



Metropolitan Edison Company
Post Office Box 420
Middletown, Pennsylvania 17057

Writer's Direct Dial Number

November 17, 1980
TLL 545

TMI Program Office
Attn: Mr. John T. Collins, Deputy Director
U. S. Nuclear Regulatory Commission
c/o Three Mile Island Nuclear Station
Middletown, Pennsylvania 17057

Dear Sir:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)
Operating License No. DPR-73
Docket No. 50-320
EPICOR II Resin Solidification Procurement Specification

Attached is the Technical Requirements portion of the Procurement Specification for an EPICOR II Resin Solidification Service which we expect to issue soon. Because of past concerns expressed by NRC relating to the Solidification Program, we are soliciting your review and comments in parallel with issuing this specification to assure that NRC concerns may be factored into the program. We expect that approval for use of the finally installed system will be based on a topical report together with a site specific evaluation in Technical Evaluation Report (TER) format, submitted by us.

We would like your comments within the next two (2) weeks.

Sincerely,

/s/ C. K. HOVEY

C. K. Hovey
Vice-President and
Director, TMI-2

GKH:RIN:dad

cc: [REDACTED]

Rec'd 1/1

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SPECIFICATION FOR

SOLIDIFICATION OF EPICOR II RESINS

(TECHNICAL REQUIREMENTS)

PREPARATION R.A. Fennon, Joe Leuberg, M. Russell DATE 11-13-80

ENGINEERING APPROVAL Dr. R. Skillman, J. Dineen DATE 11-14-80

QA APPROVAL R.O. Baskin DATE 11/14/80

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THIS DOCUMENT CONTAINS
POOR QUALITY PAGES

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- 2.0 Wasteform Requirements
- 3.0 Outline for Topical Reports on Solidification Systems
- 4.0 SN-1 Transport Cask Information
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- 6.0 Solid Waste Staging Facility Information

TECHNICAL SPECIFICATIONS

FOR

EPICOR II SPENT RESIN SOLIDIFICATION

1.0 SCOPE

This document establishes technical requirements for a radwaste service to solidify, package, and, as an option, ship EPICOR II ion exchange resins to the Nuclear Engineering Company burial facility in Washington State. Included within this specification is guidance for solidification equipment set-up at TMI-II, inspection, quality control, and performance requirements for the solidified product.

2.0 REFERENCES

The following references form a part of this specification to the extent invoked by the text:

1. State of Washington Radioactive Materials License; License Number WN-1019-2, expiration date November 30, 1981.
2. Regulatory Guide 8.8, Revision 3, "Information Relevant to Ensuring That Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable (ALARA)", U.S. Nuclear Regulatory Commission Office of Standards Development, June 1978.
3. GPU TDR No. 175 "TMI Unit II Resin Sluicing Test Program", by S. B. Presgrove (Process Support Group).
4. GPU Solidification Test Program Results (not yet issued).

5. Recovery Quality Assurance Plan for Three Mile Island Nuclear Station Unit II, Revision 0.
6. Code of Federal Regulations, Title 10, Part 71, Appendix E, "Quality Assurance Criteria for Shipping Packages for Radioactive Material".
7. Code of Federal Regulations, Title 10, Part 21, "Reporting of Defects and Non-compliance".
8. Code of Federal Regulations, Title 49, Parts 100-199.

3.0 GENERAL REQUIREMENTS

3.1 Classification

- 3.1.1 The radwaste solidification method shall use cement to convert the EPICOR II ion exchange resin into a solidified wasteform which is acceptable for disposal at a licensed land burial facility.
- 3.1.2 For bidding purposes, the Nuclear Engineering Company land burial facility in Washington State should be used to determine packaging and shipping costs (Reference 1).
- 3.1.3 The equipment associated with the radwaste solidification service specified herein shall be designed to be portable, non-permanent.
- 3.1.4 The containers used to solidify the EPICOR II resins should be designed for use with available Type B transport shields (if necessary) and minimize transportation and burial charges. The legal weight restriction in the states between TMI and Washington should be considered in determining liner sizes.

3.1.5 The EPICOR liners contain layers of organic mixed-bed bead resins. Some of these liners also contain smaller amounts of powdered organic and inorganic ion exchange materials. The resin types, specifications, proportions, and layer configurations are proprietary to EPICOR, Inc., and will not be provided to the contractor. Internal design of the EPICOR liners is proprietary but sufficient information will be given to the contractor to support his sluicing or resin transfer operation. Additional information on the contents of these liners, liner designs, and the transfer bell (for the 4x4* liners only), are further specified in Attachment 1.

3.2 Definitions

3.2.1 ALARA - All activities shall be performed in conformance with NUREG 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Reasonably Achievable", (Reference 2).

3.2.2 Solidification - Solidification shall be the conversion of radioactive spent demineralization media to a homogeneous (uniformly distributed), monolithic, immobilized solid with definite volume and shape, bounded by a stable surface of distinct outline on all sides with no free liquid more than 0.5% of, or one gallon in, the container volume; whichever is less.

3.2.3 Dewatered Resin - Resin from which free water has been removed via pumping from a bottom drain at a slow rate until loss of pump suction occurs.

* Nominal size (4 ft. diameter by 4 ft. high)

- 3.2.4 Free Liquid - Any liquid which can be poured or drained from a container twenty-four hours after solidification and is therefore not bound by the solid matrix of a solid waste mass.

4.0 SCOPE OF SERVICES PROVIDED BY CONTRACTOR

- 4.1 The contractor shall furnish labor and equipment to solidify twenty-three (23) EPICOR II liners containing dewatered resins and provide technical assistance to prepare license submittals, procedures and management of these activities. The contractor services shall include but not be limited to the following:
- 4.1.1 The lease of the contractor's mobile solidification equipment for a period of one hundred twenty (120) days or for such period stated elsewhere in the contract.
- 4.1.2 Labor and supervision to operate the contractor's equipment for a five (5) day, forty (40) hour week for the period referenced in paragraph 4.1.1. All personnel working on the TMI-II site shall be required to pass a written examination in safety and health physics practices. Personnel working in radiation areas will require Radiation Work Permit (RWP) certification. The contractor should allow a minimum of three (3) days to qualify his crew. Personnel engaging in health physics monitoring shall also require TMI-II certification.
- 4.1.3 Labor materials and supervision to mobilize and demobilize the contractor's equipment (including transportation).
- 4.1.4 Furnish all consumables except anti-contamination and radiation protection supplies.

- 4.1.5 Provide technical assistance to prepare licensing information in the form of Technical Evaluation Reports (TER's), installation, operation, material handling, packaging, transportation procedures, revisions to Process Control Program (PCP), and safety evaluations as required.
- 4.1.6 Provide technical assistance to prepare occupational radiation exposure evaluation in conformance with ALARA.
- 4.1.7 Perform the necessary testing using non-radioactive resins to qualify the contractor's Process Control Program and meet the wasteform requirements listed in Attachment 2.
- 4.1.8 Provide disposal liners as required to solidify the contents of the twenty-three (23) EPICOR liners if the EPICOR liners are not used for this purpose.

4.2 The following services shall be furnished by the contractor at GPU's option:

- 4.2.1 The lease of the contractor's shipping cask and trailer if required to transport the contents of the twenty-three (23) EPICOR liners to a licensed land burial site.
- 4.2.2 Labor and supervision to decontaminate the EPICOR liners remaining after solidification if contractor's process does not include use of these liners for the solidified product. The empty liners shall be cleaned and flushed to the extent that they contain essentially no residual resins (consistent with the results of Reference 3) and do not require shielded storage, i.e. sealed, less than 200 mr/hr contact with no exterior smearable contamination and less than $\frac{1}{2}\%$ free water remaining by volume.

5.0 SCOPE OF SERVICES FURNISHED BY GPU

5.1 The following equipment and services shall be provided to the contractor upon reasonable notice and if available:

- 5.1.1 One (1) 8' x 40' office trailer including electricity, heat and telephone.
- 5.1.2 One (1) 8' x 40' trailer for storage of non-radioactive supplies.
- 5.1.3 Crane service to move EPICOR liners from storage to contractor's laydown area, move solidified containers into storage or into a shipping cask.
- 5.1.4 First aid and security as required.
- 5.1.5 Radiation protection supervision, dosimetry, swipe counting and training.
- 5.1.6 Site services including 115 V and 480 V AC power, potable water, service air, fire protection and sanitary facilities.
- 5.1.7 Fifty-five (55) gallon drums for packaging fresh and/or radioactive liquid wastes created in the resin solidification and decontamination operations.
- 5.1.8 Limited warehouse space for critical items needing a heated environment.
- 5.1.9 Use of the SN-1 shipping cask if requested by the contractor. (SN-1 specifications are given in Attachment 4).
- 5.1.10 Laundry and respiratory cleaning services.

6.0 DETAILED REQUIREMENTS

- 6.1 The contractor's solidification/packaging system must be designed and fabricated to specified quality standards commensurate with the importance of safety in its operation.

The materials used as the solidification medium shall meet ASTM standards or equivalent and subject to the QA requirements stipulated in Attachment 9.

- 6.1.1 Materials used in the contractor's system should be compatible with the chemical, physical, and radioactive environment of specific applications during normal conditions and anticipated operational concurrences.
- 6.1.2 The contractor's system should be designed to control leakage and facilitate access, operation, inspection, testing, and maintenance in order to maintain radiation exposures to operating and maintenance personnel as low as is reasonably achievable. Regulatory Guide 8.8 provides guidelines acceptable to the NRC staff on this subject (Reference 2).
- 6.1.3 Pressure-retaining components of the contractor's system containing radioactive liquids should use welded construction to maximum practicable extent and the system should be designed to facilitate decontamination.
- 6.1.4 Piping systems should be hydrostatically tested to 1.5 times the design pressure except (1) at atmospheric tanks where no isolation valves exist, (2) where such testing would damage equipment, and (3) where such testing could seriously interfere with other system or component testing. The test

pressure should be held for 30 minutes with no leakage indicated.

- 6.2 GPU has conducted a test program (Reference 4) which has shown that the EPICOR resins can be solidified to yield a satisfactory product (conforming to definition 3.2.2) according to the following mix specification:

Dewatered Resin (see definition 3.2.3)	32.9 \pm 1.0% by weight
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Water	14.4 \pm 0.7% by weight
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Portland Cement (Type 1) conforming to ASTM C130	47.9 \pm 1.0% by weight
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Anhydrous Sodium Metasilicate Bead (Regular grade number 20; Diamond Shamrock Soda Products or equivalent)	4.8 \pm 0.3% by weight
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These mix proportions were chosen to minimize final waste volume; there are other proportions which could yield an acceptable product, however resulting in a potentially greater total system cost. Should the contractor elect to use a different mix specification, as long as total system costs (including required shipping and disposal) are not significantly increased by the greater waste volumes, no penalty will be assigned.

- 6.3 The mixing process whereby the formula constituents are combined shall include any method at the discretion of the contractor providing the resins are homogeneously mixed and evenly dispersed within the cement matrix, with no resin pockets or voids. Non-proprietary formulas of constituents and methods will be favorably reviewed in the evaluation process.

- 6.4 The contractor's process may include resin transport by sluicing or other means consistent with good and safe practice. GPU has demonstrated that at least 95% of the existing resin inventory can be sluiced from the EPICOR liners (Reference 3). The results of the resin sluicing tests will be available at the pre-bidder's conference.
- 6.5 If the EPICOR II liners are used for solidification, the contractor shall be responsible for replacement of any closure plugs and/or lids that are removed during sluicing and solidification.
- 6.6 A minimum of one full-scale solidification test using non-radioactive materials supplied by GPU shall be conducted by the contractor, with the results submitted for GPU review. This test shall include demonstration of any required sluicing or resin transfer. If the contractor's solidification test does not satisfy definition 3.3.2 or the wasteform requirements given in Attachment 2, GPU shall review the contractor's process and, as a minimum, require a successful retest. If the contractor's performance in this testing does not show promise of achieving a suitable solidified product, GPU reserves the right to terminate any contractual arrangements.
- 6.7 To ensure good ALARA practice, GPU will supply the contractor the lowest activity liner first for initial solidification.
- 6.8 If the contractor's equipment is contaminated through previous use, the equipment and vehicle on which it is delivered shall be properly packaged and placarded in accordance with DOT regulations. At least 24 hours notification shall be given to GPU before the equipment is delivered on site.

6.9 The utility may make available at no cost the SN-1 Type B transport cask (Attachment 4) for use in transporting solidified resin liners if necessary. However, the contractor shall be responsible for providing any special dunnage or additional shielding in order to meet the requirements of 49CFR160-199.

6.10 Should the contractor's proposal include the use of a private carrier or other shipping containers or trailers, his proposal shall include the certificate of compliance, transportation tariffs and rental rates for equipment as well as the name of the private carrier.

6.11 GPU is licensed by the NRC for operations at Three Mile Island. As a condition of the license, GPU is required to report, "Abnormal degradation of systems.....designed to contain radioactive material.....".

The contractor shall report, within eight (8) hours of the happening of any spill or other inadvertent release of radioactive material, the details of such occurrence to a designated representative of GPU.

6.12 The proposed location of the solidification operation is adjacent of the west end of Module A of the Solid Waste Staging Facility (SWSF - see the drawings of this facility, Attachment 6) at the TMI site. Approximately 10,000 ft² of level graded ground area will be provided for the solidification operation. Grade elevation at this location is 280 ft. Storage cells in Module A will be available as necessary to support the solidification operation.

6.13 GPU shall require that the uncontrolled area adjacent to the solidification facility be maintained at a radiation field no greater than 0.25 mR/hr and that full-time occupancy areas (if any) be maintained at no greater than 0.25 mR/hr.

6.14 All operations will be conducted with regard to good house-keeping standards, contamination control and ALARA standards. The contractor shall be responsible for cleanup and decontamination of any area that becomes contaminated due to his operations. This activity must be covered within the contractor's Process Control Program.

7.0 QUALITY ASSURANCE

7.1 The contractor shall have in effect a Quality Assurance Program to control off-site activities required by this specification. The contractor's Quality Assurance Program will be approved by GPU and be subject to GPU audit, surveillance and/or inspection.

7.2 Contractor site activities will be under the GPU QA Program (Reference 5).

7.3 Among the QA Program requirements are those delineated in Parts I and 2 of Attachment 5, "QA Requirements for Specifications, EPICOR II Spent Resin Solidification".

