

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

2. AMENDMENT/MODIFICATION NO. 1	3. EFFECTIVE DATE 20-Oct-2004	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
6. ISSUED BY US Army Corps of Engineers, Kansas City District 760 Federal Building, 601 East 12th Street Kansas City, Missouri 64106-2896		7. ADMINISTERED BY (If other than item 6)	

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)	(X)	9a. AMENDMENT OF SOLICITATION NO. W912DQ-04-B-0012
	X	9B. DATED (SEE ITEM 11) 10/4/2004
		10A. MODIFICATION OF CONTRACT/ORDER NO.
		10B. DATED (SEE ITEM 13)

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above number solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:
 (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegraph which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(X)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBER CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF:
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is not, is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
**Monolith Joint 8/9 and 9/10 Waterstop Leakage Repairs
 Truman Dam, Benton, Missouri**

The Solicitation is amended in accordance with the attached pages.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)
15B. CONTRACTOR/OFFEROR	16B. UNITED STATES OF AMERICA RY
15C. DATE SIGNED	16C. DATE SIGNED

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

The following items are applicable to this modification:

1. SPECIFICATIONS:

- a. Revised Sections: The following sections are revised as follows:

Section 01110 SUMMARY OF WORK is deleted and replaced in its entirety. A copy of the revised section is attached.

Section 01555 STOPLOG INSTALLATION: in accordance with paragraph titled "Stoplogs", Appendix A is provided "For Information Only". A copy is attached.

Section 03350 CHEMICAL GROUT INJECTION is deleted and replaced in its entirety. A copy of the revised section is attached.

- b. Narrative Change: The following narrative change is made as indicated.

Section 01550 DIVING REQUIREMENTS, paragraph titled "Minimum Dive Team Manning Levels Using Surface Supplied Air": Standby Diver requirement is changed from "2" to "1".

2. DRAWINGS

- c. Revised Drawings: The following Drawings are revised as indicated:

Sheet C-2 Note 6 is deleted and replaced with the following: " Debris may be present upstream of Monolith Joint 8/9. The Contractor shall assume a maximum of 5 cubic yards of woody debris to be moved to access Monolith Joint 8/9."

3. Bidders are required to acknowledge receipt of this amendment on the Bidding Form, in the space provided, or by separate letter or telegram prior to opening of bids. Failure to acknowledge all amendments may cause rejection of the proposal.

4. Bids will be received until 04 November, 2004 at 11:00 local time, in Room 760 Federal Building, 601 E. 12th Street, Kansas City, Missouri 64106-2896.

SECTION 01110

SUMMARY OF WORK

03/00

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

1.1.1 Project Description

The overall project includes the installation of the stoplogs on the upstream face of Truman Dam at tainter gate #4. The tainter gate will be fully exercised, which will remove the water between the stoplogs and the tainter gate. The Contractor will then mitigate leakage between the stoplogs and around the stoplogs as specified. After mitigating the leakage between and around the stoplogs the Corps of Engineers will perform a 1-day engineering inspection of the tainter gate. After the inspection the Contractor shall perform a thorough cleaning of the joints of monolith joints 8/9 and 9/10. At the completion of cleaning the Contractor shall perform pressure injection grouting using divers below the lake surface at monolith joints 8/9 and 9/10 to reduce leakage into the gallery. The Contractor shall monitor joint leakage and inspect monolith joint drains associated with monolith joints 8/9 and 9/10 located in the drainage gallery.

1.1.2 Location

The project is located in Benton County Missouri at Harry S. Truman Dam and Reservoir near Warsaw, Missouri.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

SECTION 03350

CHEMICAL GROUT INJECTION
09/03

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 928	(2000) Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs
ASTM D 93	(2002) Flash Point by Pensky-Martens Closed Cup Tester (IPD D34/88)
ASTM D 412	(1998a) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
ASTM D 1042	(2001) Linear Dimensional Changes of Plastics Under Accelerated Service Conditions
ASTM D 1623	(1978; R 1995) Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
ASTM D 3574	(2003) Flexible Cellular Materials-Slab, Bonded, and Molded Urethane Foams

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2002) National Electrical Code
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NSF INTERNATIONAL (NSF)

