CONTRACT PHASE: HEAL PHYSICS

MAKEPEACE NO: 4355
NSEC NO: 50-11-7001

Submitted To

D. E. MAKEPEACE COMPANY

SUBJECT: LIQUID WASTE DISPOSAL SYSTEM

February 6, 1957

BY

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LIQUID WASTE DISPOSAL SYSTEM

The D. E. Makepeace Company is desirous of planning a liquid waste disposal system which will satisfy the AEC, state and local authorities, and company requirements. The system must be efficient and yet have a high degree of flexibility, inasmuch as the nuclear activities of the company are varied. It is also anticipated that the facility will be engaged in fulfilling contracts with more than one supplier at a given time. It is, therefore, incumbent upon the D. E. Makepeace Company to be able to separate recoverable waste for return to individual suppliers. This is necessary for accountability purposes.

There are two types of waste which may be encountered in this system, soluble and insoluble material. The only source of soluble material in the projected operations of the facility are the pickling solutions and the first and possibly second rinses. It is recommended that the pickling and rinse vats not be connected to a drain but that they empty into plastic carboys or drums if analysis indicates that recoverable amounts of accountable material are present. By so doing, very little if any soluble material will enter the liquid waste system.

The insoluble material will consist mostly of machine turnings, dust and powder from the floor which may be flushed into the drains. It is proposed that removable filter cartridges be placed in the line so that these solid particles may be trapped, removed from the system, and returned to the supplier if recoverable amounts of accountable materials are present. The cartridges used for the handling of one supplier's material can be replaced when a second supplier's material is being processed.

Thus, both soluble and insoluble material belonging to a supplier may be kept separate from other work at the facility.

It is not anticipated that recoverable amounts of material from either an accountability or health physics standpoint will be present in the hold up tanks except in case of accidental discharge. However, the system must be so designed to anticipate such an occurrence. Accordingly, provision is made for adequate storage facilities for a few days' output; and, also, if necessary, for the diverting of the waste fluid through an ion exchange rinse which will remove uranium. When natural uranium is being processed, the pickling solution and rinse water may contain appreciable amounts of this material. Although this is not recoverable from the accountability standpoint, it may well be undesirable to allow this to leave the facility. It is recommended, therefore, that this material be passed directly through the ion exchanger, inasmuch as the resin requires a very low pH for effective action, the acidity of the pickling fluid will reduce the acid treatment costs.

The radioactivity or the uranium content of the hold up tanks must be determined prior to discharge. We have, therefore, provided a single recirculation system for agitation and sampling purposes. Inasmuch as the pumps are required for transporting the liquid, they may also be used for purposes of mixing the tank contents prior to sampling, thus eliminating the need for an agitator and materially reducing the cost. We have recommended a six (6) inch aperature be made in the top of the tank, covered presently by a plate which will allow the insertion of an automatic radiation detector system in the future.

The use of carbon steel is recommended for the following reasons: (1) the cost is lower than stainless steel; (2) the delivery time is shorter, (3) they have stood up very well at other installations doing similar processing, (4) not much is gained by using stainless steel, inasmuch as hydrofluoric acid commonly used in pickling operations will attack stainless steel.

It is believed that the system herein described will provide the D. E. Makepea Company with a liquid waste disposal unit which not only will meet the present requirements of the facility, but is flexible and expansive enough to meet the anticipated requirements.

FILTER SPECIFICATIONS

Commercial Filters Corporation, Melrose, Massachusetts

Model WR-150-10-3-F-G-2A with honeycomb filter tubes

Material:	Carbon Steel
Pipe Size:	3"
Number of Filter Tubes:	30
Height:	40-1/4"
Diameter:	16-3/4"
Weight:	210
Capacity:	200 gpm

Inlet and Outlet pressure gauges included to indicate flow and filter plugging.

