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AUTH.NAME AUTHOR AFFILIATION
BASKIN,K.P. Southern California Edison Co.
RECIP.NAME RECIPIENT AFFILIATION
MIRAGLIA,F. Licensing Branch 3

Withholding Request) Ltr Dec 11, 1981 - Ltr

SUBJECT: Forwards proprietary & nonproprietary version of "Process Control Program for Chem-Nuclear Sys,Inc Cement Solidification Units," per Amend 21 to FSAR Section 11.4. Proprietary version withheld (ref 10CFR2.790). Affidavit encl

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Southern California Edison Company

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K. P. BASKIN
MANAGER OF NUCLEAR ENGINEERING, SAFETY, AND LICENSING

TELEPHONE
(213) 572-1401

November 10, 1981

Director, Office of Nuclear Reactor Regulation
Attention: Mr. Frank Miraglia, Branch Chief
Licensing Branch No. 3
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Subject: Docket Nos. 50-361 and 50-362
San Onofre Nuclear Generating Station
Units 2 and 3

Amendment 21 to San Onofre Units 2&3 FSAR revised section 11.4 to indicate that in lieu of the installed urea - formalydehyde system, Southern California Edison has contracted with Chem-Nuclear Systems, Inc. (CNSI) to provide the primary means of radwaste solidification utilizing concrete as the solidification medium. Enclosed is a description of the Process Control Program for CNSI's Solidification Units which will form the basis for compliance with the Technical Specification limiting condition for operation on Solid Radioactive Waste.

Please note that three (3) copies of a "Proprietary" and five (5) copies of a "Non Proprietary" version of the program (both NRC MAIL CODE B028) are enclosed along with an affidavit, as required by 10CFR2.790(b), requesting that, and providing reasons for, the Commission withholding the "Proprietary" version of the program from public disclosure.

It is respectfully requested that the proprietary version of Chem-Nuclear Systems, Inc. Document No. SD-OP-003-Rev. D - Process Control Program for CNSI Cement Solidification Units, be withheld from public disclosure by the Commission in accordance with 10CFR2.790(b). If you should have any questions regarding the proprietary nature of the material transmitted herewith, please address these questions directly to:

Gerald P. Motl (803-798-9042)
Director, Field Operations
Chem-Nuclear Systems, Inc.
240 Stoneridge Dr. - Suite 100
Columbia, South Carolina 29210

Change:
PDR
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1/S-Non-Prop

In addition, it is requested that Southern California Edison and San Diego Gas and Electric be provided with a copy of any questions concerning the proprietary nature of this submittal.

If you have any questions or comments regarding the Process Control Program, please contact me.

Very truly yours,

W P Bushin

Enclosure

TO: U.S. Nuclear Regulatory Commission
Washington, D.C.

Attention: Frank Miraglia

Re: Chem-Nuclear Systems, Inc. Document SD-OP-003
"Process Control Program for CNSI Cement
Solidification Units"

AFFIDAVIT SUBMITTED IN SUPPORT OF REQUEST THAT
THE ABOVE DOCUMENT BE WITHHELD FROM
PUBLIC DISCLOSURE PURSUANT TO
10 C.F.R. S 2.790

STATE OF SOUTH CAROLINA)
)ss.
COUNTY OF RICHLAND)

GERALD P. MOTL states as follows on behalf of Chem-Nuclear Systems, Inc.:

1. I am the Director of Field Operations of Chem-Nuclear Systems, Inc. ("CNSI").

2. I have reviewed and am familiar with the contents of the document entitled "Process Control Program for CNSI Cement Solidification Units", CNSI Document No. SD-OP-003, and submit this affidavit in support of the request by Southern California Edison that portions of this document be withheld from public disclosure.

3. The information contained in the document provided, as described hereinabove, has been held in confidence by CNSI as follows:

CNSI has always maintained confidentiality with regard to the design and operation of its mobile solidification units. The proprietary information contained in the above document is not available from public sources.

4. The information contained in the above document is of a type customarily held in confidence by CNSI, and there is a rational basis for such confidentiality as follows:

CNSI has devoted extensive resources to the development and improvement of its radioactive waste disposal services. It is customary for CNSI to maintain confidentiality concerning services maintained for particular customers and originators of radioactive waste both for the protection of such originating entities and also to protect the competitive position of CNSI.

