TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-0307

Q.A. LEVEL II

TITLE: SHOTCRETE
DIVISION 3 - CONCRETE
SUBDIVISION - CAST IN PLACE CONCRETE

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B. R. [illegible] DATE 12-7-88

APPROVED BY [illegible] DATE 12-7-88

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GROUT, MATERIALS AND PLACEMENT

PART 1 - GENERAL

1.1 WORK INCLUDED

The work under this specification includes providing initial support to excavation walls by pneumatically applying a low slump concrete at high velocity onto a prepared rock surface, and for creating fireproof ventilation barriers in underground openings.

1.2 REFERENCED PUBLICATIONS

The publication listed below form a part of this specification.

1.2.1 U.S. Department of Commerce, National Bureau of Standards (NBS)

- o Handbook No. 44 — Specifications, Tolerances and Other Technical Requirements for Commercial Weighing and Measuring Devices

1.2.2 American Concrete Institute (ACI)

- o 506.3R — Guide to Certification of Shotcrete Nozzlemen
- o 201.2R — Guide to Durable Concrete
- o 506 — Recommended Practice for Shotcreting
- o 506.2 — Specification for Materials, Proportioning, and Application to Shotcrete
- o 301 — Specification for Structural Concrete for Buildings

1.2.3 American Society for Testing and Materials (ASTM)

- o C33 — Specification for Concrete Aggregates
- o C42 — Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- o C87 — Test Method for Effect of Organic Impurities in Fine Aggregate on Strength of Mortar
- o C94 — Standard Specification for Ready-Mixed Concrete

- o C150 Standard Specification for Portland Cement
- o C231 Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
- o C260 Specification for Air-Entraining Admixtures for Concrete
- o C309 Specification for Liquid Membrane-Forming Compounds for Curing Concrete
- o C330 Standard Specification for Lightweight Aggregates for Structural Concrete
- o C484 Specification for Chemical Admixtures for Concrete
- o C595 Specification for Blended Hydraulic Cements
- o C618 Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use s a Mineral Admixture in Portland Cement Concrete
- o C666 Test Method for Resistance of Concrete to Rapid Freezing and Thawing
- o C685 Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
- o C989 Standard Specification for Ground Iron Blast-Furnace Slag for Use in Concrete and Mortars

1.3 SYSTEM DESCRIPTION

1.3.1 Furnish, place and cure shotcrete for the following:

a. Initial protection and support for the excavated shaft walls.

b. Protection and support of underground excavation surface where deemed necessary.

c. Creation of fireproof ventilation barriers at selected locations in the underground openings.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for Shotcrete is II.

1.4.2 The Vendor shall have an approved Quality Assurance Program.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Portland Cement ASTM-C150

2.1.2 Concrete Aggregates ASTM-C33

2.1.3 Air Entraining Admixtures ASTM-C260

2.1.4 Chemical Admixtures ASTM-C494

2.1.5 Liquid Membrane Forming Compounds for Curing Concrete ASTM-C309

PART 3 - EXECUTION

3.1 MIXING

3.2 DELIVERY

3.3 PLACEMENT

3.4 REINFORCEMENT

3.5 CURING

3.6 SAMPLING

3.7 INSPECTION AND TESTING

3.8 ACCEPTANCE

DATA REQUIREMENTS LIST

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TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-0501

Q.A. LEVEL II

TITLE: STRUCTURAL STEEL
DIVISION 5 - METALS
SUBDIVISION - STRUCTURAL METAL FRAMING

APPROVED BY [signature] DATE 12/1/88

APPROVED BY [signature] DATE 12-7-88

APPROVED BY [signature] DATE 12-7-88

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STRUCTURAL STEEL

PART 1 - GENERAL

1.1 WORK INCLUDED

The work of this section includes the furnishing, detailing of shop drawings, fabrication, and delivery of structural steel used in the shafts, stations, muck pocket and headframes as shown on the Contract Drawings. Shop painting and necessary field touch-up of structural steel is also included.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Code of Federal Regulations (CFR)

- Title 30, Part 57, Safety and Health Standards for Underground Metal and Nonmetal Mines

1.2.2 California Administrative Code (CAC)

- Title 8, Subchapter 17, Mine Safety Orders

1.2.3 American Institute of Steel Construction (AISC)

- M011 Manual of Steel Construction, 8th Edition
- S326 Specification for the Design, Fabrication and Erection of Structural Steel for Buildings
- M013 Detailing for Steel Construction

1.2.4 American Society for Testing and Materials (ASTM)

- A36 Standard Specification for Structural Steel
- A307 Standard Specification for Carbon Steel Bolts and Studs, 60,000, psi Tensile Strength
- A325 Standard Specification for High-Strength Bolts for Structural Steel Joints
- A449 Standard Specification for Quenched and Tempered Steel Bolts and Studs
- A501 Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing

- o A563 Specification for Carbon and Alloy Steel Nuts
- o F436 Standard Specification for Hardened Steel Washers
- o E165 Practice for Liquid Penetrant Inspection Method
- o E709 Practice for Magnetic Particle Examination
- o E94 Guide for Radiographic Testing
- o E142 Method for Controlling Quality of Radiographic Testing

1.2.5 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel
- o A2.4 Standard Symbols for Welding, Brazing and Non-destructive Examination

1.2.6 Federal Specification (Fed. Spec.)

- o TT-C-490B Cleaning Methods and Pretreatment of Ferrous Surfaces for Organic Coatings
- o TT-P-645A Primer, Paint, Zinc Chromate, Alkyd Type

1.2.7 Military Specifications (Mil. Spec.)

- o DOD-P-15328D(1) Primer (Wash), Pretreatment, (Formula No. 117 for Metals) (Metric)

1.2.8 Steel Structures Painting Council (SSPC)

- o SSPC SP3 Power Tool Cleaning
- o SSPC SP6 Commercial Blast Cleaning

1.3 SYSTEM DESCRIPTION

The structural steel specified in this section shall include buntons, beams, columns, stub columns, bracings, guides, brackets, and attachments (i.e., baseplates, cap plates, stiffeners, gusset plates, clip angles); and connectors (i.e., bolts, nuts, washers, stud anchors). Miscellaneous steel is specified in FS-SP-0502.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for Structural Steel is II.

1.4.2 The vendor shall furnish for the Contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management controls relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 - PRODUCTS

2.1 STEEL

2.1.1 Structural Steel (ASTM A36)

2.1.2 Structural Steel Tubing (ASTM A501)

2.2 BOLTS, NUTS AND WASHERS

2.2.1 Common Bolts and Nuts (ASTM A307)

2.2.2 High-Strength Steel Bolts (ASTM A325, Type 1 or 2)

2.2.3 Collar Bolts (ASTM A325)

2.2.4 Washers (ASTM F436)

2.2.5 Washers for High-Strength Bolts (ASTM A325 or ASTM A449)

2.2.6 Carbon and Alloy Steel Nuts (ASTM A563)

2.3 ACCESSORIES

2.3.1 Welding Electrodes (AWS Code D1-1)

2.4 FABRICATION

2.4.1 Fabrication shall be in accordance with approved shop drawings, AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", AISC Manual of Steel Construction, AWS Structural Welding Code - Steel, and this Specification.

2.5 SHOP PAINTING

2.5.1 Surface Cleaning (SSPC SP6) (SSPC SP3)

2.5.2 Pretreatment (Mil. Spec. DOD-P-15328) or (Fed. Spec. TT-C-490)

2.5.3 Priming (Fed. Spec. TT-P-645)

2.5.4 Factory Applied Finish Coating: for all structural steel for underground and shaft below collar

PART 3 - EXECUTION

3.1 ERECTION

3.3.1 Structural Steel shall be erected by the Contractor in accordance with AISC "Specification for the Design Fabrication and Erection of Structural Steel for Buildings", AWS Structural Welding Code-Steel and this specification.

3.2 TESTS AND INSPECTIONS

3.2.1 Visual Inspection Welds (AWS D1.1, Part 6)

3.2.2 Nondestructive Testing (AWS D1.1 Radiographic, Ultrasonic, Magnetic Particle, Dye Penetrant) as directed

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TECHNICAL SPECIFICATION
(OUTLINE SPECIFICATION)

NO. FS-SP-0502

Q.A. LEVEL II

TITLE: MISCELLANEOUS STEEL
DIVISION 5 - METALS
SUBDIVISION - METAL FABRICATIONS

APPROVED BY [signature] DATE 12/1/88

APPROVED BY [signature] DATE 12-7-88

APPROVED BY [signature] DATE 12-7-88

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MISCELLANEOUS STEEL

PART 1 - GENERAL

1.1 WORK INCLUDED

The work of this section includes the furnishing, detailing of shop drawings, fabrication, and delivery of miscellaneous steel items as shown on the Contract Drawings. Shop painting and necessary field touch-up of miscellaneous steel is also included. Miscellaneous steel items are comprised of:

- Chain Link Fence Fabric for Barriers and Rock Support
- Ladder Hatches and Gates for Brattice
- Expanded Metal for Ladderway Enclosures
- Steel Grating
- Bars and Plates
- Checkered Plate
- Handrails
- Stair Treads
- Kick Plates
- Ladders

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Code of Federal Regulations (CFR)

- Title 30, Part 57, Safety and Health Standards for Underground Metal and Nonmetal Mines

1.2.2 California Administrative Code (CAC)

- Title 8, Subchapter 17, Mine Safety Orders

1.2.3 American Institute of Steel Construction (AISC)

- o M011 Manual of Steel Construction, 8th Edition
- o S326 Specification for the Design, Fabrication and Erection of Structural Steel for Buildings
- o M013 Detailing for Steel Construction

1.2.4 American Society for Testing and Materials (ASTM)

- o A36 Standard Specification for Structural Steel
- o A53 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
- o A307 Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
- o A392 Specification for Zinc-Coated Steel Chain-Link Fence Fabric
- o A501 Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
- o A563 Specification for Carbon and Alloy Steel Nuts
- o A641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
- o F436 Standard Specification for Hardened Steel Washers
- o F669 Specification for Strength Requirements of Metal Posts and Rails for Industrial Chain Link Fence

1.2.5 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel

1.2.6 Federal Specification (Fed Spec)

- o RR-G-661 Grating, Metal Bar Type (Floor, Except for Naval Vessels)
- o TT-C-490 Cleaning Methods and Pretreatment of Ferrous Surfaces for Organic Coatings
- o TT-P-645 Primer, Paint, Zinc-Chromate, Alkyd Type

1.2.7 Military Specification (Mil Spec)

- o MIL-M-17194 Metal, Expanded, Steel
- o DOD-P-15328 Primer (Wash), Pretreatment, (Formula No. 117 for Metals)

1.2.8 Steel Structures Painting Council (SSPC)

- o SSPC SP3 Power Tool Cleaning
- o SSPC SP6 Commercial Blast Cleaning

1.3 SYSTEM DESCRIPTION

The Miscellaneous Steel for this section shall be used in the shafts, headframes, stations, galloway stage and formwork. Structural steel is specified in FS-SP-0501.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for Miscellaneous Steel is II.

1.4.2 The vendor shall furnish for the Contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management control relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 - PRODUCTS

2.1 STEEL

2.1.1 Fence Fabric (ASTM A392)

2.1.2 Safety Gates and Handrails (A36) and (A53)

2.1.3 Ladder Hatches and Gates for Brattice (A36), (A53) and (A501)

2.1.4 Bars and Plates (A36)

2.1.5 Tie Wire (ASTM A641)

2.1.6 Expanded Metal (Mil-M-17194)

2.1.7 Steel Grating (Fed. Spec RR-G-661)

2.1.8 Checkered Plate, Stair Treads, Kick Plates, Ladders (A36)

2.2 BOLTS, NUTS AND WASHERS

2.2.1 Bolts (ASTM A307)

2.2.2 Nuts (ASTM A563)

2.2.3 Washers (ASTM F436)

2.3 ACCESSORIES

2.3.1 Welding Electrodes (AWS Code D1.1)

2.4 FABRICATION

2.4.1 Fabrication shall be in accordance with approved shop drawings, AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, AISC Manual of Steel Construction, AWS Structural Welding Code - Steel and this specification.

2.5 SHOP PAINTING

2.5.1 Surface Cleaning (SSPC SP6) (SSPC SP3)

2.5.2 Pretreatment (Mil Spec DOD-P-15328) or (Fed. Spec. TT-C-490)

2.5.3 Priming (Fed. Spec. TT-P-645)

2.5.4 Factory Applied Finish Coating: For all miscellaneous steel for underground and shaft below collar.

PART 3 - EXECUTION

3.1 ERECTION

3.1.1 Contractor shall erect miscellaneous steel in accordance with AISC Manual of Steel Construction and AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, AWS Structural Welding Code - Steel and this specification.

3.2 INSPECTION

3.2.1 Visual Inspection Welds (AWS D1.1, Part 6)

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TECHNICAL SPECIFICATION
(OUTLINE SPECIFICATION)

NO. FS-SP-0801

Q.A. LEVEL II

TITLE: UNDERGROUND FIRE DOORS
DIVISION 8 - DOORS AND WINDOWS
SUBDIVISION - SPECIAL DOORS

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Curtiss DATE 12-7-88

APPROVED BY Arshad Ali DATE 12-7-88

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UNDERGROUND FIRE DOORS

PART 1 - GENERAL

1.1 WORK INCLUDED

The work under this section consists of furnishing underground fire doors and related accessories, including frameworks, anchors, air cylinders and control devices. The work requires furnishing all materials and services for fabrication, painting, and delivery of the fire doors for underground installation in accordance with this specification and the Contract Drawings.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Code of Federal Regulations (CFR)

- o 30 CFR 57 Safety and Health Standards for Underground Metal and Non-metal Mines

1.2.2 State of California Administrative Code (CAC)

- o Title 8, Chapter 4, Subchapter 17 (Article 7058), Mine Safety Orders.