8.0 TECHNICAL INFORMATION TO BE SUBMITTED

8.1 With Proposal:

8.1.1 Contractor QA plan for liners and materials.

8.1.2 Required in-door and/or heated storage.

8.1.3 Description of sluicing and solidification equipment including operating procedures, service manuals, and means and frequency of product verification.

- 8.1.4 Contractor experience in performing similar projects.
- 8.1.5 Resumes of management, quality assurance, and supervisory personnel tentatively assigned to the project.
- 8.1.6 Descriptions of liners used for solidification if other than EPICOR II.
- 8.1.7 Description of proposed shipping containers, including Certificate of Compliance, weights, and transport vehicle.
- 8.1.8 Proposed mix specification if different from paragraph 6.2.
- 8.1.9 Plan of required work area and means of minimizing radiation exposure to contractor's personnel.
- 8.1.10 Required services and amount of those services. (e.g., electricity, water, air).
- 8.1.11 Contractor's schedule to indicate conformance with proposed milestone schedule.

ATTACHMENT 1.0 LINER DESIGN AND CONTENTS

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Liner Radionuclide Inventories (Gamma-emitters only)	8 - 30

TABLE 1: LINER CONTENTS

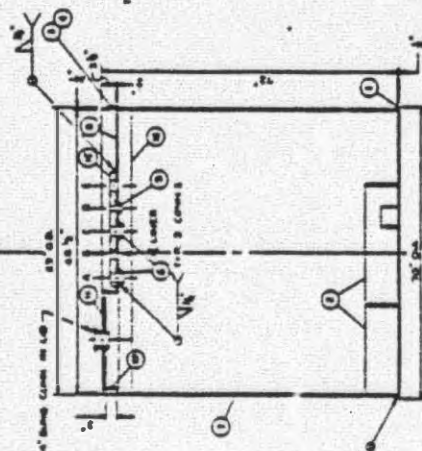
Item #	Type*	Ci/Liner	Approximate Ft ³ Dewatered In Liner Media	Cylinder Size***	Estimated Max. R/HR** On Liner Exterior Surface
1	DS5	.678	130	6 x 6	.5
2	DS3	1.76	130	6 x 6	1.4
3	DS4	2.08	130	6 x 6	1.7
4	DS6	5.679	130	6 x 6	4.5
5	DS1	5.96	130	6 x 6	4.8
6	DS2	6.05	130	6 x 6	4.8
7	DF6	.61	30	4 x 4	.5
8	DF7	1.02	30	4 x 4	.8
9	DF1	2.37	30	4 x 4	1.9
10	DF13	3.401	30	4 x 4	2.7
11	DF4	4.6	30	4 x 4	3.7
12	DF10	4.706	30	4 x 4	3.8
13	DF2	6.47	30	4 x 4	5.2
14	DF12	15.242	30	4 x 4	12
15	DF8	19.4	30	4 x 4	16
16	DF14	19.913	30	4 x 4	16
17	DF3	28.0	30	4 x 4	22
18	DF9	30.568	30	4 x 4	25
19	DF11	42.976	30	4 x 4	34
20	DF5	58.36	30	4 x 4	47
21	PF10	131.33	30	4 x 4	105
22	PF5	153.0	30	4 x 4	120
23	PF6	155.0	30	4 x 4	120

* CPU Designation of Liner

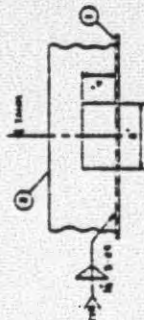
** .8 x Ci in 4 x 4, .8 x Ci in 6 x 6

*** Drawings on following pages

THIS IS NOT A CODE TALK.
SYSTEMS CENTERING ARE NOT REQUIRED
8 PASTURE PROPERTY WITH IN AND OUT
TO BEING IN THE WILSON QUARTER
TO GO ON SECTION II.
9 VARIOUS AND TO SECTION OF PASTURE
AND TO GO ON SECTION III AND IV
AND TO GO ON SECTION III AND IV
PANEL - SEE NOTE #.



10-11-15



SAC/ADM 0-0



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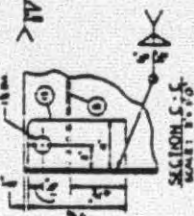


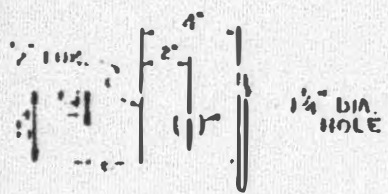
TABLE I

ITEM	QTY	UNIT	PRICE	TOTAL	DATE	TIME	LOCATION	REMARKS
A	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
B	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
C	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
D	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
E	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
F	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
G	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
H	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
I	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
J	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
K	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
L	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
M	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
N	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
O	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
P	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
Q	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
R	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
S	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
T	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
U	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
V	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
W	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
X	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
Y	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
Z	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AA	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AB	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AC	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AD	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AE	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AF	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AG	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AH	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AI	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AJ	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AK	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AL	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AM	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AN	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AO	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AP	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AQ	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AR	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AS	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AT	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AU	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AV	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AW	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AX	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AY	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
AZ	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BA	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BB	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BC	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BD	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BE	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BF	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BG	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BH	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BI	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BJ	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BK	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BL	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BM	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BN	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BO	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BP	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BQ	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BR	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BS	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BT	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BU	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BV	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BW	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BX	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BY	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
BZ	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CA	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CB	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CC	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CD	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CE	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CF	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CG	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CH	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CI	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CJ	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CK	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CL	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CM	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CN	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CO	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CP	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CQ	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CR	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CS	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CT	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CU	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CV	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CW	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CX	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CY	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
CZ	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DA	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DB	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DC	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DD	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DE	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DF	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DG	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DH	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DI	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DJ	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DK	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DL	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DM	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DN	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DO	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DP	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DQ	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DR	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DS	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
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DV	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
DW	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
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EK	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
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EM	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
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ES	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
ET	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
EU	1	EA	1.00	1.00	1/1/00	10:00	1000	1000
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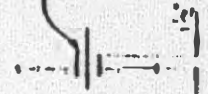
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POOR ORIGINAL

POOR ORIGINAL



2" THRD. HALF C.P.L.G. LEVEL CONT.



NOTE:
FOR LINER REQUIREMENTS SEE APP. LINER
DETAIL ASSEMBLY.

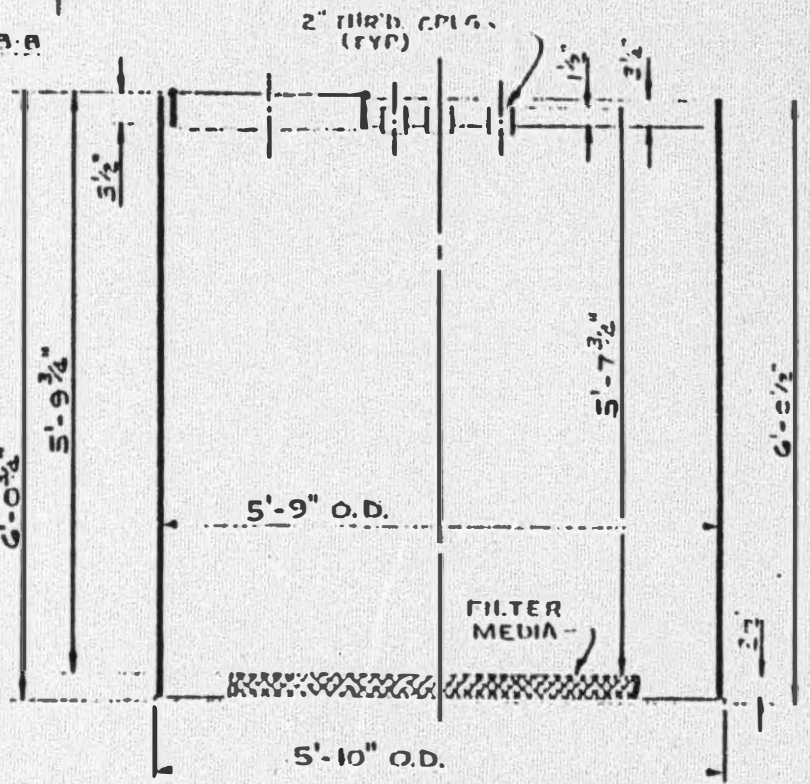
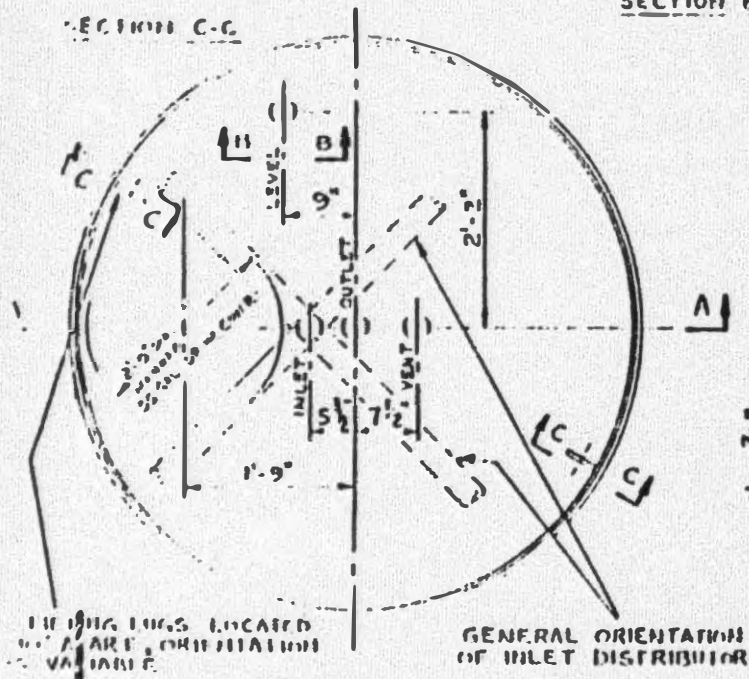
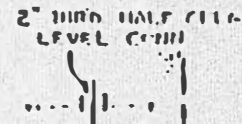
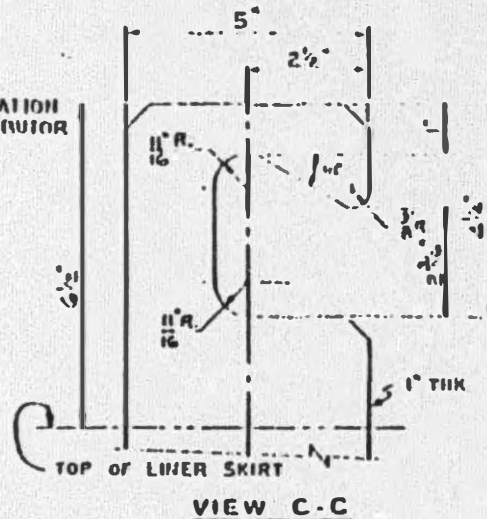
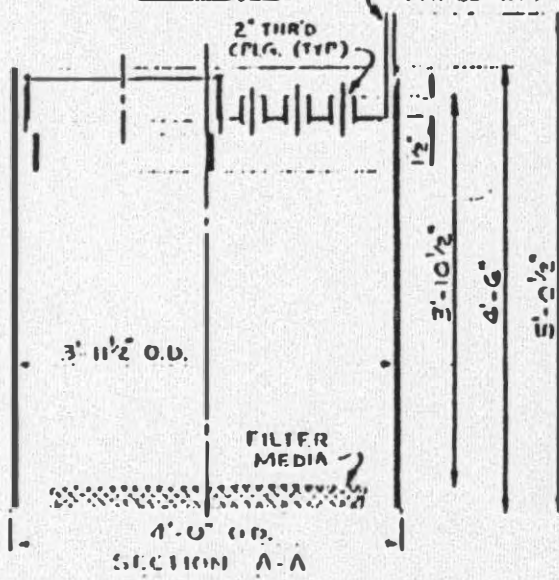


FIGURE 1-2



SECTION B-D



LINEAR REQUIREMENTS:

MATERIAL:

CARBON STEEL SA 36 WITH PHENOLIC, 360
OR PLASITE PRIMER 755 1/2" WITH 3-1/2"
GREY FINISH COAT, EACH 3/4" MILS THICK
COATING INSIDE AND OUTSIDE.

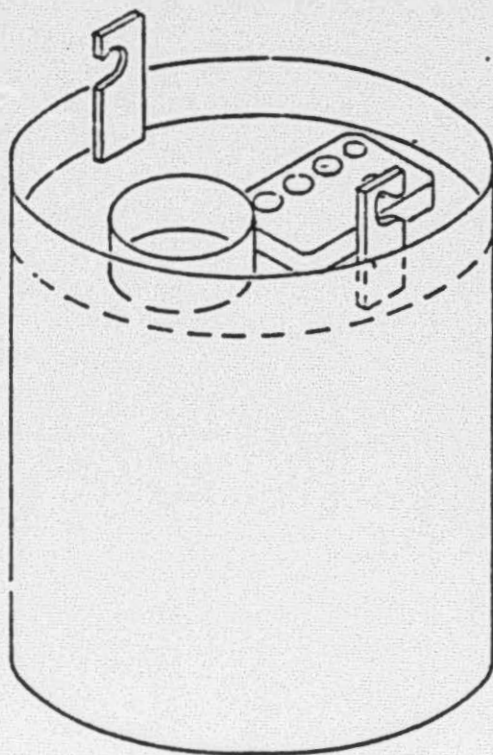
SPECIFICATIONS:

1. THIS IS NOT A CODE VESSEL.
2. ALL DIMENSIONS ARE APPROXIMATE

EPICOR 2 4x4 LINER
(FOR T.M.I. UNIT 2)

FIGURE 1-1

POOR ORIGINAL



4x4 LINER

47 $\frac{1}{2}$ " I.W. O.O. .X 54 $\pm\frac{1}{8}$ " H.T.
 48" I.W. O.O.

