UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUN 27 1978

Docket No. 50-201

Mr. Ralph W. Deuster, President
Nuclear Fuel Services, Inc.
6000 Executive Boulevard, Suite 600
Rockville, Maryland 20852

Dear Mr. Deuster:

In our letter dated June 2, 1978 we forwarded to you a copy of the DuPont report entitled Safety Related Information Available on NFS Waste Tanks. This report recommended several actions that should be taken to both improve the understanding of present waste tank system conditions and to provide increased readiness to respond to possible future waste tank problems. One of these recommended actions calls for a careful evaluation of the overall time that would be required to transfer waste from the in-service tank 8D2 to the spare tank 8D1. Additionally, a careful review of the reliability of the special transfer pump and associated equipment and a careful review of the adequacy of the tank pump-out procedure have also been recommended. This review and evaluation are needed to provide increased assurance that waste tank transfer can proceed in a timely, safe and efficient manner should waste transfer become necessary. Accordingly, we request that you take the following action:

1. Evaluate the overall time required to conduct waste transfer in the event a leak develops in 8D2. The overall time should begin with the initiation of leakage and conclude with the completion of waste transfer and any subsequent transfer line flushes and transfer equipment removal. This evaluation of the time required for waste transfer should include, but not necessarily be limited to:

   a. Estimates of leak rates; including assumptions used.

   b. Time required to detect the leak.

   c. Reliability of waste tank pan high level alarms and the tank farm trouble alarms.

   d. Reliability of the pan pumpout pumps.

e. Time to pump down condensate from spare tank 8D1.

f. Time to perform each step in the 8D2 pumpout procedure.

2. Verify the operational capability of the 8G2 special transfer pump and motor. This verification should be conducted on a periodic basis and should include but not necessarily be limited to:

   a. Routine electric checks on the motor, such as measurements of insulation resistance, armature resistance, etc.

   b. Checks to verify the absence of binding of moving parts in both pump and motor.

   c. Ability of the pump to transfer solution containing suspended sludge.

   d. Consideration of the need for backup transfer equipment.

3. Evaluate the adequacy of the radiological controls needed during waste transfer. This evalaation should include as a minimum:

   a. A calculation of personnel exposure received during transfer equipment installation and waste transfer.

   b. A calculation of the effectiveness of the three feet thick dirt shield around the transfer line and the lead and concrete shield around the 8D1 and 8D2 pumpout and sample hatches.

   c. The need for installation of suitable leakage collection containments around transfer equipment mechanical joints.

Through discussions with members of your staff, it is our understanding that the 8D2 pumpout procedure is in the process of being revised and updated. We would appreciate receiving a copy of the revised procedure as soon as it is completed.

Please provide us with the revised 8D2 pumpout procedure and the evaluations requested above within two months of the date of this letter. We would be happy to discuss these items with you at any time.

Sincerely,

Original Signed by
R. W. Starostecki

Richard W. Starostecki, Chief
Fuel Reprocessing and Recycle Branch
Division of Fuel Cycle and Material Safety

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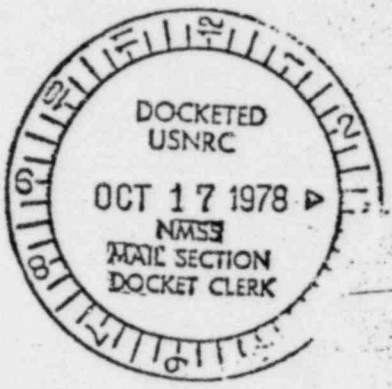
October 12, 1978

Docket No. 50-201

U.S. NUCLEAR REG. COMMISSION



Mr. Richard W. Starostecki, Chief
Fuel Reprocessing and Recycle Branch
Division of Fuel Cycle and Material Safety
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Reference: NRC Letter to NFS dated June 27, 1978

Dear Mr. Starostecki:

Your letter of June 27th requested NFS to review and evaluate some specific actions recommended by DuPont in their report entitled "Safety Related Information Available on NFS Waste Tanks." Per your request, NFS has again carefully considered its procedure for the transfer of waste from the in-service tank 8D-2 to the spare tank 8D-1 and has again concluded that the present procedures allow for such a potential transfer to proceed in a timely, safe and efficient manner; however, in the interest of additional conservatism, we are planning, as described below, to augment that procedure.