NSF ANSI/NSF 61	(1998) Drinking Water System Components - Health Effects (Sections 1-9)
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U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) Safety and Health Requirements Manual
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1.2 DEFINITIONS

Words, phrases, or other expressions used in this specification shall have meanings, as follows:

- a. Drilling shall mean initial advancement of hole to required depth.
- b. Seepage prevention grouting shall mean any grout mixture injected

under pressure to prevent leakage through cracks and joints in the structure.

c. Washing shall mean the process of cleaning drill cuttings and sludge from a drill hole by injecting a water and air mixture at the bottom of the hole and returning the fluid and suspended matter to the top of the hole.

d. Gauge grouting pressure shall mean the pressure of grout as measured at the collar of the hole while grout is being pumped into the hole.

e. Total grouting pressure shall mean the pressure at the packer.

f. Seepage grout take shall mean the quantity of materials injected into a hole, expressed in units of gallons or cubic feet of grout.

g. Monolith joints are described as vertical joints between mass concrete sections. The mass concrete sections are labeled as Monolith 1 (M1) to 18 (M18). The designation for a monolith joint is based on which monoliths form that joint. For example, the monolith joint between Monoliths 1 and 2 is referred to as Monolith Joint 1/2.

1.3 WORK DESCRIPTION

The work shall consist of cleaning and preparation of Monolith Joints 8/9 and 9/10 and pressure injection of chemical grout into the joints, as required, per the contract drawings. After the installation of the stoplogs, the Government will operate tainter gate number four through a full cycle. This will subsequently dewater the area between the stoplogs and the tainter gate. The Contractor will not be allowed on the ogee section during this operation which is estimated to take four (4) hours. After the tainter gate operation, the Contractor shall mitigate the stoplog leakage as required in Section 01555 STOPLOG INSTALLATION, Paragraph STOPLOG LEAKAGE MITIGATION PLAN. After the stoplog leakage has been mitigated, the Government will perform a one day engineering inspection of the tainter gate. The Contractor shall provide a manbasket and crane for use by the Government during this inspection period. The Contractor shall schedule their work accordingly around the cycling of the gate and the engineering inspection period. The Contractor shall provide all required personnel, equipment and equipment access, materials, electric power, compressed air sources, water supplies, and expertise necessary to accomplish completion of this work. The work shall be performed on the upstream face of the monolith as shown on the contract drawings.

1.4 MONOLITH JOINT LEAKAGE HISTORY

To fully understand all of the discussions concerning the waterstop leakage and evacuation of the leakage from the dam, the configuration of the system will be briefly described. The waterstops and vertical waterstop drains are located on the upstream face of the powerhouse, spillway and non-overflow sections. The vertical waterstop drains deliver water through horizontal drains to gutters in the drainage galleries. The water that enters the vertical drains comes through the waterstops from the reservoir.

This water flows through the gutters to the drainage gallery sump in powerhouse monolith 6. The water is discharged from the sump into the station drainage sump, which is located on the downstream side of the erection bay (Monolith 5). The water is discharged from the station drainage sump into the draft tube bulkhead slot of turbine/generator unit #1.

Measurements taken at weirs in the drainage gallery gutters are used to

estimate flow rates from the monolith joints and foundation drains. The flow rates vary with the time of the year with maximum flow occurring during the winter.

The flow rate from monolith joints 8/9 and 9/10 has increased over time. The total flow rate during this winter (2003 to 2004) is estimated to be 200 gallons per minute with 70% attributed to Monolith Joint 8/9 and 30% attributed to Monolith Joint 9/10.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Plan of Operation; G, AE.

Safety Plan; G, RE.

SD-06 Test Reports

Chemical Grout Test Report; G, AE.

Daily Report; G, AE.

SD-07 Certificates

Injection Pressure Gauges or Transducers

Chemical Grout; G, AE.

Qualification of Chemical Grouter; G, AE.

SD-08 Manufacturer's Instructions

Chemical Grout Material Safety Data Sheets (MSDS); G, AE

Chemical Grout Manufacturer's Product Literature, Surface Preparation, Placing, and Finishing Recommendations; G, AE.

Concrete Patching Mortar Material Safety Data Sheets (MSDS); G, AE.

Concrete Patching Mortar Manufacturer's Product Literature, Surface Preparation, Placing, and Finishing Recommendations; G, AE.