1.2.3 American Institute of Steel Construction (AISC)

- o M013 Detailing for Steel Construction

1.2.4 American National Standards Institute (ANSI)

- o A10.13 Safety Requirements for Steel Erection

1.2.5 American Society for Testing and Materials (ASTM)

- o A36 Standard Specification for Structural Steel
- o A307 Standard Specification for Carbon Steel Bolts and studs, 60,000 psi Tensile Strength.

1.2.6 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel

1.2.7 National Fire Protection Association (NFPA)

- o 70 National Electrical Code
- o 80 Fire Doors and Windows
- o 251 Standard Methods of Fire Tests of Building Construction and Materials
- o 252 Standard Methods of Fire Tests of Door Assemblies

1.3 SYSTEM DESCRIPTION

The underground fire doors are reinforced steel doors and will be located near the shaft stations as life safety barriers to isolate the shaft from the testing and operating areas when needed. Door locations are shown in the Contract Drawings. The underground fire doors will be pneumatically operated either locally or from the surface by remote control.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for Underground Fire Doors is II.

1.4.2 The vendor shall furnish for approval, the Contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management controls relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Frameworks and Anchors

2.1.2 Bottom Metal Runners

2.1.3 Fire Door Assembly

- o Fire Rating and Type
- o Door Frame
- o Metal Plates
- o Hinges
- o Latches
- o Air Cylinder
- o Personnel By-Pass Door
- o Paint Coatings

2.1.4 Control and Monitor

- o Local and Remote Controllers
- o Solenoid Valves and By-Pass
- o Electrical System
- o Lighting and Alarm

2.1.5 Seals

- o Gaskets

2.2 FABRICATION

2.2.1 Fabrication of the fire door assemblies shall be in accordance with approved shop drawings, the Contract Drawings and this specification.

PART 3 - EXECUTION

3.1 INSTALLATION

Installation by Contractor per recommended sequence.

3.1.1 Drift Size Excavation

3.1.6 Test Support Prior to Concrete Placement

- o Geologic Mapping
- o Location Markers
- o Radial Borehole Test

3.2 CONCRETE PLACEMENT (Refer to FS-SP-0308, "Shaft Liner Concrete")

- o Forming
- o Reinforcing
- o Embedded Metal
- o Block-Outs

3.3 INSTALLATION

- o Embedments
- o Fences and Gates

3.4 TEST SUPPORT BEFORE AND AFTER CONCRETE PLACEMENT

- o Radial Bore Hole Tests

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TECHNICAL SPECIFICATION
(OUTLINE SPECIFICAITON)

NO. FS-SP-0802

Q.A. LEVEL II

TITLE: STOPPINGS, BULKHEADS AND REGULATORS
DIVISION 8 - DOORS AND WINDOWS
SUBDIVISION - SPECIAL DOORS

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B. R. [illegible] DATE 12-7-88

APPROVED BY Arshad Ali DATE 12-7-88

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STOPPINGS, BULKHEADS AND REGULATORS

PART 1 - GENERAL

1.1 WORK INCLUDED

The work under this specification includes the construction and installation of ventilation stoppings, bulkheads and air regulators to serve the underground ventilation system.

1.2 REFERENCED PUBLICATIONS

1.2.1 Code of Federal Regulations (CFR)

- o 30 CFR 57 Safety and Health Standards - Underground Metal and Nonmetal Mines Sub-Part G&T

1.2.2 California Administrative Code (CAC)

- o Title 8, Chapter 4, Subchapter 17, Mine Safety Orders, Article 31

1.2.3 American Concrete Institute (ACI)

- o 506.3R Guide to Certification of Shotcrete Nozzlemen
- o 506 Recommended Practice for Shotcreting
- o 506.2 Specification for Materials, Proportioning, and Application to Shotcrete

1.2.4 American Society for Testing and Materials (ASTM)

- o C33 Specification for Concrete Aggregates
- o C260 Specification for Air-Entraining Admixtures for Concrete
- o C494 Specification for Chemical Admixtures for Concrete
- o C595 Specification for Blended Hydraulic Cements
- o E162 Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source

1.3 SYSTEM DESCRIPTION

The structures covered by this specification will serve to control underground ventilation air flows as shown in the Contract Drawings.

- o The bulkheads and stoppings will be equipped with personnel doors and, in certain locations, with vehicle doors to permit passage of equipment.
- o Penetrations will be provided for ducting to pass through the stopping where necessary.
- o Air regulators, where used, shall consist of a sliding plate shutter to adjust the cross-section of the opening in the stopping.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for Stopping and Bulkheads is II.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Framework and Anchors

2.1.2 Weldmesh reinforcing wire

2.1.3 Shotcrete

2.2 FABRICATION

2.2.1 Fabrication of the framework for openings in the stopping shall be in accordance with the Contract Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Location preparation

3.1.2 Temporary backing for shotcrete placement

3.1.3 Installation of framework for openings as shown in the Contract Drawings

3.1.4 Shotcrete application

3.2 INSPECTION

3.2.1 Field inspection

3.2.2 Acceptance

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TECHNICAL SPECIFICATION
(OUTLINE SPECIFICATION)

NO. FS-SP-1103

Q.A. LEVEL III

TITLE: SUBSURFACE MAINTENANCE SHOP
DIVISION 11 - EQUIPMENT
SUBDIVISION - MAINTENANCE EQUIPMENT

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Systems DATE 12-7-88

APPROVED BY Arshad Ali DATE 12-7-88

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SUBSURFACE MAINTENANCE SHOP

PART 1 - GENERAL

1.1 WORK INCLUDED

This section covers the general requirements for a subsurface maintenance shop intended to be used for the servicing of mine vehicles and miscellaneous construction equipment.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification:

1.2.1 American National Standards Institute (ANSI)

- o B15.1 Safety Standard for Mechanical Power Transmission Apparatus
- o S1.13 Methods for Measurement of Sound Pressure Levels

1.2.2 California Administrative Code (CAC)

- o Title 8, Chapter 4, Subchapter 17, Mine Safety Orders
- o Title 8, Chapter 4, Subchapter 20, Tunnel Safety Orders

1.2.3 Code Federal Regulations (CFR)

- o 30 CFR 32 Mobile Diesel-Powered Equipment for Non-coal Mines
- o 30 CFR 57 Safety and Health Standards - Underground Metal and Non-metal Mines

1.2.4 National Fire Protection Association (NFPA)

- o 17 Dry Chemical Extinguishing Systems
- o 70 National Electrical Code

1.2.5 American Conference of Governmental Industrial Hygienists (ACGIH)

- o Industrial Ventilation Manual of Recommended Practice

1.3 SYSTEM DESCRIPTION

The subsurface vehicle and construction equipment shop shall have the following features:

- o Fume and dust exhaust removal hoods
- o 480V and 115V electrical service ___ kVA capacity
- o Water supply ___ gal/min capability at ___ psig
- o Waste water removal capability
- o A concrete floor with drain, capable of supporting mining vehicles
- o Lighting in conformance to standards
- o Fire Door access between shop and ES-2 shaft

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for the subsurface maintenance shop is III.

PART 2 - PRODUCTS

2.1 MATERIAL AND EQUIPMENT

- o Sheet Metal exhaust hoods
- o 3000 psi compressive strength concrete
- o Fluorescent lighting fixtures
- o Water and Waste water piping

- o 5 ton capacity electric remote control trolley mounted hoist
- o Fire Door in compliance with 30 CFR 57.4760 Table C-3 and FS-SP-0801

PART 3 - EXECUTION

3.1 INSTALLATION

- 3.1.1 Wiring Requirements
- 3.1.2 Piping Requirements
- 3.1.3 Concrete Requirements
- 3.1.4 Ducting Requirements
- 3.1.5 Ground Support Requirements

3.2 INSPECTION

- 3.1.1 Construction Inspection
- 3.2.2 Safety Inspection

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TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-1105

Q.A. LEVEL III

TITLE: DRILL JUMBO (LEASE)
DIVISION 11 - EQUIPMENT
SUBDIVISION - MAINTENANCE EQUIPMENT

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B. R. Cuthrell DATE 12-7-88

APPROVED BY Arshad Ali DATE 12-7-88

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DRILL JUMBO (LEASE)

PART 1 - GENERAL

1.1 WORK INCLUDED

This performance specification defines the functional requirements of a self propelled rubber tired jumbo for drilling blast holes in a rock face.

1.2 REFERENCED PUBLICATIONS

1.2.1 Code of Federal Regulations

- o 30 CFR 32 Mobile Diesel Powered Equipment for Non-coal Mines
- o 30 CFR 57.5050 Safety and Health Standards - Underground Metal and Non-metal Mines (Exposure Limits for Noise)

1.2.2 State of California Administrative Code (CAC)

- o Title 8, Chapter 4, Subchapter 17, Mine Safety Orders

1.2.3 American National Standards Institute (ANSI)

- o B15.1 Safety Standards for Mechanical Power Transmission Apparatus

1.3 SYSTEM DESCRIPTION

The system consists of a diesel propelled rubber tired drill carriage with electro-hydraulic or pneumatic drill positioning booms, drill feed slides and feeds, and rock drills.

1.4 QUALITY ASSURANCE

The Quality Assurance Level Assignment for the Drill Jumbo is III.

PART 2 - PRODUCTS

2.1 JUMBO (DRILL CARRIAGE)

- o Number of Booms
- o Size
- o Maximum Disassembled Dimensions
- o Maneuverability through openings

2.2 ENGINE

- o Diesel Type
- o Size
- o Ventilation Requirements
- o Exhaust Scrubbing System

2.3 DRIVE

- o Transmission
- o Axles, Wheels, and Tires

2.4 STEERING

2.5 BRAKES

- o Service
- o Parking and Emergency

2.6 TANK CAPACITIES

- o Fuel
- o Hydraulic Oil

2.7 HYDRAULIC SYSTEMS

2.8 BOOMS, SLIDES AND FEEDS

- o Number
- o Feed Length
- o Face Coverage

2.9 DRILLS

- o Type
- o Size
- o Performance Characteristics

PART 3 - EXECUTION

Not Applicable

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TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-1106

Q.A. LEVEL III

TITLE: LHD VEHICLES (LEASE)
DIVISION 14 - CONVEYING SYSTEMS
SUBDIVISION - MATERIAL HANDLING SYSTEMS

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Ellingsworth DATE 12-7-88

APPROVED BY Richard Hi DATE 12-7-88

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LHD VEHICLES

PART 1 - GENERAL

1.1 WORK INCLUDED

This performance specification defines the functional requirements of a rubber tired load haul dump (LHD) unit with an articulated frame equipped with a TBD yard (minimum) bucket.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 American National Standards Institute (ANSI)

- o B15.1 Safety Standards for Mechanical Power Transmission Apparatus
- o S1.13 Methods for Measurement of Sound Pressure Levels

1.2.2 American Society for Testing and Materials (ASTM)

- o D975 Specification for Diesel Fuel Oils

1.2.3 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel

1.2.4 California Administrative Code (CAC)

- o Title 8, Chapter 4, Subchapter 17, Mine Safety Orders
- o Title 8, Chapter 4, Subchapter 20, Tunnel Safety Orders

1.2.5 Code of Federal Regulations (CFR)

- o 30 CFR 32 Mobile Diesel Powered Equipment for Non-coal Mines
- o 30 CFR 57 Safety and Health Standards Underground Metal and Non-metal Mines

1.2.6 National Fire Protection Association (NFPA)

- o NFPA 17P Dry Chemical Extinguishing Systems

1.2.7 Society of Automotive Engineers (SAE)

- o J726 Recommended Practice, Air Cleaner Test Code
- o J818 Rated Operating Load for Loaders
- o J1165 Recommended Practice,Reporting Cleanliness Levels of Hydraulic Fluids

1.3 SYSTEM DESCRIPTION

The system will be used for removing rock from the mine face to the skip loading system. The equipment will pick up load in the bucket, transport the load, traversing some sharp corners, and dump its load in the storage bin at the mucking shaft.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for the LHD is III.

