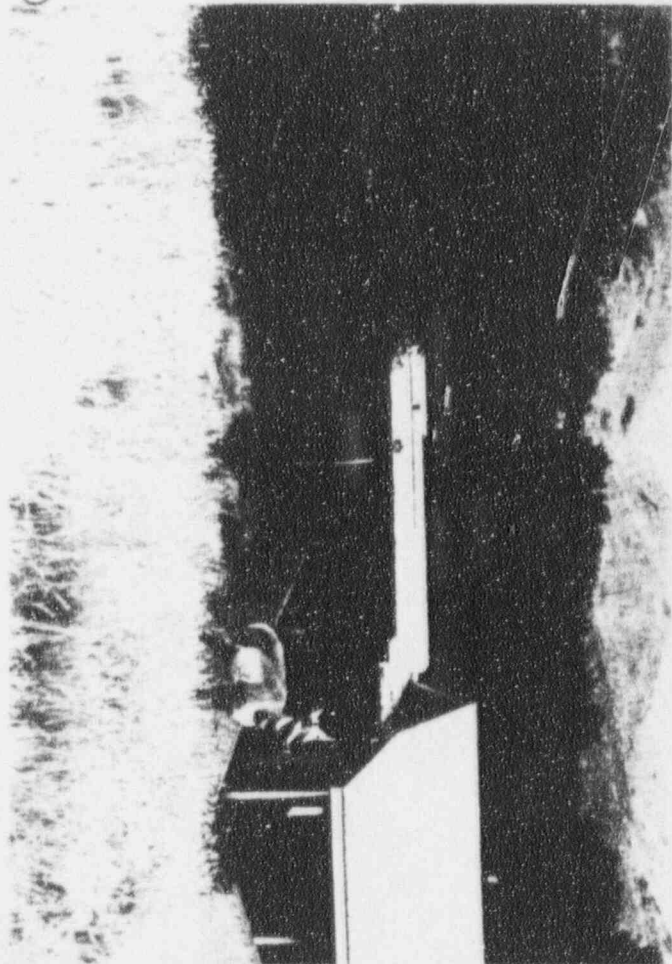
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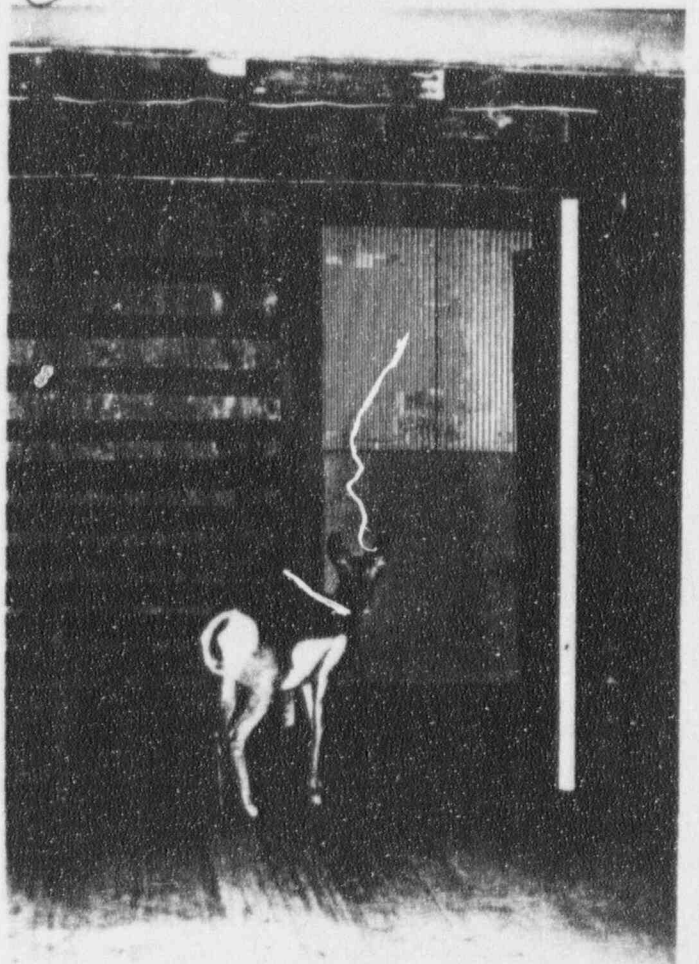
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