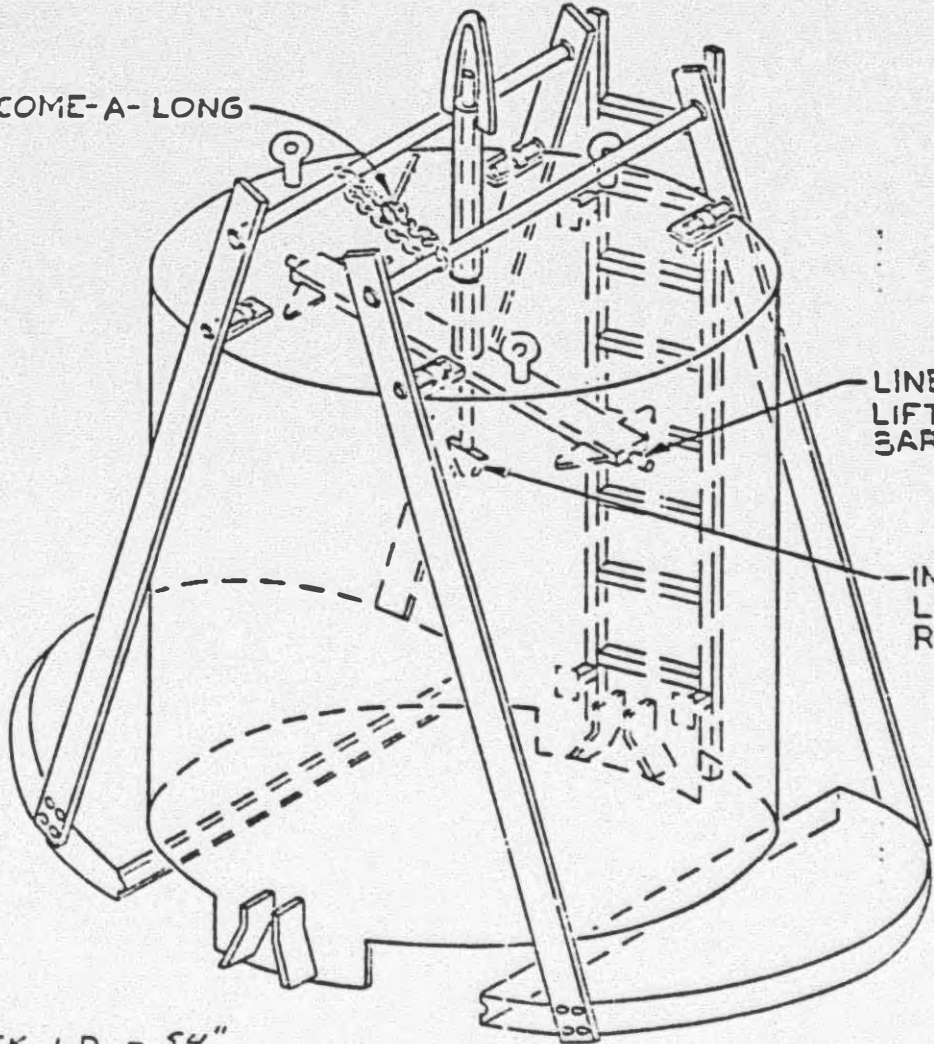
POOR ORIGINAL

JAS		J S 031180	
SQ LDR		ENG INTER	
SCALE		NO	
REV MADE: CM		SQ LDR DATE	
REV MADE: CM		SQ LDR DATE	

COME-A-LONG

LINE
LIFTING
BAR

INNER
LIFT
ROD



CASK I.D. - 54"
CASK INTERIOR - 64.5"
HT.

POOR ORIGINAL

TRANSFER BELL

BIDDING PURPOSES
RELEASED FOR
ENGR.
DATE

Page 1

DATE _____

CLIENT _____ FILE NO. _____ BY _____

SUBJECT EPICOR II - CURIES DEPOSITED - DS-6 Checked By _____

ISOTOPE	t $\frac{1}{2}$	DATE: <u>7/14/80</u> TOTAL CURIES	TRANSPORT GROUP
Mn 54	312.5 d.		IV
Co 58	70.8 d.	4.42E-4	IV
Co 60	5.27 y.	4.37E-4	III
Kr 85	10.72 y.	3.73E-2	VI
Sr 89	50.52 d.		III
Sr 90	29 y.		II
Y 90	64 h.		IV
Nb 95	3.5 d.	1.902E-3	IV
Zr 95	64 d.	1.32E-3	III
Ru 103	39.4 d.	9.79E-4	IV
Ru 106	368 d.	8.74E-3	III
Cd 109	453 d.		IV
Aq 110m	252 d.		III
Sn 113	115 d.		IV
Sb 125	2.73 y.	2.09E-2	III
I 131	8.04 d.	4.961E-4	III
Xe 133	5.25 d.		II
Cs 134	2.06 y.	3.481E-3	III
Cs 137	30.17 y.	2.086E-2	III
La 140	40.23 h.	8.557E-4	IV
Ba 140	12.79 d.	5.356E-4	III
Ce 141	32.5 d.		IV
Ce 144	284.4 d.	9.439E-3	II

Page 01

DATE _____

CLIENT _____ FILE NO. _____ BY _____

SUBJECT EPICOR II - CURIES DEPOSITED - DS-3 Checked By _____

DATE: <u>7/11/80</u>			
ISOTOPE	t _{1/2}	TOTAL CURIES	TRANSPORT GROUP
Mn 54	312.5 d.	2.53E-4	IV
Co 58	70.8 d.	4.376E-4	IV
Co 60	5.27 y.	4.379E-4	II
Kr 85	10.72 y.		VI
Sr 89	50.52 d.		III
Sr 90	29 y.		II
Y 90	64 h.		IV
Nb 95	3.5 d.	6.77E-3	IV
Zr 95	64 d.	1.511E-3	II
Ru 103	39.4 d.	1.692E-3	II
Ru 106	368 d.	1.294E-2	III
Cd 109	453 d.		IV
Ag 110m	252 d.		III
Sn 113	115 d.	6.79E-4	IV
Sb 125	2.73 y.		III
I 131	8.04 d.	< 3.432E-4	II
Xe 133	5.25 d.		II
Cs 134	2.06 y.	6.181E-3	III
Cs 137	30.17 y.	2.999E-2	III
La 140	40.23 h.	< 1.128E-3	IV
Ba 140	12.79 d.	< 7.661E-4	II
Ce 141	32.5 d.		IV
Ce 144	284.4 d.	3.13E-3	III



CLIENT _____ FILE NO. _____ BY _____
SUBJECT EPICOR II - CURIES DEPOSITED - DS-6 Checked By _____

DATE: 5/28/80

<u>ISOTOPE</u>	<u>t 1/2</u>	<u>TOTAL CURIES</u>	<u>TRANSPORT GROUP</u>
Mn 54	312.5 d.	6.214 E-4	IV
Co 58	70.8 d.	3.071 E-3	IV
Co 60	5.27 y.	5.07 E-3	III
Kr 85	10.72 y.	2.918	VI
Sr 89	50.52 d.		III
Sr 90	29 y.		II
Y 90	64 h.		IV
Nb 95	3.5 d.	2.533 E-2	IV
Zr 95	64 d.	1.342 E-2	III
Ru 103	39.4 d.	5.927 E-3	IV
Ru 106	368 d.	2.005 E-1	III
Cd 109	453 d.		IV
Ag 110m	252 d.	2.657 E-3	III
Sr 113	115 d.	1.657 E-2	IV
Sb 125	2.73 y.	1.375 E-1	III
I 131	8.04 d.		III
Xe 133	5.25 d.	4.229 E-4	II
Cs 134	2.06 y.	5.872 E-2	III
Cs 137	30.17 y.	3.225 E-1	III
La 140	40.23 h.		IV
Ba 140	12.79 d.		III
Ce 141	32.5 d.		IV
Ce 144	284.4 d.	3.905 E-1	III



Page ____ of ____

DATE _____

CLIENT _____ FILE NO. _____ BY _____

SUBJECT EPICOR II - CURIES DEPOSITED - DS-1 Checked By _____

DATE: 7/8/79			
ISOTOPE	t 1/2	TOTAL CURIES	TRANSPORT GROUP
Mn 54	312.5 d.		IV
Co 58	70.8 d.	1.46E-3	IV
Co 60	5.27 y.	6.578E-4	II
Kr 85	10.72 y.		VI
Sr 89	50.52 d.		III
Sr 90	29 y.		II
Y 90	64 h.		IV
Nb 95	3.5 d.	1.015E-2	IV
Zr 95	64 d.	6.72E-4	III
Ru 103	39.4 d.	4.441E-2	IV
Ru 106	368 d.	9.151E-2	III
Cd 109	453 d.		IV
Ag 110m	252 d.		III
Sn 113	115 d.	1.54E-3	IV
Sb 125	2.73 y.		III
I 131	8.04 d.	48.359E-4	III
Xe 133	5.25 d.		II
Cs 134	2.06 y.	9.128E-3	III
Cs 137	30.17 y.	4.508E-2	III
La 140	40.23 h.	48.288E-3	IV
Ba 140	12.79 d.	41.065E-3	III
Ce 141	32.5 d.	3.35E-4	IV
Ce 144	284.4 d.	3.25E-2	III

CLIENT FILE NO. BY
SUBJECT EPICOR II - CURIES DEPOSITED - DS-2 Checked By

DATE: <u>12/19/79</u>			
ISOTOPE	t 1/2	TOTAL CURIES	TRANSPORT GROUP
Mn 54	312.5 d.		IV
Co 58	70.8 d.	2.912E-3	IV
Co 60	5.27 y.	5.288E-3	III
Kr 85	10.72 y.		VI
Sr 89	50.52 d.		III
Sr 90	29 y.		II
Y 90	64 h.		IV
Nb 95	3.5 d.	1.805E-2	IV
Zr 95	64 d.	4.86E-3	II
Ru 103	39.4 d.	1.928E-2	IV
Ru 106	368 d.	6.95E-2	III
Cd 109	453 d.		IV
Aq 110m	252 d.		III
Sn 113	115 d.	1.97E-3	IV
Sb 125	2.73 y.		III
I 131	8.041 d.	<6.148E-3	III
Xe 133	5.25 d.	1.33E-3	II
Cs 134	2.06 y.	7.88E-1	III
Cs 137	30.17 y.	3.842	III
La 140	40.23 h.	<1.195E-1	IV
Ba 140	12.79 d.	41.476E-2	III
Ce 141	32.5 d.	7.88E-4	IV
Ce 144	284.4 d.	3.693E-2	III

CLIENT _____ FILE NO. _____ BY _____

SUBJECT EPICOR II - CURIES DEPOSITED - DF-6 Checked By _____

DATE: <u>1/8/80</u>			
<u>ISOTOPE</u>	<u>t_{1/2}</u>	<u>TOTAL CURIES</u>	<u>TRANSPORT GROUP</u>
Mn 54	312.5 d.		IV
Co 58	70.8 d.	6.031E-3	IV
Co 60	5.27 y.	5.615E-4	III
Kr 85	10.72 y.		VI
Sr 89	50.52 d.		III
Sr 90	29 y.		II
Y 90	64 h.		IV
Nb 95	3.5 d.	4.77E-3	IV
Zr 95	64 d.	2.049E-3	III
Ru 103	39.4 d.	2.89E-3	IV
Ru 106	368 d.	1.332E-2	III
Cd 109	453 d.	6.62E-4	IV
Ag 110m	252 d.		III
Sn 113	115 d.	5.6E-4	IV
Sb 125	2.73 y.		III
I 131	8.04 d.	< 4.162E-3	III
Xe 133	5.25 d.		II
Cs 134	2.06 y.	5.261E-1	III
Cs 137	30.17 y.	2.666	III
La 140	40.23 h.	< 1.318E-2	IV
Ba 140	12.79 d.	< 9.904E-3	III
Ce 141	32.5 d.		IV
Ce 144	284.4 d.		III

Page of DATE CLIENT FILE NO. BY SUBJECT EPICOR II - CURIES DEPOSITED - DF-7 Checked By

DATE: 2/5/80

<u>ISOTOPE</u>	<u>t 1/2</u>	<u>TOTAL CURIES</u>	<u>TRANSPORT GROUP</u>
Mn 54	312.5 d.		IV
Co 58	70.8 d.	1.019E-3	IV
Co 60	5.27 y.	7.3E-4	III
Kr 85	10.72 y.		VI
Sr 89	50.52 d.		III
Sr 90	29 y.		II
Y 90	64 h.		IV
Nb 95	3.5 d.	6.63E-3	IV
Zr 95	64 d.	2.01E-3	II
Ru 103	39.4 d.	1.67E-3	IV
Ru 106	368 d.	2.329E-2	III
Cd 109	453 d.		IV
Ag 110m	252 d.		III
Sn 113	115 d.	6.81E-4	IV
Sb 125	2.73 y.		III
I 131	8.04 d.	43.28E-4	III
Xe 133	5.25 d.		III
Cs 134	2.06 y.	1.136E-2	III
Cs 137	30.17 y.	6.119E-2	III
La 140	40.23 h.	4.07E-4	IV
Ba 140	12.79 d.	4.23E-4	III
Ce 141	32.5 d.	3.19E-5	III
Ce 144	284.4 d.	1.10E-2	III

CLIENT FILE NO. BY

 SUBJECT EPICOR II - CURIES DEPOSITED - DF - 1 Checked By

 DATE: 11/3/79

ISOTOPE	t $\frac{1}{2}$	TOTAL CURIES	TRANSPORT GROUP
Mn54	312.5d.	7.93E-4	IV
Co58	70.8d.	9.7E-4	IV
Co60	5.27 y.	1.65E-4	III
Kr85	10.72 y.	-	VI
Sr89	50.52 d.		III
Sr90	29 y.		II
Y90	64 h.		IV
Nb95	3.5 d.	5.371E-3	IV
Zr95	64 d.	2.7E-3	III
Ru103	39.4d.	4.144E-2	IV
Ru106	368 d.	5.535E-2	III
Cd109	453 d.		IV
Ag110m	252 d.		III
Sn113	115 d.		IV
Sb125	2.73 y.		III
I131	8.041d.	6.957E-4	III
Xe133	5.25d.		VI
Cs134	2.06y.	2.871E-2	II,
Cs137	30.17y.	1.419E-1	III)
La140	40.23h.	1.613E-2	IV
Ba140	12.79 d.	1.638E-3	III
Ce141	32.5 d.	6.42E-4	IV
Ce144	284.4d.	3.757E-2	III