1. EVALUATION OF RESPONSE TIME*

a. Estimate of Leakage Rate

Because the design and the operation of the waste tank 8D-2 have been directed at avoiding the deficiencies that had arisen in some high level waste tanks at U. S. government sites, there has not been leakage from a similar waste tank; therefore, there is no historical base to estimate potential leak rates. Any estimate of potential leakage would be conjectural and is irrelevant because the permanently installed 8D-2 pan pump would return leakage of up to about 20 gpm back to the 8D-2 tank, thus eliminating or at least significantly reducing any postulated leakage.

b. Time Required to Detect Leak

The liquid levels in the pan and in the vault of the 8D-2 waste tank complex are continuously monitored by instrumentation and annunciated, via a trouble alarm, in the plant's Control Room as well as in the Waste Tank Farm Shelter. The liquid level detector in the 8D-2 pan is set to annunciate at six inches, which is approximately 1,200 gallons. An operator, licensed by the U.S. NRC would acknowledge the alarm, investigate the cause, and report to a NRC-licensed Shift Supervisor, one of whom is always on site.

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* Identification corresponds to that in referenced NRC letter.

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DUPE 7811170233

FEE EXEMPT

The Shift Supervisor is authorized by NFS to take any or all of the following actions should he suspect that waste tank 8D-2 is leaking:

* withdraw a sample of the liquid from the 8D-2 pan for radiation/radioactivity measurement;

* sample the airborne radioactivity in the vault;

* initiate pumpdown of the ballast liquid in 8D-1 waste tank; and/or,

* pump the liquid accumulating in the 8D-2 pan to the 8D-2 tank via the 8D-2 pan pump.

Meanwhile, the Shift Supervisor, in accordance with the established Emergency Plan, would notify the members of the Plan Safety Committee.

c. Instrument Reliability

The 8D-2 waste tank pan level instrument, including the associated high level alarm, is:

(1) monitored at least once each shift by an NRC-licensed operator who records the pan level instrument reading on a daily record sheet pertinent only to the Waste Tank Farm;

(2) functionally checked monthly by a simulated signal to the transmitter; this check includes assuring that the "WTF Trouble" alarm annunciates in the plant's Control Room;

(3) calibrated every six months with simulated signals to the transmitter.

To reconfirm the pan level detection system, NFS will in the next month add water to the 8D-2 pan and verify the instrument response.

d. Pan Pump Reliability

Because of both the high integrity of the 8D-2 vault walls and the high ambient temperature in the 8D-2 vault, there has been no accumulation of moisture in the 8D-2 pan; therefore, the pan pump has had little service. While we have no reason to believe that the 8D-2 pan pump would not operate properly if called upon, we will test the 8D-2 pan pump during 1978 and annually thereafter by adding water to the pan and pumping it to Lagoon No. 1 via the installed line. The 8D-1 pan pump is identical to the 8D-2 pan pump and thereby serves as a readily available spare.

e. 8D-1 Condensate Pumpdown

A submersible pump in 8D-1 is used to remove condensate from 8D-1. Upon removal, the condensate is either treated by ion exchange and routed to the lagoon system or returned to the 8D-2 storage tank. This presently installed pump has a capacity of about 12-15 gpm. Because the minimum 8D-1 condenstate level will be maintained at about 120,000 gallons as an anti-bouyancy measure, it would presently take up to seven days (depending upon the amount of condenstate that the Safety Committee decided to remove) to remove the condensate from 8D-1.