Joint Seal; G, AE.

SD-11 Closeout Submittals

Audio/Video Inspection and Monitoring; G, AE.

1.8 PLAN OF OPERATION

The Contractor shall submit a plan indicating the chosen chemical grouting method and planned sequence and duration of all activities. The plan shall be updated and submitted at least two days in advance of any planned change in operations. Failure to provide the plan may result in shutdown of the operation without compensation to the Contractor.

a. The plan of operation shall include a detailed description of the construction methods for performing the chemical grout injection work as specified herein. The plan shall list all the equipment to be used and its function and capacity. The plan shall list the Contractor's proposed drilling equipment and procedures; washing equipment and procedures; and resin storage. It shall address all relevant details and safety measures involving the injection of polyurethane resin and shall meet all of the requirements for monitoring of the resin injection.

b. The Contractor shall submit a detailed design for the chemical grout injection program. The program shall address all relevant issues, i.e. number, capacity and manufacturer of chemical grout pumps, 10-year expected service life, delivery pipe, grout hole alignment and packer arrangements, containment and disposal of the chemical grout around the injection plant, containment of the chemical grout in the monolith joint and removal of sealant or containment system. The Contractor shall submit a detailed layout of the chemical grout pumping plant with complete description of make, model, and capacity of various units.

c. The monolith joints shall be prepared and cleaned per the resin manufacturer's instructions, however, use of acids and corrosives will not be permitted for cleaning.

1.9 SAFETY PLAN

The Contractor shall submit a plan indicating the safety precautions to be taken while performing the work. The work areas include, but are not limited to, the ogee section, bridge deck, reservoir, and storage yard. The plan shall include the use of a safety net or other means to prevent personnel or materials from falling down the ogee section and the use of scaffolding to provide a stable work platform on the ogee section. The plan shall also meet the requirements of EM 385-1-1. The plan shall be updated and submitted at least 2 days in advance of any planned change in operations. Work shall not begin until the Safety Plan has been reviewed and approved.

1.10 CHEMICAL GROUT TEST REPORT

The Contractor shall submit the manufacturer's test report showing that the chemical grout meets the requirements of this specification.

#.1 DAILY REPORT

The Contractor shall submit a daily report at the end of each day. The report shall include the elevations of the structure grouted that day, the amount of grout placed, and other information as defined in paragraphs 3.5 and 3.6. At the completion of grouting a joint, the Contractor shall submit a total of all grout placed in the joint.

1.11 INJECTION PRESSURE GAUGES OR TRANSDUCERS

The Contractor shall submit certificates for calibration of all injection pressure gauges or transducers to be used on the project.

1.12 CHEMICAL GROUT

The Contractor shall submit certification that the grout meets the requirements of this specification.

1.7 QUALIFICATION OF CHEMICAL GROUTER

The Contractor shall submit certifications showing that they meet the required qualifications. Failure to provide or meet the qualifications will result in shutdown of the operation at no additional cost to the Government. The Contractor shall have prior experience of successfully injecting chemical grout into joints in concrete at dams, as specified, herein. The Contractor shall have a minimum of five (5) years experience injecting chemical grout into joints in concrete dams or similar large concrete structures. The qualifications shall include the name and location of three (3) operational dam projects, or similar large concrete structures, where the bidder has successfully used chemical grout to stop water leakage. Additionally, the contractor shall provide contact(s) outside of the Contractor's company who can verify the project(s) listed. The contractor shall provide the contact(s) name, address, and phone number.

The Contractor shall have a Chemical Grout Materials Technician with a minimum of 3 years experience in chemical grouting on large concrete structures. The Contractor shall submit a resume including a list of the projects requiring chemical grouting on concrete structures in the last 3 years. Work shall not begin until the Chemical Grout Materials Technician has been reviewed and approved.

1.11 CHEMICAL GROUT MATERIAL SAFETY DATA SHEETS (MSDS)

The Contractor shall maintain copies of all grout MSDS at his onsite construction office.

1.15 CHEMICAL GROUT MANUFACTURER'S PRODUCT LITERATURE, SURFACE PREPARATION, PLACING, AND FINISHING RECOMMENDATIONS

The chemical grout manufacturer's product literature, surface preparation, placing, and finishing recommendations shall be submitted for review and approval.