PART 2 - PRODUCTS

2.1 MATERIALS (N/A)

2.2 EQUIPMENT

2.2.1 Self Propelled Load, Haul and Dump Vehicle

- o Engine
- o Maximum Dimensions
- o Maximum Disassembled Dimensions
- o Standard Cab Controls
- o Transmission
- o Hydraulic Requirements
- o Canopy Requirements

- Fire Suppression System
- Tires
- Lights
- Bucket Requirements
- Bucket Hydraulics - Safety Check Valve
- Exhaust Requirements - Exhaust Scrubbing System
- Personnel Protection Requirements - Heat and Moving Parts
- Maintenance Requirements
- Data Requirements
- Identification Requirements
- Painting Requirements

PART 3 - EXECUTION

3.1 Perform surface check of all system components.

3.2 Disassemble LHD for transfer down shaft.

3.3 Transport to Main Test Level.

3.4 Reassemble LHD and service unit per manufacturer's operations and maintenance instructions.

3.5 Inspect LHD To satisfy all performance and safety requirements per applicable codes and standards.

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TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-1107

Q.A. LEVEL TBD

TITLE: MINE SERVICE VEHICLE
DIVISION 14 - CONVEYING SYSTEMS
SUBDIVISION - MATERIAL HANDLING

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Cuthrell DATE 12-7-88

APPROVED BY Arshad Ali DATE 12-7-88

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MINE SERVICE VEHICLE

PART 1 - GENERAL

1.1 WORK INCLUDED

This section covers the performance and dimensions required for a subsurface service vehicle.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 American National Standards Institute (ANSI)

- o B15.1 Safety Standards for Mechanical Power Transmission Apparatus
- o S1.13 Methods for Measurement of Sound Pressure Levels

1.2.2 American Society for Testing and Materials (ASTM)

- o D975 Specification for Diesel Fuel Oils

1.2.3 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel

1.2.4 California Administrative Code (CAC)

- o Title 8, Chapter and Subchapter 17, Mine Safety Orders
- o Title 8, Chapter and Subchapter 20, Tunnel Safety Orders

1.2.5 Code of Federal Regulations (CFR)

- o Title 30, Part 32, Engine Exhaust Systems (except for 32.4(e)(1) and 32.5(a)(4))
- o Title 30, Part 57, Health and Safety Standards, Metal and Non-metal Underground Mines

1.2.6 National Fire Protection Association (NFPA)

- o NFPA 17P Dry Chemical Extinguishing Systems

1.3 SYSTEM DESCRIPTION

The mine service vehicle shall be capable of the following:

- o Passing through an 11' wide x 8'-6" high opening.
- o Making a 90^{o} turn in from a 14' wide opening into a 14' wide opening.
- o Carrying a payload of ____ lbs.
- o Transporting _____ persons including the driver.
- o Operating on a minimum grade of +_____% while fully loaded.
- o A minimum speed on the level of _____ mph.
- o Maximum component cross sectional dimension ____ inches.
- o Maximum component weight _____ lbs.
- o Fuel tank capacity of ____ gallons.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for the Mine Service Vehicle is to be determined.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- o Air Cooled (Water Cooled) Diesel Power System
- o Articulation
- o Driven Wheels (2 wheel drive/4 wheel drive)
- o Power Takeoffs, Lift Gates, etc.
- o Lights, Steering, Horn, Tow Bars, Bumpers, etc.
- o Hydraulic System

- o Falling Object Protection and other Safety Features
- o Operational Warning Lights, Signs and Labels
- o Exhaust Muffler
- o Operational Warning Lights, Signs and Labels
- o Catalytic Converter and Other Exhaust Conditioning Equipment
- o Frame and Decking Materials
- o Fire Suppression System

2.2 FABRICATION

2.2.1 Welding and Fastening Requirements

2.2.2 Tolerances

2.2.3 Shop Fit Up

PART 3 - EXECUTION

3.1 SURFACE STARTUP AND INSPECTION

3.2 TEARDOWN FOR LOWERING IN SHAFT

3.3 SUBSURFACE REASSEMBLY

3.4 PREPARATION FOR OPERATION

3.5 FINAL INSPECTION

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TECHNICAL SPECIFICATION
(OUTLINE SPECIFICATION)

NO. FS-SP-1109

Q.A. LEVEL II

TITLE: MOBILE DUST COLLECTION UNITS
DIVISION 11 - EQUIPMENT
SUBDIVISION - INDUSTRIAL AND PROCESS EQUIPMENT

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B. R. Guthrie DATE 12-7-88

APPROVED BY Arshad Ali DATE 12-7-88

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MOBILE DUST COLLECTION UNITS

PART 1 - GENERAL

1.1 WORK INCLUDED

The work under this section defines the performance requirements for the procurement and delivery of mobile dust collection units (3 and 1 spare) to be furnished and tested complete with all components required for operation. The machine type units will be mobile, mounted on non-flat tires and equipped with a towing bar for transporting to any active area for dust entrapment and collection. Units shall be capable of processing dust laden air an estimated quantity of up to 10,000 CFM. Units shall be MSHA approved, mine proven and capable of quiet operation, not to exceed 85 decibels.

1.2 REFERENCED PUBLICATIONS

The publications listed below from a part of this specification.

1.2.1 Code of Federal Regulations (CFR)

- o 30 CFR 57 Safety and Health Standards for Underground Metal and Non-metal Mines

1.2.2 State of California Administrative Code (CAC)

- o Title 8, Chapter 4, Subchapter 17 (Article 31), Mine Safety Orders

1.2.3 American Conference of Governmental Industrial Hygienists (ACGIH)

- o Threshold Limit values for Toxic Dusts, Fumes and Mists

1.2.4 Air Movement and Control Association (AMCA)

- o AMCA 99 Standards Handbook
- o AMCA 203 Field Performance Measurement
- o AMCA 210 Laboratory Methods of Testing Fans
- o AMCA 300 Standard Test Code for Sound Rating

1.2.5 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel

1.3 SYSTEM DESCRIPTION

Each mobile dust collection unit shall be a complete operating unit with enclosed filter bags, pressure type operated fans, electrical motors and components, hydraulic components, adaptors for ductwork connections and dry collection bins for safe dust removal into plastic bags.

The system will include metal centrifuge type pre-cleaners and fabric filter collectors to remove coarse dust and separate particulates from dust laden air. The overall efficiency of the filter bags shall be at least 90% collection of the submicron particulates down to 0.8 microns. Collected dust shall drop into bins that have sufficient storage capacity for 8-hours of continuous operation.

The unit will primarily be enclosed in a metal framework with controls/accessories mounted outside and will be provided with hydraulic drive and steering levers for control of localized movement. It shall be equipped with foam-filled flat proof tires and a tow bar assembly for towing by diesel powered mobile equipment for transport and relocation underground.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for the Mobile Dust Collection Units II.

1.4.2 The Vendor shall have an approved Quality Assurance Program.

PART 2- PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- o Metal Frame
- o Ducting Adaptors
- o Centrifuge Chamber and Dust Bins
- o Filter Bags
- o Vibrator Controls

- o Electric Motors
  - Hydraulic System Motor: 15HP, 480 Volts, 3 phase
  - Centrifuge Fan Motor: 40 HP, 480 Volts, 3 phase
  - Filter Bag Fan Motor: 15 HP, 480 Volts, 3 phase
- o Hydraulic System - lever controls and hoses
- o Electrical Controls - switches and receptacles
- o Lubrication System
- o Fans
- o Silencers
- o Tires
- o Towing Assembly
- o Painting - factory applied finish
- o Safety Devices
  - Parking Brake
  - Reflectors
  - Fire Extinguisher

2.1.1 No component such as: metal frame, ducting adaptors, tire-wheels-axle shall exceed 4.5 ft. x 4.5 ft. in cross sectional area in order to pass through the shaft opening.

2.2 PERFORMANCE CRITERIA

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Surface Start-Up

3.1.2 Disassembly for lowering down shaft

3.1.3 Subsurface Reassembly per manufacturer's instructions

3.2 INSPECTION AND TESTING

3.2.1 Initial inspection (surface) - check controls, fan vibration and performance and noise level

3.2.2 Final inspection at operating face

3.2.3 Operational test - for dust collection efficiency, overall performance and acceptance.

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Form LV-315A

TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-1504

Q.A. LEVEL II

TITLE: MAIN MINE VENTILATION FANS
DIVISION 15 - MECHANICAL
SUBDIVISION - HEATING, VENTILATING AND AIR CONDITIONING

APPROVED BY Bruce T. Staley DATE 12-1-88

APPROVED BY B.R. Luytens DATE 12-7-88

APPROVED BY Richard Hi DATE 12-7-88

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MAIN MINE VENTILATION FANS

PART 1 - GENERAL

1.1 WORK INCLUDED

The work included under this section covers the design, fabrication, testing and delivery of direct drive, vane axial, main mine ventilation fans. The fans will be used as the primary equipment for underground ventilation during the ESF construction and operations.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Code of Federal Regulations (CFR)

- o 30 CFR 57 Safety and Health Standards for Underground Metal and Non-metal Mines.

1.2.2 California Administrative Code (CAC)

- o Title 8, Chapter 4, Subchapter 17, (Art. 31) Mine Safety Orders

1.2.3 Air Movement and Control Association (AMCA)

- o AMCA 99 Standards Handbook
- o AMCA 203 Field Performance Measurement
- o AMCA 210 Laboratory Methods of Testing Fans
- o AMCA 300 Standard Test Code for Sound Rating

1.2.4 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel

1.2.5 National Fire Protection Association (NFPA)

- o 70 National Electrical Code

1.3 SYSTEM DESCRIPTION

The system includes seven (7) mine ventilation fans:

- Four units + one spare, each of 48" dia/200 BHP/1770 rpm to deliver 83,000 cfm at 11" water gage static pressure (sea level base).

  (1) ES-1 Surface Fan
  (1) ES-1 Underground Booster Fan
  (2) ES-2 Underground Booster Fans
  (1) Spare

- One unit + one spare, each of 60" dia/350 BHP/1770 rpm to deliver 162,000 cfm at 10" water gage static pressure (sea level base).

  (1) ES-2 Surface Fan
  (1) Spare

The fans shall be vane axial direct drive units with motor in the air stream. Blade settings are to be adjustable and the fans are to deliver at least 50% of rated capacity in a reverse mode. Attenuator shall be provided so that the noise level, beyond a distance of 10 feet from the fan shall not exceed 80 decibels. Monitor for fan vibration, bearing temperatures and air pressure are also to be provided.

Specific fan locations shall be as shown in the Contract Drawings.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance level assignment for the Main Mine Ventilation Fans is II.

1.4.2 The vendor shall furnish for the Contracting QA Representative's Quality Assurance program describing specified work, including descriptions which identified management controls relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Housing and Guide Vanes

- o Construction
- o Dimensions
- o Clearances
- o Class Rating

2.1.2 Fan Wheels

- o Construction
- o Dimensions
- o Class Rating

2.1.3 Fan Blades

- o Construction
- o Clearances
- o Class Rating
- o Adjustability

2.1.4 Electric Motor

- o Voltage/Amperage Rating/RPM
- o Frame Type/Size
- o Insulation
- o Direct Drive Shaft

- o Reversibility
- o Bearings
- o Lubrication

2.1.5 Inlet/Outlet Adaptors

- o Construction
- o Dimensions
- o Screens

2.1.6 Noise Silencer

- o Construction
- o Dimensions

2.1.7 Painting - Standard Factory Finish

2.1.8 Monitors

- o Air Pressure
- o Bearing Temperature
- o Vibration

2.2 FABRICATION

2.2.1 Fabrication shall be in accordance with approved shop drawings and Schedule of Delivery.

2.3 FACTORY TESTING

2.3.1 Fan Performance

- o Air Quantity
- o Pressure

- o Brake Horsepower
- o Efficiency

2.3.2 Vibrations and Balancing Data

2.3.3 Silencer Performance

PART 3 - EXECUTION

3.1 INSTALLATION AND TESTING

3.1.1 Field Inspection

3.1.2 Field Performance Test

3.1.3 Field Vibration Test

3.3.3 Field Silencer Performance Test

3.2 ACCEPTANCE

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TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-1505

Q.A. LEVEL II

TITLE: AUXILIARY MINE VENTILATION FANS
DIVISION 15 - MECHANICAL
SUBDIVISION - HEATING, VENTILATING AND AIR CONDITIONING

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Cuthrell DATE 12-7-88

APPROVED BY Arsenal Hill DATE 12-7-88

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AUXILIARY MINE VENTILATION FANS

PART 1 - GENERAL

1.1 WORK INCLUDED

The work included under this section covers the design, fabrication, testing and delivery of direct drive, vane axial, auxiliary mine ventilation fans. The fans will be used as the auxiliary equipment for underground ventilation during the ESF construction and operations.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Code of Federal Regulations (CFR)

- o 30 CFR 57 Safety and Health Standards for Underground Metal and Nonmetal Mines.

1.2.2 California Administrative Code (CAC)

- o Title 8, Chapter 4, Subchapter 17, (Art. 31) Mine Safety Orders

1.2.3 Air Movement and Control Association (AMCA)

- o AMCA 99 Standards Handbook
- o AMCA 203 Field Performance Measurement
- o AMCA 210 Laboratory Methods of Testing Fans
- o AMCA 300 Standard Test Code for Sound Rating

1.2.4 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel

1.2.5 National Fire Protection Association (NFPA)

- o 70 National Electrical Code

1.3 SYSTEM DESCRIPTION

The system includes twenty five (25) auxiliary ventilation fans:

- o Twelve units + one spare, each of 32" dia/15 BHP/1770 rpm to deliver 20,000 cfm at 3.25" water gage total pressure (sea level base)
- o Four units + one spare, each of 32" dia/5 BHP/1170 rpm to deliver 18,000 cfm at 0.9" water gage total pressure (sea level base)
- o Three units + one spare, each of 42 1/4" dia/100 BHP/1770 rpm to deliver 45,000 cfm at 10" water gage total pressure (sea level base)
- o Two units + one spare, each of 42 1/4" dia/50 BHP/1770 rpm to deliver 45,000 cfm at 5" water gage total pressure (sea level base)

The fans shall be vane axial direct drive units with motor in the air stream. Blade settings are to be adjustable. Attenuator shall be provided so that the noise level, beyond a distance of 10 feet from the fan shall not exceed 80 decibels.

Actual locations of auxiliary fans are shown in Title I drawing number FS-GA-0225.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for the Auxiliary Mine Ventilation Fans is II.

