

Procurement Specification Cover Sheet

1. Title Furnishing and Delivery of Tank Closure Grout			
2. Specification No. C-SPP-F-00055		3. Revision 4	
4. Page 1 of 23			
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8. Cognizant Technical Function <i>AGanguly</i>		9. Additional Reviewer <i>[Signature]</i>	
Name Amit Ganguly		Date 12/18/12	
Title CSA Engineer		Name Randall W. Forty	
Department SRR Engineering/Design Services		Date 12/18/12	
		Title CSA Discipline Lead	
		Department SRR Engineering/Design Services	
9. Additional Reviewer <i>[Signature]</i>			
Name William E. Narrows			Date 12/18/12
Title Procurement Specification Authority			
Department SRR Engineering/Design Services			
10. Cognizant Quality Function <i>H. Sareen</i> 12/20/12			
Name Bruce A. Dragon <i>for</i> Harish K. Sareen			Date 12/20/12
Title Construction Quality Services Manager			
Department SRR ESH & QA & CA/Quality Assurance			
11. Manager <i>[Signature]</i>		13. Other Approver	
Name Surendra K. Gupta		Date 12/18/12	
Title Project Engineer		Name Kim A. Hauer <i>[Signature]</i>	
Department SRR Engineering/ Design Services		Date 12/19/12	
		Title Manager	
		Department Closure and Waste Disposition	
12. Other Approver <i>AGanguly for C. Langton, per telecon 12/19/12</i>		14. Other Approver <i>AGanguly for G. Arthur per Telecon 12/19/12</i>	
Name Christine A. Langton		Date 12/19/12	
Title Advisory Scientist		Name Gregory C. Arthur	
Department Savannah River National Laboratory		Date 12/19/12	
		Title Manager/Design Authority	
		Department SRR Engineering/Closure Project Engineering	

Procurement Specification Revision History Sheet

1. Specification No C-SPP-F-00055 Furnishing and Delivery of Tank Closure Grout		2. Revision 4	3. Page 2 of 23
4. Date	5. Revision No.	6. Paragraph No.	7. Description of Changes
3/23/2011	0	All	Initial Issue
5/13/2011	1	3.1.3.1.A	Deleted removal of truck chute wash water by Supplier; added SRR.
		3.5.3	Added new item to SRS furnished services for truck chute wash area at point of delivery and water disposal.
		3.6.4.3	Editorial correction – changed concrete to grout.
		4.1.4.3.A	Deleted removal of truck chute wash water by Supplier; added SRR.
8/25/2011	2	3.2.1.2.A.7	Added compressive strength requirements
		3.2.3.10	Added shrinkage compensating component
		Attachment 5.2	Added shrinkage compensating component
		Attachment 5.3	Revised Inspection and testing requirements
		Attachment 5.5	Revised mix designs, added shrinkage compensating component
12/03/2012	3	<p><u>Major Revision</u> – 2.2.2; 3.2.1.2, 3.2.3.8, 3.2.3.9; 3.2.3.10; 3.4.4; 3.6.1.2; 3.6.3; 3.6.4; 3.8.2.3; 3.8.4.1; 3.8.5.1; 4.1.4.1; 4.1.5; Attachments 5.1, 5.2, 5.3, & 5.5</p>	<p>Incorporated lessons learned from Tanks 18/19F closure throughout the specification for closure of Tanks 5 & 6 F and other future tanks by grouting. <u>Revisions are noted by revision bars</u>, and summarized below: Deleted use of shrinkage compensating component; updated applicable ASTM standards; deleted flow rate and stability testing requirements throughout the specification; allowed conditional submittal of Certificates of Conformance when laboratory test results are considered proprietary; allowed alternative approval by SRR for testing laboratory qualification; updated average capacity of batch plant for an eight hour period; deleted tank specific data and statements; added electronic file submittals for EDR and QVDR documents; clarified intent of air content testing; optimized compressive strength sampling and testing requirements; revised Attachments 5.3 and 5.5 for consistency with changed requirements, as noted; deleted use of “SIKA ViscoCrete” as HRWR in Attachment 5.5 and corrected units of measure for mix components.</p> <p>Incorporated DCF #C-DCF-F-01524, including SDDR# 11565.</p>
12/18/12	4	Cover Sheet	Added additional “Other Approver” Block

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1.0 SCOPE

1.1 General Description

1.1.1 Furnishing and Delivery of Tank Closure Grout

1.1.1.1 Furnish and deliver production Tank Closure Grout in accordance with the requirements provided in this document. Perform trial batching as required to demonstrate design mix will produce production grout to meet specification requirements.

1.1.2 Work Included

1.1.2.1 Qualification, operation and maintenance of a Batch Plant and the necessary equipment for batching, mixing and delivery.

1.1.2.2 Initial qualification of Tank Closure Grout utilizing the supplier's source materials and Batch Plant. Provide sufficient trial batching at the Batch Plant utilizing material components which represent the actual material components to be used for Tank Closure Grout production.

1.1.2.3 Provide material components (and component testing) that conform to the requirements of this document.

1.1.2.4 Provide sufficient facilities and equipment to store and protect the material components.

1.1.2.5 Grout Mix Re-qualification if required due to changes resulting from decisions or actions on the part of the Tank Closure Grout supplier.

1.1.2.6 Provide qualified testing laboratory services if required for the qualification, operation and maintenance of the Batch Plant.

1.1.3 Related Work Not Included

1.1.3.1 Forming, placing, consolidating, finishing, curing or protection at the placement site.

1.1.3.2 Inspection and testing of the trial batches and grout initial qualification testing.

1.1.3.3 Tank Closure Grout production grout testing.

1.1.3.4 Testing for Tank Closure Grout mix re-qualification if required due to changes by SRR.

1.1.3.5 Grout trial batching testing, grout mix initial qualification testing, and grout mix re-qualification testing, will be performed at the production facility. Production grout testing will be performed at the point of delivery.

2.0 REFERENCES

2.1 Definitions

2.1.1 Acronyms

AEA	Air-Entraining Admixture
CY	Cubic Yard
EDR	Engineering Document Requirements
HRWR	High Range Water Reducing Admixture
QVDR	Quality Verification Document Requirements
RA	Retarding Admixture (Hydration Stabilizer)

SDDR	Supplier Deviation Disposition Request
SRNL	Savannah River National Laboratory
SRR	Savannah River Remediation, LLC
SRS	Savannah River Site
VMA	Viscosity Modifying Admixture
WRA	Water Reducing Admixture

2.1.2 Terms

- 2.1.2.1 Deviation – any departure from the requirements contained in the purchase order and specification which the supplier proposes to incorporate if approved by SRS.
- 2.1.2.2 Nonconformance – a deficiency in component characteristic, as defined in SRS approved drawings and documents.
- 2.1.2.3 Point of Placement - is the end of the pump hose or tremie, i.e. the final “as-cast” grout location inside the tank.
- 2.1.2.4 Point of Delivery - is the end of the chute on the delivery truck at the SRS F-Tank Farm.
- 2.1.2.5 Repair – restoring a nonconformance characteristic to a condition such that the capability of an item to function reliably and safely is unimpaired even though that item still does not conform to the original requirement.
- 2.1.2.6 Rework – the process by which a nonconforming item is made to conform to original requirements by completion or correction.
- 2.1.2.7 Use-as-is – disposition permitted for a nonconforming item when it can be established that the item is satisfactory for its intended use.

2.2 Codes / Standards / Orders / Regulations

2.2.1 General

- 2.2.1.1 Materials, production, examination and testing shall be in accordance with SRS accepted national codes and standards editions as invoked and supplemented by this specification.
- 2.2.1.2 Obtain SRR acceptance via a Supplier Deviation Disposition Request (SDDR) for editions and/or addenda of Codes / Standards not specifically authorized by this specification prior to use.