#.1 CONCRETE PATCHING MORTAR MATERIAL SAFETY DATA SHEETS (MSDS)

The Contractor shall maintain copies of all mortar MSDS at his onsite construction office.

#.1 CONCRETE PATCHING MORTAR MANUFACTURER'S PRODUCT LITERATURE, SURFACE PREPARATION, PLACING, AND FINISHING RECOMMENDATIONS

The concrete patching mortar manufacturer's product literature, surface preparation, placing, and finishing recommendations shall be submitted for review and approval.

1.10 AUDIO/VIDEO INSPECTION AND MONITORING

The Contractor shall provide audio/video monitoring during all work activity under water. The Contractor shall provide underwater audio/video inspection of Monolith Joint 8/9 and Monolith Joint 9/10 prior to the start of the grouting operation. The Contractor shall provide video inspection of the vertical waterstop drains at Monolith Joint 8/9 and Monolith Joint 9/10 before the start of the grouting operation and at the end of each day of the grouting operation on the respective joint. The initial video inspection shall be performed inside the vertical waterstop drain and shall be used to determine from which direction (upstream or downstream) the majority of the leakage is coming from. The Contractor shall record all audio and video in color when required to provide audio/video inspection or audio/video monitoring and shall submit one (1) complete copy of all recordings in VHS format. At least two (2) color monitors shall be provided in the Work Enclosure to view the work in progress. The

Contractor shall monitor the horizontal waterstop drains daily (that carry the water from the vertical waterstop drains) as they exit into the gutter which is located in monolith 9. The Government shall have access to the galleries at all times during construction.

1.18 WORK AREA AND COORDINATION

Work area and coordination requirements shall be as specified in Section 01555 STOPLOG INSTALLATION.

1.11 WORK ENCLOSURE

The Contractor shall provide a temporary work enclosure to protect equipment and personnel exposed to exterior (cold-weather) conditions. The Government representatives will have access to and use of the temporary enclosure at all times during the project. The audio-video monitoring of all work activities shall be accomplished in the temporary enclosure to allow uninterrupted monitoring of the work.

1.12 SCHEDULE

The chemical grout injection work shall begin not earlier than February 1, 2005 and be completed no later than March 19, 2005. Based on the leakage history, the best months for performing the work would be February and March which is when the joint width of the monolith joints are expected to be the largest. Delays of the start date may occur if sleet, ice or snow is forecasted.

1.13 POWER/WATER SUPPLY

The Government will provide one (1) 480 volt, 30 ampere power supply service from the tainter gate number four area. The Contractor is responsible for transforming to other voltages as required and all wiring shall conform to NFPA 70. The Contractor shall supply additional power supply as necessary to complete the work. The Contractor will be responsible for supplying their own water and other items as necessary.

1.14 SITE VISIT

It is recommended that the Contractor visit the site prior to finalizing their bid. A site visit will greatly improve the understanding of the requirements of the work to be performed. The site visit shall include, but not limited to, a review of the lake access point, stoplogs and associated lifting beam and crane spreader beam, monolith drainage galleries and associated drains, sumps, and screens, and construction work limits.

1.15 POWER PLANT OPERATIONS

The operation of the turbine/generator units and spillway will be coordinated with the Contractors during working hours. If generation is necessary, the turbine/generators furthest from the spillway will be utilized to minimize impact at the spillway area. In addition, use of the spillway for flood releases are not expected during the contract period, but may be necessary in an emergency situation. Therefore, the Contractor shall secure all equipment and materials to prevent loss or damage of these items during operation of the turbine/generator units. The Contractor shall be responsible for any damage to the turbine/generator units caused by their unsecured equipment. The Contractor shall coordinate this work as specified in Section 01555 STOPLOG INSTALLATION, paragraph 1.9.3.