1.4.2 The vendor shall furnish for the Contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management controls relative to the fabrication process, quality control and inspection requirements, material procurements and procedures, and documentation.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Housing and Guide Vanes

- o Construction
- o Dimensions
- o Clearances
- o Class Rating

2.1.2 Fan Wheels

- o Construction
- o Dimensions
- o Class Rating

2.1.3 Fan Blades

- o Construction
- o Clearances
- o Class Rating
- o Adjustability

2.1.4 Electric Motor

- o Voltage/Amperage Rating/RPM
- o Frame Type/Size
- o Insulation
- o Direct Drive Shaft
- o Bearings
- o Lubrication

2.1.5 Inlet/Outlet Adaptors

- o Construction
- o Dimensions
- o Screens

2.1.6 Noise Silencer

- o Construction
- o Dimensions

2.1.7 Painting-Standard Factory Finish

2.2 FABRICATION

2.2.1 Fabrication shall be in accordance with approved shop drawings and Schedule of Delivery.

2.3 FACTORY TESTING

2.3.1 Fan Performance

- o Air Quantity
- o Pressure
- o Brake Horsepower
- o Efficiency

2.3.2 Vibration and Balancing Data

2.3.3 Silencer Performance

PART 3 - EXECUTION

3.1 INSTALLATION AND TESTING

3.1.1 Field Inspection

3.1.2 Field Performance Test

3.1.3 Field Silencer Performance Test

3.2 ACCEPTANCE

DATA REQUIREMENTS LIST

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FENIX & SCISSON, INC.	SHEET 8 OF 8	WBS NUMBER 1.2.6.7.1	DOCUMENT NO. FS-SP-1505	REV. 1

Form LV-315A

TECHNICAL SPECIFICATION
(OUTLINE SPECIFICATION)

NO. FS-SP-1506

Q.A. LEVEL II

TITLE: VENTILATION DUCTING
DIVISION 15 - MECHANICAL
SUB DIVISION - HEATING, VENTILATING AND AIR CONDITIONING

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Fenix DATE 12-7-88

APPROVED BY Arthur Ho DATE 12-7-88

REVISION DESCRIPTION	SECT. OR PAGES	REV. BY	APPROVED BY	REV. NO.	DATE
Revised to add Table of Contents and D.R.L.	2 & 5	NAS	SEE ABOVE	1	12-7-88 ~~12-1-88~~ NAS 12-5-88

FENIX & SCISSON, INC.	SHEET 1	OF 5	WBS NUMBER 1.2.6.7.1	DOCUMENT NO. FS-SP-1506	REV. 1

Form LV-313B (9-88)

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VENTILATION DUCTING

PART 1 - GENERAL

1.1 WORK INCLUDED

This specification covers the furnishing, installation, and testing of all ductwork for the mine ventilation system.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 American Society for Testing and Materials (ASTM)

- o A36 Standard Specification for Structural Steel
- o A123 Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- o A569 Specification for Steel, Carbon (0.15 Maximum Percent) Hot-Rolled Sheet and Strip Commercial Quality
- o E162 Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source

1.2.2 National Fire Protection Association (NFPA)

- o NFPA 90A Installation of Air Conditioning and Ventilating Systems

1.2.3 Underwriters Laboratories Inc (UL)

- o 181 Factory-Made Air Ducts and Connectors

1.2.4 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)

- o (1985) HVAC Duct Construction Standards - Metal and Flexible
- o (1979-2) Fibrous Glass Duct Construction Standards

1.2.5 Code of Federal Regulations (CFR)

- o .30 CFR 57 Safety and Health Standards-Underground Metal and Non-metal Mines

1.2.6 State of California Administrative Code (CAC)

- o Title 8, Chapter 4, Subchapter 17 (Article 31), Mine Safety Orders

1.3 SYSTEM DESCRIPTION

1.3.1 Ventilation ducting shall be provided in the ESF shafts and the underground workings, as indicated in the Contract Drawings.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for Ventilation Ducting is II.

1.4.2 The vendor shall furnish for the Contracting QA Representative's approval, a Quality-Assurance program describing specified work, including descriptions which identifies management controls relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Sheet steel ducting in shaft (ASTM A569)

2.1.2 Phenolic fiberglass ducting in level workings (SMACNA 1979-2)

2.1.3 Couplings and gaskets.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Support

3.1.2 Alignment

3.1.3 Sealing at joints

3.2 INSPECTION

3.2.1 Acceptance

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Form LV-315A

TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-0201

Q.A. LEVEL II

TITLE: ES-1 AND ES-2 COLLAR INSTALLATION
DIVISION 2 - SITEWORK
SUBDIVISION - SITE PREPARATION

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Cunningham DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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ES-1 AND ES-2 COLLAR INSTALLATION

PART 1 - GENERAL

1.1 WORK INCLUDED

This specification covers the excavation for the ES-1 and ES-2 collars, the construction of the reinforced concrete collar and the installation of miscellaneous structures.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Federal Regulations

- o 30 CFR 57 — Safety and Health Standards - Underground Metal and Nonmetal Mines
- o 27 CFR — Chap. 1 Part 55, Commerce in Explosives
- o 29 CFR 1926 — Part U, Blasting and Use of Explosives (OSHA)

1.2.2 U.S. Department of Interior - Bureau of Reclamation

- o Construction Safety Standards, Sec. 24

1.2.3 U.S. Department of Energy - Nevada Nuclear Waste Site Investigation

- o DOE/NV/00410-77, Exploratory Shaft at Yucca Mountain - Safety and Health Program Plan

1.2.4 State of Nevada

- o Title 46, Chapter 512, Health and Safety Standards for Open Pit and Underground Metal and Non-Metal Mines, and Sand, Gravel and Crushed Stone Operations

1.2.5 State of California Administrative Code

- o 8 CAC 4.17, Mine Safety Orders

1.3 SYSTEM DESCRIPTION

Excavate for shaft collars. Install reinforcing steel and embedded metal, and form and pour collar concrete. Install embedments, fences and gates.

1.4 QUALITY ASSURANCE

The Quality Assurance Level Assignment for ES-1 and ES-2 Collar Installation is II.

PART 2 - PRODUCTS

2.1 REINFORCED CONCRETE

- See Specification Number FS-SP-0303, "Cast-in-Place Concrete"

2.2 EMBEDDED METAL

- See Specification Number FS-SP-0503, "Anchor Bolts and Embedded Items"
- See Specification Number FS-SP-0502, "Miscellaneous Steel"

2.3 COLLAR DOORS

- See Specification Number FS-SP-1412, "Sinking Collar Doors"

2.4 FENCES AND GATES

- See Specification Number FS-SP-0502, "Miscellaneous Steel"

PART 3 - EXECUTION

3.1 EXCAVATION

3.1.1 Blast Hole Drilling(Refer to FS-SP-0205, "Controlled Drilling and Blasting")

- Drilling Equipment

- o Minimize Drill Water Use
- o Hole Patterns

3.1.2 Blasting (Refer to FS-SP-0205, "Controlled Drilling and Blasting")

- o Charging
- o Dust and Fire Control
- o Minimize Water Usage
- o Vibration Monitoring

3.1.3 Scaling and Temporary Support

3.1.4 Testing Support After Blast

- o Rock Matrix Hydrologic Test
- o Hydrochemistry Test
- o Chlorine 36 Test
- o Visual Inspection for Perched Water
- o Shaft Mapping
- o Radial Borehole Test

3.1.5 Mucking

- o Loading
- o Hoisting (with Crane)
- o Rubble Collection for Hydrochemistry Test
- o Dust Control (Requirements for dust control during muck cycle)

3.1.6 Test Support Prior to Concrete Placement

- o Geologic Mapping
- o Location Markers
- o Radial Borehole Test

3.2 CONCRETE PLACEMENT (Refer to FS-SP-0308, "Shaft Liner Concrete")

- o Forming
- o Reinforcing
- o Embedded Metal
- o Block-Outs

3.3 INSTALLATION

- o Embedments
- o Fences and Gates

3.4 TEST SUPPORT BEFORE AND AFTER CONCRETE PLACEMENT

- o Radial Bore Hole Tests

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Form LV-315A

TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-0202

Q.A. LEVEL II

TITLE: SHAFT SINKING, ES-1
DIVISION 2 - SITEWORK
SUBDIVISION - SITE PREPARATION

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Cuthrell DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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SHAFT SINKING, ES-1

PART 1 - GENERAL

1.1 WORK INCLUDED

This work covered by this specification includes shaft excavation below the collar section by drill and blast methods, temporary ground support, and testing support services.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Federal Regulations

- o 30 CFR 57 — Safety and Health Standards-Underground Metal and Nonmetal Mines
- o 27 CFR — Chap. 1 Part 55, Commerce in Explosives
- o 29 CFR 1926 — Part U, Blasting and Use of Explosives (OSHA)

1.2.2 U. S. Department of Interior - Bureau of Reclamation

- o Construction Safety Standards

1.2.3 U. S. Department of Energy - Nevada Nuclear Waste Site Investigation

- o DOE/NV/00410, Exploratory Shaft at Yucca Mountain-Safety and Health Program Plan

1.2.4 State of Nevada

- o Title 46, Chapter 512, Health and Safety Standards for Open Pit and Underground Metal and Non-metal Mines, and Sand, Gravel and Crushed Stone Operations.

1.2.5 State of California Administrative Code

- o Title 8, Chapter 4, Subchapter 17 - Mine Safety Orders

1.2.6 American Conference of Governmental Industrial Hygienists (ACGIH)

- o Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment

1.3 SYSTEM DESCRIPTION

The system specifies activities required for conventional shaft excavation, including:

- o Blast Hole Drilling*
- o Blasting*
- o Muck Loading and Hoisting
- o Temporary Ground Support
- o Temporary Utilities
- o Temporary Ventilation
- o Temporary Communications
- o Schedule
- o Location
- o Dimensions
- o Permanent Ground Support
- o Outfitting

*Requirements for blasthole drilling and blasting are further specified in FS-SP-0205, "Controlled Drilling and Blasting."

1.4 QUALITY ASSURANCE

The Quality Assurance Level Assignment for Shaft Sinking is II.

PART 2 - PRODUCTS

None

PART 3 - EXECUTION

3.1 ALIGNMENT

- o Survey Tolerances
- o Excavation Centerline Tolerances

3.2 OVERBREAK AND UNDERBREAK

- o Allowed Tolerances on Overexcavation and Underexcavation

3.3 BLAST HOLE DRILLING

(Refer to FS-SP-0205, "Controlled Drilling and Blasting")

3.3.1 Equipment

- o Subcontractors Option
- o Minimize Drill Water Use

3.3.2 Hole Patterns

3.4 BLASTING

(Refer to FS-SP-0205, "Controlled Drilling and Blasting")

3.4.1 Patterns

3.4.2 Dust and Fume Control

3.4.3 Minimize Water Usage

3.5.4 Vibration Monitoring

3.5 SCALING AND TEMPORARY SUPPORT

3.5.1 Wet Down and Scale

3.5.2 Temporary Support

- o Rock Bolts (FS-SP-0208, "Rock Bolting")
- o Wire Mesh
- o Straps
- o Shotcrete (FS-SP-0307, "Shotcrete")

3.5.3 Minimizing Water Usage

3.6 EXCAVATION OF ES-1 SHAFT

3.6.1 Constraints on Excavation Sequence

A number of testing activities under the direction of the CONTRACTING OFFICER will be carried out concurrent with underground construction and which will require construction to stop for specified periods of time at particular locations. These constraints allow for the installation of test facilities to be time-phased with excavation in order to avoid loss of test data. The constraints imposed on an excavation sequence and schedule by the concurrent testing activities are to be determined.

Constraints related to DAS Alcoves: To be determined

Constraints Related to Monitoring Arrays: To be determined

Constraints Related to Tests: To be determined

Constraints Related to Groundwater Inflow Monitoring: The CONTRACTOR shall notify the CONTRACTING OFFICER immediately of any groundwater inflow during underground excavation.

3.7 TEST SUPPORT AFTER BLAST

3.7.1 Visual Inspection for Perched Water

3.7.2 Rock Matrix Hydrologic Test

3.7.3 Hydrochemistry Test

3.7.4 Chlorine 36 Test

3.7.5 Shaft Mapping

3.7.6 Radial Borehole Test

3.8 MUCKING

3.8.1 Rubble Collection for Sample Management Facility

3.8.2 Loading

3.8.3 Hoisting

3.8.4 Dumping

3.8.5 Dust Control (Requirements for dust control during muck cycle)

3.9 TEMPORARY SERVICES

- o Compressed Air
- o Construction Water
- o Waterwaste Discharge
- o Ventilation
- o Electrical Power
- o Communications

3.10 TEST SUPPORT PRIOR TO LINING PLACEMENT

3.10.1 Before each pour:

- o Geologic Mapping
- o Location Markers

3.10.2 Selected Locations

- o Radial Borehole Tests
- o Shaft Convergence Tests

3.10.3 Utilities and Services

Contractor shall assure the following utilities and services are available to support testing:

- o Electric Power
- o Compressed Air
- o Lighting
- o Dust Collection

3.10.4 Testing/Instrumentation Access

The Contractor shall provide access for TBD persons to all in-shaft instrument arrays for monitoring and maintenance.

3.10.5 Testing Support Priority

The Contractor shall provide testing support on a priority basis second to safety, and as specified by the Principle Investigator through coordination with the Contracting Officer.

3.11 TEST SUPPORT AFTER LINING PLACEMENT

Provide access to radial boreholes and shaft convergence test holes to service test instruments as needed.

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Form LV-315A

TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-0203

Q.A. LEVEL II

TITLE: SHAFT SINKING, - ES-2
DIVISION 2 - SITEWORK
SUBDIVISION - SITE PREPARATION

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Quytsma DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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SHAFT SINKING, ES-2

PART 1 - GENERAL

1.1 WORK INCLUDED

The work covered by this specification includes shaft excavation below the collar section by drilling and blast methods, and temporary ground support.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Federal Regulations

- o 30 CFR 57 — Safety and Health Standards - Underground Metal and Non-metal Mines
- o 27 CFR — Chap. 1 Part 55, Commerce in Explosives
- o 29 CFR 1926 — Part U, Blasting and Use of Explosives (OSHA)

1.2.2 U. S. Department of Interior - Bureau of Reclamation

- o Construction Safety Standards

1.2.3 U. S. Department of Energy - Nevada Nuclear Waste Site Investigation

- o DOE/NV/00410, Exploratory Shaft at Yucca Mountain - Safety and Health Program Plan

1.2.4 State of Nevada

- o Title 46, Chapter 512, Health and Safety Standards for Open Pit and Underground Metal and Non-metal Mines, and Sand, Gravel and Crushed Stone Operations

1.2.5 State of California Administrative Code

- Title 8, Chapter 4, Subchapter 17 - Mine Safety Orders

1.2.6 American Conference of Governmental Industrial Hygienists (ACGIH)

- Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment

1.3 SYSTEM DESCRIPTION

The system specifies activities required for conventional shaft excavation, including:

- Blast Hole Drilling*
- Blasting*
- Muck Loading and Hoisting
- Temporary Ground Support
- Temporary Utilities
- Temporary Ventilation
- Temporary Communications
- Schedule
- Location
- Dimensions
- Permanent Ground Support
- Outfitting

*Requirements for blasthole drilling and blasting are further specified in FS-SP-0205, "Controlled Drilling and Blasting."