2.2.2 Required Codes / Standards

2.2.2.1 American Concrete Institute (ACI)

- A. 211.1-91 (R2009), Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
- B. 214R-11, Guide to Evaluation of Strength Test Results of Concrete
- C. Deleted
- D. 237R-07, Self-Consolidating Concrete
- E. 301M-10, Specifications for Structural Concrete
- F. 304.2R-96 (R2008), Placing Concrete by Pumping Methods
- G. 305R-10, Guide to Hot Weather Concreting
- H. 306R-10, Guide to Cold Weather Concreting

2.2.2.2 American Society for Testing and Materials (ASTM)

- A. C 29/C 29M-09, Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
- B. C 31/C 31M-12, Standard Practice for Making and Curing Concrete Test Specimens in the Field
- C. C 33/C 33M-11a, Standard Specification for Concrete Aggregates
- D. C 39/C 39M-12, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- E. C 40/C40M-11, Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
- F. C 88-05, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
- G. C 94/C 94M-12, Standard Specification for Ready-Mixed Concrete
- H. C 117-04, Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
- I. C 123/C123M-12, Standard Test Method for Lightweight Particles in Aggregate
- J. C 131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- K. C 136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- L. C 138/C 138M-12, Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
- M. C 142/C142M-10, Standard Test Method for Clay Lumps and Friable Particles in Aggregates
- N. C 150/C 150M-12, Standard Specification for Portland Cement
- O. C 172/C 172M-10, Standard Practice for Sampling Freshly Mixed Concrete
- P. C 231/ C231M-10, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
- Q. C 232/C 232M-09, Standard Test Methods for Bleeding of Concrete
- R. C 260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete
- S. C 295/C295M-12, Standard Guide for Petrographic Examination of Aggregates for Concrete
- T. C 470/C 470M-09, Standard Specification for Molds for Forming Concrete Test Cylinders Vertically
- U. C 494/C 494M-12, Standard Specification for Chemical Admixtures for Concrete
- V. C 535-09, Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- W. C 566-97 (R2004), Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
- X. C 617/C617M-11, Standard Practice for Capping Cylindrical Concrete Specimens
- Y. C 618-12, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- Z. C 989/C989M-12a, Standard Specification for Slag Cement for Use in Concrete and Mortars

- AA. C 1064/C 1064M-11, Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
- BB. C 1077-11c, Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
- CC. C 1105-08a, Standard Test Method for Length Change of Concrete Due to Alkali-Carbonate Rock Reaction
- DD. C 1260-07, Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
- EE. C 1611/C 1611M-09b, Standard Test Method for Slump Flow of Self-Consolidating Concrete
- FF. E 329-11c, Standard Specification for Agencies Engaged in Construction Inspection, Testing or Special Inspection

2.2.2.3 National Ready-Mixed Concrete Association (NRMCA)

- A. QC3, 2011, QC Manual Section 3, "Plant Certification Check List", Eleventh Revision

2.2.2.4 American Society of Mechanical Engineers (ASME)

- A. NQA-1, 2008, Quality Assurance Requirements of Nuclear Facility Applications

2.2.3 Orders / Regulations

2.2.3.1 Occupational Safety and Health Administration (OSHA)

- A. 29 CFR 1926, 2012, Safety and Health Regulations for Construction

2.3 Applicable Documents

2.3.1 Form OSR 45-4, Supplier Deviation Disposition Request (SDDR)

3.0 REQUIREMENTS

3.1 Performance Requirements

3.1.1 Production Facility

3.1.1.1 Production Facility, mixers, and agitators: Conform to ASTM C 94/C 94M.

3.1.1.2 Production Facility: Meet the NRMCA QC3, Plant Certification Check List (NRMCA Certification) requirements for storage and handling, batching, mixing and transporting equipment.

- A. Maintain NRMCA Certification through completion of the contract.
- B. Submit NRMCA Certification.

3.1.1.3 Measuring Material Components and Batching: In accordance with ASTM C 94/C 94M unless noted otherwise in this document.

3.1.1.4 Monitor and record the moisture content of the fine and coarse aggregates used.

- A. Adjust the quantity of the mix water based upon the fine and coarse aggregate moisture contents such that the total quantity of water in any batch does not exceed the quantity specified for the grout mixes.

3.1.1.5 Provide grout with a temperature range between fifty (50) and ninety (90) degrees Fahrenheit at the point of delivery.

- A. Use ACI 306R during cold weather concreting.
- B. Use ACI 305R during hot weather concreting.
- C. The range between fifty (50) and ninety (90) degrees Fahrenheit at the point of delivery is an attribute used for information only. Test results at receipt will not be

used as acceptance criteria; rather, the test results will be used as information to recommend adjustments to the Supplier for batching succeeding loads in attempt to bring the material into the desired range.

- D. Determine if ice is needed in order to meet the criteria of hot weather concreting.
- E. Contact SRR for assistance with the determination of whether ice is necessary.

3.1.2 Batch Ticket

3.1.2.1 Provide batch tickets in accordance with Section 14.1 of ASTM C 94/C 94M.

- A. Include the additional information of Section 14.2 of ASTM C 94/C 94M except that the material components require traceability to the material components previously accepted by SRR by providing the brand, type, class, grade or source of the material components or by providing the Supplier's material identification numbers for the material components.

3.1.2.2 Designate the start time for mixing when all the solid materials are in the drum for a stationary mixer.

- A. Designate the revolutions on the truck drum revolution counter at the end of discharge from the stationary mixer into the truck.

3.1.2.3 If truck mixing is utilized, designate the start time for mixing as the time of the first addition of water to the dry material components.

- A. Designate the revolutions on the truck drum revolution counter at the first addition of water to the dry material components.

3.1.2.4 Designate the amount of water in gallons, not exceeding the water-to-cementitious material ratio, available for addition by the direction of SRR at the point of delivery.

3.1.2.5 Indicate the amount of high range water reducer added at the point of delivery.

3.1.2.6 Initial the batch ticket.

3.1.3 Additional Items

3.1.3.1 Establish a washing and cleaning area at the Batch Plant in order to wash out Supplier operated truck chutes and mixer drums.

- A. Supplier shall wash truck chutes in a SRR designated area at the point of delivery.

3.1.3.2 Provide a communication system between the Batch Plant and the point of delivery.

3.2 Design Requirements

3.2.1 Production Mixes

3.2.1.1 General

- A. Initial mix designs are described in Attachment 5.5.
- B. Provide grout utilizing the local material components at the Batch Plant.
- C. Do not make adjustments to the grout mixes without prior approval of SRR.
 - 1. Re-qualify grout mixes if adjustments are required.
 - 2. Propose Revised Mix Designs via SDDR.
- D. Do not change the material components without prior approval of SRR.
 - 1. Re-qualify grout mixes if changes in material components are required.
 - 2. Propose Material Component Changes via SDDR.
- E. Do not change the source of material components without prior approval of SRR.
 - 1. Re-qualify grout mixes if changes are required.
 - 2. Propose Material Component Source Changes via SDDR.

3.2.1.2 Tank Closure Grout Mix

- A. Tank Closure Grout Trial Batching and Initial Qualification Requirements**
 - 1. Complete sufficient trial batching to demonstrate capability to provide Tank Closure Grout production to meet specification requirements. Mix uniformity to comply with ASTM C 94/C 94M. Grout mix testing by SRR.
 - 2. Materials used in trial batching shall be representative of the materials to be used to meet Tank Closure Grout production requirements. Grout mix components shall be tested by the Supplier as described in Sections 3.2.3.2 through 3.2.3.10. Submit Trial Batching Grout Mix Component Test Results concurrent with performing grout mix trial batching and initial qualification.
 - 3. The minimum trial batch size shall be 3 CY.
 - 4. The number of trial batches, and resulting trial batch data, shall be sufficient to establish the ability to meet the minimum specified compressive strength requirement shown in Attachment 5.5, through providing the minimum required average strength requirement following the criteria shown in Appendix of ASTM C 94/C 94M and Chapter 4 of ACI 214R.
 - 5. The trial batching shall demonstrate the ability to meet the minimum slump flow requirement specified in Attachment 5.5.
 - 6. The trial batching shall demonstrate the ability to meet the maximum bleed of 0.0 after 24 hours.
 - 7. Trial batching shall demonstrate that the minimum compressive strength of the mix at 28 days is 2000 psi.
- B. Re-qualification (If required due to changes by Supplier)**
 - 1. Design, proportion, and test in accordance with ACI 211.1, ACI 301 and ACI 304.2R. Grout mix testing by Supplier.
 - 2. Submit Re-Qualification Test Results for Grout Mix and Components
- C. The Supplier shall not produce any grout batch at the Supplier's Batch Plant with an amount of water which exceeds the maximum amount of water allowed per grout batch. The maximum amount of water in any grout batch shall not exceed the amount shown in the approved grout mix; the amount of water is limited as the maximum water to cementitious materials ratio. The supplier may use less than the maximum amount of water to produce any grout batch, and then compute the amount of any additional water which could be added later without exceeding the maximum amount of water allowed per grout batch. This additional amount of water which could be added later to the grout batch without exceeding the maximum amount of water allowed per grout batch will be defined as the "hold water amount", and will be stated on the batch ticket.**
 - 1. Additional water, up to the "hold water amount" stated on the batch ticket, may be added by the direction of SRR at the point of delivery.
- D. Retarding Admixture (Hydration Stabilizer)**
 - 1. Provide per the manufacturer's written instructions.
 - 2. May be adjusted by the direction of SRR to meet the requirements as sampled at the discharge of the chute.
 - 3. SRR will notify the Supplier of the required adjustment.
 - 4. The maximum amount of the admixture shall not exceed that specified on Attachment 5.5, or as specified in the latest approved grout mix.

