UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

NOV 16 1984

MEMORANDUM FOR: James Lieberman, Director and Chief Counsel
Regional Operations and Enforcement Division
Office of the Executive Legal Director

FROM: Jack A. Hind, Director,
Division of Radiation Safety
and Safeguards
Region III

SUBJECT: KRESS CREEK DECONTAMINATION LITIGATION

Enclosed is information obtained from Region III files and other sources relating to certain of the questions set out in your memorandum dated September 6, 1984. The questions addressed are those which Region III was asked to comment on during a September 9, 1984 telephone conference with OELD and NMSS representatives. Although the search included the complete file, it was not exhaustive. Further review will undoubtedly be necessary as the staff case is developed.

C-1

As noted in the enclosure, we found elevated radiation levels in a manhole upstream of the Kerr McGee factory site but don't know what the material is or where it came from. We intend to pursue this matter further with the help of the city engineer if possible.

Region III will continue to cooperate in the development of information necessary to this case. M. Schumacher (FTS 388-5514) continues to be the Region III technical contact in this matter.

Jack A. Hind

Jack A. Hind, Director
Division of Radiation Safety
and Safeguards
Region III

Enclosures: As stated

cc w/encls:
R. Page, NMSS
W. Crow, NMSS
W. Nixon, NMSS
L. Cuoco, ELD
S. Burns, ELD
B. Davis, RIII

ENCLOSURE

#3 Location and number of tailings piles and detention ponds.

The following are abridged quotations of inspection reports.

April 2, 1956; "The waste is...in sludge piles on 12 acres...." "...liquid waste is pumped into open sumps on the 12 acres."

December 3, 1957; "Liquid process wastes are discharged...into a large sump basin."

April 19, 1961; "The pile of gangue is located at the southwest corner of the plot and is within 30 feet of the west fence."

March 23, 1963; "...and the licensee has several retention ponds for the collection of all liquid process waste from the plant."

July 7, 1973; "The liquid is discharged into pond 1,...into #2 ...into #3...pond #4."

The "Site Stabilization Plan for Kerr-McGee Chemical Corps," blueprint dated July 10, 1978, shows the location of five ponds. The Plan for Permanent Disposition of Thorium Bearing Waste Solids at West Chicago, IL states, that ponds 1 and 2 were built in the 1950's, and a small pond on the manufacturing site was abandoned. About 1966 No. 3 pond was placed in use and operated in series with No. 1 or No. 2. In 1970 ponds No. 4 and No. 5 were put into operation in series downstream of No. 3. The dotted outlines, added by RIII personnel, are ponds 1-5 located approximately where they are shown on the June 10, 1978 blueprint previously cited.

The attached drawings (not to scale) and copies of photographs show a waste pile near the southwest corner of the "12 acre" waste storage area. This appears to be the same pile that is currently on the licensee's disposal site. The northern most "Gray Mud Waste Pile" on the drawing (attachment 1) appears to be approximately where a pond is shown on the photograph copies. This would be pond #2 on the current numbering system.

Several pits shown in the center of photograph #11 (attachment 2) and the right center of photograph #12 (attachment 3) are on the "production" site. One of these may be one referred to in the Plan cited above.

#4 Controls that have existed over Tailing Piles

Region III's first dealings with the West Chicago site was an information gathering inspection on April 2, 1956. A description of the 12 acre site stated that it was not fenced on one side. The next report, of an inspection on December 3, 12, 1957 and April 9, 1958, described the "Restricted Waste Storage Area" in Enclosure B, Drawing #1 (see attachment 1) as "Area enclosed by an eight foot wire fence and posted

with appropriate radiation warning signs. Gates equipped with chain and locks." The first mention of a guard was in a report of an inspection conducted between April and August 1962. The guard was located in the production area.

The piles remained uncovered until July 1983 when an asphalt suppression system (a light coat of cationic asphalt emulsion followed by a nonwoven geotechnical fabric and then a relatively thick top coat of asphalt emulsion) was applied.

Currently, the site is completely fenced with a round the clock guard at the only entry.