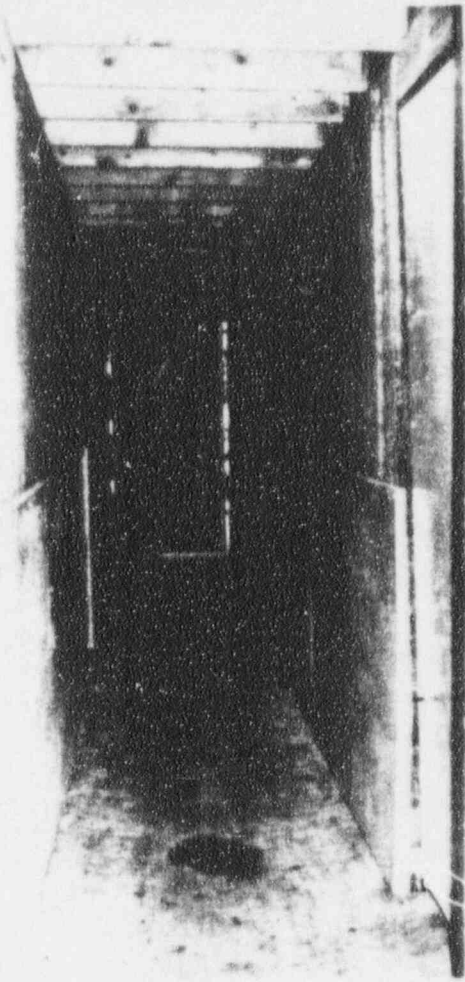
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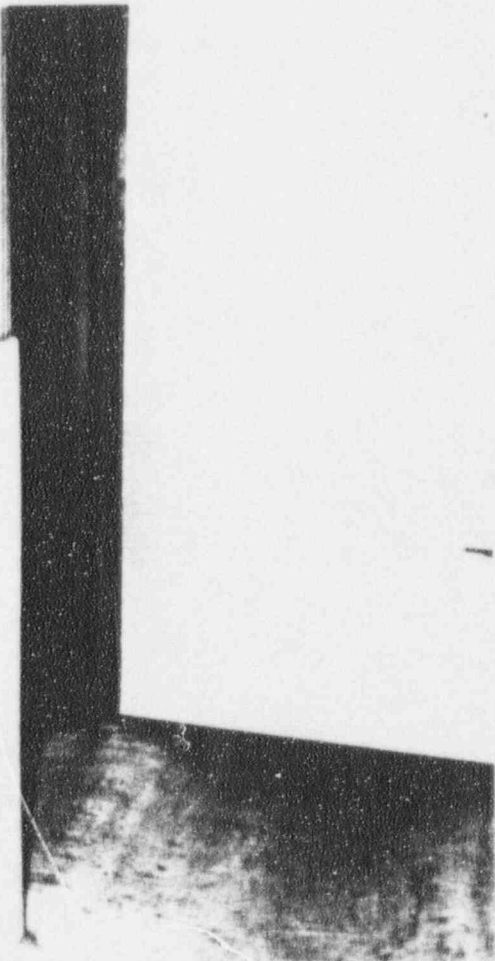
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