- E. High Range Water Reducing Admixture (HRWR) and Viscosity Modifying Admixture (VMA)
 - 1. Provide compatible admixtures per the manufacturer's written instructions.
 - 2. May be adjusted by the direction of SRR at the point of delivery to meet the working range requirements, if any of the following are not within the working range requirements as sampled at the discharge of the chute;
 - a. Slump flow.
 - b. Bleed.
 - 3. SRR will notify the Supplier of the required adjustment.
 - 4. The maximum amount of the admixture shall not exceed that specified on Attachment 5.5, or as specified in the latest approved grout mix.

3.2.2 Production Mix Identifiers

3.2.2.1 Specified on Attachment 5.5.

3.2.2.2 Ensure all documentation identifies the production mix identifiers assigned to the Batch Plant.

3.2.3 Material Components

3.2.3.1 Water and Ice

- A. Provide water and ice that conforms to ASTM C 94/C 94M.
- B. Do not use wash water for batching unless directed by SRR.

3.2.3.2 Portland Cement

- A. Provide Portland cement that meets the requirements of ASTM C 150, Type I or Type II and contains no more than 0.60 percent, by weight, of equivalent alkalis calculated as: $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$.
- B. For each shipment of Portland cement used, obtain and retain a Manufacturer's Certification Report on chemical composition requirements and physical requirements that confirms compliance with ASTM C 150.
- C. Submit Portland Cement Certification.

3.2.3.3 Slag Cement

- A. Provide a Slag Cement that meets the requirements of ASTM C 989, Grade 100.
- B. For each shipment of Slag Cement used, obtain and retain a Manufacturer's Certification Report on chemical composition requirements and physical requirements that confirms compliance with ASTM C 989, Grade 100.
 - 1. Submit Slag Cement Certification.
- C. For the first shipment of Slag Cement from a manufacturer, obtain and retain documentation, such as laboratory test results, showing conformance for the reactivity with cement to ASTM C 989 for Grade 100 Slag Cement.
 - 1. Submit Slag Cement Documentation.

3.2.3.4 Fly Ash

- A. Provide a fly ash that meets the requirements of ASTM C 618, Class F except that the loss on ignition shall not exceed six (6) percent. The Ammonia content in the Fly Ash shall be zero.
- B. For each shipment of fly ash used, obtain and retain documentation, such as laboratory test results, showing conformance to the chemical requirements and physical requirements of ASTM C 618 for the Class F fly ash.

1. Documentation shall also show the loss on ignition for the fly ash and the Ammonia content.
2. Submit Standard Fly Ash Documentation.
- C. For the first shipment of fly ash from a manufacturer, obtain and retain documentation, such as laboratory test results, showing conformance to the reactivity with cement alkalis of the supplementary optional physical requirements of ASTM C 618 for the fly ash.
 1. Previous laboratory testing, field performance records or equivalent documentation are acceptable.
 2. Submit Initial Fly Ash Documentation.

3.2.3.5 Fine Aggregate

- A. Provide a fine aggregate that meets the requirements of ASTM C 33/C 33M for fine aggregates and as specified in this Section.
- B. For each source of fine aggregate used, obtain and retain documentation, such as laboratory test results, showing conformance to the requirements of ASTM C 33/C 33M for fine aggregates and as specified in this Section.
- C. Gradation limits shall be in accordance with Section 6 of ASTM C 33/C 33M.
- D. Base fineness modulus shall be in accordance with Section 6.2 of ASTM C 33/C 33M.
- E. Fineness modulus shall not vary from the base fineness modulus more than provided in Section 6.4 of ASTM C 33/C 33M.
- F. The limit for clay lumps and friable particles is provided in Table 2 of ASTM C 33/C 33M.
- G. The limit for material finer than 75- μ m (No. 200) sieve is provided in Table 1 of ASTM C 33/C 33M and shall be for concrete subject to abrasion.
- H. Use the limit for coal and lignite provided in Table 2 of ASTM C 33/C 33M.
- I. Limit organic impurities in accordance with Section 7.2 of ASTM C 33/C 33M.
- J. Limit for soundness is provided in Section 8 of ASTM C 33/C 33M for magnesium sulfate.
- K. The expansion limit for the alkali-silica reaction is 0.10% at sixteen (16) days.
 1. If the expansion limit is not met, follow the procedure of Appendix X1, Section X1.3.4 of ASTM C 33/C 33M for acceptance.
- L. Perform testing of fine aggregate for re-qualification in accordance with the definition for fine aggregate in the Initial Qualification and Re-Qualification Examination/Testing of Aggregates Section 4.1.2.
 1. Submit Fine Aggregate Re-Qualification Test Results.
- M. Perform testing of fine aggregate for production Tank Closure Grout in accordance with the definition for fine aggregate in the Production Examination/Testing of Aggregates and Frequency Section 4.1.3.
 1. Submit Fine Aggregate Test Results.

3.2.3.6 Coarse Aggregate

- A. Provide a coarse aggregate that conforms to the requirements of ASTM C 33/C 33M for coarse aggregates and as specified in this Section.
- B. For each source of coarse aggregate used, obtain and retain documentation, such as laboratory test results, showing conformance to the requirements of ASTM C 33/C 33M for coarse aggregates and as specified in this Section.

- C. Gradation limits shall be in accordance with Section 10 of ASTM C 33/C 33M.
- D. The limit for clay lumps and friable particles is provided in Table 4 of ASTM C 33/C 33M and shall be for Class Designation 3M.
- E. The limit for material finer than 75-mm (No. 200) sieve is provided in Table 4 of ASTM C 33/C 33M and shall be for Class Designation 3M.
- F. The limit for coal and lignite is provided in Table 4 of ASTM C33/C 33M and shall be for Class Designation 3M.
- G. The limit for chert is provided in Table 4 of ASTM C 33/C 33M and shall be for Class Designation 3M.
- H. The limit for the sum of clay lumps, friable particles, and chert is provided in Table 4 of ASTM C 33/C 33M and shall be for Class Designation 3M.
- I. The limit for soundness is provided in Table 4 of ASTM C 33/C 33M and shall be for Class Designation 3M.
- J. The expansion limit for the alkali-silica reaction is 0.10% at sixteen (16) days.
 - 1. If the expansion limit is not met, follow the procedure of Appendix X1, Section X1.3.4 of ASTM C33/C 33M-08 for acceptance.
- K. The average expansion limits for the alkali-carbonate reaction is 0.015% at three (3) months and 0.025% at six (6) months.
- L. The limit for abrasion is provided in Table 4 of ASTM C 33/C 33M and shall be for Class Designation 3M.
- M. Perform testing of coarse aggregate for re-qualification in accordance with the definition for coarse aggregate in the Initial Qualification and Re-Qualification Examination/Testing of Aggregates Section 4.1.2.
 - 1. Submit Coarse Aggregate Re-Qualification Test Results.
- N. Perform testing of coarse aggregate for production Tank Closure Grout in accordance with the definition for coarse aggregate in the Production Examination/Testing of Aggregates and Frequency Section 4.1.3.
 - 1. Submit Coarse Aggregate Test Results.

3.2.3.7 Retarding Admixture (RA) Hydration Stabilizer

- A. If specified to be in the mix design, provide a retarding admixture that meets the requirements of ASTM C 494/C 494M, Type D.
- B. For each shipment of retarding admixture used, obtain and retain documentation, such as laboratory test results, showing conformance to the physical requirements of ASTM C 494/C 494M, Type D.
 - 1. Documentation shall also show that the retarding admixture does not contain chlorides except those that may be contained in the water used in the manufacture of the retarding admixture.
 - 2. Submit Retarding Admixture (Hydration Stabilizer) Documentation.

3.2.3.8 High Range Water Reducing Admixture (HRWR)

- A. If required, provide a high range water reducing admixture that meets the requirements of ASTM C 494/C 494M, Type F or G.
- B. For each shipment of high range water reducing admixture used, obtain and retain documentation, such as laboratory test results, showing conformance to the physical requirements of ASTM C 494/C 494M, Type F or G. When laboratory test results of such admixtures are proprietary information, "Certificates of Conformance" (C-of-C) may be provided in lieu of laboratory test results provided

that the C-of-C show conformance to the specified ASTM standards. C-of-C document shall also demonstrate successful use of the same product in the past for production of grout mixes with similar properties.