PART 2 PRODUCTS

2.1 CHEMICAL GROUT MATERIALS

The chemical grout material shall be a polyurethane resin. Polyurethane resin shall be injected into the monolith joints in the areas indicated on the contract drawings. The polyurethane resin system shall be a solvent free, MDI (diphenyl-methane-diisocyanate) cross linked, expanding hydrophilic urethane pre-polymer resin which reacts with water and sets into a flexible, closed-cell foam. The polyurethane resin shall have the ability to bond with concrete, have controlled shrinkage during wetting and drying, have the ability to elongate or compress with a moving joint, shall be suitable for contact with potable water supply and meet the requirements of NSF ANSI/NSF 61. The existing monolith joint width may be visually tight (approximately 0.01 inches in width). Relative joint movement varies from a maximum of or less.

The grout shall be injected as a two part multi-component system (resin is one component and water is the second component). The injection of pure resin, without the second water component, will not be permitted. The W:R ratio (water to resin ratio) shall be as recommended by the resin manufacturer, but in no event will use of W:R ratios greater than 1:1 be permitted without approval of the Contracting Officer. The polyurethane resin system shall be capable of accelerated curing by addition of a suitable chemical accelerating admixture to the resin system prior to mixing with water.

The amount of accelerating admixture mixed with the polyurethane resin shall be adjusted for specific insitu conditions at that time of grout placement. There will be significant water leakage through the joint during the monolith grouting process. The contractor shall adjust the accelerator admixtures such that the resin system cures sufficiently fast to prevent excessive dilution, washout, loss to the upstream face or loss to the vertical drain. The temperature of the water passing through the monolith joint may be sufficiently low to require pre-heating of the resin system components, including the water component, prior to injection in order to attain the needed setting properties. Chemical grout injection will occur in the winter, the Contractor should anticipate that resin/water heating will be required and that excessive leakage may be occurring through the joint and shall be entitled to no additional compensation due to the foregoing resin system heating and leakage requirements. Because of the fast setting characteristics of the mixed resin system, the multiple resin components must not be combined and mixed until they are pumped to the desired injection points. The resin system shall have the following uncured and cured properties:

RESIN PROPERTIES

Resin viscosity	less than 600 cps at 25 degrees C
Resin solids content	greater than 95 percent

CURED PROPERTIES

Ability to bond to wet concrete	
Tear resistance	20 lbs/in (ASTM D 3574)
Tensile strength	greater than 150 psi (ASTM D 3574)
Shrinkage	less than 2 percent (ASTM D 1042)
Initial Linear Shrinkage	5 percent
Elongation	>200 percent (ASTM D 3574)

Manufacturer's brochures, technical data sheets, and any other information

describing the polyurethane resin, the proper formulation to achieve the required tensile strength and elongation of the cured resin mix, minimum 10-year service life, and recommended injection pressures shall be submitted with the Plan of Operation.

The above grout properties and requirements are minimum values. The grout shall be a commercially available material with at least 10 years of market and application record in leakage grouting applications. The grout shall be an elastomeric formulation specifically designed for use in grouting moving joints and cracks in structures and should meet or exceed the specified requirements. Prime Resins' "Prim-Flex 900 LVSF and 900 XLV Polyurethane Grouts" are two chemical grout products known to meet the requirements. Alternate grouts meeting or exceeding the specified requirements will be considered. However, "Pene-Grout" and all related products and all hydrophobic grouts will not be considered.

2.2 POLYURETHANE RESIN INJECTION PLANT AND EQUIPMENT

The pump used to inject the polyurethane resin system shall have a pressure regulation system as necessary to control injection pressures while pumping at low and high volumes. The pump shall have an output and pressure rating necessary to accomplish the work as specified herein. The resin and water injection supply lines shall have diameter and capacity that is consistent and compatible with the pump equipment and grout to allow for completion of the work as specified herein.

Prior to beginning resin injection each day, the Contractor shall be responsible for performing pumping flow tests, at injection pressure, of the selected resin component ratios and shall recalibrate the pumps so that appropriate component ratios are achieved, as necessary. The water, resin, and all material used for calibration shall be supplied by the Contractor and shall consist of two accurately calibrated containers for determination of pumped component volumes and all necessary valves for maintaining pumping pressures at the selected injection pressure. Calibration using free-flow pumping will not be acceptable. All calibration material and equipment shall remain on the job at the pump location.

2.3 CONCRETE PATCHING MORTAR

The concrete patching mortar shall contain portland cement and special polymers and accelerators to provide accelerated strength gain and set time. The mortar shall be scour-resistant for use in a high velocity water environment and shall meet the requirements of ASTM C 928 Type R2. The mortar shall be safe for contact with potable water supplies and meet the requirements of NSF ANSI/NSF 61.