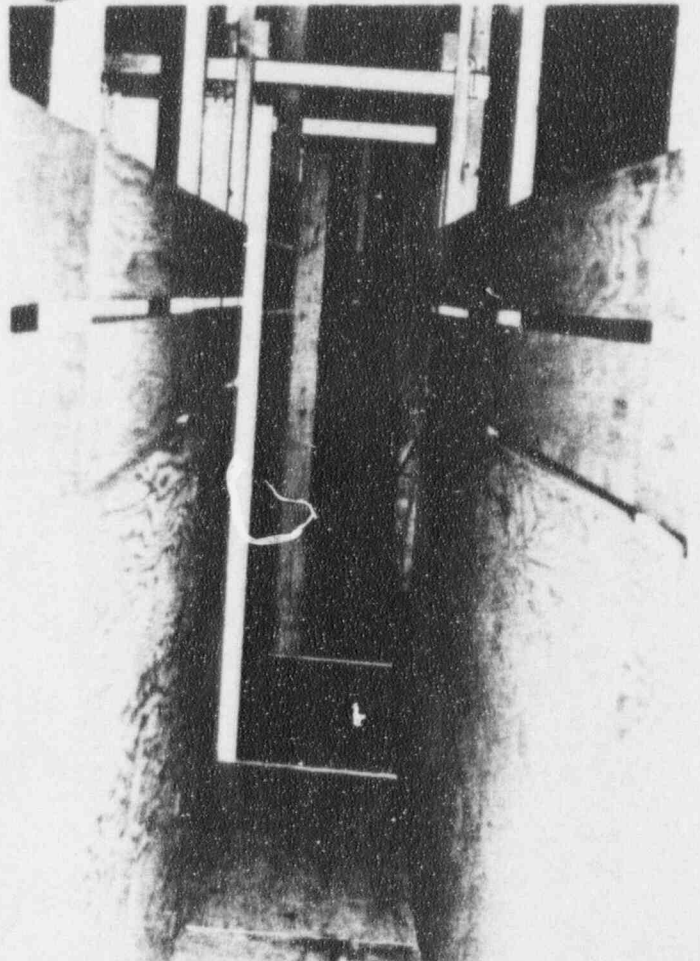
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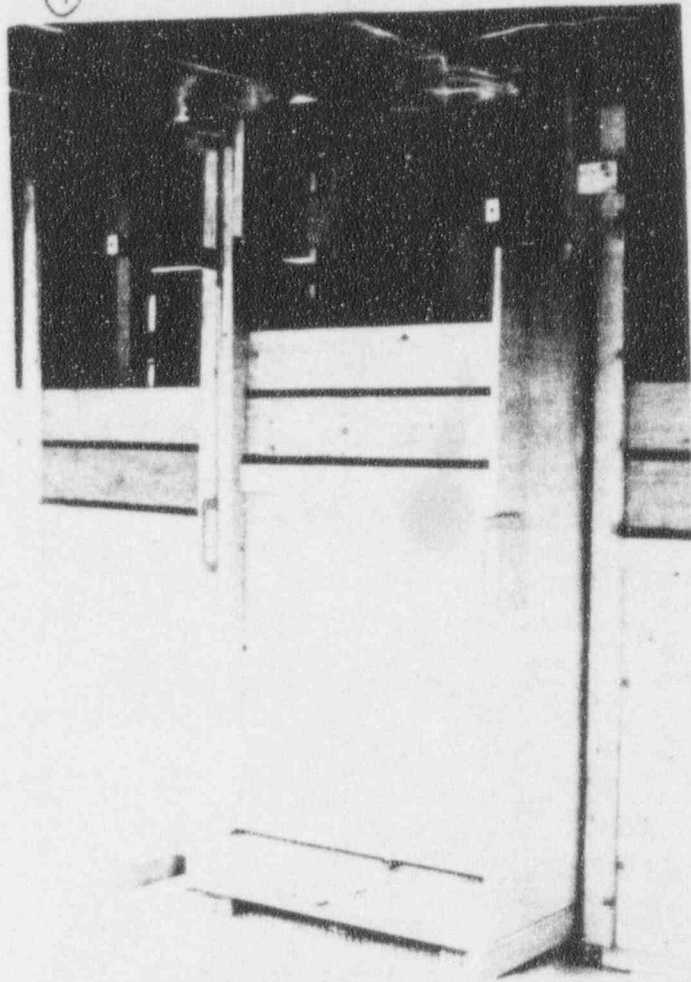
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