1. Documentation shall also show that the high range water reducing admixture does not contain chlorides except those that may be contained in the water used in the manufacture of the high range water reducing admixture.
2. Submit High Range Water Reducing Admixture Documentation.

3.2.3.9 Viscosity Modifying Admixture (VMA)

- A. A VMA shall be provided for the Tank Closure Grout "near zero bleed" mix. Provide a viscosity modifying admixture that meets the requirements of ASTM C 494/C 494M, Type S.
- B. For each shipment of viscosity modifying admixture used, obtain and retain documentation, such as laboratory test results, showing conformance to the physical requirements of ASTM C 494/C 494M, Type S. When laboratory test results of such admixtures are proprietary information, "Certificates of Conformance" (C-of-C) may be provided in lieu of laboratory test results provided that the C-of-C show conformance to the specified ASTM standards. C-of-C document shall also demonstrate successful use of the same product in the past for production of grout mixes with similar properties.
 1. Documentation shall also show that the viscosity modifying admixture does not contain chlorides except those that may be contained in the water used in the manufacture of the viscosity modifying admixture.
 2. Submit Viscosity Modifying Admixture Documentation.

3.2.3.10 Deleted.

3.3 Service Conditions

3.3.1 See contract documents.

3.4 Quality Requirements

3.4.1 SRR Review

- 3.4.1.1 SRR reserves the right to review aspects of the production, examination and testing to the extent necessary to ensure compliance to this specification and code requirements.
- 3.4.1.2 Review includes the right to access the Supplier's facilities, including sub-tier subcontractors, vendors, and suppliers, for the purpose of review, audit, surveillance, and witnessing of production, examination and testing activities.
- 3.4.1.3 Technical and quality changes to the subcontract are only valid and executable in written form as defined in the subcontract documents, including this specification.

3.4.2 Quality Assurance Program

- 3.4.2.1 Work performed in the execution of this specification shall be in accordance with an SRR approved Supplier's Quality Assurance Program that complies with the requirements defined in Attachment 5.4.
- 3.4.2.2 Submit the Supplier's Quality Assurance Program Manual to SRR with the proposal.
 - A. Include Production Facility NRMCA Certification as defined in Section 3.1.1.2.

- 3.4.2.3 SRR review and acceptance of the Supplier's Quality Assurance Program Manual is required prior to award of the contract.
- 3.4.2.4 Subsequent revisions to the Supplier's Quality Assurance Program Manual shall be reviewed and accepted by SRR prior to its use in the execution of this specification.
- 3.4.2.5 When the use of sub tier supplier(s) is deemed necessary, the Supplier is responsible to flow down those Technical and Quality requirements deemed applicable for the activities within its defined scope of work, in accordance with referenced Codes, Standards, Material Specifications, or other requirements identified in this specification and the procurement documents included with the Purchase Order/Subcontract package.
 - A. The flow down of requirements encompasses verification that the sub tier supplier has been appropriately qualified for performance of activities complying with this procurement.
 - B. The Supplier shall maintain objective evidence of the successful flow down and provide such evidence to SRS upon request.
 - C. The Supplier is furthermore responsible to flow down all commercial Terms and Conditions, including articles incorporated by reference, to all sub tier suppliers.
 - D. This flow down is also required at all levels if the sub tier supplier to the prime supplier deems it necessary to further subcontract its parts of this SRS subcontract.
- 3.4.3 Supplier Records
 - 3.4.3.1 Retain the following documents and records generated in association with this specification.
 - A. Contract documents, including this specification and associated Supplier Deviation Disposition Requests (SDDR).
 - B. Engineering and Quality documentation submittals.
 - C. Documents identified in this specification as retained records.
 - D. Any document generated in association with this specification (e.g. procedures, reports, certifications, qualifications, letters, etc.) not required as a submittal.
 - 3.4.3.2 Provide retained records to SRR monthly during production.
 - 3.4.3.3 Retain records for a minimum of 1 year beyond the closure of the subcontract.
 - A. Dispose of retained records after the retention period.
 - B. SRR shall be notified no less than 90 days prior to the end of the retention period.
- 3.4.4 Testing Laboratories
 - 3.4.4.1 Procure the services of a testing laboratory, which conforms to ASTM E 329 and ASTM C 1077, for initial qualification of the grout and mix components.
 - A. Submit Initial Qualification Testing Laboratory Documentation showing compliance with ASTM E 329 and ASTM C 1077 or be otherwise approved by SRR prior to bid award.
 - 3.4.4.2 Procure the services of a testing laboratory, which conforms to ASTM E 329 and ASTM C 1077, for re-qualification of the grout and mix components if required due to Supplier changes.
 - A. Submit Re-Qualification Testing Laboratory Documentation showing compliance with ASTM E 329 and ASTM C 1077 or be otherwise approved by SRR prior to bid award.

3.5 SRR Furnished Material, Equipment, Services

- 3.5.1 Grout pump, hopper, and other grout placement equipment and labor at the point of delivery.
- 3.5.2 Inspection and testing of the trial batches and grout initial qualification testing. Tank Closure Grout production grout testing. Testing for Tank Closure Grout mix re-qualification if required due to SRR changes.
- 3.5.3 Designated area at point of delivery for washing truck chutes and disposal of truck chute wash water.

3.6 Schedule & Plant/Delivery Capacity

- 3.6.1 Provide capacity of Batch Plant, and necessary equipment for trial batching, production batching, mixing and delivery, based on the following criteria:
 - 3.6.1.1 A sustained average capacity of 400 CY/day through a five day work week.
 - 3.6.1.2 A sustained average capacity of 74CY/hr for an eight hour period.
- 3.6.2 Provide production Tank Closure Grout with a notice of order based on the following criteria as a guide:
 - 3.6.2.1 For orders up to one hundred (100) Cubic Yards – Minimum of twelve (12) hours notification.
 - 3.6.2.2 For orders more than one hundred (100) Cubic Yards – Minimum of one (1) week notification.
- 3.6.3 Estimated grout production duration to be delivered for this procurement:
 - 3.6.3.1 Estimated duration of this grout production is six months, and the batch plant and delivery equipment shall be operational and available during this time.
 - 3.6.3.2 DELETED.
- 3.6.4 Tank Closure Grout trial batching requirements to be provided for this procurement:
 - 3.6.4.1 Tank Closure Grout trial batching requirements are described herein in Section 3.2.1.2.A.
 - 3.6.4.2 The initial trial batch will follow the design mix shown in Attachment 5.5. Subsequent trial batching will be iterations as required to develop a production mix to meet the field test acceptance criteria shown in Attachment 5.5. SRR will revise the design mix and subsequent trial batch mixes as required, and provide direction to the Supplier for subsequent trial batches. The final step in trial batching is to develop the data to demonstrate mix uniformity to meet ASTM C 94/C 94M, and compressive strength to meet Chapter 4 of ACI 214R.
 - 3.6.4.3 The Supplier shall make available fresh grout for inspection and testing, at the production facility. Inspection and testing requirements to be as shown for production grout in Attachment 5.3.
 - 3.6.4.4 The trial batching shall be representative of the production batching to be performed to fill SRR liquid waste tanks with grout, i.e. the production facilities, delivery equipment, material components, personnel, etc., shall be representative.
 - 3.6.4.5 The trial batching shall conform to the requirements described herein in Section 3.0, i.e. conformance of the production facility, testing and certification of material components, measurement of material components, control of aggregate moisture content, batch tickets, etc.

- 3.6.4.6 Quality verification documentation requirements for material components shall be as specified in Section 3.2.1.2.A.2 and shown in Attachment 5.2.
- 3.6.4.7 Excess grout shall be disposed of at the Supplier's facility as required herein in Section 4.1.4.2.

3.7 Personnel Qualification / Certification
Not Used

3.8 Deliverables and Submittals

3.8.1 Deliverables

- 3.8.1.1 Deliver to SRR, at the point of delivery, production Tank Closure Grout as defined in the purchase documents.
- 3.8.1.2 Deliver to SRR, at the point of delivery, a batch ticket with each delivery in accordance with this document.