1.4 QUALITY ASSURANCE

The Quality Assurance Level Assignment for Shaft Sinking is II.

PART 2 - PRODUCTS

None

PART 3 - EXECUTION

3.1 ALIGNMENT

- o Survey Tolerances
- o Excavation Centerline Tolerances

3.2 OVERBREAK AND UNDERBREAK

- o Allowed Tolerances on Overexcavation and Underexcavation

3.3 BLAST HOLE DRILLING

(Refer to FS-SP-0205, "Controlled Drilling and Blasting")

3.3.1 Equipment

- o Subcontractors Option
- o Minimize Drill Water Use

3.3.2 Hole Patterns

3.4 BLASTING

(Refer to FS-SP-0205, "Controlled Drilling and Blasting")

3.4.1 Patterns

3.4.2 Dust and Fume Control

3.4.3 Minimize Water Usage

3.4.4 Vibration Monitoring

3.5 SCALING AND TEMPORARY SUPPORT

3.5.1 Wet Down and Scale

3.5.2 Temporary Support

- o Rock Bolts (FS-SP-0208, "Rock Bolting")
- o Wire Mesh
- o Straps
- o Shotcrete (FS-SP-0307, "Shotcrete")

3.5.3 Minimizing Water Usage

3.6 EXCAVATION OF ES-2 SHAFT

3.6.1 Constraints on Excavation Sequence

A number of testing activities under the direction of the CONTRACTING OFFICER may be carried out concurrent with underground construction and which may require construction to stop for specified periods of time at particular locations. These constraints allow for the installation of test facilities to be time-phased with excavation in order to avoid loss of test data. The constraints imposed on an excavation sequence and schedule by the concurrent testing activities are to be determined.

Constraints Related to Tests: To be determined

Constraints Related to Groundwater Inflow Monitoring: The CONTRACTOR shall notify the CONTRACTING OFFICER immediately of any groundwater inflow during underground excavation.

3.7 TEST SUPPORT AFTER BLAST

- o Visual Inspection for Perched Water
- o Geologic Mapping (if required)

3.8 MUCKING

3.8.1 Loading

3.8.2 Hoisting

3.8.3 Dumping

3.8.4 Dust Control (requirements for dust control during muck cycle)

3.9 TEMPORARY SERVICES

- o Compressed Air
- o Construction Water
- o Waterwaste Discharge
- o Ventilation
- o Electrical Power
- o Communications

3.10 SHAFT CONCRETE LINING

(Refer to FS-SP-0308, "Shaft Liner Concrete")

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Form LV-315A

TECHNICAL SPECIFICATION
(OUTLINE SPECIFICATION)

NO. FS-SP-0301

Q.A. LEVEL TBD

TITLE: FORMS, SHAFT LINER
DIVISION 5 - METALS
SUBDIVISION - STRUCTURAL STEEL

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Quy Timms DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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FORMS, SHAFT LINER

PART 1 - GENERAL

1.1 WORK INCLUDED

The work under this specification includes furnishing all materials, equipment, tools and labor required to fabricate, paint and deliver a steel form for a concrete lined shaft.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 American Institute of Steel Construction (AISC)

- o M011 Manual of Steel Construction, Eighth Edition
- o S314 Structural Joints Using ASTM A325 or A490 Bolts
- o M013 Detailing for Steel Construction

1.2.2 American Society for Testing and Materials (ASTM)

- o A6 General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use
- o A36 Specification for Structural Steel
- o A53 Standard Specification for Pipe, Steel, Black Hot-Dipped, Zinc Coated Welded and Seamless
- o A325 High-Strength Bolts for Structural Steel Joints
- o A490 Heat Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength
- o A500 Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
- o A563 Specification for Carbon and Alloy Steel Nuts
- o F436 Specification for Hardened Steel Washer

1.2.3 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel
- o A2.4 Standard Symbols for Welding, Brazing and Non-destructive Examination

1.2.4 Steel Structures Printing Council (SSPC)

- o SP6 Commercial Blast Cleaning

1.3 SYSTEM DESCRIPTION

The shaft liner form shall consist of a base ring, barrel structure and pour lip totaling up to 20 feet high for a 12 foot diameter shaft.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for this fabrication is to be determined.

1.4.2 The vendor shall have an approved quality assurance program describing specified work, including a description which identifies management controls related to the fabrication process, quality control and inspection requirements, material procurement procedures test procedures, and documentation.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Structural steel plates, shapes and bars shall conform to ASTM A36 Specification.

2.1.2 Structural tubing shall conform to ASTM A500 Grade B Specification.

2.1.3 High strength bolts shall conform to ASTM A325 Specification.

2.1.4 Carbon and alloy steel nuts shall conform to ASTM A563 Specification.

2.1.5 Hardened steel washers shall conform to ASTM F436 Specification, Vendor shall supply two washers per bolt.

2.1.6 Pipe shall conform to ASTM A53 Grade B Specification, pipe shall be black.

2.1.7 All material shall be new and clean.

2.1.8 Plate material shall be ordered to thickness and shall not be more than 0.01" less than nominal thickness.

2.2 EQUIPMENT

2.2.1 All welding equipment shall be in good condition and subject to inspection and approval by the QCR.

2.3 FABRICATION

2.3.1 Welding to be done by using: qualified welding equipment, qualified procedures and qualified welders and/or inspectors.

2.3.2 Fabrication shall be in accordance with approved shop drawings, AISC Manual of Steel Construction, AWS Structural Welding Code - Steel, and this specification.

- o Plates to be formed by rolling shall be cold rolled.
- o No localized heating for forming will be permitted.
- o The edges of all parts to be joined by welding shall be prepared by machining, grinding, flame cutting or combinations of these methods.
- o All weld joints and the immediate area shall be mechanically or chemically cleaned of all foreign matter.
- o Close fitup is required at points where fillet welds are applied.
- o Welding shall be performed with 70 Ksi low hydrogen electrodes.

- All welding shall conform to AWS D1.1.

- All weld defects as specified herein and in the AWS D1.1 Structural Welding Code - Steel, Section 8.15 shall be repaired as specified in Section 3.7 of the AWS Code.

2.3.3 Inspection and testing of welds shall be in accordance with Chapter 6 of the AWS D1.1 Code.

- Inspection and testing shall be performed by the vendor.

- All welds shall be 100% visual and dimensionally inspected. Up to 50% of the welds shall also be magnetic particle or dye penetrant inspected as requested by the QCR.

- If stiffener rings are spliced by butt weld, this weld shall be full penetration, and 100% radiographically inspected.

- The weld inspector shall certify that the welds were inspected, repaired where required and reinspected and are free of specified defects.

2.3.4 Dimensional Inspection

- The vendor shall give proper notice and furnish all facilities necessary for inspection. This shall include personnel and equipment required. Any inspection may be witnessed by the QCR.

- Prior to fabrication, the vendor shall identify and measure the thickness of each plate. The thickness shall be measured at each corner and at the centerline on each edge. A record of each plate thickness shall be supplied to the QCR prior to fabrication. Plates 0.01" less than nominal thickness will not be accepted.

- For checking dimensional tolerances, the vendor shall completely erect the form. Dimensions shall be measured at 70^{0} Fahrenheit ($\pm 10^{0}$), and shall be in accordance with certified drawings.

  - At any point along the form axis, the radius shall not exceed 6 feet 1/4 inch, $\pm$ 1/4 inch.

- Overall height ± 1/4"; bottom of base ring to top of top circumferential stiffener.
- Spacing circumferential and vertical stiffeners ± 1/4".
- Plumbness: 1/2" measured centerline top of form to centerline bottom of base ring.
- Wall straightness ± 1/2" measured at any location on the circumference.

2.3.5 Mark each section of the form to assure erection at the site will be identical to shop erection.

2.3.6 Blast clean in accordance with SSPC SP6.

PART 3 - EXECUTION

Not Used

DATA REQUIREMENTS LIST

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TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-0308

Q.A. LEVEL II

TITLE: SHAFT LINER CONCRETE
DIVISION 3 - CONCRETE
SUBDIVISION - CAST IN PLACE CONCRETE

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.T.R. DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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SHAFT LINER CONCRETE

PART 1 - GENERAL

1.1 WORK INCLUDED

The work of this section includes the supply of all labor, plant and materials and the performance of all work necessary for supplying and placing concrete in the shafts and subsurface, as shown on the Contract Drawings, and as specified.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 American Concrete Institute (ACI)

- o 214 Recommended Practice for Evaluation of Strength Test Results of Concrete
- o 301 Specification for Structural Concrete for Buildings
- o 315 Details and Detailing of Concrete Reinforcement
- o 318-1 Building Code Requirements for Structural Plain Concrete
- o 318 Building Code Requirements for Reinforced Concrete
- o 347 Recommended Practice for Concrete Formwork
- o 305 Hot Weather Concreting
- o 306-1 Cold Weather Concreting

1.2.2 American Society for Testing and Materials (ASTM)

- o A97 Steel Welded Wire Fabric, Deformed for Concrete Reinforcement
- o A185 Steel Welded Wire Fabric, Plain, for Concrete Placement
- o A615 Deformed and Plain Billet-Steel Bars for Concrete
- o A775 Epoxy-coated Reinforcing Steel Bars

- o C31 Making and Curing Concrete Test Specimens in the Field
- o C33 Specification for Concrete Aggregates
- o C39 Test Method for Compressive Strength of Cylindrical Concrete Specimens
- o C40 Organic Impurities in Fine Aggregates for Concrete
- o C87 Effect of Organic Impurities in Fine Aggregate on Strength of Mortar
- o C88 Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
- o C94 Ready-Mixed Concrete
- o C125 Standard Definitions of Terms Relating to Concrete and Concrete Aggregates
- o C127 Specific Gravity and Absorption of Coarse Aggregate
- o C128 Specific Gravity and Absorption of Fine Aggregate
- o C131 Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- o C136 Sieve Analysis of Fine and Coarse Aggregates
- o C138 Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
- o C143 Slump of Portland Cement Concrete
- o C150 Standard Specification for Portland Cement
- o C156 Water Retention by Concrete Curing-Materials
- o C171 Sheet Materials for Curing Concrete
- o C172 Sampling Freshly Mixed Concrete
- o C260 Air-Entraining Admixtures for Concrete

- o C231 Air Content of Freshly Mixed Concrete by the Pressure Method
- o C311 Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
- o C494 Specification for Chemical Admixtures for Concrete
- o D75 Practice for Sampling Aggregates
- o D512 Test Methods for Chloride Ion in Water
- o D1293 Standard Test Methods for pH of Water
- o D1888 Test Methods for Particulate and Dissolved Matter, Solids or Residue in Water

1.2.3 American Welding Society (AWS)

- o D1.4 Structural Welding Code-Reinforcing Steel

1.3 SYSTEM DESCRIPTION

Set formwork, place and cure concrete for the shaft liner to provide support for the shaft excavation and anchorage for shaft furnishings. Where required, blockouts will be placed to allow access to shaft instrumentation holes.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for Shaft Liner concrete is II.

1.4.2 The supplier shall have an approved Quality Assurance program.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Portland Cement

Shall conform to the requirements of ASTM C150

2.1.2. Aggregates

Shall conform to requirements of ASTM C33

2.1.3 Air-Entraining Admixtures

Shall conform to requirements of ASTM C260

2.1.4 Chemical Admixtures

Shall conform to requirements of ASTM C496

2.1.5 Reinforcement

Provide reinforcing bars and welded steel fabric reinforcement conforming to ASTM A615 and A97 and in accordance with the applicable drawings.

2.2 MIXES

Furnish mix proportions to obtain concrete of 5,000 psi 28-day compressive strength when tested according to ASTM C39.

PART 3 - EXECUTION

3.1 MIXING

Begin mixing within 30 minutes after cement has been added to the aggregates.

3.2 PLACING

Transport concrete from the mixer to the forms as rapidly as practical without causing segregation or loss of ingredients.

3.3 FORMWORK

Forms will be placed to tolerance as shown on the Contract Drawings. The minimum distance from the bottom of the forms to the shaft bench shall be 20 feet.

3.4 PLACING

Method of placement into the forms shall not cause segregation of the ingredients. Blasting shall not resume before concrete has taken its initial set.

3.5 SAMPLING

Obtain samples at point of discharge into the forms to perform slump tests and to form test cylinders for testing in an approved materials-testing laboratory.

3.6 VIBRATING

Vibrate the newly-placed concrete in the forms for no longer than necessary to achieve consolidation.

3.7 CURING

Allow concrete to cure for a minimum period of 48 hours after placement before removing forms. (This may be modified by the Contracting Officer based on a pre-construction test program).

3.8 TESTING

Frequency of obtaining concrete samples for testing shall be at the direction of the CONTRACTING OFFICER. Minimum acceptable sampling shall be no more than seven cylinders from each batch delivered to the site.