5. The information described hereinabove was transmitted to the Commission and received by it in confidence as follows:

The document was forwarded to the Commission along with Southern California Edison's license application.

6. The information contained in the above document is not available in public sources as follows:

The document contains a complete description of the CNSI mobile solidification unit, including hardware, chemical usages, and adjustment data, and formulas, all of which are set forth as proprietary information.

7. Public disclosure of the document requested to be withheld from such disclosure is likely to cause substantial harm to the competitive position of CNSI as follows:

CNSI has devoted extensive resources to the development and improvement of its radioactive waste disposal services. Release of the above document to the public would afford competitors of CNSI an unfair advantage and would cause substantial harm to the Company and loss of the benefit of past investment of financial resources including engineering costs. Company employees agree, as a condition of employment, to maintain and keep company proprietary information confidential. The information contained in the document is not available through public sources.

8. For the reasons set forth in the affidavit, CNSI respectfully requests that the Nuclear Regulatory Commission withhold the above document from public disclosure as permitted under 10 C.F.R. S 2.790(b)4.

Gerald P. Motl

GERALD P. MOTL
Director, Field Operations

STATE OF SOUTH CAROLINA)
)ss.
COUNTY OF RICHLAND)

On this 15th day of July, 1981, before me personally appeared Gerald P. Motl, to me known to be the Director of Field Operations of Chem-Nuclear Systems, Inc., the corporation that executed the foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that he is authorized to execute said instrument.

IN WITNESS WHEREOF, I have set my hand and affixed my official seal the day and year first above written.

NOTARY PUBLIC in and for the State of South Carolina, residing at Columbia, South Carolina

REVISIONS

REV.	DESCRIPTION	DATE	APPROVED
A	Complete Rewrite	6/24/81	
B	Incorporate Changes	9/11/81	
C	Complete Rewrite	9/29/81	
D	Incorporate Change Per Change Request # SD-OP-003-03	10/20/81	

CNSI SAFETY REVIEW BOARD APPROVAL
BY Harry F. Jones
DATE 2/11/81

REVISION STATUS

SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
REV.	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
SHEET	18																
REV.	D																

PREPARED Jim Stachus	DATE 2-9-81	**CHEM – NUCLEAR SYSTEMS, INC.**
CHECKED DJones	2-9-81	TITLE: PROCESS CONTROL PROGRAM FOR CNSI CEMENT SOLIDIFICATION UNITS
ENGINEER	2-9-81	
QUALITY	2-9-81	
APPROVED		

CONTRACT NO.	DOCUMENT NO.	REV.	SHEET
	SD-OP-003-P	D	1

TABLE OF CONTENTS

1.0 SCOPE

1.1 PURPOSE

THE PURPOSE OF THE PROCESS CONTROL PROGRAM FOR CNSI CEMENT SOLIDIFICATION UNITS IS TO ESTABLISH A SET OF PROCESS PARAMETERS WHICH PROVIDE REASONABLE ASSURANCE OF COMPLETE SOLIDIFICATION OF LOW-LEVEL RADIOACTIVE LIQUID WASTE.

1.2 APPLICABILITY

THIS PROCESS CONTROL PROGRAM SHALL BE USED BY ALL PERSONNEL OPERATING THE CNSI CEMENT SOLIDIFICATION UNIT.

2.0 REFERENCES

2.1 QA-AD-001, CNSI QUALITY ASSURANCE PROGRAM

2.2 CN-AD-019, CNSI ALARA POLICY

2.3 EN-AD-002, CNSI DESIGN CONTROL

2.4 CNSI OPERATING PROCEDURE FOR CEMENT SOLIDIFICATION UNITS, AS APPLICABLE

2.5 NUREG 0472, RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS FOR PWR

2.6 NUREG 0473, RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS FOR BWR

2.7 BRANCH TECHNICAL POSITION-ESTB 11-3, DESIGN GUIDANCE FOR SOLID RADIOACTIVE WASTE MANAGEMENT SYSTEMS INSTALLED IN LIGHT-WATER-COOLED NUCLEAR POWER REACTOR PLANTS