In order to significantly reduce the potential time requirements of this step in the waste transfer procedure, NFS has decided to replace the present pump with the special waste transfer pump (8G-2) which has a capacity of about 100 gpm, thus reducing the maximum time requirements to about twenty hours. As indicated above, the 8G-2 pump will be used for the routine removal of condensate collected in 8D-1; therefore, its reliability will be monitored.

f. 8D-2 Pumpout Procedure

On August 23rd, NFS delivered to your Staff copies of "8D-2 Pumpout Procedure, Revision 1," which is the presently effective procedure for responding to a potential leak in waste tank 8D-2. As noted above, NFS intends to install waste transfer pump (8G-2) in the spare waste tank (8D-1) as a means of routinely testing the availability of the transfer pump. When the installation is complete, the pumpout procedure will have been revised to reflect the status of the transfer pump.

Attached is our time and motion summary of the procedure which starts with 8G-2 in the 8D-1 tank.

2. OPERATIONAL CAPABILITY OF 8G-2

a. Motor Checks

NFS will begin work on the installation of the special transfer pump (8G-2) in waste tank (8D-1) this month. After installation, the pump will be functionally tested at least quarterly. In addition, the motor will be subject to NFS' routine preventative maintenance program.

b. Pumping Action

The 8G-2 pump, when installed in waste tank 8D-1, will be used to transfer the approximately 100,000 gallons per year of condensate that collects in 8D-1 to either waste tank 8D-2 or to the lagoon system. This will provide confirmation of proper pump performance.

c. Sludge Pumping

The waste transfer pump, 8G-2, is a deep-well pump that was especially selected for the waste transfer operation. It is a two stage, centrifigal pump rated to deliver the 100 gpm when pumping a saturated $NaNO_3$ solution at a specific gravity of 1.4 and a temperature of 210°F. The pump design includes a sparge ring at the pump inlet.

A synthetic 8D-2 waste prepared by NFS to match the waste tank input records indicates that the sludge portion is relatively free flowing such that the bulk of the tank contents should be pumpable.

d. Back-up Transfer Equipment

Although NFS believes that the rugged 8G-2 pump would perform adequately for periods much longer than the relatively short time (less than 100 hours) necessary to transfer waste from 8D-2 to 8D-1, NFS is committing to additional back-up transfer equipment as a "defense-in-depth."

NFS has initiated the purchase of a positive displacement pump capable of at least 100 gpm transfers. A formal procedure will also be developed for use of this pump should 8G-2 become inoperative.

3. RADIOLOGICAL CONTROLS

a. Personnel Exposure

Although a highly unlikely event, the transfer of waste from 8D-2 to 8D-1 would be a preplanned event involving rather straightforward techniques which would be conducted under the close scrutiny of the Plant Safety Committee and other management. With the operations preplanned, bulk shielding in place and personnel at a distance during the actual transfer operations, personnel exposure should be insignificant.

The procedure calls for three feet of soil or equivalent shielding over the pipe during the transfer. Calculations (attached) show that this would reduce the radiation dose rate to less than 1 mr/hr at the surface of the dirt.

b. Shielding Effectiveness

The three foot thick dirt shield called for in the procedure is only a target minimum. It could easily be augmented if dose rates were found to be higher than desirable during the actual transfer.

c. Joint Leakage

The piping system is predominately welded, but there are some mechanical joints. The 8G-2 pump specifications called for zero leakage past the

mounting flange. All joints would be assembled by maintenance personnel skilled in assembling equipment for radiochemical service.

We would be pleased to meet with your Staff and discuss these actions in additional detail.