PART 3 EXECUTION

3.1 GENERAL

a. The Contractor shall inform the Contracting Officer, 72 hours in advance, as to when polyurethane injection, including any additional drilling and preparation, will be performed and the grouting shall be performed only in the presence of the Contracting Officer's Representative.

b. The normal upstream reservoir elevation is 706.0 msl. All grout work will be below this elevation. Divers will be required to perform this work. Diving requirements shall comply with Section 01550 DIVING REQUIREMENTS.

c. In addition to the diver requirements, the Contractor is required to place stoplogs in the spillway stoplog slots, see Section 01555 STOPLOG INSTALLATION. The Contractor shall open the existing vertical waterstop drain caps as indicated on the drawings. The open drain shall be used by the Contractor for observation of the grout program and flushing of the drain to prevent grout from setting in the drain system. These drains shall be maintained in an open condition, clear of all excess grout that may restrict the flow of water into the drainage gallery. The drains shall be continuously monitored during the grouting process.

d. When using polyurethane, the Contractor shall follow all safety practices and precautions, including use of forced ventilation where necessary, as recommended by the polyurethane resin manufacturer. Material Safety Data Sheets and manufacturer's Instruction Sheets on safe handling and use shall be given to each workman doing the repair work and also shall be given to the Contacting Officer's Representative. Failure of the Contractor to follow recommended safety procedures will be cause to stop the work until the recommended procedures are achieved.

3.2 DRILLING INJECTION PORT HOLES

Drill injection port holes at the monolith joint as necessary to grout the area required as shown on the contract drawings and, as required, to reduce the leakage rate to less than 15 gpm for each monolith joint. The number of holes and spacing shall be per the grout manufacturer's recommendations and shall be submitted in the Plan of Operation. The end of the holes shall be at least from the vertical waterstop to prevent damage to the waterstop.

3.3 CLEANING OF HOLES

Concrete surfaces and drill holes shall be prepared and cleaned per the resin manufacturer's instructions, however, use of acids and corrosives will not be permitted for cleaning. Rinse out holes and joints with high-pressure water injection to ensure the joint line is open and free of silt and drill cuttings. If a joint remains ungrouted overnight, it shall be re-cleaned or rinsed with high-pressure water injection before grouting.

3.4 JOINT SEAL

Sealing of the upstream face of the monolith joint may be required to obtain absolute refusal without excessive loss of resin. Method for sealing may include application of a surface sealant or anchorage of a form across the joint. The joint seal method shall be submitted for approval. The seal shall be removed prior to final measurement of the flow rate through the monolith joint. Excessive loss of resin into the vertical and horizontal drain system shall be prevented or mitigated, see Paragraph GROUT INJECTION.

3.4 GROUT INJECTION

Polyurethane resin shall be injected into the monolith joints to fill the joint as indicated on the contract drawings and, as required, to reduce the leakage rate to less than 15 gpm for each monolith joint. The maximum grouting pressure shall not exceed 1000 psi. At Monolith Joint 8/9, the grout shall be placed from the top of the ogee section to the intersection of Monolith 9 and top of rock. At Monolith Joint 9/10, the grout shall be placed from the top of the ogee section to the intersection of the top of rock and Monolith 9/10. The Contractor should anticipate that adjustment of the accelerator concentrations shall be required based on the specific

insitu conditions. If grout is introduced into the drains, or it is anticipated that it will, the Contractor shall install grout collectors/filters on the drain discharge to protect the drainage gallery and sump pumps. The Contractor shall perform gallery inspections continuously during each grouting shift. The Contractor shall be responsible for cleaning up the gallery and for the design, installation, and removal of any collector/filter system. The monolith joint leakage rate shall be measured at the horizontal drain outlet in the drainage gallery. The measurement shall be with a device that provides at least 90% accuracy between repetitive measurements. At least 5 measurements shall be made each time the flow is measured. The flow shall be measured each work day at the beginning and end of the work day. The Government may independently measure the flow. Discrepancies between the Government and Contractor measured flow rates shall be addressed and corrected by the Contractor at no additional cost to the Government.