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TECHNICAL SPECIFICATION
(OUTLINE SPECIFICATION)

NO. FS-SP-0503

Q.A. LEVEL II

TITLE: ANCHOR BOLTS AND EMBEDDED ITEMS
DIVISION 5 METALS
SUBDIVISION METAL FASTENING

APPROVED BY M A. [illegible] DATE 11-30-88

APPROVED BY B.R. [illegible] DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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ANCHOR BOLTS AND EMBEDDED ITEMS

PART 1 - GENERAL

1.1 WORK INCLUDED

The work of this section includes the furnishing and fabricating of anchor bolts, inserts, steel plates or shapes used: in the base of headframes; in bolting the hoists to the foundation; in connecting buntons, guides and utility brackets to the walls of the shafts; in connecting station framing; in bolting the loading flask and surge bin in the loading pocket of the ES-2 shaft and in bolting the tail shaft cross beams and ladder landings as detailed in the Contract Drawings.

1.2 REFERENCED PUBLICATIONS

The publications listed below from a part of this specification.

1.2.1 Code of Federal Regulations (CFR)

- 30 CFR 57 Safety and Health Standards for Underground Metal and Nonmetal Mines

1.2.2 California Administrative Code (CAC)

- Title 8, Subchapter 17, Mine Safety Orders

1.2.3 American Institute of Steel Construction (AISC)

- M011 Manual of Steel Construction, 8th Edition

1.2.4 American National Standards Institute (ANSI)

- A10.13 Safety Requirements for Steel Erection

1.2.5 American Society for Testing and Materials (ASTM)

- A36 Standard Specification for Structural Steel
- A307 Standard Specification for Carbon Steel Bolts and Studs 60,000 psi Tensile Strength
- F436 Standard Specification for Hardened Steel Washers

1.2.6 American Welding Society (AWS)

o D1.1 Structural Welding Code, Steel

1.3 SYSTEM DESCRIPTION

Anchor bolts and embedded items are comprised of threaded rods, nuts and washers, plates or rolled shapes with welded stud anchors, ferrule loop type inserts or expansion type anchors complete with nuts and washers.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for Anchor Bolts and Embedded Items is II.

1.4.2 The vendor shall furnish for the Contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management control relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Anchor Bolts (ASTM A307)
2.1.2 Plates and Rolled Shapes (ASTM A36)
2.1.3 Expansion Anchors or Inserts (Stainless Steel)
2.1.4 Nuts (A307)
2.1.5 Washers (ASTM F436)

2.2 ACCESSORIES

2.2.1 Welding Electrodes (AWS D1.1)

2.3 FABRICATION

2.3.1 Fabrication shall be in accordance with the AISC Manual of Steel Construction, AWS Structural Welding Code, Steel and this specification.

PART 3 - EXECUTION

3.1 INSTALLATION

3.1.1 Anchor Bolts and embedded items shall be installed as shown in the Contract Drawings.

3.1.2 Survey plan will be shown as a developed elevation on the drawings.

3.2 INSPECTION

3.2.1 Visual Inspection Welds (AWS D1.1, Part 6)

3.2.2 Inspection of Installed Items (anchor bolts, embedded items and fasteners).

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TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-0701

Q.A. LEVEL II

TITLE: SUMP LINERS
DIVISION 7 - THERMAL AND MOISTURE PROTECTION
SUBDIVISION - WATERPROOFING

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Ewy DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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SUMP LINERS

PART 1 - GENERAL

1.1 WORK INCLUDED

The work under this specification includes the furnishing and installation, at the bottom of each shaft, a watertight thermoplastic lining system.

1.2 REFERENCED PUBLICATIONS

1.1.1 American Society for Testing and Materials (ASTM):

D1248 Specification for Polyethylene Plastics Molding and Extrusion Materials
D2103 Standard Specification for Polyethylene Film and Sheeting

1.3 SYSTEM DESCRIPTION

1.3.1 Furnish and install at the bottom of each shaft a watertight plastic lining to contain ground or process water originating from the formation or introduced from underground workings.

The material has a non-slip surface and a high impact resistance. The lining is anchored in place with headed studs, thermal welded to the lining and embedded in concrete. All seams are thermal welded after placement to ensure complete water tightness.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for Sump Liners is II.

1.4.2 The supplier shall have an approved Quality Assurance Program.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Preformed panels of 5 mm thickness polyethylene sheeting.

2.1.2 Accessories: Seam flashing and/or panel connection assemblies.

2.1.3 Special Equipment: Thermal welding guns for connecting adjoining panels.

PART 3 - EXECUTION

3.1 FITTING AND INSTALLATION

3.2 ANCHORING IN PLACE

3.3 AMBIENT CONDITIONS

3.4 THERMAL WELDING OF PLASTIC SHEETS

3.5 TESTING

3.6 ACCEPTANCE

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TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-1403

Q.A. LEVEL II

TITLE: ES-1 HEADFRAME
DIVISION 14 - CONVEYING SYSTEMS
SUBDIVISION - SCAFFOLDING

APPROVED BY M A. Young DATE 11-30-88

APPROVED BY B. T. Q. Ewing Jr. DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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ES-1 HEADFRAME

PART 1 - GENERAL

1.1 WORK INCLUDED

The work described in this Section consists of furnishing all materials, equipment, tools, labor, and incidental services to fabricate, and deliver the headframe structural steel in accordance with this specification and the Contract Drawings.

1.2 RELATED SECTIONS

FS-SP-0501 Structural Steel
FS-SP-0502 Miscellaneous Steel
FS-SP-0503 Anchor Bolts and Embedded Items

1.3 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.3.1 American National Standards Institute (ANSI)

- o A10.13 Safety Requirements for Steel Erection
- o A58.1 Minimum Design Loads for Buildings and other Structures

1.3.2 American Institute of Steel Construction (AISC)

- o M011 Manual of Steel Construction, Eighth Edition

1.3.3 American Iron and Steel Institute (AISI)

- o SG-671 Cold Formed Steel Design Manual, Specification for the Design of Cold-Formed Steel Structural Members: Part I

1.3.4 American Society for Testing and Materials (ASTM)

- o ASTM A36 Standard Specification for Structural Steel
- o ASTM A307 Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
- o ASTM A325 Standard Specification for High-Strength Bolts for Structural Steel Joints

1.3.5 American Welding Society (AWS)

- o AWS D1.1 Structural Welding Code - Steel

1.3.6
- o Code of Federal Regulations (CFR)
- o 30 CFR 57 Safety and Health Standards-Underground Metal and Nonmetal Mines

1.3.7
- o California Administrative Code (CAC)
- o Title 8, Chapter 4, Subchapter 17, Mine Safety Orders
- o Title 8, Chapter 4, Subchapter 20, Tunnel Safety Orders

1.4 SYSTEM DESCRIPTION

Fabrication of the ES-1 headframe includes:

1. Shaft headframe structural steel members
2. Fixed guide structural steel supports within the headframe
3. Stairs and platforms

1.5 QUALITY ASSURANCE

1.5.1 The Quality Assurance Level Assignment for the ES-1 Headframe is II.

1.5.2 The vendor shall furnish for the Contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management controls relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Furnish structural steel in accordance with Contract Documents and requirements specified by AISC and ASTM.

2.1.2 High-strength bolts: Furnish bolts complying with requirements specified in ASTM A325.

2.1.3 Anchor Bolts: Furnish anchor bolts complying with requirements specified in FS-SP-0503.

2.1.4 Other bolts and washers: Furnish carbon steel bolts and washers conforming to requirements specified in ASTM A307.

2.2 EQUIPMENT

2.2.1 All welding equipment shall be in good condition and subject to inspection and approval by the Contracting Officer or his representative.

2.3 FABRICATION

2.3.1 Headframe: Fabricate headframe in accordance with Contract Drawings.

PART 3 - EXECUTION

3.1 ERECTION/INSTALLATION

Erection by Contractor of the headframe shall be in conformance with standards as outlined in "Referenced Publications".

3.2 MODIFICATIONS

The Contractor may install, add, attach, modify, or delete structural steel members, platforms, or mechanical supports to the headframe only after obtaining proper direction of the Contracting Officer. This includes sheave bracing, etc.

3.3 STRUCTURE ADJUSTMENT

The Contractor shall establish a survey plan to monitor the elevations of the headframe columns and backleg foundation connection. If elevation differentials exceed one inch, then the Contractor shall adjust the verticality of the structure by jacking, adding shims, etc.

(Scheduling of surveying and records - later.)

3.4 TOLERANCES

(Later)

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TECHNICAL SPECIFICATION
(OUTLINE SPECIFICATION)

NO. FS-SP-1404

Q.A. LEVEL II

TITLE: ES-2 HEADFRAME
DIVISION 14 - CONVEYING SYSTEMS
SUBDIVISION - SCAFFOLDING

APPROVED BY M S. Young DATE 11-30-88

APPROVED BY B. R. Ewy DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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ES-2 HEADFRAME

PART 1 - GENERAL

1.1 WORK INCLUDED

The Work described in this Section consists of furnishing all materials, equipment, tools, labor, and incidental services to fabricate and deliver the headframe structural steel in accordance with this specification and the Contract Drawings.

1.2 RELATED SECTIONS

FS-SP-0501 Structural Steel
FS-SP-0502 Miscellaneous Steel
FS-SP-0503 Anchor Bolts and Embedded Items

1.3 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.3.1 American National Standards Institute (ANSI)

- o A10.13 Safety Requirements for Steel Erection
- o A58.1 Minimum Design Loads for Buildings and Other Structures

1.3.2 American Institute of Steel Construction (AISC)

- o M011 Manual of Steel Construction, Eighth Edition

1.3.3 American Iron and Steel Institute (AISI)

- o SG-671 Cold-Formed Steel Design Manual Specification for the Design of Cold-Formed Steel Structural Members: Part I

1.3.4 American Society for Testing and Materials (ASTM)

- o ASTM A36 Standard Specification for Structural Steel
- o ASTM A307 Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength

- o ASTM A325 Standard Specification for High-Strength Bolts for Structural Steel Joints

1.3.5 American Welding Society (AWS)

- o AWS D1.1 Structural Welding Code - Steel

1.3.6 Code of Federal Regulations (CFR)

- o 30 CFR 57 Safety and Health Standards-Underground Metal and Nonmetal Mines

1.3.7 California Administrative Code (CAC)

- o Title 8, Chapter 4, Subchapter 17, Mine Safety Orders
- o Title 8, Chapter 4, Subchapter 20, Tunnel Safety Orders

1.4 SYSTEM DESCRIPTION

Fabrication of the ES-2 headframe includes:

1. Shaft headframe structural steel members
2. Fixed counterweight guides and structural steel supports for timber guides within the headframe
3. Stairs and platforms

1.5 QUALITY ASSURANCE

1.5.1 The Quality Assurance Level Assignment for the ES-2 Headframe is II.

1.5.2 The vendor shall furnish for the Contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management control relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Furnish structural steel in accordance with Contract Documents and requirements specified by AISC and ASTM.

2.1.2 High-strength bolts: Furnish bolts complying with requirements specified in ASTM A325.

2.1.3 Anchor bolts: Furnish anchor bolts complying with requirements specified in FS-SP-0503.

2.1.4 Other bolts and washers: Furnish carbon steel bolts and washers conforming to requirements specified in ASTM A307.

2.2 EQUIPMENT

2.2.1 All welding equipment shall be in good condition and subject to inspection and approval by the Contracting Officer or his representative.

2.3 FABRICATION

2.3.1 Headframe: Fabricate headframe in accordance with Contract Drawings.

PART 3 - EXECUTION

3.1 ERECTION/INSTALLATION

Erection (by Contractor) of the headframe shall be in conformance with standards as outlined in "Referenced Publications".

3.2 MODIFICATIONS

The Contractor may install, add, attach, modify, or delete structural steel members, platforms, or mechanical supports to the headframe only after obtaining proper direction of the Contracting Officer. This includes sheave bracing etc.

3.3 STRUCTURE ADJUSTMENT

The Contractor shall establish a survey plan to monitor the elevations of the headframe columns and backleg foundation connection. If elevation differentials exceed one inch, then the Contractor shall adjust the verticality of the structure by jacking, adding shims, etc.

(Scheduling of surveying and records - later.)

3.4 TOLERANCES

(Later)

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TECHNICAL SPECIFICATION
(OUTLINE SPECIFICATION)

NO. FS-SP-1406

Q.A. LEVEL II

TITLE: SHAFT CONVEYANCE GUIDES
DIVISION 14 - CONVEYING SYSTEMS
SUBDIVISION: ELEVATORS

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Quytinus DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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SHAFT CONVEYANCE GUIDES

PART 1 - GENERAL

1.1 WORK INCLUDED

The work under this specification includes furnishing and installing timber conveyance guides in ES-1 and ES-2, and steel counterweight guides in ES-2.

1.2 REFERENCED PUBLICATIONS

1.2.1 Code of Federal Regulations (CFR)

30 CFR57 Safety and Health Standards Underground Metal and Non Metal Mines: 57.19102 - Shaft Guides

1.2.2 California Administrative Code

- Title 8, Subchapter 17, Mine Safety Orders: 7130 - Shaft Guides

1.2.3 American Society For Testing and Materials (ASTM)

- D245 Methods for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber
- D2555 Methods for Establishing Clear Wood Strength Values
- D2016 Standard Test Methods for Moisture Content of Wood
- A500 Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
- A36 Standard Specification for Structural Steel
- A6 Standard Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use
- A325 Standard Specification for High-Strength Bolts for Structural Steel Joints

- o A563 Specification for Carbon and Alloy Steel Nuts

1.2.4 National Lumber Grades Authority (NLGA)

- o 189a Mine Guides, (Grade "Clear") Standard Grading Rules for Canadian Lumber (Approved by the American Lumber Standards Board of Review).