#7 Possible pathways by which material may have migrated from the site.

a) Factory Site

1. Rain carrying contamination from the site via building gutters and downspouts to street or site surface drains. Material washed to the street would go to the storm sewer system by way of street curbs, gutters, and gutter drains. Street gutter drains are present on Factory Street. The presence of building gutters and downspouts discharging directly onto the street could not be verified.

2. Site surface drains connected directly to the storm sewers would allow for a direct pathway. Although an existing drain pipe connected to an abandoned drain near building 9 is shown on Calalytic, Inc. Engineering Department "Water Treatment Underground Piping Plan" (attachment 5) no evidence for or against this possibility could be found upon examining sewers on Factory Street due to (1) confusion between sanitary and storm sewers and (2) the apparent differences in vintages of some sewers.

3. Site surface drains connected to building 14 sump and pump house would discharge through the building by overflowing the sump to the storm sewer. An existing discharge pipe from building 14 is shown on the Calatytic Plan. The system was modified in November 1982 to eliminate this discharge method except for extremely heavy rainfall.

b. Disposal Site

Material washed off the tailings pile on the disposal site to the storm sewer by way of leaching, direct flow through ground fissures, animal burrowing, vegetation intrusion (roots) or deterioration due to age. The manhole immediately west of the tailings pile did not appear to have been modified and no entry pipe from the direction of the pile could be seen in the manhole. Although run-off of material found beyond the storm sewer line was documented in a report of a Region III inspection performed in July 1976, an earth berm is currently present above the storm sewer line between the pile and the west fence line. We do not know if the berm was part of the original sewer construction, but in a letter from F. Lyons to J. Keppler dated July 26, 1976, it was stated that "The contour of our property has been graded to prevent runoff." This was in reference to contamination found off site west of the disposal site boundary. The berm merges into the general surface elevation some distance south of the pile as the sewer line moves toward the southwest portion of the disposal site. The ground surface elevation is generally lowest at the southwest corner of the site where it appears that surface water may temporarily collect during wet periods. It is possible that surface runoff could have entered the sewer in this area by percolating through the ground but this could not be confirmed. We were unable to find any manholes in this area although the city engineer's map indicates one is present.

#9 Factual basis for concluding the Kress Creek contamination came from the Kerr McGee West Chicago site.

The circumstantial basis for this conclusion appears strong. The material in Kress Creek is predominantly thorium-232 and daughters similar to that used on the site and at the West Washington Street location formerly owned by Kerr McGee. We know of no other source of such material in the area that could plausibly be cited as the cause. There is also the known overflow connection between the storm sewer collection sump in building 14 on the factory site and the West Chicago storm sewer leading to Kress Creek. Our records indicated that this sump and the outfall at Kress Creek have been monitored for thorium since about 1980 with occasional positive analyses being made. There is reference made in a letter dated October 21, 1975 (attachment 6) of considerable drainage from the percolation ponds into the storm sewer under the west border of the 27 acre site and also southerly into the DuPage River.

#10 Known routine or extraordinary discharges, releases or spills from the site.

A review of 35 inspection reports covering December 3, 1957 through August 1, 1984 did not produce any information on known routine or extraordinary discharges, although several nonroutine discharges were documented. The discharges were via the building 14 sump which drained the factory site, fed into the West Chicago storm sewer and discharged into Kress Creek. Releases associated with heavy rains occured 4/28/81, 3/15-16, 4/2-3, 16 and 12/6/82. None of the releases were above regulatory limits (10 CFR 20.106(a)).

The only airborne release noted (see question 11) would not support the Kress Creek contamination observed.

One instance of material beyond the disposal site west boundary was noted in a July 1976 inspection report. Direct readings of 0.5-6 mR/hr were recorded "to several feet out from the fence." This material was removed on or about July 26, 1976. It is unlikely that this isolated instance alone can account for the Kress Creek contamination.

#11 Enforcement history of Kerr-McGee and predecessors.