#.1 MONITORING AND REPORTING

The Contractor shall provide daily reports documenting the monitoring program as outlined in paragraph Audio/Video Inspection and Monitoring. In addition, the Contractor shall include in the daily reports the monolith joint flow measurements at the beginning of the work day, volume of grout injected in the monolith joints, elevations of grout placement during that day, and monolith joint flow measurements at the end of the work day. This information shall be provided in the final report.

3.5 CLEANING POLYURETHANE RESIN FROM CONCRETE AND OTHER APPURTENANCES

At the completion of polyurethane resin injection, the Contractor shall remove and clean spilled or leaked resin from all exposed concrete and appurtenant structures. Such surfaces include the spillway crest, upstream face of the dam, vertical waterstop drain interior, horizontal drain interior, grouting and inspection galleries, gallery gutters, sump pump pit and pumps.

3.6 INSPECTION AND REPAIR

The Contractor shall perform an inspection of the monolith joints immediately following the grouting process in the presence of the Contracting Officers Representative. If the water leakage flow rate is observed to exceed 15 gpm, the Contractor shall perform all necessary leakage repairs to the monolith joints at no cost to the Government.

3.7 CONCRETE REPAIR

#.1 Monolith Joint Drains

The Contractor shall remove concrete as necessary to expose the drain plug as indicated on the demolition drawing D-1. The Contractor shall take precautions to ensure the safe removal of concrete off of the spillway ogee section. The limits of concrete around the plug to be removed shall be saw cut to a minimum depth of and as indicated on the demolition drawing D-1. The drain plug shall be re-capped with a mortar patch as specified in Paragraph CONCRETE PATCHING MORTAR. The concrete surfaces to be bonded by the patching mortar shall be cleaned and prepared per the mortar manufacturer's recommendations and shall be kept in a saturated surface dry (SSD) condition with no standing water on the surface. The concrete surface, adjacent air, and patching mortar temperature shall be measured at the beginning and end of the day before the placement and modifications to the mortar patching and curing operations shall be made based on the manufacturer's recommendations for placement and curing temperatures. The concrete and drain cap surfaces not to be bonded by the mortar shall be

coated with a suitable bond breaker. The mortar shall be thoroughly compacted into the prepared void by tamping, rodding, ramming, etc. The plug cap shall be finished to match the surface finish, curvature, and elevation of the adjacent spillway ogee section. The Contractor shall divert all stoplog leakage away from the exposed drain plug during the monolith joint grouting and drain plug patching operations. The new drain plug patch shall be properly cured per the manufacturer's recommendations prior to the removal of the stoplogs and subsequent exposure to water.

#.1 Miscellaneous Supports

The Contractor shall repair all areas of the spillway ogee section that were modified for attachment of temporary supports. The Contractor shall take precautions to ensure the safe removal of the supports off of the spillway ogee section. The modified areas shall be filled with a mortar patch as specified in Paragraph CONCRETE PATCHING MORTAR. The concrete surfaces to be bonded by the patching mortar shall be cleaned and prepared per the mortar manufacturer's recommendations and shall be kept in a saturated surface dry (SSD) condition with no standing water on the surface. The concrete surface, adjacent air, and patching mortar temperature shall be measured at the beginning and end of the day before the placement and modifications to the mortar patching and curing operations shall be made based on the manufacturer's recommendations for placement and curing temperatures. The concrete surfaces not to be bonded by the mortar shall be coated with a suitable bond breaker. The mortar shall be thoroughly compacted into the prepared void by tamping, rodding, ramming, etc. The areas shall be finished to match the surface finish, curvature, and elevation of the adjacent spillway ogee section. The Contractor shall divert all stoplog leakage away from the exposed areas during the patching operation. The patches shall be properly cured per the manufacturer's recommendations prior to the removal of the stoplogs and subsequent exposure to water.

-- End of Section --

**Standard Operation Procedure
for Operating the
Spillway Stoplog Lifting Beam
and Placing Stoplogs at
Harry S. Truman Dam and Reservoir**

1. Stoplog Description: Two stoplogs are stored upstream of each tainter gate in the stoplog slots (8 total stoplogs). Each stoplog section is 3'-8" in height, 4'-0" wide and 41'-9.5" \pm 1/16" long. The dry weight of each stoplog is 22,000 pounds. The stoplog sections are identical and interchangeable and each was designed to sustain a head of 47.4 feet, which is the hydrostatic load generated by the full pool elevation of 739.6 feet. The eight sections provided will give protection to a reservoir pool Elevation 721.6.