2.8 ANSI 199, LIQUID RADIOACTIVE WASTE PROCESSING SYSTEMS FOR PRESSURIZED WATER REACTOR PLANTS

2.9 ANSI 197, LIQUID RADIOACTIVE WASTE PROCESSING SYSTEMS FOR BOILING WATER REACTOR PLANTS

2.10 NRC REGULATORY GUIDE 1.143, DESIGN GUIDES FOR RADIOACTIVE WASTE MANAGEMENT SYSTEMS, STRUCTURES, AND COMPONENTS INSTALLED IN LIGHT-WATER-COOLED NUCLEAR POWER PLANTS

3.0 SYSTEM DESCRIPTION

3.1 PROCESS DESCRIPTION

THE CNSI CEMENT SOLIDIFICATION UNIT IS SPECIFICALLY DESIGNED TO OPTIMIZE SOLIDIFICATION OF RADIOACTIVE WASTES, EVAPORATOR BOTTOMS, ION EXCHANGE RESIN SLURRIES AND SLUDGES.

THE CEMENT PROCESS MAKES USE OF THE READILY AVAILABLE PORTLAND I CEMENT AND HYDRATED LIME ($Ca(OH)_2$) TO SOLIDIFY LIQUID WASTES. THE PROCESS IS INITIATED BY TRANSFERRING LIQUID WASTE INTO THE CNSI DISPOSABLE LINER. THE WASTE IS THEN CONDITIONED BY DEWATERING OR ADDING CONDITIONING CHEMICALS AS REQUIRED. (CONDITIONING CHEMICALS MAY ALSO BE PRELOADED INTO THE LINER). WITH CONTINUOUS AGITATION PROVIDED BY THE INSTALLED MIXER BLADES, CEMENT IS ADDED TO DEVELOP A THICK PASTE LIKE SLURRY WHICH WILL SOLIDIFY TO A HARD, WATER-FREE END PRODUCT.

3.2 PROCESS PARAMETERS

CEMENT UNDERGOES FOUR SEPARATE REACTIONS DURING ITS CURING TIME WHICH PERMANENTLY COMBINES CEMENT, WATER AND A VARIETY OF IONS FOUND IN WASTE STREAMS TO FORM A STABLE, SOLID CONCRETE END PRODUCT. CERTAIN CHEMICALS AND METALLIC IONS PRESENT IN THE WASTE ACT AS ACCELERATORS OR RETARDANTS TO THESE REACTIONS. BY PRETREATING THE WASTE WITH CHEMICALS DESIGNED TO LIMIT OR NEUTRALIZE THESE EFFECTS, A CONTROLLED, ACCEPTABLE CURE TIME CAN BE ACHIEVED AND THE WASTE-TO-ADDITIVE RATIO WILL BE SIGNIFICANTLY IMPROVED. EACH OF THE REACTIONS IS EXOTHERMIC AND BY CONTROLLING THE SPEED OF REACTION AND MINIMIZING THE TOTAL CEMENT ADDITION BY THE USE OF CERTAIN ADDITIVES, THE HEAT DEVELOPED BY LARGE VOLUME SOLIDIFICATIONS WILL ALSO BE MINIMIZED.

THE SAMPLE VERIFICATION PROCEDURE WILL SERVE TO VERIFY THE EXACT PRETREATMENT REQUIRED TO ACHIEVE THE OPTIMUM WASTE-TO-ADDITIVE RATIO. SOLIDIFICATION RATIOS HAVE BEEN DEVELOPED THROUGH A CNSI RESEARCH AND DEVELOPMENT PROGRAM. HOWEVER, WASTE MAKE-UP AND DENSITY VARIES WIDELY FROM ONE WASTE STREAM TO ANOTHER MAKING THIS VERIFICATION A NECESSARY QUALITY ASSURANCE STEP IN THE ENTIRE SOLIDIFICATION PROGRAM. THE AMOUNT OF ADDITIVES AND CEMENT TO BE USED FOR SAMPLE AND FULL SCALE SOLIDIFICATIONS ARE PROVIDED BY FIGURES 2 THROUGH 5, AS APPROPRIATE.