CLIENT FILE NO. BY

SUBJECT EPICOR II - CURIES DEPOSITED - DF-13 Checked By

DATE: 6/6/80

ISOTOPE	$t_{1/2}$	TOTAL CURIES	TRANSPORT GROUP
Mn 54	312.5 d.	9.549 E-1	IV
Co 58	70.8 d.	8.761 E-4	IV
Co 60	5.27 y.	1.523 E-3	III
Kr 85	10.72 y.	3.965 E-2	VI
Sr 89	50.52 d.		III
Sr 90	29 y.		II
Y 90	64 h.		IV
Nb 95	3.5 d.	5.684 E-3	IV
Zr 95	64 d.	1.579 E-3	III
Ru 103	39.4 d.	1.362 E-3	IV
Ru 106	368 d.	2.904 E-2	III
Cd 109	453 d.		IV
Ag 110m	252 d.	5.618 E-5	III
Sn 113	115 d.	2.633 E-3	IV
Sb 125	2.73 y.	3.677 E-2	III
I 131	8.04 d.		III
Xe 133	5.25 d.	1.448 E-4	III
Cs 134	2.06 y.	1.656 E-2	III
Cs 137	30.17 y.	1.095 E-1	III
La 140	40.23 h.		IV
Ba 140	12.79 d.		III
Ce 141	32.5 d.		IV
Ce 144	284.4 d.	1.335 E-2	III

CLIENT FILE NO. BY

SUBJECT EPICOR II - CURIES DEPOSITED - DF-10 Checked By

DATE: <u>3/14/80</u>			
<u>ISOTOPE</u>	<u>t 1/2</u>	<u>TOTAL CURIES</u>	<u>TRANSPORT GROUP</u>
Mn54	312.5d.	1.46E-3	IV
Co58	70.8d.	2.148E-3	IV
Co60	5.27 y.	1.051E-3	III
Kr85	10.72 y.		VI
Sr89	30.52 d.		III
Sr90	29 y.		II
Y90	64 h.		IV
Nb95	3.5 d.	4.359E-2	IV
Zr95	64 d.	2.131E-2	III
Ru103	39.4d.	1.085E-2	IV
Ru106	368 d.	1.316E-1	III
Cd109	453 d.		IV
Aq110m	252 d.	2.618E-3	III
Sn113	115 d.	7.279E-3	IV
Sb125	2.73 y.	1.497E-1	III
I131	8.041d.	< 3.818E-3	III
Xe133	5.25d.		II
Cs134	2.06y.	1.487E-1	III
Cs137	30.17y.	1.772E-1	III
La140	40.23 h.	< 5.188E-3	IV
Ba140	12.79 d.	< 3.341E-3	III
Ce141	32.5 d.		IV
Ce144	284.4d.	1.105E-1	III

Page of DATE CLIENT FILE NO. BY SUBJECT EPICOR II - CURIES DEPOSITED - DF - 2 Checked By DATE: 11/16/79

<u>ISOTOPE</u>	<u>t 1/2</u>	<u>TOTAL CURIES</u>	<u>TRANSPORT GROUP</u>
Mn 54	312.5d.		IV
Co 58	70.8d.	4.968E-3	IV
Co 60	5.27 y.	1.198E-3	III
Kr 85	10.72 y.		VI
Sr 89	50.52 d.		III
Sr 90	29. y.		II
Y 90	64 h.		IV
Nb 95	3.5 d.	1.583E-3	IV
Zr 95	64 d.	2.35E-3	III
Ru 103	39.4d.	1.01E-2	IV
Ru 106	368 d.	2.22E-2	III
Cd 109	453 d.		IV
Ag 110m	252 d.		III
Sn 113	115 d.		IV
Sb 125	2.73 y.		III
I 131	8.041d.	4.323E-3	III
Xe 133	5.25d.		VI
Cs 134	2.06y.	4.318E-1	III
Cs 137	30.17y.	2.052	III
La 140	40.23h.	1.24E-2	IV
Ba 140	12.79 d.	9.64E-3	III
Ce 141	32.5 d.		IV
Ce 144	284.4d.		III



Page ____ of ____

DATE _____

CLIENT _____ FILE NO. _____ BY _____

SUBJECT EPICOR II - CURIES DEPOSITED - DF-12 Checked By _____DATE: 5/19/80

<u>ISOTOPE</u>	<u>t 1/2</u>	<u>TOTAL CURIES</u>	<u>TRANSPORT GROUP</u>
Mn 54	312.5 d.	2.066E-3	IV
Co 58	70.8 d.	2.559E-3	IV
Co 60	5.27 y.	4.152E-3	II
Kr 85	10.72 y.	5.522	VI
Sr 89	50.52 d.		III
Sr 90	29 y.		II
Y 90	64 h.		IV
Nb 95	3.5 d.	4.318E-2	IV
Zr 95	64 d.	1.899E-2	II
Ru 103	39.4 d.	7.256E-3	IV
Ru 106	368 d.	1.498E-1	III
Cd 109	453 d.		IV
Ag 110m	252 d.	3.895E-3	III
Sn 113	115 d.	6.848E-3	IV
Sb 125	2.73 y.	1.624E-1	III
I 131	8.04 d.		III
Xe 133	5.25 d.		VI
Cs 134	2.06 y.	5.339E-2	III
Cs 137	30.17 y.	3.067E-1	III
La 140	40.23 h.		IV
Ba 140	12.79 d.		III
Ce 141	32.5 d.		IV
Ce 144	284.4 d.	1.361E-1	III

Page of DATE CLIENT FILE NO. BY SUBJECT EPICOR II - CURIES DEPOSITED - DF-B Checked By DATE: 2-7-80

<u>ISOTOPE</u>	<u>t 1/2</u>	<u>TOTAL CURIES</u>	<u>TRANSPORT GROUP</u>
Mn54	312.5d.		IV
Co58	70.8d.	2.711E-3	IV
Co60	5.27 y.	1.705E-3	III
Kr85	10.72 y.	2.423E-1	VI
Sr89	50.52 d.		III
Sr90	29 y.		II
Y90	64 h.		IV
Nb95	3.5 d.	2.165E-2	IV
Zr95	64 d.	8.15E-3	III
Ru103	39.4d.	3.99E-3	IV
Ru106	368 d.	1.212E-1	III
Cd109	453 d.		IV
Ag110m	252 d.		III
Sn113	115 d.		IV
Sb125	2.73 y.		III
I131	8.041d.	2.024E-3	III
Xe133	5.25d.		II
Cs134	2.06y.	2.592	III
Cs137	30.17y.	2.72E-1	III
La140	40.23h.	6.96E-3	IV
Ba140	12.79 d.	4.71E-3	III
Ce141	32.5 d.		IV
Ce144	284.4d.	4.58E-2	III

Page 1 of 1 DATE CLIENT FILE NO. BY SUBJECT EPICOR II - CURIES DEPOSITED - DF-14 Checked By

DATE: 7/14/80

ISOTOPE	t $\frac{1}{2}$	TOTAL CURIES	TRANSPORT GROUP
Mn 54	312.5 d.	1.217E-3	IV
Co 58	70.8 d.	1.618E-3	IV
Co 60	5.27 y.	2.597E-3	III
Kr 85	10.72 y.	1.503E-1	VI
Sr 89	50.52 d.		III
Sr 90	29 y.		II
Y 90	64 h.		IV
Nb 95	3.5 d.	2.806E-3	IV
Zr 95	64 d.	3.156E-3	II
Ru 103	39.4 d.		IV
Ru 106	368 d.	2.816E-2	III
Cd 109	453 d.		IV
Ag 110m	252 d.	3.842E-3	III
Sn 113	115 d.	1.074E-3	IV
Sb 125	2.73 y.	3.533E-1	III
I 131	8.04 d.		III
Xe 133	5.25 d.		IV
Cs 134	2.06 y.	4.134E-2	III
Cs 137	30.17 y.	2.656E-1	III
La 140	40.23 h.		IV
Ba 140	12.79 d.		III
Ce 141	32.5 d.		IV
Ce 144	284.4 d.	4.658E-2	III
Cr 51		2.458E-3	

CLIENT _____ FILE NO. _____ BY _____
SUBJECT EPICOR II - CURIES DEPOSITED - DF - 3 Checked By _____

DATE: 11/29/79			
ISOTOPE	t 1/2	TOTAL CURIES	TRANSPORT GROUP
Mn 54	312.5 d.		IV
Co 58	70.8 d.	2.16E-2	IV
Co 60	5.27 y.	2.23E-3	IV
Kr 85	10.72 y.		VI
Sr 89	30.52 d.		III
Sr 90	29 y.		II
Y 90	64 h.		IV
Nb 95	3.5 d.		IV
Zr 95	64 d.		III
Ru 103	39.4 d.		III
Ru 106	368 d.		III
Cd 109	453 d.		IV
Ag 110m	252 d.		III
Sn 113	115 d.		IV
Sb 125	2.73 y.		III
I 131	8.04 d.	1.66E-2	III
Xe 133	5.25 d.		III
Cs 134	2.06 y.	3.09	III
Cs 137	30.17 y.	14.79	III
La 140	40.23 h.	1.09E-1	IV
Ba 140	12.79 d.	6.35E-2	III
Ce 141	32.5 d.		IV
Ce 144	284.4 d.		III

CLIENT _____ FILE NO. _____

BY (27-90) _____

SUBJECT EPICOR II - CURIES DEPOSITED - DF-11

Checked By _____

DATE: 4/16/80

ISOTOPE	$t_{1/2}$	TOTAL CURIES	TRANSPORT GROUP
Mn 54	312.5 d.	5.251E-3	IV
Co 58	70.8 d.	5.868E-3	IV
Co 60	5.27 y.	4.717E-3	II
Kr 85	10.72 y.	1.733	VI
Sr 89	50.52 d.		III
Sr 90	29 y.		II
Y 90	64 h.		IV
Nb 95	3.5 d.	2.372E-2	IV
Zr 95	64 d.	1.249E-2	II
Ru 103	39.4 d.	6.478E-3	IV
Ru 106	368 d.	9.709E-2	III
Cd 109	453 d.		IV
Ag 110m	252 d.	3.336E-3	III
Sn 113	115 d.	7.603E-3	IV
Sb 125	2.73 y.	1.984E-1	III
I 131	8.04 d.		III
Xe 133	5.25 d.		II
Cs 134	2.06 y.	4.169E-2	III
Cs 137	30.17 y.	2.398E-1	III
La 140	40.23 h.		IV
Ba 140	12.79 d.		III
Ce 141	32.5 d.		III
Ce 144	284.4 d.	1.259E-1	III

CLIENT FILE NO. BY
SUBJECT EPICOR II - CURIES DEPOSITED - DF-5 Checked By

DATE: <u>12/10/79</u>			
ISOTOPE	t $\frac{1}{2}$	TOTAL CURIES	TRANSPORT GROUP
Mn 54	312.5 d.	1.91E-3	IV
Co 58	70.8 d.	4.971E-3	IV
Co 60	5.27 y.	4.174E-4	II
Kr 85	10.72 y.		VI
Sr 89	50.52 d.		III
Sr 90	29 y.		II
Y 90	64 h.		IV
Nb 95	3.5 d.	1.34E-3	IV
Zr 95	64 d.	7.84E-3	III
Ru 103	39.4 d.		IV
Ru 106	368 d.	6.95E-2	III
Cd 109	453 d.		IV
Aq 110m	252 d.		III
Sn 113	115 d.	1.41E-3	IV
Sb 125	2.73 y.		III
I 131	8.041 d.	2.826E-3	III
Xe 133	5.25 d.		II
Cs 134	2.06 y.	4.77E-1	III
Cs 137	30.17 y.	2.352	III
La 140	40.23 h.	7.765E-3	IV
Ba 140	12.79 d.	6.725E-3	III
Ce 141	32.5 d.		IV
Ce 144	284.4 d.	4.93E-2	III

CLIENT FILE NO. BY

 SUBJECT EPICOR II - CURIES DEPOSITED - PF-10 Checked By

DATE: <u>1/8/80</u>			
<u>ISOTOPE</u>	<u>t 1/2</u>	<u>TOTAL CURIES</u>	<u>TRANSPORT GROUP</u>
Mn 54	312.5d.	-	IV
Co 58	70.8d.	3.232E-1	IV
Co 60	5.27 y.	2.773E-2	II
Kr 85	10.72 y.	-	VI
Sr 89	50.52 d.	-	III
Sr 90	29 y.	-	II
Y 90	64 h.	-	IV
Nb 95	3.5 d.	1.71E-3	IV
Zr 95	64 d.	7.42E-4	III
Ru 103	39.4d.	1.39E-3	IV
Ru 106	368 d.	5.68E-3	III
Cd 109	453 d.	-	IV
Ag 110m	252 d.	-	III
Sn 113	115 d.	2.7E-4	IV
Sb 125	2.73 y.	1.916E-2	III
I 131	8.041d.	2.222E-1	III
Xe 133	5.25d.	-	IV
Cs 134	2.06y.	21.531	III
Cs 137	30.17y.	109.105	III
La 140	40.23h.	5.64E-4	IV
Ba 140	12.79 d.	3.31E-4	III
Ce 141	32.5 d.	-	IV
Ce 144	284.4d.	1.533E-3	III

CLIENT _____ FILE NO. _____ BY _____

SUBJECT EPICOR II - CURIES DEPOSITED - PF-5 Checked By _____

DATE: 12/4/79			
ISOTOPE	t 1/2	TOTAL CURIES	TRANSPORT GROUP
Mn54	312.5d.	-	IV
Co58	70.8d.	7.24E-2	IV
Co60	5.27 y.	6.43E-3	III
Kr85	10.72 y.	-	VI
Sr89	50.52d.	-	III
Sr90	29 y.	-	I
Y90	64 h.	-	IV
Nb95	3.5 d.	-	IV
Zr95	64 d.	-	III
Ru103	39.4d.	-	IV
Ru106	368 d.	-	III
Cd109	453 d.	-	IV
Ag110m	252 d.	-	III
Sn113	115 d.	-	IV
Sb125	2.73 y.	-	III
I131	8.041d.	7.28E-3	III
Xe133	5.25d.	-	I
Cs134	2.06y.	14.67	III
Cs137	30.17y.	72.77	III
La140	40.23h.	-	IV
Ba140	12.79 d.	-	III
Ce141	32.5 d.	-	IV
Ce144	284.4d.	-	III

CLIENT _____ FILE NO. _____ B' _____

SUBJECT EPICOR II - CURIES DEPOSITED - PF-6 Checked By _____

DATE: 12/13/79

<u>ISOTOPE</u>	<u>t_{1/2}</u>	<u>TOTAL CURIES</u>	<u>TRANSPORT GROUP</u>
Mn54	312.5d.	-	IV
Co58	70.8d.	6.723E-2	IV
Co60	5.27 y.	6.951E-3	III
Kr85	10.72 y.	-	VI
Sr89	50.52 d.	-	III
Sr90	29 y.	-	II
Y90	64 h.	-	IV
Nb95	3.5 d.	-	IV
Zr95	64 d.	-	III
Ru103	39.4d.	-	III
Ru106	368 d.	-	III
Cd109	453 d.	-	IV
Ag110m	252 d.	-	III
Sn113	115 d.	-	IV
Sb125	2.73 y.	-	III
I131	8.04 d.	4.54E-2	III
Xe133	5.25 d.	-	III
Cs134	2.06 y.	14.533	III
Cs137	30.17 y.	72.153	III
La140	40.23 h.	3.463E-4	IV
Ba140	12.79 d.	2.355E-4	III
Ce141	32.5 d.	-	IV
Ce144	284.4 d.	-	III

ATTACHMENT 2.0 WASTEFORM REQUIREMENTS

GPU will supply the contractor with EPIODR-type resins for non-radioactive solidification testing on a laboratory scale and for the full-scale demonstration of the contractor's installed system. All data generated by the contractor from his laboratory scale testing shall be supplied to GPU for review.