Twenty-nine items of noncompliance in 10 out of a total of 35 inspection reports for the period of December 3, 1957 through August 1, 1984 were categorized to determine their potential for involvement in the Kress Creek contamination. Of the 29 items, 3 dealt with excessive radiation levels in unrestricted areas, 1 with incineration of contaminated items and 1 with the release of materials to an unrestricted area.

The excessive radiation levels were measurements taken between the licensee's west fence and the E. J. and E. Railroad by AEC representatives and ranged from "1.2 to 1.9 milliroentgens per hour (mR/hr)." The readings were of the waste material on site, not of material in the unrestricted area.

Incineration of contaminated items took place twice (January 5 and 12, 1968). Empty monazite ore bags were incinerated with a resultant maximum in-stack air sample concentration of "0.137 x 10^{-11} uCi/ml." (Authorization to incinerate was received by Amendment No. 2 dated March 27, 1968.) Subsequent samples from 23 licensed incinerations between 4/1/70 and 2/11/72 resulted in the highest result being "0.367 x 10^{-11} uCi/ml." Most ranged from "0.3-0.1 x 10^{-11} uCi/ml."

The release of materials to an unrestricted area occurred for the one year period ending June 11, 1983 during which time the annual average concentration limit for lead-212 (6E-10 uCi/cc) was exceeded by a factor of 1.4. The annual average concentration for thorium was not exceeded during this period.

It appears unlikely that airborne releases offsite due to incineration and the waste pile contributed appreciably to the contamination measured in Kress Creek.

#13 Storm sewer that crosses the West Chicago site.

The portion of the West Chicago storm sewer system which parallels the factory site on the east and the disposal site on the west and crosses Kerr McGee property near the southern boundary of the intermediate site, was constructed about 1924 in accordance with a West Chicago ordinance. This section originates at Factory and Blair Streets. No maps of the storm sewer system were available until 1979 when the current city engineer had a storm sewer system drawn, presumably from the ordinance specifications. A copy of this map was obtained from West Chicago and is available in Region III.

The engineer stated that no written maintenance records are kept. Two mentioned instances of repair of this system were due to a collapse of a section at the intersection of Brown and Factory Streets, and replacement of a section crossing under Roosevelt Road. The only substantiation of these would be purchase requisitions for materials used. Further information may be obtainable from the recollections of a foreman who has been a city employee for approximately 30 years.