ION EXCHANGER SPECIFICATIONS

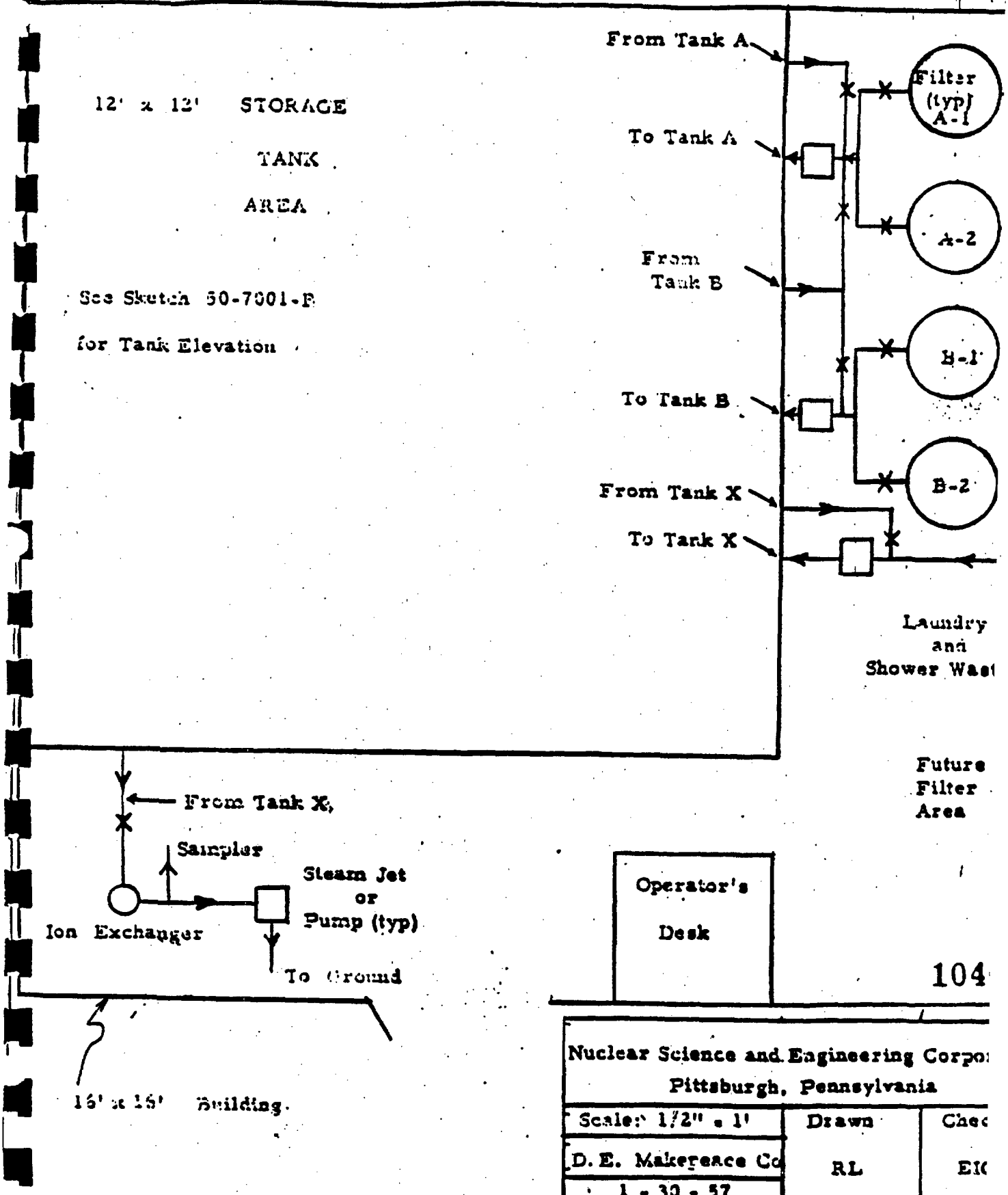
Column Material:	Carbon Steel
Height:	6'
Diameter:	4"
Resin:	Amberlite IRA 400 (Rohm and Haas)

SPECIFICATION FOR AGITATION AND SAMPLING

Tank agitation can be provided by linking the sampler lines to the suction side of the steam jets or pumps. With the normal waste intake closed off, the contents of a tank can be thoroughly mixed by recirculation of the contents up the sampler line, to the pump intake, and back into the tank. A tee and valve should be provided in the recirculation line for sampling.

Representative samples can be obtained after 1 - 2 hours of recirculation and preferably during recirculation. Pump capacity should be high enough to affect 5 - 10 volume changes in a tank during the agitation period.

SKETCH 50-7001-A - WASTE ARE LAYOUT



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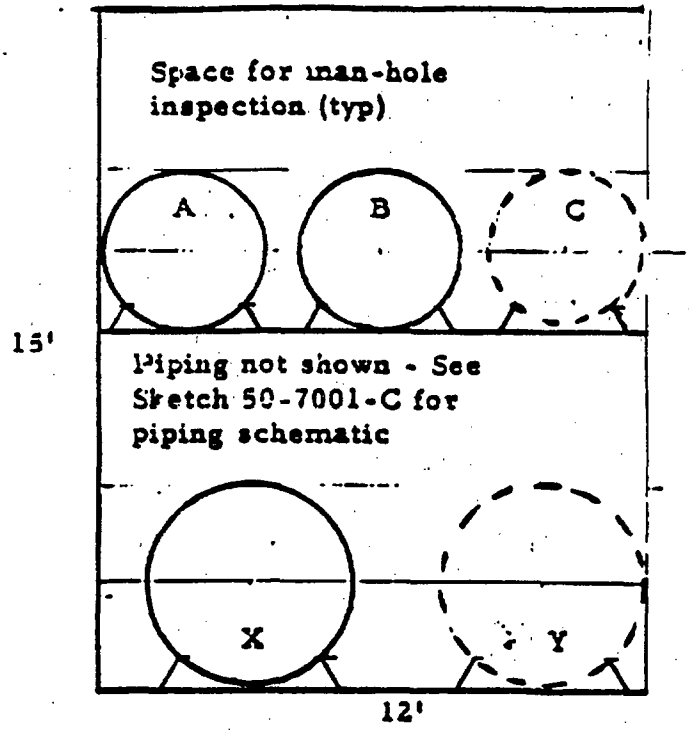
SKETCH 50-7001-B TANK ELEVATION