Full-scale testing shall be done on-site and be witnessed by a GPU representative. The solidified product shall be examined for structural integrity, homogeneity, and free liquid content.

Structural Integrity

The solidified samples shall demonstrate the properties defined for solidification, Section 3.2.2. Compressive strength data shall be provided. The full scale sample shall be cored, top, side and bottom.

Homogeneity

The surface of the full-scale solidification waste sample shall be inspected for voids, unsolidified material and pockets. Voids and unsolidified material shall total less than 0.1% of the observable product volume.

ATTACHMENT 3.0

Outline For Topical Reports On Solidification Systems

POOR ORIGINAL

OUTLINE FOR TOPICAL REPORTS ON
SOLIDIFICATION SYSTEMS

1.0 Introduction/Abstract

2.0 Process Description

- 2.1 Feed Control
- 2.2 Filling and Mixing (level control)
- 2.3 Positioning and Drive
- 2.4 Capping and Radiation Monitoring
- 2.5 Flushing, Self-cleaning, and Decontamination
- 2.6 Instrument and Control
- 2.7 Interlocks and Alarm
- 2.8 Design and Operating Conditions
- 2.9 P&ID

3.0 Process Parameters

- 3.1 Process Control Program to Provide Complete Solidification
- 3.2 Free Liquid Detection Procedure
- 3.3 Feed Characteristics/Type
- 3.4 Additives Used
- 3.5 Solidification Agent/Classification
- 3.6 Radioactivity Leachability

4.0 Equipment Description

- 4.1 Tanks
- 4.2 Hopper (bin)
- 4.3 Feeder
- 4.4 Mixer
- 4.5 Pump (Metering/Transfer)
- 4.6 Container (Drum)
- 4.7 Control Panel
- 4.8 Piping and Valves
- 4.9 Instrument
- 4.10 Heat Tracing
- 4.11 Scope of Supply and Interfaces

5.0 Equipment (System) Layout

- 5.1 Recommended Layout
- 5.2 Drum/Container Storage Area Required
- 5.3 Truck Loading Bay
- 5.4 Radiation Exposure Control (ALARA)
- 5.5 Maintenance Accessibility

- 6.0 Codes and Standards
- 7.0 Applicable Federal Regulations, Regulatory Guides, and
NRC Branch Technical Positions
- 8.0 Quality Assurance Program
- 9.0 Research and Development Program
- 10.0 Operating Experience
- 11.0 Postulated Accident Analyses
- 12.0 References

ATTACHMENT 4.0

SN-1 Transport Cask

Certificate of Compliance

Drawing - SN-1 Transport Cask

POOR ORIGINAL

Form: NuREG-0283
Volume 2
Revision 1
Nov. 78

Form NRC-18
(12-73)
10 CFR 71

U.S. NUCLEAR REGULATORY COMMISSION
CERTIFICATE OF COMPLIANCE
For Radioactive Materials Packages

1.(a) Certificate Number	1.(b) Revision No.	1.(c) Package Identification No.	1.(d) Pages No	1.(e) Total No. Pages
6771	1	USA/6771/B	1	2

2. PREAMBLE

- 2.(a) This certificate is issued to satisfy Sections 173.393a, 173.394, 173.395, and 173.396 of the Department of Transportation Hazardous Materials Regulations (49 CFR 170.189 and 14 CFR 103) and Sections 146-19-10a and 146-19-100 of the Department of Transportation Dangerous Goods Regulations (46 CFR 146-149), as amended.
- 2.(b) The design and contents described in item 5 below, meets the safety standards set forth in Subpart C of Title 10, Code of Federal Regulations, Part 71, "Packaging of Radioactive Materials for Transport and Transportation of Radioactive Material Under Certain Conditions."
- 2.(c) This certificate does not relieve the consignor from compliance with any requirements of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. This certificate is based on the basis of a safety analysis report of the package design or application:

3.(a) Prepared by (Name and address):	3.(b) Title and identification of report or application:
NUS Corporation 4 Research Place Rockville, Maryland 20850	NUS Corporation application dated April 17, 1975, as supplemented.
	3.(c) Docket No. 71-6771

4. CONDITIONS

This certificate is conditional upon the fulfilling of the requirements of Subpart D of 10 CFR 71, as applicable, and the conditions specified in item 5 below.

5. Description of Packaging and Authorized Contents, Model Number, Fissile Class, Other Conditions, and References

(a) Packaging

(1) Model No.: SN-1

(2) Description

A shipping container for radioactive waste. The packaging consists of an outer container which is a 4-inch thick right circular cylindrical steel shell. The cylinder is 80 inches in diameter and 84 inches high with a welded bottom plate and a cover secured by twenty-four 1-1/4-inch diameter steel bolts. Impact limiters consisting of shock absorbing foam clad in 24-gage stainless steel are provided at the top and bottom of the container. The remainder of the cask is surrounded by a one-inch layer of canned insulation. The maximum weight, including contents, is 60,000 pounds.

(3) Drawings

The packaging is constructed in accordance with SUNTAC Nuclear Corporation Drawing No. 8-08001, Revision E.

5. (b) Contents

(1) Type and form of material

Greater than Type A quantities of nonfissile radioactive material as solidified or dewatered waste.

(2) Maximum quantity of material per package.

Maximum decay heat load not to exceed 100 watts.

6. The contents will be packaged in fourteen 55-gallon, DOT Spec. 17M drums; a single 170 cu. ft. DOT Spec. 60 inner container; or inner container(s) designed to meet burial site requirements.
7. The package authorized by this certificate is hereby approved for use under the general license provisions of Paragraph 71.12(b) of 10 CFR Part 71.
8. Expiration date: May 31, 1980. (*under revision*)

REFERENCES

RUS Corporation application dated April 17, 1975.

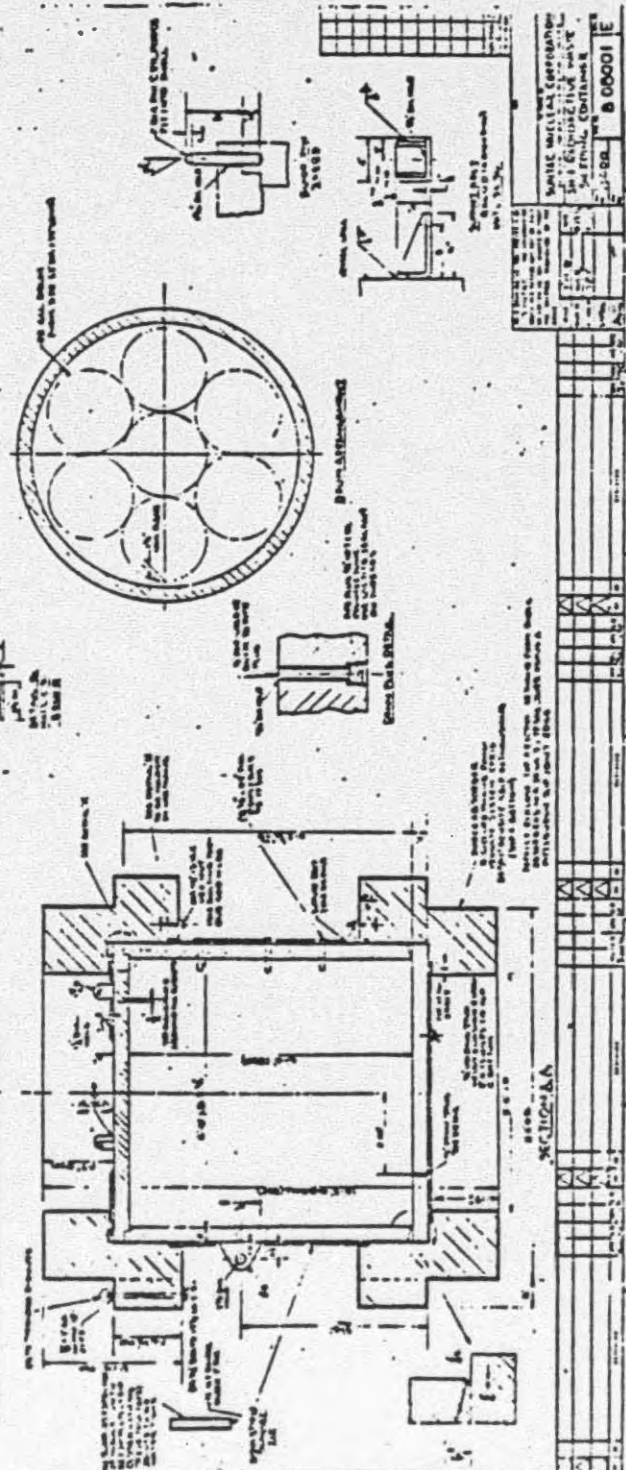
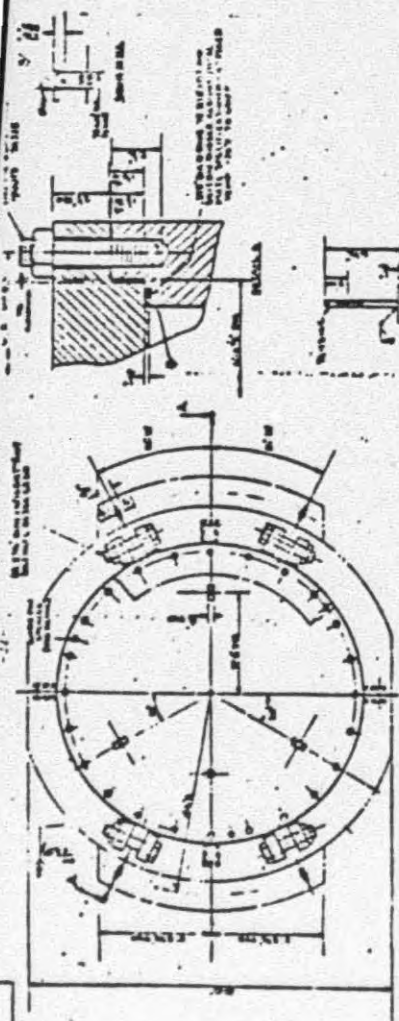
Supplement dated: April 21, 1975.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Charles E. MacDonald
Charles E. MacDonald, Chief
Transportation Branch
Division of Fuel Cycle and
Material Safety

Date: MAR 30, 1977

(Continued from p. 1)
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UNITED STATES GOVERNMENT		OFFICE OF THE SECRETARY OF DEFENSE		WASHINGTON, D.C. 20301	
FORM NO. 104-100		MAY 1962 EDITION		GPO : 1962 O - 300-000	
1. NAME (Last, first, middle initial)		2. GRADE OR POSITION		3. ORGANIZATION	
4. ADDRESS (Street, city, state, and zip code)		5. CITY		6. STATE	
7. ZIP CODE		8. COUNTRY		9. TELEPHONE	
10. DATE OF BIRTH		11. SEX		12. RACE	
13. EDUCATION		14. OCCUPATION		15. EMPLOYER	
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230. DATE OF ARRIVAL IN COUNTRY		231. DATE OF DEPARTURE FROM COUNTRY			

QA REQUIREMENTS FOR SPECIFICATION - EPICOR II
SPENT RESIN SOLIDIFICATION PART I-SYSTEMAPPLICABLE REQUIREMENTS ARE CHECKED

base Req.

es No. 10CFR50, Appendix B - The work and supplies covered by this order shall be controlled under a quality system that conforms to all the requirements of 10CFR50, Appendix B.10CFR50, Appendix B (as applicable) - The work and supplies covered by this order shall be controlled under a quality system that conforms to those requirements of 10CFR50, Appendix B as noted in subsequent Sections.

The provisions of 10CFR21 apply hereto. The Contractor shall immediately inform the Company's Vice President of Generation in writing if it obtains information reasonably indicating that the Plant or service or materials or a basic component delivered to the Owner for the Plant (a) fails to comply with the Atomic Energy Act of 1954, as amended, or any applicable rule, regulation, order or license of the Nuclear Regulatory Commission (NRC) relating to substantial safety hazards, or (b) contains a defect, which could create a substantial safety hazard, unless it has actual knowledge that the NRC has been adequately informed of such defect or failure to comply, all as required by Part 21 of 10 Code of Federal Regulations ("10CFR-21"), and shall simultaneously furnish to the Company's Vice President of Generation copies of any notification given by the Contractor to the NRC pursuant to 10CFR21.



10CFR21 does not apply.

10CFR71 - The work and supplies covered by this order shall be controlled under a quality system that conforms to the applicable requirements of 10CFR71.Reg. Guide 1.143 - The work and supplies covered by this order shall be controlled under a quality system that conforms to the requirements of Reg. Guide 1.143, Regulatory position C.6 as noted below.BTP 9.5.1 - The work and supplies covered by this order shall be controlled under a quality system that conforms to the requirements of Sec. IV.B.7 of Branch Technical Position (BTP) 9.5.1.Prior to Award of Contract - The supplier's quality system description or QA Program Manual shall be submitted for review and approval to:Supervisor, QA Engineering
TMI Nuclear Generating Station
P. O. Box 480
Middletown, PA 17057

OR

QA Manager
Design & Procurement
CPU Service Corporation
100 Interpace Parkway
Parsippany, NJ 07054

(Select One)

POOR ORIGINAL

☒ Right of Access - The work and supplies covered by this order are subject to surveillance/inspection/test/audit by GPUSC/Met-Ed at the seller's facility and/or his sub-supplier's facility/or at the site. Prior notice will be given to the seller before any of these activities are performed. The seller shall furnish at no additional cost, the necessary facilities and equipment, and perform inspections and/or tests as required by the purchaser to demonstrate conformance to the procurement documents.