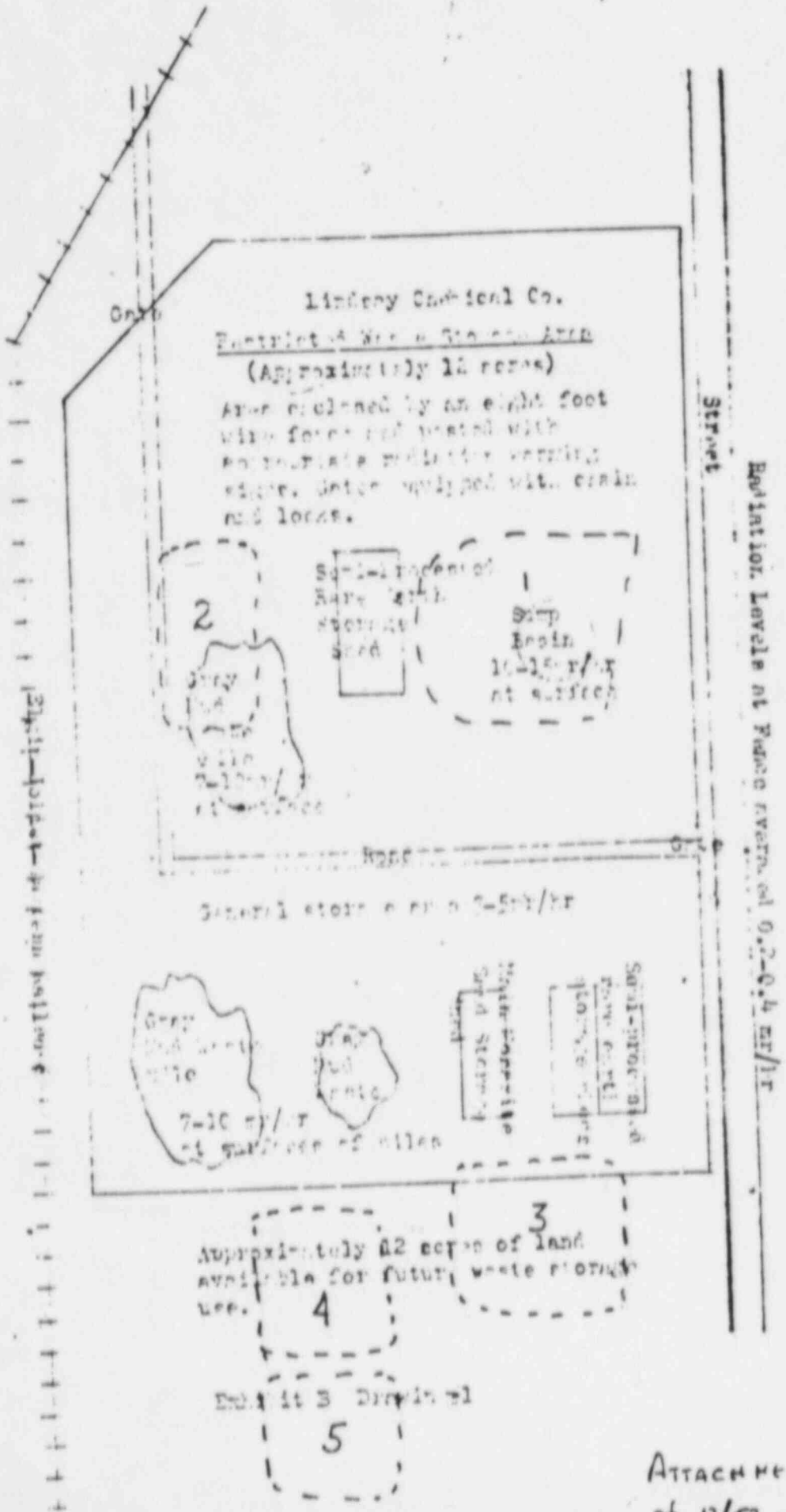
A section of storm sewer paralleling the factory site on the west side of the E.J.&E added circa 1951 runs under the railroad embankment and joins the east section on the disposal site. Comprised of sections from both 1924 and 1951, it appears to originate as far north as Washington and Wood Streets, the direction of the West Washington location of bulding W1 mentioned in Question 6 (see attachment 7). There is some uncertainty about the storm sewer in this area and where it crosses the tracks on George Street. Some modifications may have been made about the time of the 1951 connection. Better understanding may shed some light on the contamination of Kress Creek.

In addition to the manholes discussed in response to question 6, the licensee knows the location of an additional manhole which connects the west section to the section running south on the disposal site.

The manhole south of the one closest to the tailings pile on the disposal site could not be located by regional personnel walking the site.