3.8.2 Submittals

- 3.8.2.1 Reference the following information on transmittals, submittals and other correspondence:
 - SRR Purchase Order No.: _____ (Defined on Award)
 - SRR Project No.: _____ (Defined on Award)
 - SRR Project Title: _____ (Defined on Award)
 - Supplier's Order Number: _____
- 3.8.2.2 Address transmittals, EDR submittals, SDDR correspondence and one copy of each QVDR document to:
 - Savannah River Site
 - Document Control Center, Bldg. 704-1N
 - SRS Purchase Order No.: _____ (Defined on Award)
 - SRS Project No.: _____ (Defined on Award)
 - Aiken, SC 29808
 - Attention: _____ (Defined on Award)
- 3.8.2.3 Address a copy of transmittal letters and other communication to:
 - Savannah River Site
 - Building _____ (Defined on Award)
 - SRS Purchase Order No.: _____ (Defined on Award)
 - SRS Project No.: _____ (Defined on Award)
 - Aiken, SC 29808
 - Attention: (Defined on Award) _____ (Procurement Representative)

3.8.3 Documentation - General

- 3.8.3.1 Use black markings on white paper.
- 3.8.3.2 Use of recycled paper with a maximum of 25 percent recycled content is acceptable for documentation.

3.8.4 QVDR Submittal Process

- 3.8.4.1 Submit Quality Verification Documents listed in Attachment 5.2.
 - A. Develop an itemized list according to the listing in Attachment 5.2 and include with the documentation set.
 - B. Submit QVDR documentation to the SRS Cognizant Technical Function, care of the SRR Procurement Representative.
 - C. Submit an electronic file copy of all QVDR documents in "Unsecured" PDF version by e-mail to vendordocuments@srs.gov . Provide the purchase order number and the QVDR document description in the e-mail title block and in the body of the e-mail. A maximum of 30 MB per e-mail is allowed to be transmitted.

3.8.5 EDR Submittal Process

3.8.5.1 Submit Engineering Documents. (Attachment 5.1)

- A. Submit an electronic file copy of all EDR documents in "Unsecured" PDF version by e-mail to vendordocuments@srs.gov. Provide the purchase order number and the EDR document description in the e-mail title block and in the body of the e-mail. A maximum of 30 MB per e-mail is allowed to be transmitted.

3.8.5.2 SRR review will result in a status as follows:

Status 1: Work may proceed.

Status 2: Submit final documentation. Work may proceed.

Status 3: Revise and resubmit. Work may proceed subject to resolution of indicated comments.

Status 4: Revise and resubmit. Work may not proceed.

Status 5: Permission to proceed not required.

3.8.5.3 Results of SRR review will be returned within 7 calendar days from the date of receipt.

3.8.5.4 Revise documents with a status of 2, 3, or 4 to incorporate SRR comments.

3.8.5.5 Submit revised documents within 10 calendar days from the date of Supplier receipt.

3.8.5.6 Notify SRR prior to changing Status 1 or Status 5 Engineering Documents.

3.8.5.7 Submit changed Engineering documents.

3.8.5.8 Assignment of Status 1 or Status 5 to the Engineering Documents by SRR does not relieve the Supplier of any part of their obligation:

- A. To satisfy the requirements defined in this specification.
- B. For the correctness of Engineering Documents.
- C. For the adequacy and suitability of material and equipment represented.

3.9 Packaging, Handling, Shipping, and Storage Requirements (PHSS)

3.9.1 Supplier Standards are acceptable for packaging, handling, shipping and storage for the material components associated with this document.

3.10 Deviations

3.10.1 After award of the subcontract, a Supplier Deviation Disposition Request (SDDR) form shall be prepared and submitted to SRR for review and disposition for each Supplier proposed deviation from this procurement specification, including material substitution requests.

3.10.1.1 For each proposed deviation, the Supplier shall:

- A. Identify the specification and revision number.
- B. Identify the criteria that cannot be met by item and specification section number.
- C. Present an explanation for the deviation.
- D. Present a proposal for resolution of the deviation and technical justification for the proposed solution.
- E. Present a price and schedule adjustment for resolution of the deviation.

NOTE: Proposed deviations shall be identified promptly and transmitted to SRR to allow for adequate review and approval durations without impacting the Supplier's schedule. (If possible, a minimum of 7 calendar days should be allowed)

3.10.2 After award of the subcontract, a SDDR form shall be prepared and submitted to document disposition of non-conformances from the specification (including approved documents) where the Supplier wishes to request a "Use-as-is" or "Repair" disposition.

NOTE: A Nonconformance shall be identified on an SDDR and SRR notified within 5 working days of discovery.

3.10.2.1 For each nonconformance where a "Use-as-is" or "Repair" disposition is being requested, the Supplier shall provide the following information on the associated SDDR for SRR for review and disposition:

- A. Identify the specification and/or document number and revision number.
- B. Identify the criteria that cannot be met.
- C. Present an explanation for the nonconformance.
- D. Present a proposal for resolution of the nonconformance and provide a sound justification for the technical adequacy of the proposed solution.
- E. Present a price and schedule adjustment for resolution of the nonconformance.

3.10.2.2 Replacement of rejected materials or other rework of an item such that it is restored to a configuration that meets the specification/approved design does not require a SDDR.

3.10.3 Do not perform any work or make delivery of any item for which a SDDR is submitted until a written disposition of the SDDR is received from SRR.

4.0 ACCEPTANCE OF ITEMS

4.1 Inspection/Testing Requirements

4.1.1 General Requirements

4.1.1.1 Measuring and Test Equipment (M&TE)

4.1.1.2 Calibrate all M&TE instruments in accordance with the requirements in NQA-1 Subpart 2.5 paragraph 703, ASTM C 94, and NRMCA QC3.

4.1.1.3 Retain M&TE Calibration Records and make available to SRR upon request.

4.1.2 Initial Qualification and Re-Qualification Examination/Testing of Aggregates

4.1.2.1 Fine Aggregate

- A. Determine gradation in accordance with ASTM C 136.
- B. Determine base fineness modulus in accordance with ASTM C 136.
- C. Determine bulk density and voids in accordance with ASTM C 29/C 29M.
- D. Determine percentage of clay lumps and friable particles in accordance with ASTM C 142.
- E. Determine amount of material finer than 75 μm in accordance with ASTM C 117.
- F. Determine percentage of coal and lignite in accordance with ASTM C 123.
- G. Determine presence of organic impurities in accordance with ASTM C 40.
- H. Determine soundness in accordance with ASTM C 88 using magnesium sulfate.
- I. Perform petrographic examination in accordance with ASTM C 295.
- J. Determine Alkali-Silica reaction in accordance with ASTM C 1260.

4.1.2.2 Coarse Aggregate

- A. Determine gradation in accordance with ASTM C 136.
- B. Determine bulk density and voids in accordance with ASTM C 29/C 29M.

- C. Determine percentage of clay lumps and friable particles in accordance with ASTM C 142.
- D. Determine amount of material finer than 75 μ m in accordance with ASTM C 117.
- E. Determine percentage of coal and lignite in accordance with ASTM C 123.
- F. Determine percentage of chert in accordance with ASTM C 123.
- G. Determine soundness using ASTM C 88 using magnesium sulfate.
- H. Perform petrographic examination in accordance with ASTM C 295.
- I. Determine Alkali-Silica reaction in accordance with ASTM C 1260.
- J. Determine Alkali-Carbonate rock reaction in accordance with ASTM C 1105.
- K. Determine resistance to degradation in accordance with ASTM C 131 or ASTM C 535.

4.1.3 Production Examination/Testing of Aggregates and Frequency

4.1.3.1 Fine Aggregate

- A. Determine moisture content in accordance with ASTM C 566 each day.
- B. Determine gradation in accordance with ASTM C 136 every week.
- C. Determine fineness modulus in accordance with ASTM C 136 every week.
- D. Determine percentage of clay lumps and friable particles in accordance with ASTM C 142 every six (6) months.
- E. Determine amount of material finer than 75- μ m in accordance with ASTM C 117 every week.
- F. Determine presence of organic impurities in accordance with ASTM C 40 every six (6) months.

4.1.3.2 Coarse Aggregate

- A. Determine moisture content in accordance with ASTM C 566 each day.
- B. Determine gradation in accordance with ASTM C 136 each week.
- C. Determine percentage of clay lumps and friable particles in accordance with ASTM C 142 every six (6) months.
- D. Determine amount of material finer than 75-mm in accordance with ASTM C 117 every week.

4.1.4 Initial Inspection and Acceptance of the Production Mixes

4.1.4.1 The initial inspection and acceptance of the production grout by SRR under this document are as follows:

- A. SRR will verify and record on the batch ticket that the Supplier's representative has reviewed the batch ticket for the amount of water added and the Supplier's representative has initialed the batch ticket.
- B. The retarding admixture and high range water reducing admixture may be adjusted by the direction of SRR as necessary to the requirements at the point of delivery as provided in the Performance Requirements Section.
- C. Adjust the slump flow at the discharge of the chute to be within the working range requirements as shown on Attachment 5.5.
 - 1. Perform acceptance slump flow test in accordance with the testing frequencies and requirements per Attachment 5.3.