3.3 MOBILE UNIT DESCRIPTION

3.3.1 THE CNSI CEMENT SOLIDIFICATION UNIT IS A PORTABLE SYSTEM CONTAINING ALL PIPING, SUPPORT, CONTROL AND MONITORING EQUIPMENT NECESSARY TO SOLIDIFY RADIOACTIVE LIQUID WASTE USING THE CEMENT PROCESS.

3.3.2 THE UNIT IS COMPOSED OF SEVERAL PROCESSING SUBSYSTEMS, EACH CONTROLLING A SPECIFIC FUNCTION OF THE CEMENT PROCESS. THESE SUBSYSTEMS INCLUDE WASTE TRANSFER, CHEMICAL ADDITION, CEMENT CONVEYOR, VENT, AND DEWATER SYSTEMS. CONTROL FUNCTIONS FOR THE UNIT ARE INCORPORATED INTO THE PNEUMATIC AND MAIN CONTROL PANELS. SERVICE SUPPLIES ARE PROVIDED BY THE UTILITY AND DISTRIBUTED THROUGH THE SERVICE AIR, WATER, AND ELECTRICAL DISTRIBUTION SYSTEMS.

3.3.3 MOST OF THE MOBILE UNIT COMPONENTS ARE ARRANGED ON PORTABLE FRAMEWORKS (SKIDS) TO PROVIDE FLEXIBILITY OF OPERATIONS FOR EITHER INDOOR OR OUTDOOR USE. THE CEMENT CONVEYOR, CONTROL PANEL, PUMP SKID, HYDRAULIC SKID AND FILLHEAD CONTAIN MOST OF THE MAJOR ELEMENTS OF THE MOBILE UNIT.

3.3.4 A CLOSED-CIRCUIT TELEVISION SYSTEM IS AN INTEGRAL PART OF THE MOBILE UNIT AND ALLOWS THE OPERATOR TO MONITOR THE SOLIDIFICATION PROCESS.

3.4 System Operation

3.4.1 BEFORE BEGINNING ANY WASTE PROCESSING WITH THE CEMENT SOLIDIFICATION UNIT, THE CNSI OPERATOR SHALL COMPLETE A SUCCESSFUL SAMPLE VERIFICATION IN ACCORDANCE WITH THE SAMPLE VERIFICATION PROCEDURE OF SECTION 5.0.

3.4.2 THE SUCCESSFUL SAMPLE SOLIDIFICATION PARAMETERS ARE RECORDED ON A SOLIDIFICATION WORKSHEET (FIGURE 1). THESE PARAMETERS ARE AMPLIFIED FOR FULL SCALE SOLIDIFICATION VALUES TAKEN FROM FIGURES 2 THROUGH 5, AS APPROPRIATE.

3.4.3 ACTUAL FULL SCALE SOLIDIFICATION SHALL THEN BE CONDUCTED IN ACCORDANCE WITH THE MSU OPERATING PROCEDURE (REF. 2.4) USING THE PARAMETERS CALCULATED ON THE BATCH SOLIDIFICATION FORM ON THE BOTTOM OF FIGURE 1.

3.4.4 Sequence of Operation

THE CONDITIONING CHEMICALS MAY BE PRELOADED INTO THE LINER OR ADDED TO THE WASTE WHILE MIXING. THE ADDITION OF CHEMICALS OR WASTE MAY BE INTERRUPTED AT ANY TIME. THE MIXER MAY ALSO BE SECURED DURING WASTE OR CHEMICAL ADDITION WITH NO EFFECT ON THE PROCESS, HOWEVER, IT MUST REMAIN IN OPERATION DURING THE CEMENT ADDITION. AFTER CEMENT ADDITION, THE MIXER IS SECURED AND THE PROCESS IS COMPLETE.

3.4.5 Mixer Speed

THE MIXER SPEED SHOULD BE HIGH ENOUGH TO ALLOW COMPLETE MIXING OF WASTE CONDITIONER AND CEMENT. GENERALLY, THE SPEED WILL BE SET AT 40 RPM WHILE ADDING CONDITIONING CHEMICALS AND 40 TO 75 RPM WHEN STARTING CEMENT ADDITION. THE SPEED WILL BE INCREASED TO 100 RPM AFTER TWO-THIRDS OF THE CEMENT HAS BEEN ADDED.