#14 Measurements of activity at the storm sewer outlet

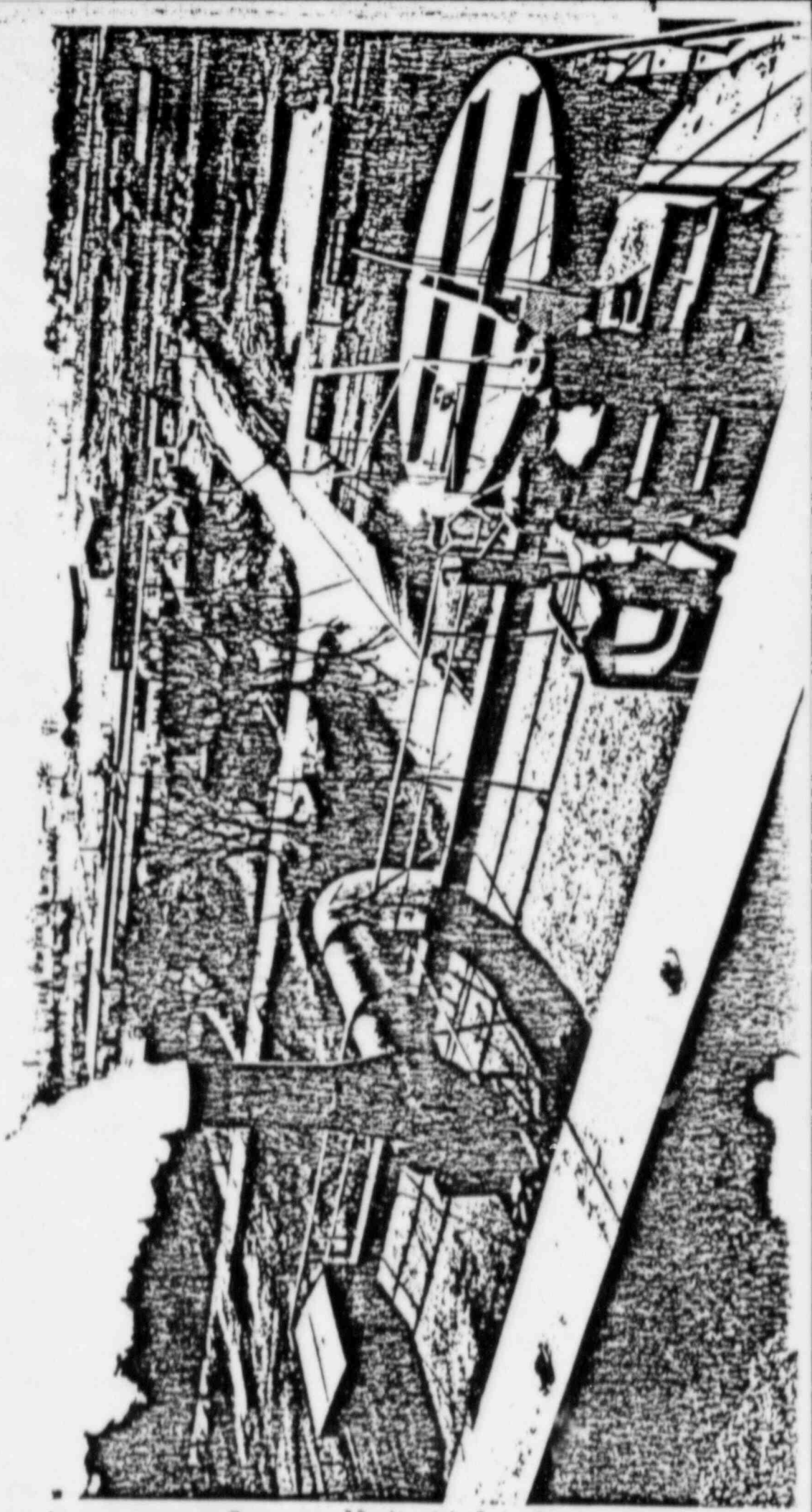
Attached are copies of records in our files of measurements made at the Kress Creek storm sewer outfall. Our files do not indicate any routine sampling being done before April 1980. The attached record covers the period through October 1982 and includes both gross measurements and isotopic analyses.