2. Informational slump flow test may be taken from the top of any batch at the direction of SRR in order to determine the delivered slump flow, at the discharge of the chute.
 - a. If the delivered slump flow at the discharge of the chute indicates it is below the minimum working range requirement, high range water reducing admixture can be added at the direction of SRR.
 - b. After addition of HRWR at the point of delivery, and prior to discharge of the batch, perform an additional informational slump flow test to ensure that the range is within the working range. In lieu of the information test, an acceptance test may be performed at the direction of SRR.
 - c. SRR may accept mixes that do not meet the specified slump flow, based on technical expertise and professional judgment. Actual material characteristics will be documented on the Testing Reports provided by SRR's testing agency.
 - D. Complete discharge of the grout within ninety (90) minutes or before the drum has revolved three hundred (300) revolutions, whichever comes first.
 1. These limits may be exceeded in accordance with ASTM C 94/C 94M-10 Section 12.7 provided the grout is of such slump flow that it can be placed without the additional introduction of high range water reducing admixture to the batch.
 - E. SRR will record the discharge completion time and number of drum revolutions from the drum revolution counter at the completion time of discharge on the batch ticket.
 1. SRR will also record the total time (start of mixing time to the discharge completion time) plus the total number of drum revolutions and record this information on the batch ticket(s).
 - F. The batch ticket(s) will be reviewed and accepted by SRR at the point of delivery.
- 4.1.4.2 Rejected / Excess Grout
- A. Grout rejected due to the Supplier's error shall be returned to the Supplier's facility for disposal.
 - B. Grout rejected due to an error by SRR will be disposed of at the Supplier's facility.
 - C. Excess grout shall be disposed of at the Supplier's facility.
- 4.1.4.3 Chute and Drum Washing
- A. Wash chutes in a SRR designated area at the point of delivery.
 - B. Wash and clean all mixer drums at the production facility.
- 4.1.5 Inspection/Testing Requirements by SRR
- 4.1.5.1 SRR will perform inspection and testing in accordance with Attachment 5.3 at the point of delivery. Perform sampling of fresh grout and field acceptance testing at the point of delivery, in accordance with Attachment 5.3.
- 4.1.5.2 SRR may increase the testing frequencies as it sees fit.
- 4.1.5.3 If the temperature of the grout falls outside the specified limits of this document, SRR may perform a check test immediately on another portion of the same sample.
- A. In the event the temperature is outside the specified range, SRR shall direct the supplier to take measures to adjust succeeding loads in attempt to bring them into range.

- 4.1.5.4 If the slump flow of the grout falls outside the specified limits of this document, SRR may perform a check test immediately on another portion of the same sample at the discretion of SRR.
- A. In the event the slump flow, is outside the specified range, SRR will direct the supplier to take measures to adjust succeeding loads in attempt to bring them into range.
 - B. SRR may reject mixes that do not meet the specified slump flow.
- 4.1.5.5 Testing of total air content of the Tank Closure Grout mixes is required in accordance with Attachment 5.3, but is for information only.
- 4.1.5.6 SRR will cast seven (7) compressive strength cylinders, four (4) inches in diameter x eight (8) inches long.
- A. Test two (2) cylinders at seven (7) days, three (3) cylinders at twenty-eight (28) days, and two (2) cylinders placed on "hold".
 - 1. However, it is expected that the "hold" cylinders will be tested for strength at any age, if requested by SRR.
 - B. Perform compressive strength test breaks within the permissible test age tolerance provided in the industry standard test method specified on Attachment 5.3.
 - C. SRR will evaluate compressive strength in accordance with ASTM C 94/C 94M.
 - 1. Provide support to SRR in determining the cause of questionable grout.
- 4.1.5.7 SRR will perform grout yield checks as specified on Attachment 5.3 to check the quantity of grout shown on the Supplier's batch ticket(s) is the actual quantity of grout received.

4.2 SRS Surveillance and Audits

4.2.1 Testing Laboratories

- 4.2.1.1 SRR will procure, as required, the services of a testing laboratory for production and trial batch testing.
- A. The testing laboratory will conform to ASTM E 329 and ASTM C 1077, or be otherwise approved by SRR.
- 4.2.1.2 SRR will procure the services of a testing laboratory for testing of the grout and mix components for re-qualification, if required, due to changes by SRR.
- A. The testing laboratory will conform to ASTM E 329 and ASTM C 1077, or be otherwise approved by SRR.
- 4.2.1.3 Supplier shall procure the services of a testing laboratory for testing of the grout and mix components for re-qualification, if required, due to changes by Supplier.
- A. The testing laboratory shall conform to ASTM E 329 and ASTM C 1077, or be otherwise approved by SRR.
- 4.2.2 All materials and production facilities shall be subject to inspection by SRR.
- 4.2.2.1 Cooperate with SRR or its representative by providing reasonable access for making necessary checks of the production facilities and for obtaining samples.
- 4.2.2.2 SRR will sample fresh re-qualification grout and test it during re-qualification in accordance with this document.
- A. The Supplier shall provide prior notification to SRR of the re-qualification grout batches.

B. This notification shall be, at a minimum, five (5) days prior to re-qualification batching.

4.2.2.3 SRR may increase or decrease the testing frequencies as it sees fit for SRR surveillances.

4.3 Final Acceptance Method

4.3.1 Supplier shall provide batch ticket(s), inspection report(s), and test result(s) outlined in this document for acceptance by SRR.

4.3.2 Final acceptance of Tank Closure Grout is by SRR at point of delivery based on the Supplier provided batch ticket(s), inspection report(s), and test result(s) outlined in this document.

4.3.3 SRR will verify assignment of Status 1 or 5 (in accordance with the "Deliverables" section of this specification) for all documents listed on the EDR, Attachment 5.1.

4.3.4 SRR will verify receipt and acceptability of all documents listed on the QVDR, Attachment 5.2.

5.0 ATTACHMENTS

5.1 Engineering Document Requirements (2 Pages)

5.2 Quality Verification Document Requirements (3 Pages)

5.3 Inspection and Testing of Production Tank Closure Grout (2 Pages)

5.4 Supplier Quality Assurance Program Requirements (1 Page)

5.5 Production Tank Closure Grout Mix Components (1 Page)

Engineering Document Requirements Form Instructions

Attachment No. 5.1
Revision No. 4
Spec/Req'n No. C-SPP-F-00055
Page 2 of 2

Purpose The Engineering Document Requirements (EDR) form is prepared by the originator, establishes a basis for actions required of a Supplier and provides the schedule for the submittal of engineering documents by the Supplier.

Legend Entry

No.	Information Required
1	Document category number – see below.
2	Applicable specification number and appropriate paragraph.
3	Description corresponding to document category number.
4	Permission to proceed with fabrication or other specific processes is marked yes, if required.
5	List a milestone after award i.e., prior to fabrication, prior to test, prior to shipment, or with shipment that the listed document is to be submitted by Supplier.
6	Number of copies required for submittal.
7	Reproducible, Mylar, Vellum, etc.
8	Enter remarks when appropriate.