3.4.6 Waste-to-Cement Ratio (by volume)

THE NORMAL WASTE-TO-CEMENT/CONDITIONER RATIO (BY VOLUME) WILL BE APPROXIMATELY 2 TO 1 FOR BORIC WASTE AND ABOVE 2.5 TO 1 FOR RESINS, POWDEX AND OTHER SOLIDS.

IF NORMAL RATIOS ARE EXCEEDED, CURE TIME MAY BE DELAYED AND THE SOLIDIFIED PRODUCT MAY HAVE FREE-STANDING WATER ON ITS SURFACE.

3.4.7 CURE TIME

CURE TIME WILL USUALLY BE 24 TO 72 HOURS AND THE TEMPERATURES MAY RISE DURING THIS TIME TO 200° F. THE LINER SHOULD BE VENTILATED UNTIL TEMPERATURE STARTS DECREASING INDICATING A COMPLETED REACTION.

4.0 REQUIREMENTS FOR SAMPLE VERIFICATION

4.1 GENERAL PRECAUTIONS

NOTE: IF DIFFICULTIES ARE ENCOUNTERED WITH ANY PART OF THIS VERIFICATION PROCEDURE OR UNEXPECTED RESULTS ARE OBTAINED, CONTACT THE SOLIDIFICATION MANAGER, PROJECT ENGINEER OR SUPERVISOR.

4.1.1 THE CHEMICALS AND CEMENT USED ARE CONSIDERED NON-TOXIC AND SAFE TO HANDLE, HOWEVER, CARE SHOULD BE USED TO AVOID BREATHING DUST. IF A LIQUID CAUSTIC IS USED FOR SPECIAL APPLICATIONS, FOLLOW THE SAFETY PRECAUTIONS OUTLINED IN THE APPROPRIATE OPERATING PROCEDURE, REF. 2.4.

4.2 RADIOLOGICAL PRECAUTIONS

4.2.1 THE CNSI OPERATOR SHALL BE SUBJECT TO THE APPLICABLE HEALTH PHYSICS AND SAFETY PRECAUTIONS OF THE FACILITY PROVIDING THE RADIOACTIVE WASTE.

4.2.2 LABORATORY GLOVES, FACE SHIELD AND AN APRON SHALL BE WORN WHILE HANDLING, COLLECTING AND TESTING OF ALL SAMPLES.

4.2.3 THE CNSI OPERATOR SHALL ESTABLISH RADIOLOGICALLY CLEAN AND CONTAMINATED ZONES IN THE SAMPLE PROCESS AREA TO PREVENT THE POSSIBLE SPREAD OF CONTAMINATION.

4.3 PREREQUISITES

4.3.1 WASTE RECIRCULATION

4.3.1.1 DUE TO THE IMPORTANCE OF OBTAINING A REPRESENTATIVE SAMPLE FOR USE IN THE VERIFICATION PROCEDURE, THE WASTE GENERATING FACILITY PERSONNEL SHALL CONFIRM THAT THE CONTENTS OF THE WASTE STORAGE TANK HAVE EITHER BEEN RECIRCULATED FOR A MINIMUM OF THREE VOLUME TURNOVERS OR ARE ADEQUATELY MIXED TO ACHIEVE A HOMOGENEOUS MIXTURE.

4.3.1.2 ANY NUMBER OF MECHANICAL OPERATIONS OF THE WASTE STORAGE TANK MAY NEGATE THE EFFECTS OF PREVIOUS RECIRCULATION/AGITATION PERIOD. THESE OPERATIONS WOULD INCLUDE THE FOLLOWING:

4.3.1.2.1 INTRODUCTION OF ADDITIONAL WASTE INTO THE STORAGE TANK AFTER RECIRCULATION HAS COMMENCED.

4.3.1.2.2 SECURING OF RECIRCULATION WHILE DRAWING THE VERIFICATION SAMPLE.

4.3.1.2.3 SHIFTING FROM A RECIRCULATION MODE TO A TRANSFER MODE.

4.3.1.3 IF ANY OF THE SITUATIONS LISTED ABOVE OCCUR, IT WILL BE NECESSARY TO REPEAT THE RECIRCULATION PROCESS AND SAMPLE VERIFICATION PROCEDURE OF SECTION 5.0 IN ORDER TO RE-ESTABLISH THE SOLIDIFICATION PROCESS PARAMETERS.