ATTACHMENT TO REPORT
of 12/57 - 4/58

ATTACHMENT TO REPORT
of 12/57 - 4/58

ATTACHMENT 2

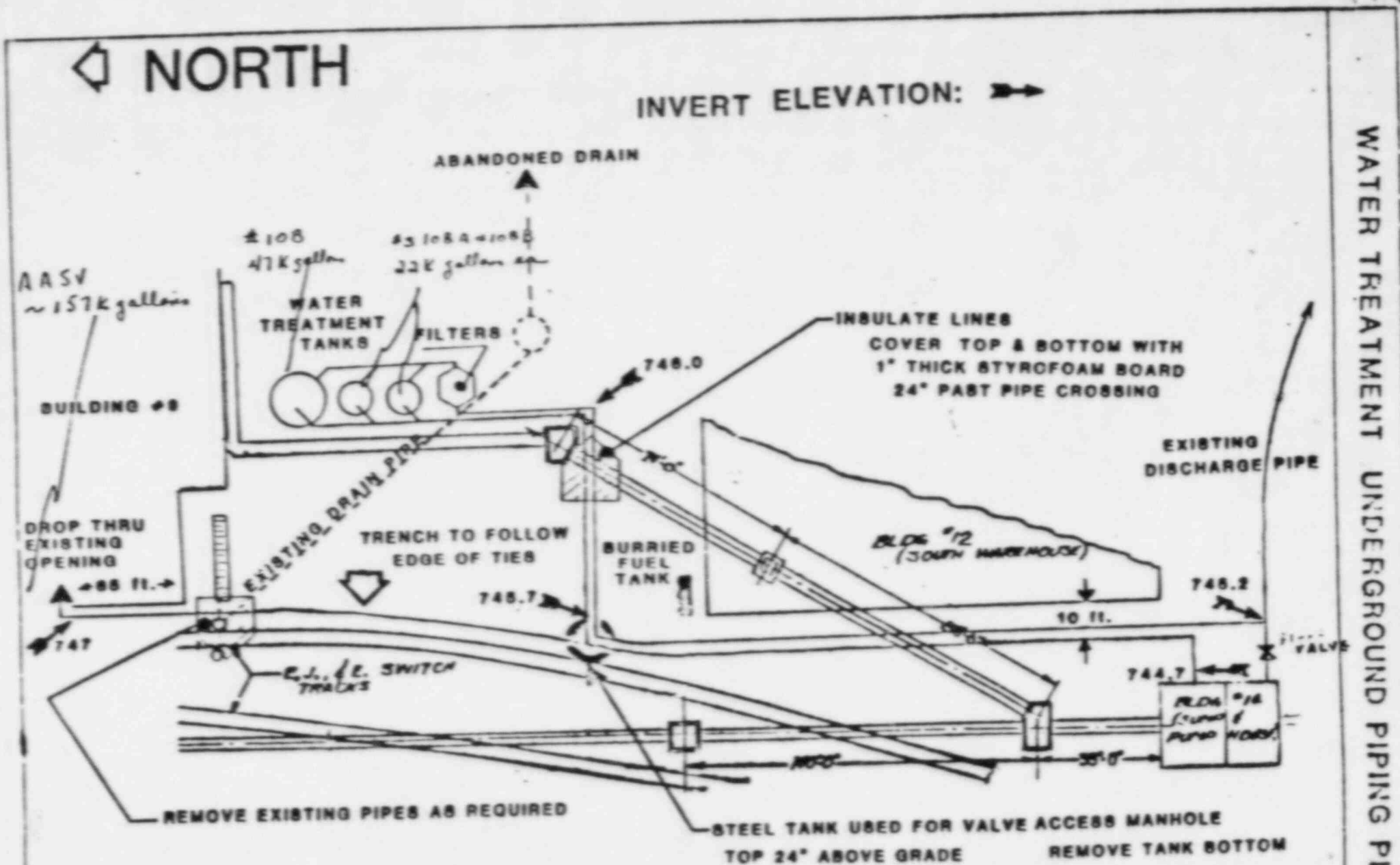


ATTACHMENT TO REPORT
of 12/57 - 4/58

ATTACHMENT 3


GEORGE ST
WEST CHICAGO H. S.
1 N
CONDE
ALLEN
BLAIR ST
STIMMEL ST
PEARL
POMEROY ST
WOOD
BROWN
BARBER
HAZEL ST
LESTER ST
BARNES AVE
PIONEER PARK
SHERMAN
RAILROAD
FARNEY (PROPOSED) SITE
Intermediate Site
WEYRAUCH
Disposal Site
9
10
16
15
FOREST
GLEN
AVE
ATTACHMENT 4

WATER TREATMENT UNDERGROUND PIPING PLAN



NOTE: PIPES MUST BE PITCHED TO DRAIN
USE 1" STYROFOAM BOARD COVER ON PIPE LESS THAN 30" DEEP