☐ Work on this purchase order/contract shall be under the GPUSC QA Program and will be subject to inspection, surveillance and audit under this program.

☐ Material Traceability - All materials/supplies covered by this order shall have documentation on file at the seller's facility for at least seven (7) years after delivery to site to permit traceability back thru the manufacturing and inspection/test cycles. Records shall be sufficient to demonstrate conformance to all requirements of the procurement documents. These records need not be kept longer than one (1) year if the original documents are furnished with the delivered goods to the purchaser.

☐ Inspection Control - The seller shall have in effect a program for inspection of activities affecting quality to verify conformance with documented instructions, procedures, and drawings for accomplishing the activity. Inspections shall be performed by individuals other than those who performed the activity being inspected. The program shall allow for both inspection and/or process monitoring.

☒ Procedure Approvals - The following process procedures are required to be approved by the purchaser prior to start of work governed by the Procedures:

- ☐ a. Welding Procedure
- ☐ b. Weld Repair Procedure
- ☐ c. Heat Treat Procedure
- ☐ d. Radiographic Procedure
- ☐ e. Dye Penetrant Procedure
- ☐ f. Magnetic Particle Procedure
- ☐ g. Ultrasonic Test Procedure
- ☐ h. Leak Test Procedure
- ☐ i. Vacuum Box Procedure
- ☐ j. Eddy Current Procedure
- ☒ k. Hydrostatic Test Procedure

☒ THESE PROCEDURES SHOULD BE SUBMITTED TO QA ENGINEERING SUPERVISOR, P.O. Box 480, TMI NUCLEAR STATION, MIDDLETOWN, PA 17057

-OR-

☐ QA MANAGER-DESIGN & PROCUREMENT/GPU SERVICE CORP./100 INTERPACE PARKWAY/PARSIPPANY NJ. 07054

~~AT LEAST SIXTY (60) DAYS PRIOR TO START OF WORK~~

☒

the site.

Right of Access - The work and supplies covered by this order are subject to surveillance/inspection/test/audit by GPUSC/Met-Ed at the seller's facility and/or his sub-supplier's facility/or at Prior notice will be given to the seller before any of these activities are performed. The seller shall furnish at no additional cost, the necessary facilities and equipment, and perform inspections and/or tests as required by the purchaser to demonstrate conformance to the procurement documents.

Work on this purchase order/contract shall be under the GPU SC QA Program and will be subject to inspection, surveillance and audit under this program.

☐

Material Traceability - All materials/supplies covered by this order shall have documentation on file at the seller's facility for at least seven (7) years after delivery to site to permit traceability back thru the manufacturing and inspection/test cycles. Records shall be sufficient to demonstrate conformance to all requirements of the procurement documents. These records need not be kept longer than one (1) year if the original documents are furnished with the delivered goods to the purchaser.

☐

Inspection Control - The seller shall have in effect a program for inspection of activities affecting quality to verify conformance with documented instructions, procedures, and drawings for accomplishing the activity. Inspections shall be performed by individuals other than those who performed the activity being inspected. The program shall allow for both inspection and/or process monitoring.

☒

Procedure Approvals - The following process procedures are required to be approved by the purchaser prior to start of work covered by the Procedures:

המחשבה

- a. Welding Procedure
- b. Weld Repair Procedure
- c. Heat Treat Procedure
- d. Radiographic Procedure
- e. Dye Penetrant Procedure
- f. Magnetic Particle Procedure
- g. Ultrasonic Test Procedure
- h. Leak Test Procedure
- i. Vacuum Box Procedure
- j. Eddy Current Procedure
- k. Hydrostatic Test Procedure



THESE PROCEDURES SHOULD BE
SUBMITTED TO QA ENGINEERING
SUPERVISOR, P.O. Box 480,
TMI NUCLEAR STATION, MIDDLE-
TON, PA 17057

-OR-

QA MANAGER-DESIGN & PROCUREMENT/GPU SERVICE CORP./100
INTERLACE PARKWAY/MEMPHIS
TN. 07054

~~AT LEAST SIXTY (60) DAYS~~
~~BEFORE TO COME ON WORK.~~

(CONTRACTED SERVICES)

base Req.
 em No.

Procedure Approvals (Cont'd):

- ☒ 1. Performance Test Procedure
- ☐ 2. Painting and Coating
- ☒ 3. Packaging, Shipping, and Storage of mix materials to preclude weather damage.
- ☒ 4. Cleaning (decontamination)
- ☒ 5. Process Control Program
- ☒ 6. Compression Test Procedure



Witness/Hold Points - The following witness/hold points shall apply to the work during the manufacturing/test/inspection/shipping process. The seller shall advise the purchaser's quality assurance organization in sufficient time to allow the purchaser's representative to arrive and observe the specific witness/hold point. One (1) working days' notice is required to Modifications and Operation QA Manager (Phone: 717-948-8616 GPU Service Corp., P. O. Box 480, TMI Nuclear Station, Middletown, Pa. 17057)

- ☒ a. Check solidification mix materials prior to fabrication.
- ☐ b. First item inspection
- ☐ c. Fit-up prior to welding (significant component)
- ☐ d. Final inspection
- ☐ e. Final Assembly
- ☐ f. Test (Performance) shop
- ☒ g. Test (Performance) site
- ☒ h. Hydrostatic Test (after setup at the site).
- ☐ i. NDE (Purchaser to specify)
- ☐ j. Review of radiographic film
- ☐ k. Preparation for shipment
- ☐ l. Documentation review
- ☐ m. Release for shipment



Control of Nonconformance - The seller shall maintain control of all nonconforming materials associated with the order. Reports of nonconformances shall be maintained and contain sufficient information to allow the purchaser to assess the significance of the nonconformance. The report must contain the nonconforming condition, cause of nonconformance, action to be taken or taken to prevent recurrence and corrective action to be taken or taken. Seller shall advise the purchaser of any significant nonconformances discovered prior to performing any further action to correct same.



Changes - The seller shall advise the purchaser in writing of all proposed changes in design, materials, processes involving the supplies covered by this order and shall obtain the purchaser's written consent before effecting such changes.

POOR ORIGINAL
 (CONTACTED SERVICES)

Purchase Req.

Item No.



Calibration Control - The seller shall control the calibration of all tools, gages, instruments and other measuring and testing devices against certified standards traceable to the National Bureau of Standards or other controlled standards.



Material Control - The seller shall be able to identify and control all solidification mix materials/supplies covered by this order to prevent the use of incorrect or defective material/supplies at all times before and during the processing operation.



Test Control - The seller shall have in effect a test program to assure that all testing required to demonstrate that the materials/supplies will perform satisfactorily in service is performed in accordance with written test procedures which meet the requirements of the procurement documents. Reports of tests shall be maintained and include test prerequisites met, test instrumentation used, acceptance criteria, test results and environmental conditions under which the test was conducted.



Release for Fabrication - Prior to start of any manufacturing, the seller shall notify the purchaser and obtain a written release from the purchaser's QA organization to proceed with manufacturing of material covered by the order.



Documentation

- A. The following documentation must be furnished by the seller at time of shipment. The documentation package must be reviewed by the seller and written assurance provided the purchaser that the documentation furnished meets the requirements of the procurement documents. All documentation must be completely legible and of microfilm quality.
 - ☐ a. Certified material test reports of actual chemical and physical results showing material conforms to applicable material specification.
 - ☒ b. Compression Test Reports
 - ☐ c. NDE Reports
 - ☐ d. Radiographic film including reader sheets & shooting sketches.
 - ☐ e. Traceability Records (See Material Traceability)
 - ☐ f. Certified Test Reports (See Test Control)
 - ☐ g. Heat Treat/Stress Relief Furnace Charts

Purchase Req.
Item No.

Documentation (Cont'd):

A. (Continued):

- ☒ h. Hydrostatic Test Reports
- ☐ i. Manufacturer's Code Data Report
- ☐ j. Manufacturer's Stress Report
- ☐ k. Welding Procedure Qualifications
- ☒ l. Processing records required to document the solidification process.
- ☐ m. Certificate of calibration traceable to National Bureau of Standards shall be supplied with the equipment.
- ☒ n. Certificate of Conformance stating that services and mix water supplied on this order are of quality equal to or better than that required by this specification.

(Also check (o) for format requirements)

- ☒ o. Certificate of Conformance - The Certificate of Conformance shall identify Met-Ed/GPUSC Purchase Order Number and the specific procurement requirements met, such as codes, standards, specifications (if applicable). Also the Certificate should identify any procurement requirements that have not been met, together with an explanation and the means for resolving the nonconformances. It shall be signed by a person who is responsible for this quality assurance function.
- ☐ p. Certificate of Conformance stating that the items requested on this order contain less than 200ppm leachable chlorides as determined by ASTM _____. (Also check (o) for format requirements).
- ☒ q. The vendor shall forward all required final documentation as follows:

One (1) copy to GPUSC QC Manager, TMI Nuclear Station, P. O. Box 480, Middletown, PA 17057.

POOR ORIGINAL

(CONTRACTED SERVICES)

urchase Req.
Item No.



Shelf Life Requirements:

The exterior package of the mix materials shall be marked:

"Limited Shelf Life Item. Do not use after _____ (date)

Until Item has been inspected and found acceptable for use."

The vendor shall post the date in the space provided or note "N/A" if item's shelf life is not limited. The vendor shall assure that at the time of receipt of material at Three Mile Island Nuclear Station, no more than 25% of the item's total shelf life (i.e., Shelf Life from date of manufacture to date of expiration) shall have expired.



Cleanliness - The materials/supplies covered by this order shall be subject to the requirements as defined in Specification GED-CS-1, Rev. 0, "General Specification for Cleanliness of Nuclear Reactor Plant Systems and Components". Copy attached. Class A, B, C or D.



Handling, Storage & Shipping:



a. The solidification system/components and materials/supplies covered by the order shall be handled, stored and shipped in accordance with the seller's standard "good" commercial practice.



b. The materials/supplies covered by the order shall be handled, stored and shipped in accordance with the seller's procedures (_____) which have been previously approved by GPUSC via memo _____.



c. The vendor shall assure the items are packaged to prevent damage during shipping, receiving, or long-term storage per ANSI W45.2.2 - 1972, Level A, B, C.



Receiving test inspection required. See memo from Engineering to QC Manager for details of this requirement. (No vendor action required for this item.)



The vendor shall provide Qualified personnel who have been indoctrinated and trained for performing activities affecting quality as necessary to assure that suitable proficiency is achieved and maintained.

The vendor shall maintain Personnel Qualification records pertinent to services ordered herein.

POOR ORIGINAL
(CONTRACTED SERVICES)

Case Req.

m No. _____



Items shall be marked in accordance with the referenced ASTM specifications. When exception to marking is permitted by the referenced specifications, vendor shall provide a certificate of conformance that the items meet the requirements of the referenced specifications. (19 (o) applies for format).



A. Any parts that will be supplied by the vendor as part of services requested on this order shall be provided with a Certificate of Conformance which states that the parts meet the applicable requirements of:



(1) Specification . . . _____



or (2) Original Purchase Order (State P.O. No.)



or (3) Manufacturer's Catalog



or (4) Other

The Certificate of Conformance shall identify the Met-Ed Purchase Order Number, and the specific procurement requirements met, such as codes, standards or other specifications. It shall be signed by a person who is responsible for this quality assurance function.

B. Before these parts are installed in the plant, they shall be made known to GPU-QA and a written release obtained from them.

C. The vendor shall identify each item by showing part name, part number, manufacturer's name and plant location, purchase order number and item number.



The vendor shall invoke applicable quality program requirements on his subvendor/contractors.



Prior to commencement of work on site, the vendor shall contact Modifications and Operations QA Manager.



Design Control - The seller shall have in effect a design control program to assure that the selection and application of materials, parts, equipment, and processes are suitable to the functioning of the item as specified. ~~The seller shall assure that procedures are established to control and verify the adequacy of the design, identify design organizations requiring in-house approval or concurrence, and assure all design changes are subject to the same control measures as applied to the original design.~~ The seller shall assure all test programs used to verify the adequacy of design in lieu of other verification processes, includes suitable qualification testing of a prototype under the most adverse design conditions.

(CONTRACTED SERVICES)

POOR ORIGINAL

Purchase Req.

Item No.



Procurement Document Control - The seller shall assure that procurement documents to subcontractors include applicable regulatory requirements, design bases and other requirements necessary to reflect the level of quality specified for the completed item. The seller shall assure that subcontractors provide, as necessary, an adequate quality assurance program consistent with the requirements of 10CFR50, Appendix B.



Control of Special Processes - The seller shall assure that special processes used in the design and fabrication of the item are controlled and accomplished by qualified personnel using approved procedures which reflect all applicable codes, standards, specifications criteria, and other special requirements necessary to the proper completion and evaluation of the processes. Special processes include but are not limited to welding, heat treating, and nondestructive testing (NDT).



Audits - The seller shall establish a comprehensive audit program to assure the periodic evaluation of the quality assurance program and its effectiveness. Audit results shall be documented and reviewed by management to assure that the necessary corrective action is completed in a timely manner. Audit reports and findings shall be made available to the purchaser's audit team upon request.