4.3.2 THE ACTIVITY SUPPLYING WASTE SHALL IDENTIFY THE WASTE PROPERTIES AS FAR AS PRACTICABLE, I.E; OIL CONTENT, DENSITY, TYPE, ESTIMATED ACTIVITY, DETERGENT CONTENT, ETC. WASTE CONTAINING OIL ABOVE ONE PERCENT BY VOLUME SHALL NOT BE SOLIDIFIED BY THIS PCP.

4.3.3 EQUIPMENT

EQUIPMENT REQUIRED TO USE DURING THE SAMPLE VERIFICATION PROCEDURE IS LISTED IN TABLE 1. THE TABLE INDICATES THE MINIMUM QUANTITY REQUIRED TO BEGIN A VERIFICATION PROCEDURE.

THE CNSI OPERATOR SHALL ENSURE THAT ALL NECESSARY EQUIPMENT IS AVAILABLE OR ADEQUATE SUBSTITUTES ARE AVAILABLE.

THE CNSI OPERATOR SHALL ENSURE THAT ADDITIVES RECEIVED COMPLY WITH THE CHEMICAL COMPOSITION NECESSARY FOR THIS PROCESS.

TABLE 1
EQUIPMENT REQUIRED FOR TESTING SAMPLES

600-1000 ML CONTAINERS WITH LIDS (6)
STIRRING DEVICES (5)
PIPETTES (2)
PIPETTOR
0-212°F THERMOMETER
pH PAPER: WIDE RANGE (1.0 TO 11.0)
NARROW RANGE (8.0 TO 12.0)
0-600 OR 0-1000 GM TRIPLE BEAM BALANCE
IF LIQUID CAUSTIC IS USED:
- 50 ML BURET (2)
- RING STAND
- BURET CLAMP (2)

MARKING PEN
SAMPLE HEATING OVEN, THERMOSTATICALLY CONTROLLED FROM 100° F TO 180° F.

CHEMICALS TO BE USED SHOULD BE TAKEN FROM THE FULL SCALE SOLIDIFICATION CHEMICALS AND ARE LISTED ON THE RESPECTIVE FIGURE FOR EACH WASTE FORM.

4.4 SAMPLE ACCEPTANCE CRITERIA

IN ORDER TO ENSURE ACCEPTABLE SOLIDIFICATION HAS OCCURRED, THE CNSI OPERATOR SHALL CONFIRM THAT ALL ACCEPTANCE CRITERIA ARE MET AS FOLLOWS:

4.4.1 VISUAL INSPECTION OF THE MIXTURE AFTER CEMENT ADDITION WILL CONFIRM THAT THE MIXTURE IS HOMOGENEOUS WITH NO FREE WATER ON THE SURFACE.

4.4.2 VISUAL INSPECTION OF THE END PRODUCT AFTER HARDENING IS A UNIFORM, LIQUID FREE, FREE STANDING MONOLITH.

4.4.3 THE END PRODUCT RESISTS PENETRATION WHEN PROBED WITH A PENCIL SIZE PROBE.

4.5 REQUIREMENTS FOR SAMPLE VERIFICATION

4.5.1 VERIFY THAT ALL MATERIAL LISTED IN TABLE 1 IS AVAILABLE AND READY TO USE IN THE AREA SELECTED BY THE UTILITY FOR SOLIDIFICATION SAMPLING.

4.5.2 REFER TO FIGURES 2 THROUGH 5, AS APPLICABLE, WHEN CONDUCTING SAMPLE VERIFICATION. USE THE SOLIDIFICATION WORK SHEET, FIGURE 1, FOR ALL SAMPLE SOLIDIFICATIONS.