Refer to Sketch 50-7001-A for Waste Area Layout

TANK	DESCRIPTION	MATERIAL
A, B	3-1/2' D x 10', 500 gal	Carbon Steel
C	Same as A, B installed in future	Carbon Steel
X	4-1/2'D x 10' 1000 gal	Carbon Steel
Y	Same as X installed in future	Carbon Steel

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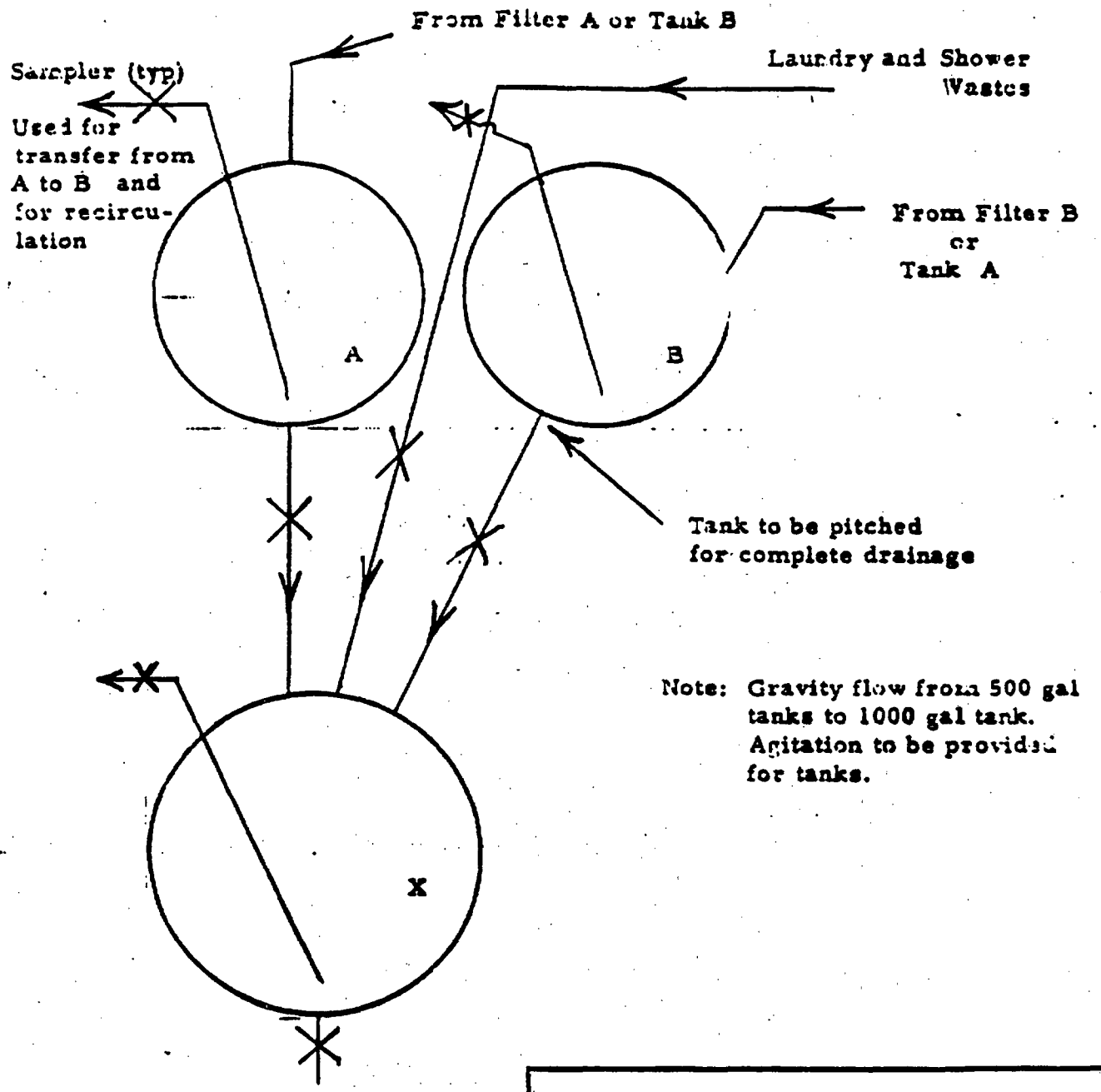
SKETCH 50-7001-C TANK PIPING SCHEMATIC



Note: Gravity flow from 500 gal tanks to 1000 gal tank. Agitation to be provided for tanks.

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