2. Spreader Beam: The spreader beam is stored at the Government equipment storage yard. The spreader beam is 36'-0" long and 1'-5.5" wide. The spreader beam was designed for a 90 ton crane. The spreader beam is equipped with two fixed spuds and two moveable spuds which will except the cylinder end of the crane outriggers. The spreader beam is used to spread the crane load to bridge structural members which can handle the load.

3. Lifting Beam: The lifting beam is stored at the Government equipment storage yard. The lifting beam dry dead weight is 4,000 pounds. Drawings showing the lifting beam configuration and the items needed to operate the lifting beam are on file in the Structural Section. The following items are needed to operate the lifting beam:

- a. Quick Air Couplings.
- b. Air Hose Reel Arrangement with two reels of air hose (85 feet each)
- c. Instrumentation Pack
- d. Lifting Slings

4. Crane Loads: The crane shall be capable of lifting the dry weight of the stoplog and lifting beam which is estimated to be 26,000 pounds. When the stoplog is in the slot the estimated weight of the stoplog and lifting beam including water weight and the effects of friction is 51,000 pounds.

5. The following is a sequence of action to place stoplogs in a slot and remove the stoplogs from the slot:

- a. Attach Quick Air Couplings to air supply connectors on lifting beam.

b. Attach air hoses on the Air Hose Reel Arrangement to the Quick Air Couplings.

c. Attach the Instrumentation Pack Industrial Instrumentation connector to the lifting beam.

d. Check battery pack power supply.

e. Verify Indicator Lights on the Instrumentation Pack work prior to operating the lifting beam.

f. Verify which air supply line engages and releases the air actuated pins. (Viewing the lifting beam from upstream to downstream, the release line is located on the left and the engage line is located on the right.)

g. Attach a sling to the lifting beam shackles. The sling should be capable of lifting the total weight of the stoplog, lifting beam, water load and friction if any.

h. Position lifting beam over the stoplog to be lifted from spillway stoplog slot. The lifting beam air actuated lifting pins shall be positioned over the stoplog lifting eyes and the end assembly shall be positioned over the stoplog end assembly.

i. Lower the lifting beam until the beam rests on the stoplog.

j. Check indicator lights on the Instrumentation Pack to verify the lifting beam is resting on the stoplog.

k. Engage lifting beam pins. This may be done by applying air pressure to the appropriate air supply line and leaving the other air supply line open to act as an exhaust.

l. Check indicator lights on the Instrumentation Pack to verify the lifting beam pins have properly engaged the stoplog.

m. Lift the stoplog up out of the slot and open the dogging bar using the dogging bar chains attached to the road way parapet.

n. There are two stoplogs per slot. In order to place a stoplog down a stoplog slot the first stoplog must be removed from the slot and supported on the bridge deck or a truck with a flat-bed trailer may be used to maneuver the stoplogs. Then the lifting beam may be attached to the lifting beam as indicated in items h to m.

- o. Lower the lifting beam with engaged stoplog down the stoplog slot. While lowering the stoplogs down the slot, visually verify the progress of the lifting beam and stoplog.
- p. When the stoplog is in place, release the air actuated pins.
- q. Check indicator lights on the Instrumentation Pack to verify the lifting beam pins have properly released the stoplog.
- r. Slowly raise the lifting beam.
- s. To remove the stoplogs from the slots, lower the lifting beam down onto the stoplog.
- t. Check indicator lights on the Instrumentation Pack to verify the lifting beam is resting on the stoplog.
- u. Engage lifting beam pins. This may be done by applying air pressure to the appropriate air supply line and leaving the other air supply line open to act as an exhaust.
- v. Check indicator lights on the Instrumentation Pack to verify the lifting beam pins have properly engaged the stoplog.
- w. Lift the lifting beam and stoplog out of the slot.
- x. Return stoplogs to an available stoplog slot, by lowering the dogging devices and resting the stoplog on the dogging device.