(CONTRACTED SERVICES)

POOR ORIGINAL

ATTACHMENT 5.0

Part 2

QA REQUIREMENTS FOR SPECIFICATION - EPICOR II.
SPENT RESIN SOLIDIFICATION PART 2 - SHIPPING

APPLICABLE REQUIREMENTS ARE CHECKED

Phase Req.
Item No. _____

- ☐ 10CFR50, Appendix B - The work and supplies covered by this order shall be controlled under a quality system that conforms to all the requirements of 10CFR50, Appendix B.
- ☐ 10CFR50, Appendix B (as applicable) - The work and supplies covered by this order shall be controlled under a quality system that conforms to those requirements of 10CFR50, Appendix B as noted in subsequent Sections.
- ☒ The provisions of 10CFR21 apply hereto. The Contractor shall immediately inform the Company's Vice President of Generation in writing if it obtains information reasonably indicating that the Plant or service or materials or a basic component delivered to the Owner for the Plant (a) fails to comply with the Atomic Energy Act of 1954, as amended, or any applicable rule, regulation, order or license of the Nuclear Regulatory Commission (NRC) relating to substantial safety hazards, or (b) contains a defect, which could create a substantial safety hazard, unless it has actual knowledge that the NRC has been adequately informed of such defect or failure to comply, all as required by Part 21 of 10 Code of Federal Regulations ("10CFR-21"), and shall simultaneously furnish to the Company's Vice President of Generation copies of any notification given by the Contractor to the NRC pursuant to 10CFR21.
- ☐ 10CFR21 does not apply.
- ☒ 10CFR71 - The work and supplies covered by this order shall be controlled under a quality system that conforms to the applicable requirements of 10CFR71.
- ☐ Reg. Guide 1.143 - The work and supplies covered by this order shall be controlled under a quality system that conforms to the requirements of Reg. Guide 1.143, Regulatory position C.6 as noted below.
- ☐ BTP.9.5.1 - The work and supplies covered by this order shall be controlled under a quality system that conforms to the requirements of Sec. IV.B.7 of Branch Technical Position (BTP) 9.5.1.
- ☒ Prior to Award of Contract - The supplier's quality system description or QA Program Manual shall be submitted for review and approval to:
- | | | |
|---|----|---|
| <input checked="" type="checkbox"/> Supervisor, QA Engineering
TMI Nuclear Generating Station
P. O. Box 480
Middletown, PA 17057 | OR | <input type="checkbox"/> QA Manager
Design & Procurement
GPU Service Corporation
100 Interpace Parkway
Parsippany, NJ 07054 |
|---|----|---|

(Select One)

Page 1 of 8

(CONTRACTED SERVICES)

Purchase Req.
Item No.



the site.

Right of Access - The work and supplies covered by this order are subject to surveillance/inspection/test/audit by GPUSC/Met-Ed at the seller's facility and/or his sub-supplier's facility/or at the site. Prior notice will be given to the seller before any of these activities are performed. The seller shall furnish at no additional cost, the necessary facilities and equipment, and perform inspections and/or tests as required by the purchaser to demonstrate conformance to the procurement documents.



Work on this purchase order/contract shall be under the GPUSC QA Program and will be subject to inspection, surveillance and audit under this program.



Material Traceability - All materials/supplies covered by this order shall have documentation on file at the seller's facility for at least seven (7) years after delivery to site to permit traceability back thru the manufacturing and inspection/test cycles. Records shall be sufficient to demonstrate conformance to all requirements of the procurement documents. These records need not be kept longer than one (1) year if the original documents are furnished with the delivered goods to the purchaser.



Inspection Control - The seller shall have in effect a program for inspection of activities affecting quality to verify conformance with documented instructions, procedures, and drawings for accomplishing the activity. Inspections shall be performed by individuals other than those who performed the activity being inspected. The program shall allow for both inspection and/or process monitoring.



Procedure Approvals - The following process procedures are required to be approved by the purchaser prior to start of work governed by the Procedures:



- a. Welding Procedure
- b. Weld Repair Procedure
- c. Heat Treat Procedure
- d. Radiographic Procedure
- e. Dye Penetrant Procedure
- f. Magnetic Particle Procedure
- g. Ultrasonic Test Procedure
- h. Leak Test Procedure
- i. Vacuum Box Procedure
- j. Eddy Current Procedure
- k. Hydrustatic Test Procedure



THESE PROCEDURES SHOULD BE SUBMITTED TO QA ENGINEERING SUPERVISOR, P.O. Box 480, TMI NUCLEAR STATION, MIDDLETOWN, PA 17057

-OR-



QA MANAGER-DESIGN & PROCUREMENT/GPU SERVICE CORP./100 INTERPACE PARKWAY/PARSIPPANY NJ, 07054

~~AT LEAST SIXTY (60) DAYS PRIOR TO START OF WORK.~~

Purchase Req.
Item No.

Procedure Approvals (Cont'd):

- ☐ 1. Performance Test Procedure
- ☐ m. Painting and Coating
- ☒ n. Packaging, Shipping. (includes loading and closing).
- ☒ o. Cleaning
- ☐ p. Fabrication Sequence
- ☐ q. Operations Sequence



Witness/Hold Points - The following witness/hold points shall apply to the work during the manufacturing/test/inspection/shipping process. The seller shall advise the purchaser's quality assurance organization in sufficient time to allow the purchaser's representative to arrive and observe the specific witness/hold point. One (1) working days' notice is required to Modification and Operations QA Mgr. (Phone: 717-948-8616 GPU Service Corp., P. O. Box 480. TMI Nuclear Station, Middletown, Pa. 17057).

- ☐ a. Check Material prior to fabrication
- ☐ b. First item inspection
- ☐ c. Fit-up prior to welding (significant component)
- ☐ d. Final inspection
- ☐ e. Final Assembly
- ☐ f. Test (Performance) shop
- ☐ g. Test (Performance) site
- ☐ h. Hydrostatic Test
- ☐ i. NDE (Purchaser to specify)
- ☐ j. Review of radiographic film
- ☒ k. Preparation for shipment (closure and loading).
- ☐ l. Documentation review
- ☐ m. Release for shipment



Control of Nonconformance - The seller shall maintain control of all nonconforming materials associated with the order. Reports of nonconformances shall be maintained and contain sufficient information to allow the purchaser to assess the significance of the nonconformance. The report must contain the nonconforming condition, cause of nonconformance, action to be taken or taken to prevent recurrence and corrective action to be taken or taken. Seller shall advise the purchaser of any significant nonconformances discovered prior to performing any further action to correct same.



Changes - The seller shall advise the purchaser in writing of all proposed changes in design, materials, processes involving the supplies covered by this order and shall obtain the purchaser's written consent before effecting such changes.

POOR ORIGINAL

(CONTRACTED SERVICES)

se Req.
No.



Calibration Control - The seller shall control the calibration of all tools, gages, instruments and other measuring and testing devices against certified standards traceable to the National Bureau of Standards or other controlled standards.



Material Control - The seller shall be able to identify and control all materials/supplies covered by this order to prevent the use of incorrect or defective material/supplies at all times through the manufacturing/test/inspection/shipping cycle.



Test Control - The seller shall have in effect a test program to assure that all testing required to demonstrate that the materials/supplies will perform satisfactorily in service is performed in accordance with written test procedures which meet the requirements of the procurement documents. Reports of tests shall be maintained and include test prerequisites met, test instrumentation used, acceptance criteria, test results and environmental conditions under which the test was conducted.



Release for Fabrication - Prior to start of any manufacturing, the seller shall notify the purchaser and obtain a written release from the purchaser's QA organization to proceed with manufacturing of material covered by the order.



Documentation

A. The following documentation must be furnished by the seller at time of shipment. The documentation package must be reviewed by the seller and written assurance provided the purchaser that the documentation furnished meets the requirements of the procurement documents. All documentation must be completely legible and of microfilm quality.



a. Certified material test reports of actual chemical and physical results showing material conforms to applicable material specification.



b. Tensile Test Reports



c. NDE Reports



d. Radiographic film including reader sheets & shooting sketches.



e. Traceability Records (See Material Traceability)



f. Certified Test Reports (See Test Control)



g. Heat Treat/Stress Relief Furnace Charts

QA REQUIREMENTS FOR SPECIFICATION
EPICOR II, SPENT RESIN SOLIDIFICATION

Documentation (Cont'd):

A. (Continued):

- ☐ h. Hydrostatic Test Reports
- ☐ i. Manufacturer's Code Data Report
- ☐ j. Manufacturer's Stress Report
- ☐ k. Welding Procedure Qualifications
- ☒ l. Inspection Reports
- ☐ m. Certificate of calibration traceable to National Bureau of Standards shall be supplied with the equipment.
- ☒ n. Certificate of Conformance stating items requested on this order are of quality equal to or better than required by the specification.
- ☒ o. Certificate of Conformance - The Certificate of Conformance shall identify Met-Ed/GPUSC Purchase Order Number and the specific procurement requirements met, such as codes, standards, specifications (if applicable). Also the Certificate should identify any procurement requirements that have not been met, together with an explanation and the means for resolving the nonconformances. It shall be signed by a person who is responsible for this quality assurance function.
- ☐ p. Certificate of Conformance stating that the items requested on this order contain less than 200ppm leachable chlorides as determined by ASTM _____. (Also check (o) for format requirements).
- ☒ q. Certificate of Compliance for Radioactive Materials Packages (NRC-618 (12-73)).
- ☒ r. Certificates of Conformance for each licensed cask certifying the following:
 - 1. Cask serial number and model number.
 - 2. Closure gaskets have been replaced within the previous 12 months.
- ☒ s. The vendor shall forward all required final/documentation as follows: manufacturing

One (1) copy to GPUSC QC Manager, TMI Nuclear Station, P. O. Box 480, Middletown, PA 17057.

(CONTRACTED SERVICES)

Purchase Req.
Item No. _____

☐Shelf Life Requirements:

The exterior package shall be marked:

"Limited Shelf Life Item. Do not use after _____
(date)"

Until Item has been inspected and found acceptable for use."

The vendor shall post the date in the space provided or note "N/A" if item's shelf life is not limited. The vendor shall assure that at the time of receipt of material at Three Mile Island Nuclear Station, no more than 25% of the item's total shelf life (i.e., Shelf Life from date of manufacture to date of expiration) shall have expired.

☐

Cleanliness - The materials/supplies covered by this order shall be subject to the requirements as defined in Specification GED-CS-1, Rev. 0, "General Specification for Cleanliness of Nuclear Reactor Plant Systems and Components". Copy attached. Class A, B, C or D.

☐Handling, Storage & Shipping:☐

a. The materials/supplies covered by the order shall be handled, stored and shipped in accordance with the seller's standard "good" commercial practice.

☐

b. The materials/supplies covered by the order shall be handled, stored and shipped in accordance with the seller's procedures (_____)
which have been previously approved by GPI/SC via memo _____.

☐

c. The vendor shall assure the items are packaged to prevent damage during shipping, receiving, or long-term storage per ANSI N45.2.2 - 1972, Level A, B, C.

☐

Receiving test inspection required. See memo from Engineering to QC Manager for details of this requirement. (No vendor action required for this item.)

☒

The vendor shall provide Qualified personnel who have been indoctrinated and trained for performing activities affecting quality as necessary to assure that suitable proficiency is achieved and maintained.

The vendor shall maintain Personnel Qualification records pertinent to services ordered herein.

POOR ORIGINAL

Purchase Req.
Item No.

☐

Items shall be marked in accordance with the referenced ASTM specifications. When exception to marking is permitted by the referenced specifications, vendor shall provide a certificate of conformance that the items meet the requirements of the referenced specifications. (19 (c) applies for format).

☐

A. Any parts that will be supplied by the vendor as part of services requested on this order shall be provided with a Certificate of Conformance which states that the parts meet the applicable requirements of:

☐

(1) Specification . . .

☐

or (2) Original Purchase Order (State P.O. No.)

☒

or (3) Manufacturer's Catalog

☐

or (4) Other

The Certificate of Conformance shall identify the Met-Ed Purchase Order Number, and the specific procurement requirements met, such as codes, standards or other specifications. It shall be signed by a person who is responsible for this quality assurance function.

B. Before these parts are installed in the plant, they shall be made known to GPU-QA and a written release obtained from them.

C. The vendor shall identify each item by showing part name, part number, manufacturer's name and plant location, purchase order number and item number.

☒

The vendor shall invoke applicable quality program requirements on his subvendor/contractors.

☒

Prior to commencement of work on site, the vendor shall contact Modifications and Operations QA Manager.

☐

Design Control - The seller shall have in effect a design control program to assure that the selection and application of materials, parts, equipment, and processes are suitable to the functioning of the item as specified. The seller shall assure that procedures are established to control and verify the adequacy of the design, identify design organizations requiring interface approval or concurrence, and assure all design changes are subject to the same control measures as applied to the original design. The seller shall assure all test programs used to verify the adequacy of design in lieu of other verification processes, includes suitable qualification testing of a prototype under the most adverse design conditions.

Purchase Req.
Item No.

☐

Procurement Document Control - The seller shall assure that procurement documents to subcontractors include applicable regulatory requirements, design bases and other requirements necessary to reflect the level of quality specified for the completed item. The seller shall assure that subcontractors provide, as necessary, an adequate quality assurance program consistent with the requirements of 10CFR50, Appendix B.

☐

Control of Special Processes - The seller shall assure that special processes used in the design and fabrication of the item are controlled and accomplished by qualified personnel using approved procedures which reflect all applicable codes, standards, specifications criteria, and other special requirements necessary to the proper completion and evaluation of the processes. Special processes include but are not limited to welding, heat treating, and nondestructive testing (NDT).

☐

Audits - The seller shall establish a comprehensive audit program to assure the periodic evaluation of the quality assurance program and its effectiveness. Audit results shall be documented and reviewed by management to assure that the necessary corrective action is completed in a timely manner. Audit reports and findings shall be made available to the purchaser's audit team upon request.