Document Category Number and Descriptions

- 1.0 Drawings
 - 1.1 Outline Dimensions, Services, Foundations and Mounting Details – Drawings providing external envelope, including lugs, centerline(s), location and size for electrical cable, conduit, fluid, and other service connections, isometrics and details related to foundations and mountings.
 - 1.2 Assembly Drawings – Detailed drawings indicating sufficient information to facilitate assembly of the component parts of an equipment item.
 - 1.3 Shop Detail Drawings – Drawings which provide sufficient detail to facilitate fabrication, manufacture, or installation. This includes pipe spool drawings, internal piping and wiring details, cross-section details and structural and architectural details.
 - 1.4 Wiring Diagrams – Drawings which show schematic diagram equipment, internal wiring diagrams, and interconnection wiring diagram for electrical items.
 - 1.5 Control Logic Diagrams – Drawings which show paths which input signals must follow to accomplish the required responses.
 - 1.6 Piping and Instrumentation Diagrams – Drawings which show piping system scheme and control elements.
- 2.0 Parts Lists and Costs – Sectional view with identified parts and recommended spare parts for one year's operation and specified with unit cost.
- 3.0 Complete SRS Data Sheets – Information provided by Supplier on data sheets furnished by SRS.
- 4.0 Instructions
 - 4.1 Erection/Installation – Detailed written procedures, instructions, and drawings required to erect or install material or equipment.
 - 4.2 Operations – Detailed written instructions describing how an item or system should be operated.
 - 4.3 Maintenance – Detailed written instructions required to disassemble, reassemble and maintain items or systems in an operating condition.
 - 4.4 Site Storage and Handling – Detailed written instructions, requirements and time period for lubrication, rotation, heating, lifting or other handling requirements to prevent damage or deterioration during storage and handling at jobsite. This includes shipping instruction for return.
- 5.0 Schedules: Engineering and Fabrication/Erection – Bar charts or critical path method diagram which detail the chronological sequence of activities, i.e., Engineering submittals, fabrication and shipment.
- 6.0 Quality Assurance Manual/Procedures – The document(s) which describe(s) the planned and systematic measures that are used to assure that structures, systems, and components will meet the requirements of the procurement documents.
- 7.0 Seismic Data Reports – The analytical or test report which provides information and demonstrates suitability of material, component or system in relation to the conditions imposed by the stated seismic criteria.
- 8.0 Analysis and Design Reports – The analytical data (stress, electrical loading, fluid dynamics, design verification reports, etc.) which demonstrate that an item satisfies specified requirements.
- 9.0 Acoustic Data Reports – The noise, sound and other acoustic vibration data required by the procurement documents.
- 10.0 Samples
 - 10.1 Typical Quality Verification Documents – A representative data package which will be submitted for the items furnished as required in the procurement documents.
 - 10.2 Typical Material Used – a representative example of the material to be used.
- 11.0 Material Descriptions – The technical data describing a material which a Supplier proposes to use. This usually applies to architectural items, e.g., metal siding, decking, doors, paints, coatings.
- 12.0 Welding Procedures and Qualifications – The welding procedure, specification and supporting qualification records required for welding, hard facing, overlaying, brazing and soldering.
- 13.0 Material Control Procedures – The procedures for controlling issuance, handling, storage and traceability of materials such as weld rod.
- 14.0 Repair Procedures – The procedures for controlling materials removal and replacement by welding, brazing, etc., subsequent thermal treatments, and final acceptance inspection.
- 15.0 Cleaning and Coating Procedures – The procedures for removal of dirt, grease or other surface contamination, and preparation and application of protective coatings.
- 16.0 Heat Treatment Procedures – The procedures for controlling temperatures and time at temperature as a function of thickness, furnace atmosphere, cooling rate and methods, etc.
- 19.0 UT – Ultrasonic Examination Procedures – Procedures for detecting discontinuities and inclusions in materials by the use of high frequency acoustic energy.
- 20.0 RT – Radiographic Examination Procedures – Procedures for detecting discontinuities and inclusions in materials by x-ray or gamma ray expose of photographic film.
- 21.0 MT – Magnetic Particle Examination Procedures – Procedures for detecting surface or near surface discontinuities in magnetic materials by the distortion of an applied magnetic field.
- 22.0 PT – Liquid Penetrant Examination Procedures – Procedures for detecting discontinuities in materials by the application of a penetrating liquid in conjunction with suitable developing materials.
- 23.0 Eddy Current Examination Procedures – Procedures for detecting discontinuities in materials by distortion of an applied electromagnetic field.
- 24.0 Pressure Test – Hydro, Air, Leak, Bubble or Vacuum Test Procedures – Procedures for performing hydrostatic or pneumatic structural integrity and leakage tests.
- 25.0 Inspection Procedures – Organized process followed for the purpose of determining that specified requirements (dimensions, properties, performance results, etc.) are met.
- 26.0 Performance Test Procedures – Test performed to demonstrate that functional design and operational parameters are met.
 - 26.1 Mechanical Tests – e.g., pump performance, data, valve stroking, load, temperature rise, calibration, environmental, etc.
 - 26.2 Electrical Test – e.g., impulse, overload, continuity, voltage, temperature rise, calibration, saturation, loss, etc.
- 27.0 Prototype Test Reports – Reports of a test which is performed on a standard or typical examination of equipment or item, and which is not required for each item produced in order to substantiate the acceptability of equal items. This may include tests which result in damage to the item(s) tested.
- 28.0 Personnel Qualification Procedures – Procedures for qualifying welders, inspectors and other special process personnel.
- 29.0 Supplier Shipping Preparation Procedures – Procedures used by a Supplier to prepare finished materials or equipment for shipment from its facility to the jobsite.

Quality Verification Document Requirements

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8. Supplier's Order No.	9. Supplier's Part	10. Supplier's Part Name	11. Quantity
12. PO No.	13. SRS Line/Equip Tag or Code No.	14. SRS Part Name	
15. Supplier's Conformance Statement			
We certify that the work and required documents meet the requirements of the procuring documents.			
_____ Authorized Supplier Signature		_____ Title	_____ Date
16. Source Surveillance Representative at Supplier's Facility			
Work was released based on satisfactory completion of quality surveillance and review of documentation.			
<input type="checkbox"/> With Authorized Deviations Noted in Column 6			
<input type="checkbox"/> No Deviations			
<i>N/A – Source Surveillance Not Required</i>			
_____ Signature of SSR		_____ Date	
17. Receiving Inspection at SRS			
This form and the quality verification documents referenced hereon have been received and their relationship to the hardware items verified.			
_____ Signature of SRS Inspector		_____ Date	

Quality Verification Document Requirements

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FORM INSTRUCTIONS

Purpose The Quality Verification document Requirements (QVDR) is initiated by SRS and completed by the Supplier when providing quality verification documents. The QVDR is a multipurpose form to

Transmit quality verification documents from the Supplier,
Provide evidence of SSR release of documentation and /or work, and
Provide evidence of an SRS inspection check of documentation received at SRS.

SRS Entries

Entry No.	Information Required
1	Enter Document Category Number – see below.
2	Enter Specification Number and Paragraph Reference.
3	Enter Description corresponding to the Document Category Number.
4	SSR to initial upon item release.
6	Enter "Remarks: as appropriate.
16	SSR and dates release.

Field Entries

Entry No.	Information Required
5	SRS inspector at the jobsite to complete check-in.
17	The SRS inspector will review the quality verification documentation package. If found satisfactory, he signs and dates the check-in statement.

Supplier Entries

Entry No.	Information Required
7	Enter number of pages of quality verification document being submitted.
8	Enter information required.
9	Enter information required.
10	Enter information required.
11	Enter the quantity of units covered by the documents submitted. For each item on Entry No. 12 being released, provide a separate copy of this completed form and the supporting quality verification documents.
12	Enter information required.
13	Enter information required.
14	Enter information required.
15	Supplier – Signature of an employee authorized to sign such documents.

Document Category Numbers and Descriptions

- 12.0 Welding Verification Reports – Reports of welding performed to include weld identification, and certification that qualified welding procedures and welders were used.
- 13.0 Material Verification Reports – Reports relative to material which confirm, substantiate or assure that an activity or condition has been implemented in conformance with code and material specifications imposed by the procurement documents.
- 14.0 Major Repair Verification Reports – Reports may include weld repair locations (maps), material test reports for filler metal, pre- and post-weld heat treatment records, NDE records, etc. The resolution of whether a repair is major or not is an SRS responsibility.
- 15.0 Cleaning and Coating Verification Reports – Reports include a certification of visual examination for surface preparation, surface profile, materials, etc.; and also humidity data, temperature data and coating thickness data as required by the procurement documents.
- 16.0 Heat Treat Reports – Reports normally include furnace charts and similar records which identify and certify the item(s) treated, the procedure used, furnace atmosphere, time at temperature, cooling rate, etc.
- 17.0 Material Property Reports
 - 17.1 MTR (Material Test Reports) – These reports include all chemical, physical, mechanical, and electrical property test data required by the material specification and applicable codes. These are applicable to cement, concrete, metals, cable jacket materials, rebar, rebar splices, etc.
 - 17.2 Impact Test Data – Reports of Charpy or drop weight tests including specimen configuration, test temperature and fracture data.
 - 17.3 Ferrite Data – Reports of the ferrite percentage for stainless steel materials used, including castings and welding filler metals as deposited.
 - 17.4 Materials Certificate of Conformance – Documents which certify conformance to the requirements of the applicable material specification.
 - 17.5 Electrical Property Reports – Reports of electrical characteristics, e.g., dielectric, impedance, resistance, flame tests, corona, etc.
- 18.0 Code Compliance – Verifying documents (such as data Forms U-1, M-2, State, etc.), which are prepared by the manufacturer or installer and certified by the Authorized Code Inspector.
- 19.0 UT – Ultrasonic Examination and Verification Reports – Examination results of certain characteristics of discontinuities and inclusions in material by the use of high frequency acoustic energy.
- 20.0 RT – Radiographic Examination and Verification Reports – Examination results of certain characteristics of discontinuities and inclusions in materials by x-ray or gamma ray exposure of photographic film, including film itself.
- 21.0 MT – Magnetic Particle Examination and Verification Reports – Examination results of surface (or near surface) discontinuities in magnetic materials by distortion of an applied magnetic field.
- 22.0 PT – Liquid Penetrant Examination and Verification Reports – Examination results of surface discontinuities in materials by application of a penetrating liquid in conjunction with suitable developing techniques.
- 23.0 Eddy Current Examination and Verification Reports – Examination results of discontinuities in material by distortion of an applied electromagnetic field.
- 24.0 Pressure Test – Hydro, Air, Leak, Bubble or Vacuum Test and Verification Reports – Results of hydrostatic or pneumatic structural integrity and leakage tests.
- 25.0 Inspection and Verification Reports – Documented findings resulting from an inspection.
- 26.0 Performance Test and Verification Reports – Reports of Test Results
 - 26.1 Mechanical Test, e.g., pump, performance data, valve stroking, load, temperature rise, calibration, environment, etc.
 - 26.2 Electrical Tests, e.g., load, impulse, overload, continuity, voltage, temperature rise, calibration, saturation, loss, etc.
- 27.0 Prototype Test Report – Report of the test which is performed on a standard or typical example of equipment, material or item, and which is not required for each item produced in order to substantiated the acceptability of equal items. This normally includes tests which may, or could be expected to, result in damage to the item(s) tested.
- 28.0 Certificate of Conformance – A document signed or otherwise authenticated by an authorized individual certifying the degree to which items or services meet specified requirements.