Very truly yours,

James R. Clark
Manager, Quality Assurance
and Licensing

JRC:jnw

Enclosure

Rev. 2
10/13/78

Appendix A

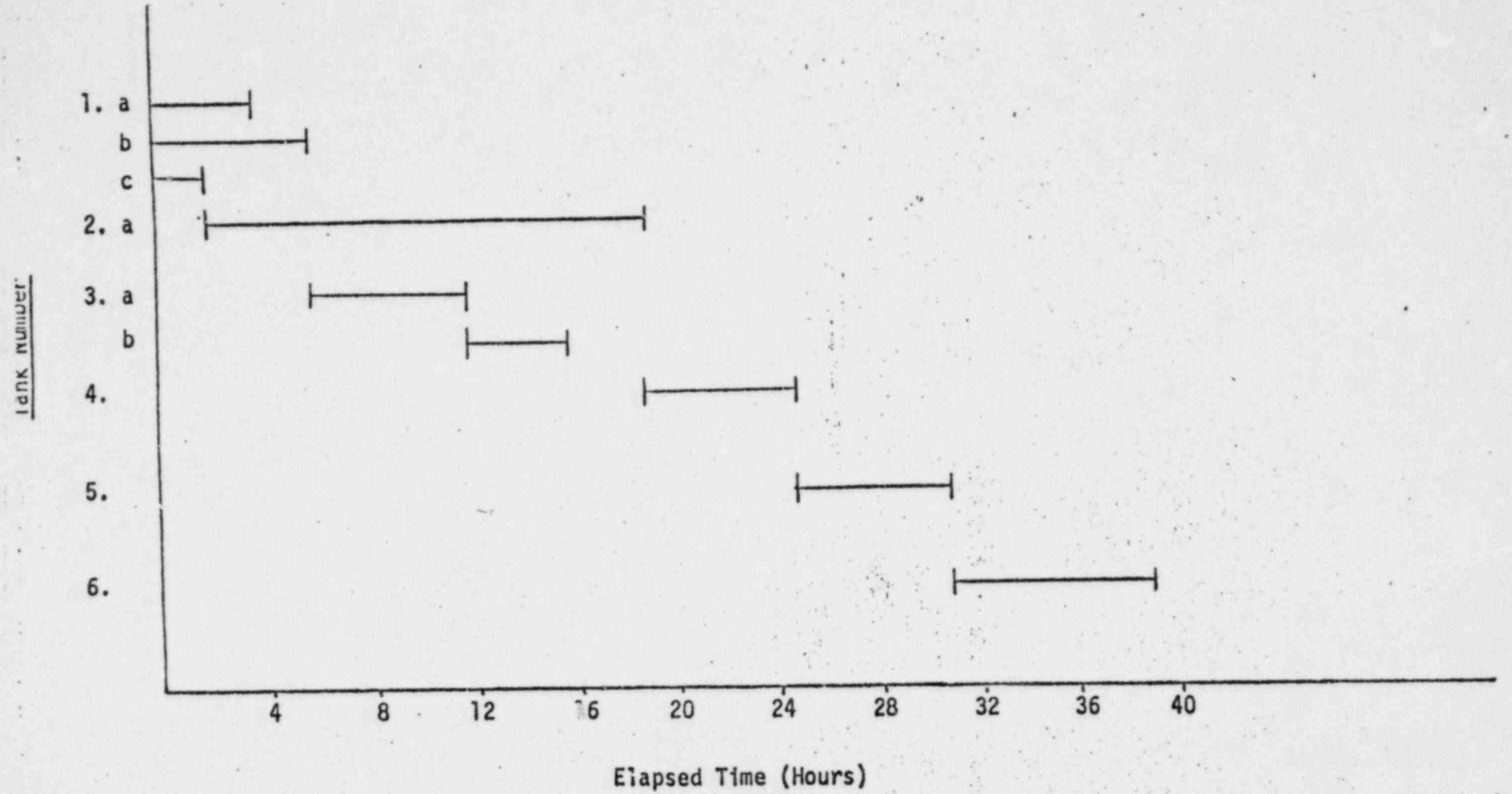
8D-2 PUMPOUT TIME ESTIMATE

		Job	Man-Hrs	Elapsed Time	Sub-Total Time Per Job	Total Elapsed Time
1.	a.	Assemble crane and move to WTF: Crane operator 4 hrs Oiler 4 hrs	8	4		
	b.	Prepare 8D-1 area, make plastic bags, etc.: 2 Operators 4 hrs	12	6		
	c.	Connect 8D-1 pumpout line 2 Mechanics 2 hrs	4	2	2	2
2.	a.	Pumpout 8D-1 to Lagoon 1. Use 8G-2 @ 100 gpm. Assume 100,000 gal in 8D-1		17	17	19
3.	a.	Prepare 8D-2 area for plug pulling and pump installation. 2 Operators 6 hrs 1 H&S 6 hrs	18	6	(6)	
	b.	Remove port plug from 8D-2. Crane Operator 4 hrs Oiler 4 hrs 2 Mechanics 4 hrs 1 H&S 2 hrs	18	4	(10)	

Job			Man-Hrs	Elapsed Time	Sub-Total Time Per Job	Total Elapsed Time
4.	a. Remove 8G-2 pump from 8D-1 and install in 8D-2					
		Crane Operator 6 hrs Oiler 6 Hrs 2 Operators 6 hrs H&S 6 hrs	24	6	6	25
5.	a. Connect discharge line from 8G-2 to 8D-1.					
		Crane Operator 1 hr 2 Mechanics 6 hrs Oiler 1 hr	8	6	6	31
6.	a. Run water line to sparge ring on pump.					
		2 Mechanics 3 hrs	6	3		
	b. Cover line from 8D-2 to 8D-1 with 3' of dirt.					
		Bulldozer Op. 4 hrs Oiler 4 hrs	8	4		
	c. Shield around pump with lead and steel.					
		2 Operators 4 hrs	8	4		
	d. Wire pump.					
		2 Electricians 8 hrs	16	8	8	39
	TOTALS		130 M-H			39 Hrs