4.5.3 SAMPLE REQUIREMENTS

4.5.3.1 A SAMPLE SHALL BE SOLIDIFIED PRIOR TO FULL SCALE SOLIDIFICATION OF WASTE. IF THERE IS NO CHANGE IN THE CHEMICAL COMPOSITION OF THE WASTE AS VERIFIED BY THE UTILITY, TEST RESULTS AND FULL SCALE SOLIDIFICATIONS WILL BE CONSIDERED REPRODUCIBLE. THEREAFTER, A SAMPLE SOLIDIFICATION WILL BE CONDUCTED PRIOR TO THE TENTH BATCH SOLIDIFIED FROM THE SAME SOURCE OF WASTE.

4.5.3.2 THE CNSI OPERATOR SHALL ENSURE THAT THE SAMPLE IS REPRESENTATIVE (I.E; THOROUGHLY MIXED) AND THAT THE SAMPLE LINE IS PROPERLY PURGED PRIOR TO DRAWING THE PCP SAMPLE.

5.0 SAMPLE VERIFICATION

5.1 CALCULATE AND RECORD THE AVAILABLE INFORMATION ON FIGURE 1 FOR ALL WASTE TYPE SAMPLE VERIFICATIONS.

5.2 USE THE APPROPRIATE FIGURE (FIGURES 2 THROUGH 5) FOR THE SAMPLE AND FULL SCALE CALCULATIONS.

NOTE: WASTE SOLIDIFIED ON A SMALL SCALE WILL CURE MUCH SLOWER BECAUSE OF THE EXCESSIVE SURFACE TO VOLUME RATIO FOR HEAT TRANSFER. SAMPLE STORAGE IN AN APPROVED CONSTANT TEMPERATURE OVEN WILL ENABLE A MORE MEANINGFUL EVALUATION ON AN OVERNIGHT BASIS.

6.0 ADMINISTRATIVE PROCEDURES

6.1 MAINTENANCE OF RECORDS

6.1.1 THE CNSI OPERATOR SHALL FORWARD A COPY OF ALL COMPLETED SAMPLE VERIFICATION FORMS TO THE MANAGER, SOLIDIFICATION SERVICES FOR REVIEW FOLLOWING COMPLETION OF LINER SOLIDIFICATION.

6.1.2 FIGURE 1 SHOULD BE USED AS A COVER SHEET WHEN FORWARDING RECORDS.

FIGURE 1

SOLIDIFICATION WORKSHEET

OPERATOR _____ DATE _____

UTILITY _____

WASTE TYPE/DESCRIPTION: _____

_____

(CONCENTRATION, RESIN TYPE, DENSITY, ETC.)

SAMPLE SOLIDIFICATION

SAMPLE VOLUME _____ ML

CEMENT (PORTLAND I) _____

_____ _____

_____ _____

_____ _____

_____ _____

SAMPLE EVALUATION: (TIME, DESCRIPTION, ACCEPTABLE, ETC.) _____

_____

_____

_____

BATCH SOLIDIFICATION

WASTE VOLUME _____

CEMENT _____

_____ _____

_____ _____

_____ _____

WASTE ALARM _____

HIGH LEVEL* _____

CEMENT ALARM _____

*HIGH LEVEL ALARM SET 2 INCHES BELOW LINER TOP

NOTE: THE CEMENT LEVEL ALARM IS A REDUNDANT PROTECTIVE DEVICE. THE EXACT AMOUNTS OF CEMENT ADDED WILL BE MONITORED BY THE LOAD CELL COMPUTER.

FIGURE 5

LINER AND CASK CALCULATIONS

LINER	L21-300	L14-195	L14-170	L8-120	L7-100	L6-80
DIAMETER	82"	76"	74"	61"	74.5"	58"
HEIGHT	104.5"	75.5"	69.37"	71.5'	37"	54"
VOLUME	317	196	174	120	93	82
USEABLE VOLUME (2" SAFETY FACTOR)	311	190	169	116	88	79
FT^3/IN	3.05	2.62	2.52	1.69	2.52	1.53
WEIGHT	2400	1850	1550	1250	1400	1100
CASK PAYLOAD	27250	17700	14000	20000	13000	7500