1.2.5 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel
- o A2.4 Standard Symbols for Welding Brazing and Non-destructive Examination

1.3 SYSTEM DESCRIPTION

There are two types of guide systems required at ESF, timber guides for skips and mancages, and structural steel tubing guides for the ES-2 counterweight. The timber guides include structural steel back-up.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for the Shaft Conveyance Guides is II.

1.4.2 Material Suppliers shall have an approved Quality Assurance Program.

1.5 DELIVERY AND STORAGE

PART 2 - PRODUCTS

2.1 TIMBER

2.1.1 Material

2.1.2 Properties

2.1.3 Treatment

2.2 STEEL BACK-UP BEAMS FOR TIMBER GUIDES

2.2.1 Material

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TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-1407

Q.A. LEVEL II

TITLE: ES-1 SHAFT SINKING DECK
DIVISION 5 - METALS
SUBDIVISION - METAL FABRICATIONS

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B. R. Ewy Timms DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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ES-1 SHAFT SINKING DECK

PART 1 - GENERAL

1.1 WORK INCLUDED

The work under this specification includes furnishing all materials, equipment, tools and labor required to fabricate, paint and deliver a steel 3-stage work deck for shaft sinking and geological and geotechnical testing.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 American institute of Steel Construction (AISC)

- o M013 Detailing for Steel Construction

1.2.2 American Society for Testing and Materials (ASTM)

- o A6 General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use
- o A36 Standard Specification for Structural Steel
- o A53 Standard Specification for Pipe, Steel, Black Hot-Dipped, Zinc Coated Welded and Seamless
- o A307 Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
- o A500 Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
- o A501 Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
- o A563 Specification for Carbon and Alloy Steel Nuts

- o F436 Standard Specification for Hardened Steel Washers

1.2.3 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel
- o A2.4 Standard Symbols for Welding, Brazing and Non-destructive Examination

1.2.4 Steel Structures Painting Council (SSPC)

- o SSPC SP6 Commercial Blast Cleaning

1.3 SYSTEM DESCRIPTION

The ES-1 Sinking Deck consists of a 3-stage work deck which will be suspended in the shaft on wire ropes. The work deck will have one opening for one sinking bucket and two hinged areas for the cryderman and utility lines. It will have provisions for mounting special equipment for shaft wall mapping.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for the ES-1 Sinking Deck is II.

1.4.2 The vendor shall furnish for the Contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management control relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 - PRODUCTS

2.1 Materials

2.2 Fabrication

2.3 Coating

2.4 Inspection

PART 3 - EXECUTION

3.1 Surface Preparation

3.2 Erection

3.3 Installation

3.4 Inspection

3.5 Protection

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TECHNICAL SPECIFICATION
(OUTLINE SPECIFICATION)

NO. FS-SP-1408

Q.A. LEVEL II

TITLE: ES-1 CONVEYANCE
DIVISION 14 - CONVEYING SYSTEMS
SUBDIVISION - LIFTS

SPECIFICATION A - SINKING CONVEYANCE

SPECIFICATION B - PERMANENT CONVEYANCE

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B. R. [illegible] DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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A - SINKING CONVEYANCE

B - PERMANENT CONVEYANCE

PART 1 - GENERAL

1.1 WORK INCLUDED

This specification is for the fabrication and delivery of a safety crosshead and sinking bucket to be used for hoisting men, muck and material during shaft sinking.

1.2 REFERENCED PUBLICATIONS

1.2.1 Federal Regulations

- o 30 CFR 57 Safety and Health Standards-Underground Metal and Nonmetal Mines

1.2.2 State of California Administrative Code

- o Title 8, Chapter 4, Subchapter 17 - Mine Safety Orders

1.2.3 American Institute of Steel Construction (AISC)

- o M011 Manual of Steel Construction, Eighth Edition
- o M013 Detailing for Steel Construction

1.2.4 American Society for Testing and Materials (ASTM)

- o A6 General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use
- o A689 Specification for Carbon and Alloy Steel Bars for Springs

1.2.5 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel
- o A2.4 Standard Symbols for Welding Brazing and Non-destructive Examination

1.3 SYSTEM DESCRIPTION

The system consists of a hoisting crosshead which uses stationary wire ropes for guidance, under which a circular bucket is suspended for hoisting men, muck and materials. The crosshead will be equipped with a bonnet to shield personnel riding in the bucket from falling materials, and safety dogs which grip the guide ropes in the event that the hoist rope connection goes slack.

1.4 QUALITY ASSURANCE

- The Quality Assurance Level Assignment for the Sinking Conveyance is II.
- The vendor shall furnish for the Contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management controls relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 - PRODUCTS

2.1 FABRICATION

- Approved Shop Drawings
- Inspection and Testing of Welds
- Dimensional Inspection

2.2 PAINTING

PART 3 - EXECUTION

3.1 DROP TESTING

3.2 SHIPPING & STORAGE

3.3 INSTALLATION

3.4 INSPECTION & ACCEPTANCE

PART 1 - GENERAL

1.1 WORK INCLUDED

This specification is for the fabrication and delivery of a mancage.

1.2 REFERENCE PUBLICATIONS

1.2.1 Federal Regulations

- o 30 CFR 57 Metallic and Non-Metallic Underground Mines (MSHA)

1.2.2 State of California Administrative Code

- o Title 8, Chapter 4, Subchapter 17 - Mine Safety Orders

1.2.3 American Institute of Steel Construction (AISC)

- o Code of Standard Practice
- o Detailing for Steel Construction

1.2.4 American Society for Testing and Materials (ASTM)

- o A6 General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars and Structural Use
- o A689 Specification for Carbon and Alloy Steel Bars for Springs

1.2.5 American Welding Society (AWS)

- o D1.1 Structural Welding Code Steel, Steel
- o A2.4 Standard Symbols for Welding, Brazing and Non-destructive Examination

1.3 SYSTEM DESCRIPTION

The system consists of a single deck mancage with guide shoes, guide rollers, and broken rope safety dog system for timber guides, manually operated chairing device integral with the cage.

1.4 QUALITY ASSURANCE

- The vendor shall furnish for the Contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management controls relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 - PRODUCTS

2.1 FABRICATION

- Approved Shop Drawings
- Inspection and Testing of Welds
- Dimensional Inspection

2.2 PAINTING

PART 3 - EXECUTION

3.1 DROP TESTING

3.2 SHIPPING & STORAGE

3.3 INSTALLATION

3.4 INSPECTION & ACCEPTANCE

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TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-1409

Q.A. LEVEL II

TITLE: ES-2 MUCK LOADING SYSTEM
DIVISION 14 - CONVEYING SYSTEMS
SUBDIVISION - MATERIALS HANDLING SYSTEMS

APPROVED BY M A. Young DATE 11-30-88

APPROVED BY B.R. Cuyjet DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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ES-2 MUCK LOADING SYSTEM

PART 1 - GENERAL

1.1 WORK INCLUDED

The work described in this Section consists of furnishing all materials, equipment, tools, labor, and incidental services to fabricate and deliver the Muck Loading System for underground in accordance with this specification and the Contract Drawings. Shop painting and necessary field touch up is also included.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 American National Standards Institute (ANSI)

- o A10.13 Safety Requirements for Steel Erection

1.2.2 American Institute of Steel Construction (AISC)

- o M011 Manual of Steel Construction, Eighth Edition

1.2.3 American Iron and Steel Institute (AISI)

- o SG-671 Cold-Formed Steel Design Manual Specification for the Design of Cold-Formed Steel Structural Members: Part I

1.2.4 American Society for Testing and Materials (ASTM)

- o ASTM A36 Standard Specification for Structural Steel
- o ASTM A307 Standard Specification Carbon Steel Bolts and Studs 60000 psi Tensile Strength
- o ASTM A325 Standard Specification for High-Strength Bolts for Structural Steel Joints
- o ASTM A449 Standard Specification for Quenched and Tempered Steel Bolts and Studs

1.2.5 American Welding Society (AWS)

- o AWS D1.1 Structural Welding Code - Steel

1.2.6 Code of Federal Regulations (CFR)

- o 30 CFR 57 Safety and Health Standards - Underground Metal and Nonmetal Mines

1.2.7 California Administrative Code (CAC)

- o Title 8, Chapter 4, Sub-Chapter 17, Mine Safety Orders

1.2.8 Federal Specification (Fed. Spec.)

- o TT-C-490B Cleaning Methods and Pretreatment of Ferrous Surfaces for Organic Coatings
- o TT-P-645A Primer, Paint, Zinc Chromate, Alkyd Type

1.2.9 Military Specification (Mil. Spec.)

- o DOD-P-15328D(1) Primer (Wash), Pretreatment, (Formula No. 117 for Metals) (Metric)

1.2.10 Steel Structures Painting Council (SSPC)

- o SSPC SP3 Power Tool Cleaning
- o SSPC SP6 Commercial Blast Cleaning

1.3 SYSTEM DESCRIPTION

The system will be used for sizing and storing muck in the pocket for measuring and loading a 10 ton muck skip. The system will be installed in an excavation made in the rock. The system consists of a steel bar grizzly, with a maximum 12-inch clear opening, installed on top of a 150-ton steel surge bin which will have an air-operated gate at the bottom. The surge bin is to discharge into a volumetric type measuring flask, with a 10-ton capacity, and having an air-operated gate. The flask will discharge into a fixed chute leading to the skip. An access ladder is to be provided for the bottom of the measuring flask to the top of the surge bin.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for the ES-2 Muck Loading System is II.

1.4.2 The vendor shall furnish for the Contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management controls relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Furnish structural steel in accordance with Contract Documents and requirements specified by AISC and ASTM.

2.1.2 High-strength bolts: Furnish bolts complying with requirements specified in ASTM A325.

2.1.3 Anchor bolts: Furnish anchor bolts complying with requirements specified in ASTM A36.

2.1.4 Other bolts and washers: Furnish carbon steel bolts and washers conforming to requirements specified in ASTM 307.

2.1.5 Furnish air-operated cylinders. Refer to FS-SP-1512 Compressed Air System.

2.2 EQUIPMENT

2.2.1 All welding equipment shall be in good condition and subject to inspection and approval by the Quality Assurance representative.

2.3 FABRICATION

2.3.1 Surge Bin: Fabricate for installation a 150-ton surge bin, complete with structural steel support, and an air-cylinder operated gate in accordance with the Contract Drawings.

2.3.2 Grizzly: Fabricate for installation steel bars on top of the surge bin with a maximum of 12-inch clear opening in accordance with the Contract Drawings.

2.3.3 Measuring Flask: Fabricate for installation a 10-ton measuring flask, complete with structural steel support below the surge bin, to the 10-ton skip in Shaft Number 2, in accordance with the Contract Drawings.

2.3.4 Skip Feed: Fabricate for installation a skip feed chute from the measuring flask to the 10-ton skip in Shaft Number 2, in accordance with the Contract Drawings.

2.3.5 Access Ladder: Fabricate for installation an access ladder from the bottom of the measuring flask to the top of the surge bin, in accordance with the Contract Drawings.

2.4 SHOP PAINTING

2.4.1 Surface Cleaning (SSPC SP6) (SSPC SP3)

2.4.2 Pretreatment (Mil Spec DOD-P-15328) or (Fed. Spec. TT-C-490)

2.4.3 Priming (Fed. Spec. TT-P-645)

2.4.4 Factory Applied Finish Coating: For the Muck Loading System expect Grizzly.

PART 3 - EXECUTION

3.3 ERECTION/INSTALLATION

Erection by Contractor of the muck loading system shall be conformance with the Contract Drawings and this specification.

3.4 INSPECTION

3.4.1 Visual Inspection Welds (AWS D1.1, Part 6)

3.5 DIMENSIONAL INSPECTION/TOLERANCES

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TECHNICAL SPECIFICATION
(OUTLINE SPECIFICATION)

NO. FS-SP-1410

Q.A. LEVEL II

TITLE: MONORAIL HOISTS AND JIB CRANES
DIVISION 14 - CONVEYING SYSTEMS
SUBDIVISION - HOISTS AND CRANES

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Ewing DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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MONORAIL HOISTS AND JIB CRANES

PART 1 - GENERAL

1.1 WORK INCLUDED

The work under this specification covers the procurement, installation and testing of monorail and jib crane systems.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Military Specifications (Mil. Spec.)

- o MIL-H-904H(2) Hoists, Chain, Hand-Operated, Hook and Trolley Suspension
- o MIL-M-82021A Monorail Track Beam Systems for Trolley Suspended Hoists

1.2.2 American Society for Testing and Materials (ASTM)

- o A275 Magnetic Particle Examination of Steel Forgings

1.2.3 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel

1.2.4 American National Standards Institute (ANSI)

- o B30.11 Monorail and Underhung Cranes

1.3 SYSTEM DESCRIPTION

1.3.1 Electrically operated monorail hoists will be installed at the top of each headframe to handle the head sheaves of the main hoists.

1.3.2 Jib Cranes will be installed at the collar of each shaft to permit handling of materials and equipment to and from the hoisting compartment. The Jib Cranes shall also be used to position the conveyance of the emergency hoist.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for the Monorail Hoists and Jib Cranes is II.