Rev. 2
10/13/78

8D-2 PUMPOUT TIME ESTIMATION



Appendix B

BASIS FOR THREE FEET OF EARTH SHIELDING

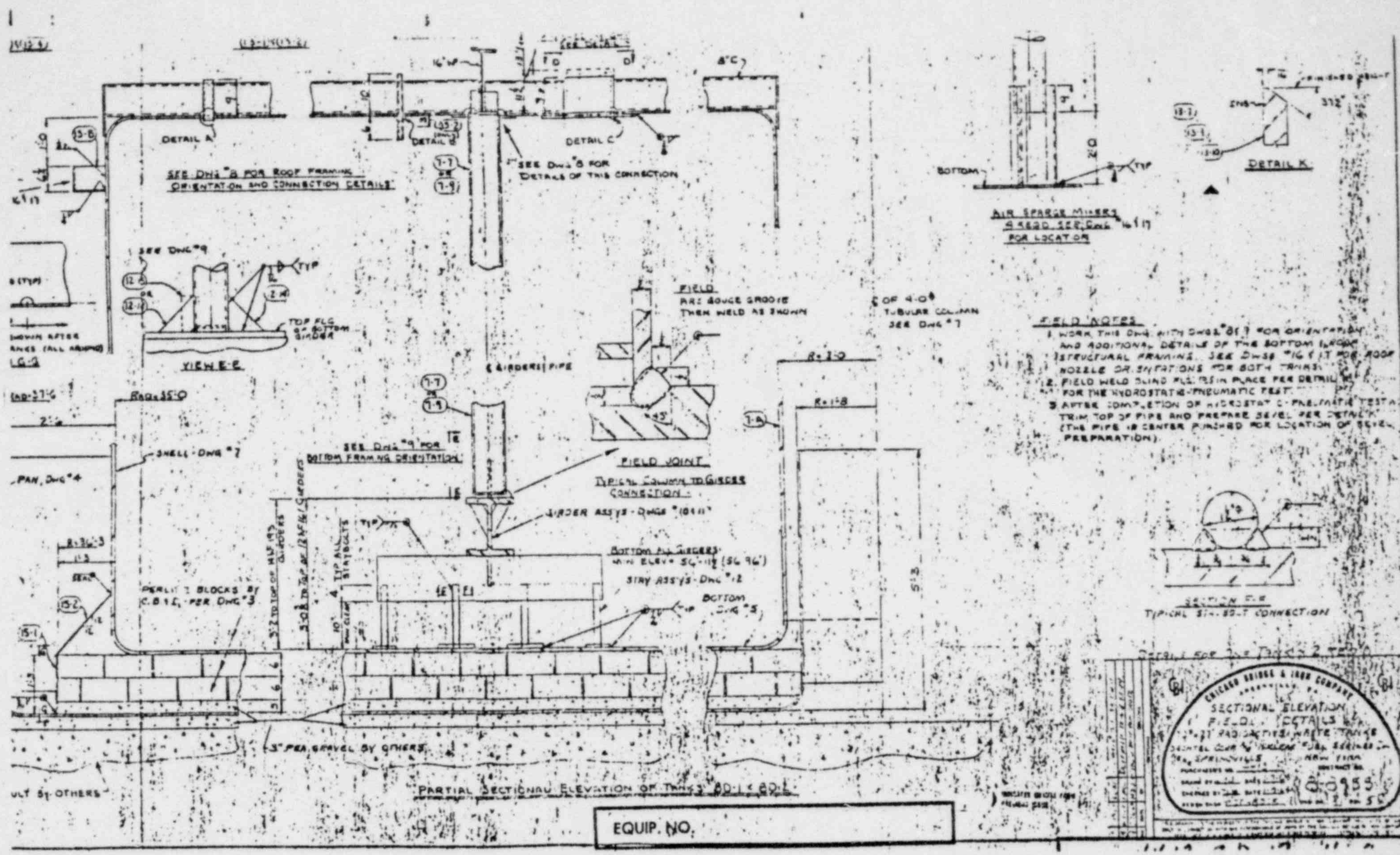
OVER TRANSFER LINE

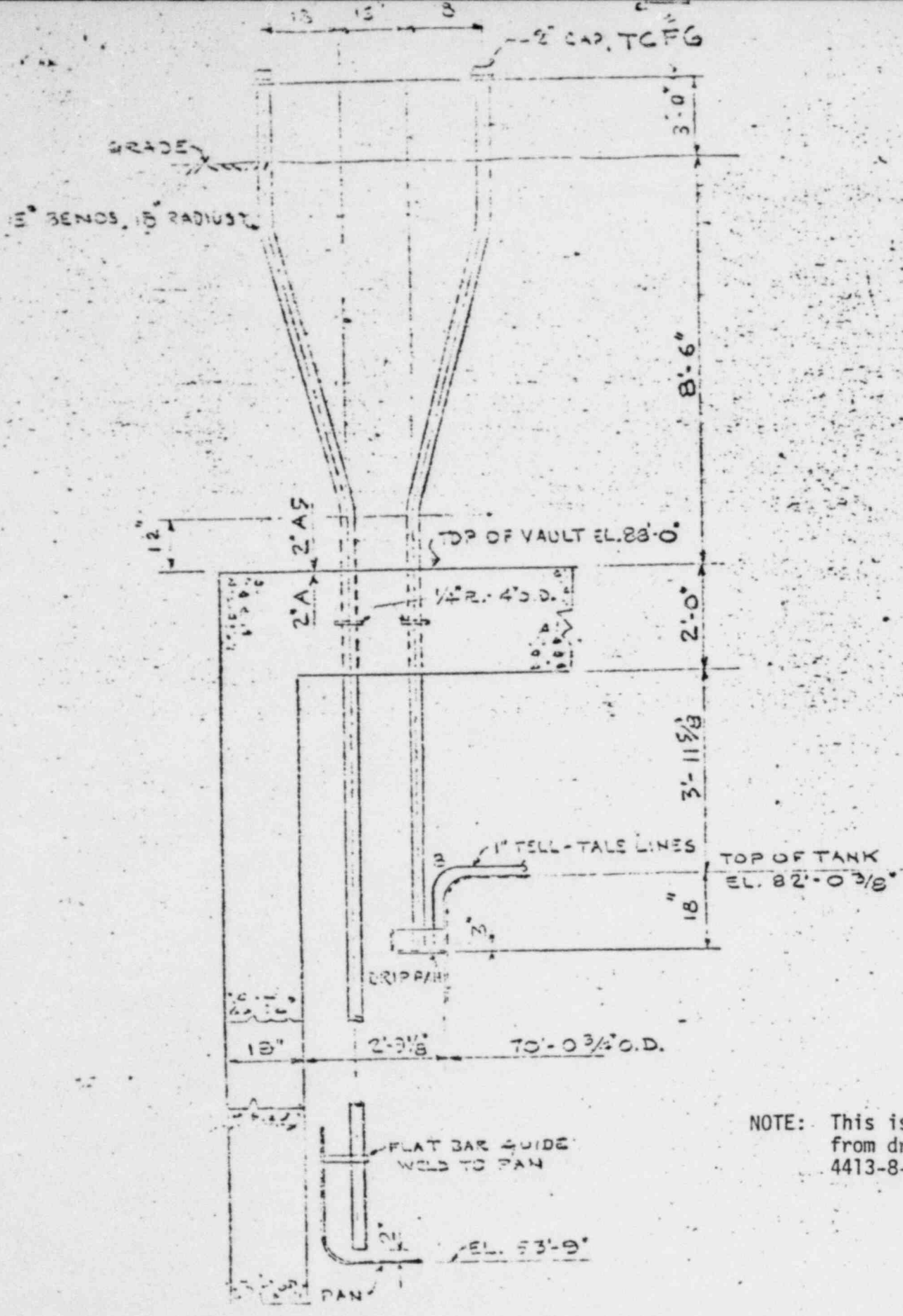
The 8D-2 solution has Cesium-137 and -134 isotopes as the principal gamma emitters. A concentration of 5.5 mCi/ml Cs-137 was used.

The model for calculation was the series of point sources. The unshielded dose rate at one meter was 22 Roentgens per hour.

The mass attenuation coefficients listed in the Radiological Health Handbook were used to determine half value layers and with the application of an estimated dose buildup factor, a shielded dose rate was determined to be 0.6 milliroentgens per hour.