Inspection and Testing of Production Tank Closure Grout

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Production Tank Closure Grout		
Material and Requirement	Test Method Evaluation	Test Frequency
Sampling Method	ASTM C172/ C172M See Note 1	As required.
Molding Cylinders	ASTM C31/C 31M See Note 2	One test for first batch delivered each day, and one random test for the second 100 cubic yards delivered. Thereafter, SRR will direct when additional test samples will be taken.
Compressive Strength	ASTM C39/C 39M	One test for first batch delivered each day, and one random test for the second 100 cubic yards delivered. Thereafter, SRR will direct when additional test samples will be taken.
Slump flow	ASTM C 1611/C 1611M	One test for first batch delivered each day, and one random test for the second 100 cubic yards delivered. Thereafter, SRR will direct when additional test samples will be taken.
Temperature	ASTM C1064/C 1064M	One test for first batch delivered each day, and one random test for the second 100 cubic yards delivered. Thereafter, SRR will direct when additional test samples will be taken.
Unit Weight/Yield	ASTM C 138/C 138M	One test for first batch delivered each day, and one random test for the second 100 cubic yards delivered. Thereafter, SRR will direct when additional test samples will be taken.
Specimen Curing	ASTM C 31/ C 31M See Note 3	One test for first batch delivered each day, and one random test for the second 100 cubic yards delivered. Thereafter, SRR will direct when additional test samples will be taken.
Bleeding of Grout	ASTM C232/C 232M See Note 4	One test for first batch delivered each day, and one random test for the second 100 cubic yards delivered. Thereafter, SRR will direct when additional test samples will be taken.
Sample Capping	ASTM C 617/C 617M	One test for first batch delivered each day, and one random test for the second 100 cubic yards delivered. Thereafter, SRR will direct when additional test samples will be taken..

Inspection and Testing of Production Tank Closure Grout

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Air content	ASTM C231/C 231M	One test for first batch delivered each day, and one random test for the second 100 cubic yards delivered. Thereafter, SRR will direct when additional test samples will be taken.
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Note 1. Sample the batch by collecting as a minimum one portion after 0.8 cubic yards has been discharged.

Note 2. Single-Use Cylindrical Molds. Plastic single-use (4-in) diameter by (8-in.) high molds with tight fitting lids, conforming to Specification ASTM C 470 may be used.

Note 3. Cure Grout in accordance with C 31 / C 31 M-08b Section 10.12 with the following exception: immediately after molding and finishing, the specimens shall be stored for a period of 24 hr. to 48 hr. in a temperature range from 60° to 80°F (18°-27°C) and in an environment preventing moisture loss from the specimens.

Note 4. Use ASTM C 232 Test Method A modified as follows: Do not tamp, rod, or in any way consolidate sample. To determine bleed: 1) Obtain sample per ASTM C172/172M and Note 1. 2) Pour sample into a 6-in. by 12-in. cylinder as one lift to a height of 11 inches and cap. 3) Cure samples with compressive strength test specimens. 4) Measure bleed water after 24 hours ± 2 hours using a graduated syringe.

Supplier Quality Assurance Program Requirements

Note to the CTF/CQF:

Level 1 - Procurements require verification of the supplier's quality program through the performance of an evaluation or audit that compares against the national or international consensus standard designated in Section A.

Level 2 - Procurements that invoke a supplier quality assurance program, may apply the same consensus standard verification process as designated in Section A, otherwise designate evaluation methods in Section C. (Ref. 1Q, 7-2; 1Q, 18-3; and 3E, 1.1)

Section A

National Consensus Standards for Supplier Quality Program Requirements are identified, but not limited, to the ones listed below:

- ASME/NQA-1 Part 1 - Nuclear Quality Assurance Program Requirements (Pages 2-4 must be completed)
- ISO 17025 (Calibration/Testing Standard)
- NQA-1, Part II, Subpart 2.7 (Computer Software)
- ASME Section VIII Division 1 (Appendix 10)
- Other NQA-1 Part II Subpart 2.5 Paragraph 702 except (e)
- Other NQA-1 Part II Subpart 2.5 Paragraph 703
- Other NRMCA QC3 Certification

Section B

Clarifications/Exceptions (as needed)

Clarification: A Quality Program based on a recognized National Consensus Standard (e.g. ISO, etc.) is acceptable for use as long as the elements identified in this Attachment are addressed and the program meets or exceeds the requirements as specified.

Section C

For Level 2 procurements, methods of evaluating supplier's quality assurance program are:

1. The supplier will provide a copy of their Quality Assurance Manual for an adequacy/concurrence review, and
2. One or more of the boxes marked below will also be applied.

- Performance of an audit as defined in section A.
- Document submittals identified on EDR document (e.g. process procedures, welder qualifications, etc.)
- Submittal of current applicable ASME certificate
- Supplier Surveillance activities
- Receiving Inspection
- Other Submittal of Supplier's NRMCA Certification
- Other Independent lab testing (by SRR) of trial batch and production grout

Production Tank Closure Grout Mix Components

MIX ID #	SLUMP FLOW	WEIGHT OF INGREDIENTS					ADMIXTURES			REMARKS
		CEMENTITIOUS MATERIALS	WATER	FINE AGG.	COARSE AGGREGATE MAX SIZE	SHRINKAGE COMPENSATING COMPONENT	H Y D R A T I O N	H I G H R A T I O N	a) grams/ CY; b) fl.oz./CY	
MIX	WORKING	C E M E N T T Y P E I/II	F L Y	S A N D	3/8" (#8)		H Y D R A T I O N	H I G H R A T I O N	V I S C O S I T Y M O D I F I E R	
		100 lbs/ CY	lbs/ CY	lbs/ CY	lbs/ CY	lbs/ CY	ft oz/ CY	ft oz/ CY	a) grams/ CY; b) fl.oz./CY	UNIT OF MEASURE
		210	363	1790	800	N/A	(3)	(4)	(5)	FOOT NOTES
LP#8-16	26-30	125	48.5	48.5	800	N/A	AS REQ'D	10-40	Up to 200 (a) Up to 41.25 (b)	BASE PRODUCTION GROUT MIX

Notes:

- (1) Mix Identifier Code. Mix identifier code for the vendor supplied grout mix shall be shown in each batch ticket at the time of delivery.
- (2) Slump flow measured according to ASTM C 1611/C 1611M
- (3) Recover (W. R. Grace) ASTM C494 Type D Hydration Stabilizer (During Trial Batching, Supplier may substitute compatible Hydration Stabilizer for Recover)
- (4) ADVA® CAST 575, ASTM C494, Type F, W.R.Grace Corporation. (During Trial Batching, Supplier may substitute compatible HRWR)
- (5) a) Kelco-Crete (CP Kelco) Diutan Gum ASTM C 494/C 494M Type S Viscosity Modifying Admixture; OR, b) EXP 958 (Diutan Gum). (During Trial Batching, Supplier may substitute compatible VMA for Diutan Gum)