(CONTINUED SERVICES)

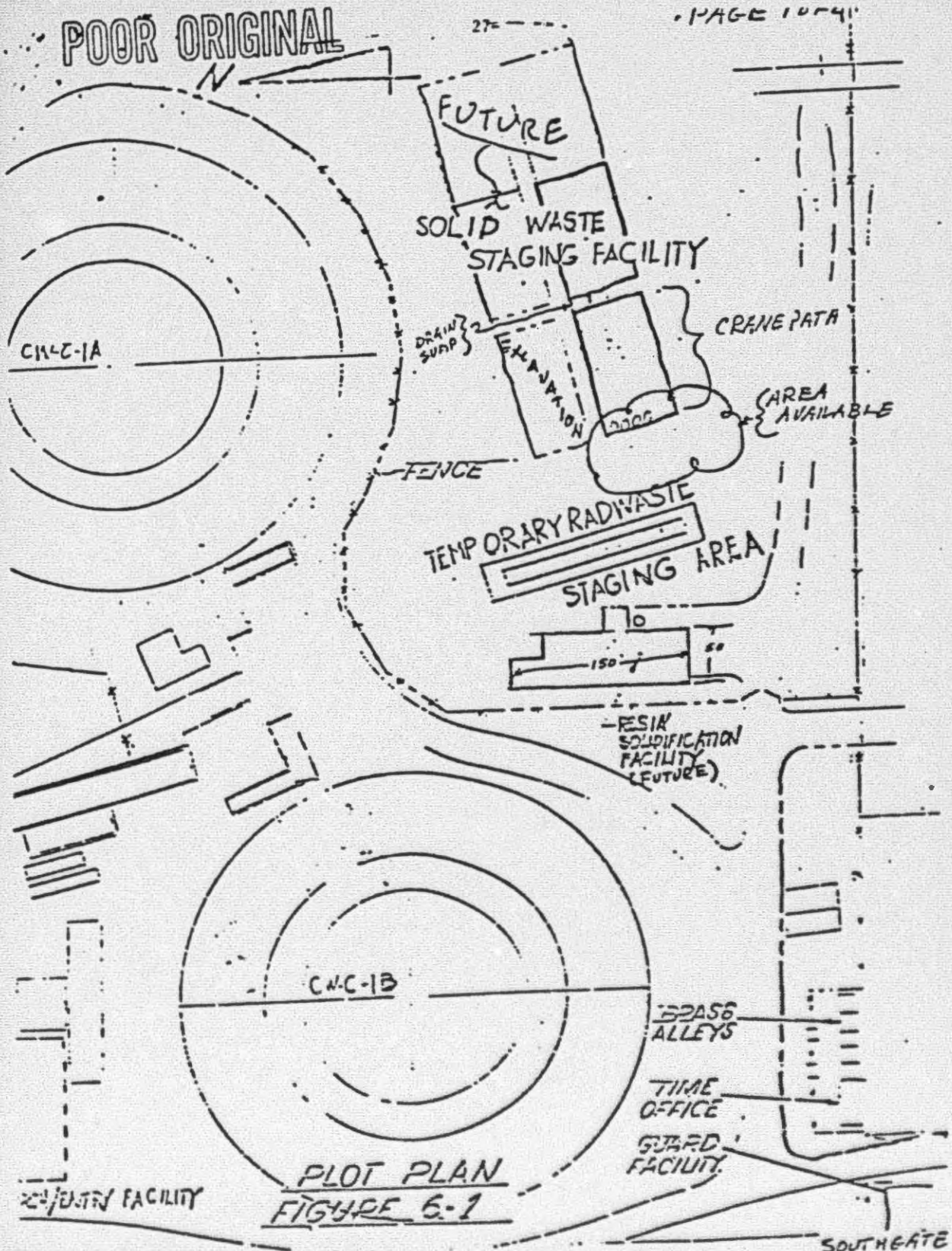
ATTACHMENT 6.0

Solid Waste Staging Facility Information

POOR ORIGINAL

27c

PAGE 1074



CMC-1A

FUTURE

SOLID WASTE
STAGING FACILITY

DRAIN
SUPP

EXPANSION

CRANE PATH

AREA
AVAILABLE

FENCE

TEMPORARY RADWASTE
STAGING AREA

150'
50'

RESIN
SOLIDIFICATION
FACILITY
(FUTURE)

CMC-1B

BASE
ALLEYS

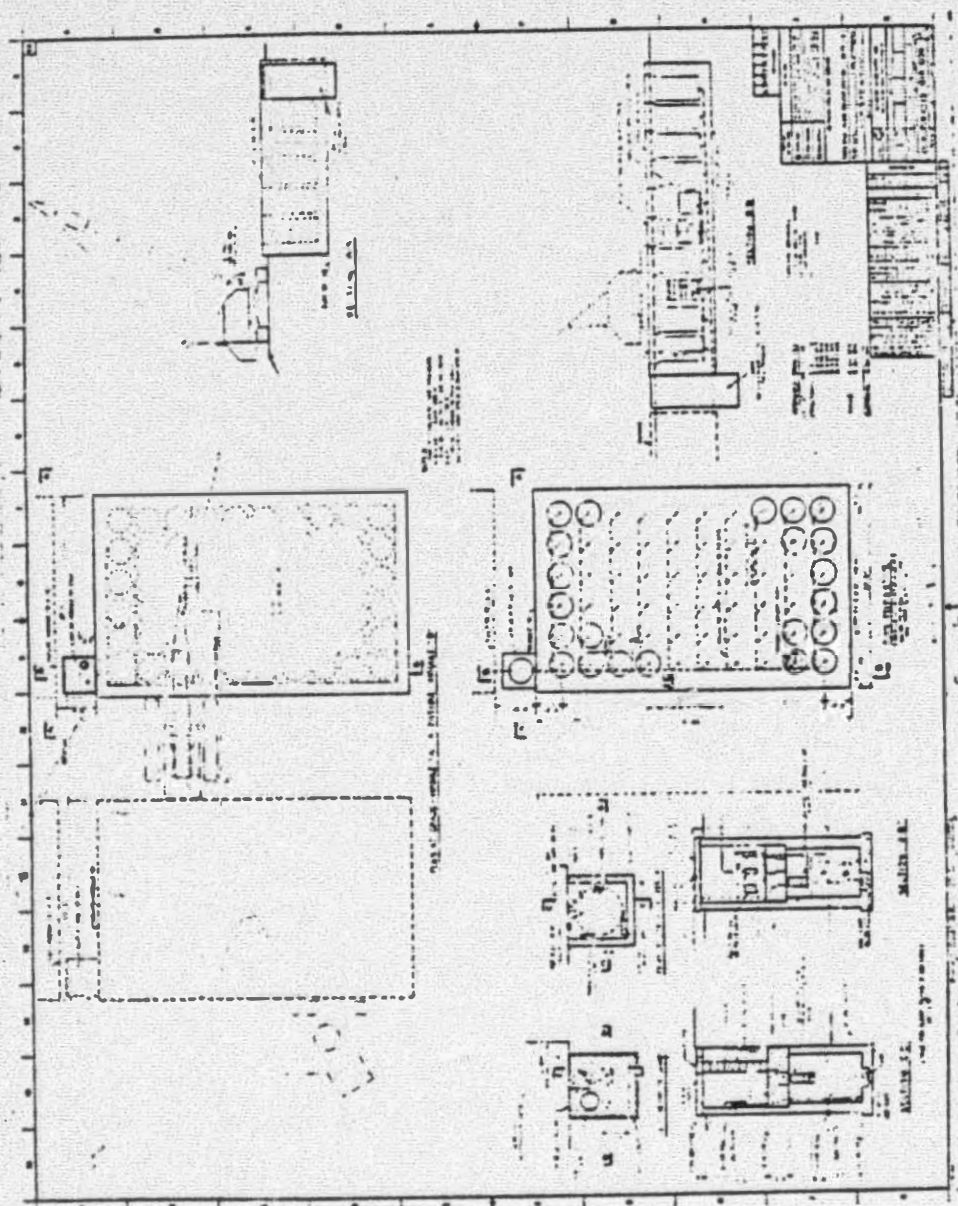
TIME
OFFICE

GUARD
FACILITY

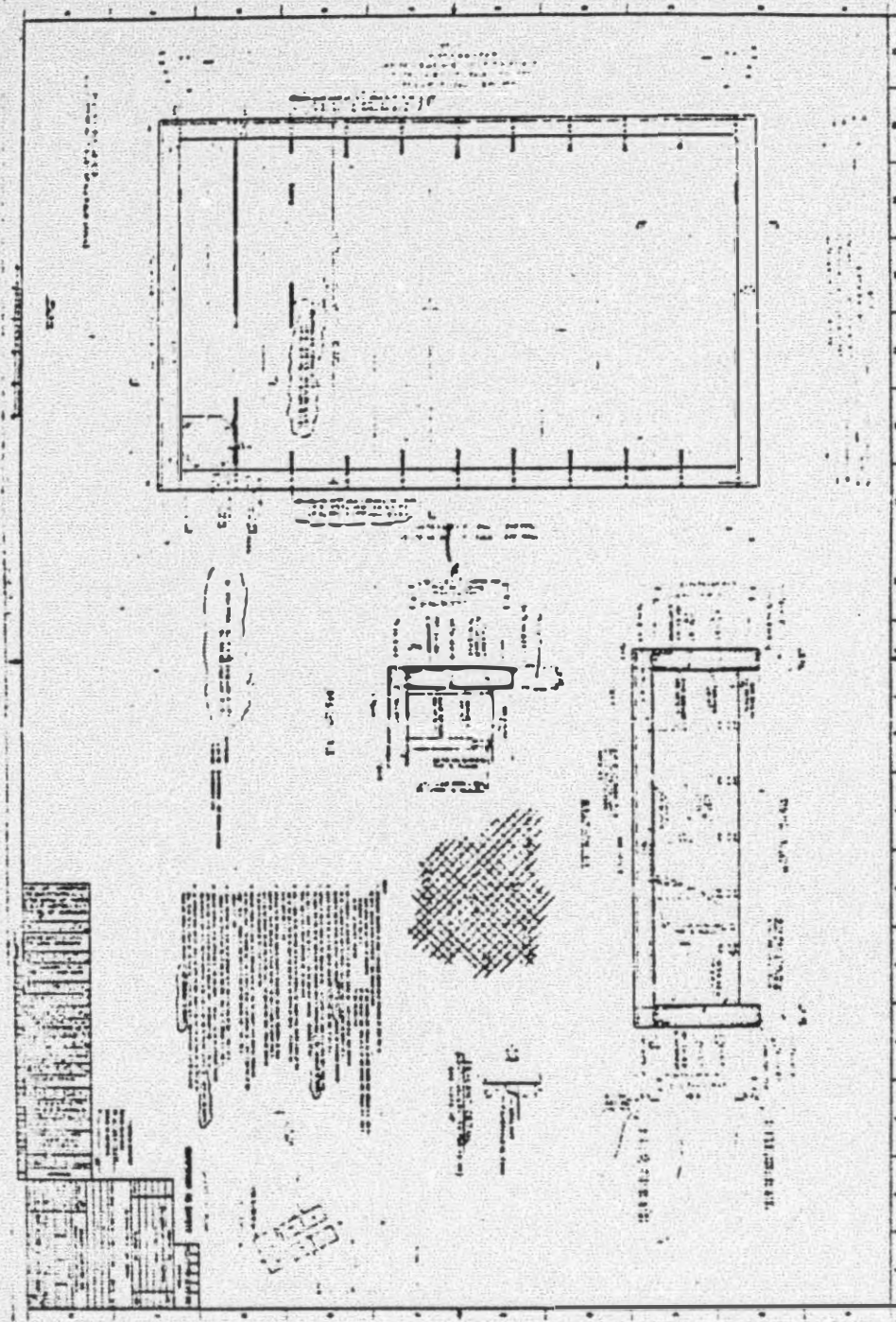
WASTE FACILITY

PLOT PLAN
FIGURE 6-1

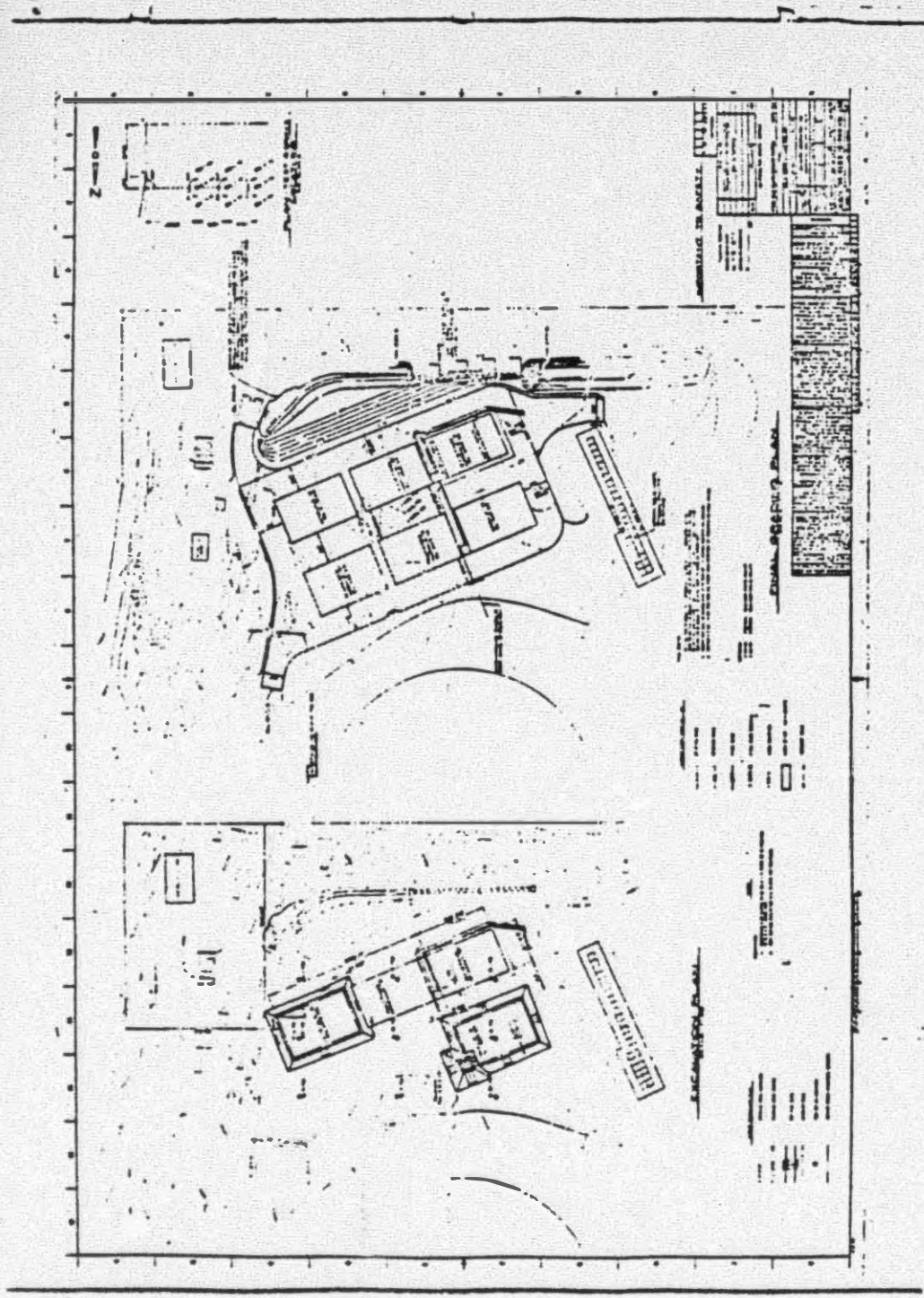
SOUTHEAST



POOR ORIGINAL



POOR ORIGINAL



POOR ORIGINAL