The mathematical calculations were compared with standard shielding graphs from the Rad Health Handbook which generally confirmed attenuations of ten thousand fold by about 40 inches of earth.


DETAIL A
DETAIL C
SEE DWG 8 FOR ROOF FRAMING ORIENTATION AND CONNECTION DETAILS
SEE DWG 8 FOR DETAILS OF THIS CONNECTION
VIEW E-E
TOP FLG OF BOTTOM GIRDER
FIELD ARC GOUGE GROOVE THEN WELD AS SHOWN
FIELD JOINT
TYPICAL COLUMN TO GIRDER CONNECTION
GIRDER ASSY'S - DWG 10 & 11
SEE DWG 9 FOR BOTTOM FRAMING ORIENTATION
SHELL - DWG 7
BOTTOM - DWG 5
3" PEA GRAVEL BY OTHERS
AIR SPARGE MIXERS
FOR LOCATION
DETAIL K
FIELD NOTES
SECTION F-F
PARTIAL SECTIONAL ELEVATION OF TANKS 8D-1 & 8D-2
EQUIP. NO.
CHICAGO BRIDGE & IRON COMPANY
SECTIONAL ELEVATION
FIELD DETAILS



NOTE: This is detail #1 from drawing number 4413-8-L-A-5.

DETAIL 1

MOISTURE TEST TUBES