1.4.2 The vendor shall have an approved Quality Assurance program.

PART 2 - PRODUCTS

2.1 GENERAL

2.1.1 Capacity of Hoists and Cranes

2.1.2 Hook lift height

2.1.3 Hook

2.1.4 Trolley

2.1.5 Monorail beam

PART 3 - EXECUTION

3.1 Fabrication

3.2 Pre-erection Inspection

3.3 Erection and Installation

3.4 Operational Inspection

3.5 Testing

3.6 Acceptance

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TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-1411

Q.A. LEVEL II

TITLE: ES-2 CONVEYANCE
DIVISION 14 - CONVEYING SYSTEMS
SUBDIVISION - TRANSPORTATION SYSTEMS

APPROVED BY Wm A. Vaughn DATE 11-30-88

APPROVED BY B.R. Chrystmus DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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ES-2 CONVEYANCE

PART 1 - GENERAL

1.1 WORK INCLUDED

The work described in this section consists of furnishing all materials, equipment, tools, labor, and incidental services to fabricate and deliver a double-deck man cage over a 10 ton bottom dump skip for ES-2 in accordance with this specification and the Contract Drawings. Shop painting and necessary field touch-up is also included.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 American National Standards Institute (ANSI)

- o A10.13 Safety Requirements for Steel Erection

1.2.2 American Society for Testing and Materials (ASTM)

- o A36 Standard Specification for Structural Steel
- o A53 Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc-Coated Welded and Seamless
- o A275 Magnetic Particle Examination of Steel Forgings
- o A283 Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- o A325 Standard Specification for High Strength Bolts for Structural Steel Joints
- o A514 Standard Specification for High Yield Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding

1.2.4 Code of Federal Regulations (CFR)

- o 30 CFR 57 Safety and Health Standards-Underground Metal and Non-metal Mines

1.2.5 California Administrative Code (CAC)

- o Title 8, Chapter 4 Subchapter 17, Mine Safety Orders

1.2.6 Federal Specification (Fed. Spec.)

- o TT-C-490B Cleaning Methods and Pretreatment of Ferrous Surfaces for Organic Coatings
- o TT-P-645A Primer, Paint, Zinc Chromate, Alkyd Type

1.2.7 Military Specification (Mil. Spec.)

- o DOD-P-15328D(1) Primer (Wash), Pretreatment, (Formula No. 117 for Metals) (Metric)

1.2.8 Steel Structures Painting Council (SSPC)

- o SSPC SP3 Power Tool Cleaning
- o SSPC SP6 Commercial Blast Cleaning

1.3 SYSTEM DESCRIPTION

This system covers the design, fabrication, testing and installation of one double deck cage over a skip for ES-2. The skip/cage will be guided on rigid timber guides. The completed skip/cage assembly shall consist of: double deck cage with deck frame, side frames, side panels, access doors, inspection deck with bonnet, safety catch assembly, rope attachment, anti-trailing rope device, guide shoes, guide roller assemblies, floor grating, roof hatch, ladder, and overhead handholds. The skip is a 10 ton capacity bottom dump type, with bail common to both skip and cage. The skip shall be provided with an equipment lowering attachment located below the skip suitable for attaching heavy loads.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for the ES-2 Conveyance is II.

1.4.2 The vendor shall furnish for the Contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management controls relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Structural steel in accordance with requirements specified by AISC and ASTM.

2.1.2 High-Strength bolts: Bolts complying with requirements specified in ASTM A325.

2.1.3 Other bolts and washers: Carbon steel bolts and washers conforming to requirements specified in ASTM 307.

2.2 EQUIPMENT

2.2.1 All welding equipment shall be in good condition and subject to inspection and approved by the Quality Assurance representative.

2.3 FABRICATION

2.3.1 General: The skip/cage shall be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product.

2.3.2 Contract Drawings: Refer to the Contract Drawings. They show all required main features necessary for proper design, fabrication and function of the skip/cage system.

2.3.3 Top of Cage: The top of the cage to be equipped with inspection platform and protective bonnet. An access hatch with hinged door will also be located on top of each deck and on protective bonnet.

2.4 SHOP PAINTING

2.4.1 Surface Cleaning (SSPC SP6) (SSPC SP3)

2.4.2 Pretreatment (Mil Spec DOD-P-15328) of (Fed. Spec. TT-C-490)

2.4.3 Priming (Fed. Spec. TT-P-645)

2.4.4 Factory Applied Finish Coating: For the main conveyance structure.

PART 3 - EXECUTION

3.1 ERECTION AND INSTALLATION

The Contractor shall erect and install each skip/cage system in accordance with manufacturer's written instructions, the Contract Drawings and this specification.

3.2 INSPECTION

3.2.1 Visual Inspection Welds (AWS D1.1, Part 6)

3.3 DIMENSIONAL INSPECTION/TOLERANCES

3.4 TESTING AND ACCEPTANCE

DATA REQUIREMENTS LIST

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Form LV-315A

TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-1412

Q.A. LEVEL II

TITLE: SINKING COLLAR DOORS
DIVISION 5 - METALS
SUBDIVISION - METAL FABRICATIONS

APPROVED BY W A. Long DATE 11-30-88

APPROVED BY B.D. Chytrony DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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SINKING COLLAR DOORS

PART 1 - GENERAL

1.1 WORK INCLUDED

The work described in this section consists of furnishing all materials, equipment, tools, labor and incidental services to fabricate and deliver sinking collar doors for ES-1 and ES-2 in accordance with this specification and the Contract Drawings. Shop painting and necessary touch-up is also included.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Code of Federal Regulations (CFR)

- Title 30, Part 57 Safety and Health Standards for Underground Metal and Nonmetal Mines

1.2.2 California Administrative Code (CAC)

- Title 8, Chapter 4, Subchapter 17, Mine Safety Orders

1.2.3 American National Standards Institute (ANSI)

- A10.13 Safety Requirements for Steel Erection

1.2.4 American Institute of Steel Construction (AISC)

- M011 Manual of Steel Construction, 8th Edition
- S326 Specification for the Design, Fabrication nd Erection of Structural Steel for Buildings
- M013 Detailing for Steel Construction

1.2.5 American Society for Testing and Materials (ASTM)

- A36 Standard Specification for Structural Steel
- A307 Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
- A325 Standard Specification for High Strength Bolts for Structural Steel Joints
- A514 Standard Specification for High Yield Strength Quenched and Tempered Alloy Steel Plate, Suitable for Welding

- o A563 Standard Specification for Carbon and Alloy Steel Nuts
- o F436 Standard Specification for Hardened Steel Washers

1.2.6 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel

1.2.7 Federal Specification (Fed. Spec.)

- o TT-C-490 Cleaning Methods and Pretreatment of Ferrous Surfaces for Organic Coatings
- o TT-P-645 Primer, Paint, Zinc-Chromate, Alkyd Type

1.2.8 Military Specification (Mil. Spec.)

- o DOD-P-15328D1 Primer (Wash), Pretreatment, (Formula No. 117 for Metals) (Metric)

1.3 SYSTEM DESCRIPTION

This system covers the design, fabrication, testing and installation of collar doors. The complete assembled collar doors shall be installed at the ES-1 and ES-2 collar level. It consists of a heavy designed structure complete with hinges and air cylinder operator. The door will be used as a protective shield for personnel working in the shaft during sinking operation.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for Sinking Collar Doors is II.

1.4.2 The vendor shall furnish for the contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management controls relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Furnish structural steel in accordance with Contract Documents and requirements specified by AISC and ASTM.

2.1.2 High-strength bolts: Furnish bolts complying with requirements specified in ASTM A325.

2.1.3 Other bolts and washer: Furnish carbon steel bolts and washers conforming to requirements specified in ASTM 307.

2.1.4 Furnish air-operated cylinders. Refer to FS-SP-1512 Compressed Air System.

2.2 EQUIPMENT

2.2.1 All welding equipment shall be in good condition and subject to inspection and approval by the Quality Assurance representative.

2.3 FABRICATION

2.3.1 Fabrication shall be in accordance with approved shop drawings, AISC Specification for the Design, Fabrication and Erection of Construction, AWS Structural Welding Code - Steel and this specification.

2.4 SHOP PAINTING

2.4.1 Surface cleaning (SSPC SP6) (SSPC SP3)

2.4.2 Pretreatment (Mil. Spec. DOD-P-15328) or (Fed. Spec. TT-C-490)

2.4.3 Priming (Fed. Spec. TT-P-645)

2.4.4 Factory Applied Finish Coating: For the sinking collar doors.

PART 3 - EXECUTION

3.1 ERECTION

3.1.1 Contractor shall erect sinking collar doors in accordance with AISC Manual of Steel Construction and AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, AWS Structural Welding Code - Steel and this specification.

3.2 INSPECTION/TEST

3.4.1 Visual Inspection Welds (AWS D1.1, Part 6)

3.4.2 Operational Tests of Collar Doors

3.3 DIMENSIONAL INSPECTION/TOLERANCES

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TECHNICAL SPECIFICATION
(OUTLINE SPECIFICATION)

NO. FS-SP-1413

Q.A. LEVEL II

TITLE: FIXED AND RETRACTABLE MUCK CHUTES
DIVISION 5 - METALS
SUBDIVISION - METAL FABRICATIONS

APPROVED BY W A. Young DATE 11-30-88

APPROVED BY B.R. Chuy DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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FIXED AND RETRACTABLE MUCK CHUTES

PART 1 - GENERAL

1.1 WORK INCLUDED

The work described in this section includes the furnishing all materials, equipment tools, labor, detailing of shop drawings, fabrication and delivery of fixed and retractable muck chutes for ES-1 and ES-2 in accordance with this specification and the Contract Drawings. Shop painting and necessary field touch up is also included.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Code of Federal Regulations (CFR)

- Title 30, Part 57, Safety and Health Standards for Underground Metal and Nonmetal Mines

1.2.2 California Administrative Code (CAC)

- Title 8, Subchapter 17, Mine Safety Orders

1.2.3 American Manual Standards Institute (ANSI)

- A10.13 Safety Requirements for Steel Erection

1.2.4 American Institute of Steel Construction (AISC)

- M011 Manual of Steel Construction, 8th Edition
- S326 Specification for the Design, Fabrication and Erection of Structural Steel for Buildings
- M013 Detailing for Steel Construction

1.2.5 American Society for Testing and Materials (ASTM)

- A36 Standard Specification for Structural Steel
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- A325 Standard Specification for High Strength Bolts for Structural Steel Joints

- o A514 Standard Specification for High Yield Strength Quenched and Tempered Alloy Steel Plate, Suitable for Welding
- o A563 Specification for Carbon and Alloy Steel Nuts
- o F436 Standard Specification for Hardened Steel Washers

1.2.6 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel

1.2.7 Federal Specification (Fed Spec)

- o TT-C-490 Cleaning Methods and Pretreatment of Ferrous Surfaces for Organic Coatings
- o TT-P-645 Primer, Paint, Zinc-Chromate, Alkyd Type

1.2.8 Military Specification (Mil Spec)

- o DOD-P-15328 Primer (Wash), Pretreatment, (Formula No. 117 for Metals)

1.2.9 Steel Structures Painting Council (SSPC)

- o SSPC SP3 Power Tool Cleaning
- o SSPC SP6 Commercial Blast Cleaning

1.3 SYSTEM DESCRIPTION

The system will be used to receive the loaded sinking muck bucket from underground excavation. It will direct the muck to a fixed discharge chute leading to a dump truck or concrete apron pad at the collar level. The system will be air cylinder operated, installed and supported in the headframe.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for Fixed and Retractable Muck Chutes is II.

1.4.2 The vendor shall furnish for the Contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management control relative to the fabrication process, quality control and inspection requirements, material procurements and test procedures, and documentation.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Furnish structural steel in accordance with Contract Documents and requirements specified by AISC and ASTM.

2.1.2 High-strength bolts: Furnish bolts complying with requirements specified in ASTM A325.

2.1.3 Other bolts and washers: Furnish carbon steel bolts and washers conforming to requirements specified in ASTM 307.

2.1.4 Furnish air-operated cylinders. Refer to FS-SP-1512 Compressed Air System.

2.2 EQUIPMENT

2.2.1 All welding equipment shall be in good condition and subject to inspection and approval by the Quality Assurance Representative.

2.3 FABRICATION

2.3.1 Fabrication shall be in accordance with approved shop drawings, AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, AISC Manual of Steel Construction, AWS Structural Welding Code - Steel and this specification.

2.4 SHOP PAINTING

2.4.1 Surface Cleaning (SSPC SP6) (SSPC SP3)

2.4.2 Pretreatment (Mil Spec DOD-P-15328) or (Fed. Spec. TT-C-490)

2.4.3 Priming (Fed. Spec. TT-P-645)

2.4.4 Factory Applied Finish Coating: For the Fixed and Retractable muck chutes.

PART 3 - EXECUTION

3.1 ERECTION

3.1.1 Contractor shall erect Sinking Dump Doors and Chutes in accordance with AISC Manual of Steel Construction and AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, AWS Structural Welding Code - Steel and this specification.

3.2 INSPECTION

3.2.1 Visual Inspection Welds (AWS D1.1, Part 6)

3.3 DIMENSIONAL INSPECTION/TOLERANCES

3.4 TESTING AND ACCEPTANCE

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TECHNICAL SPECIFICATION
(OUTLINE SPECIFICATION)

NO. FS-SP-1414

Q.A. LEVEL II

TITLE: WIRE ROPE AND ATTACHMENTS
DIVISION 14 - CONVEYING SYSTEMS
SUBDIVISION - HOISTS AND CRANES

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Ray Tinnel DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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WIRE ROPE AND ATTACHMENTS

PART 1 - GENERAL

1.1 WORK INCLUDED

This work under this specification includes the supply and installation of conveyance hoist ropes and attachments for shafts ES-1 and ES-2.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Code of Federal Regulations (CFR)

- 30 CFR57 Safety and Health Standards - Underground Metal and Nonmetal mines

1.2.2 California Administrative Code (CAC)

- Title 8, Chapter 4, Subchapter 17 - Mine Safety Orders
- Title 8, Chapter 4, Subchapter 20 - Tunnel Safety Orders

1.2.3 American National Standards Institute (ANSI)

- M11.1 Wire Rope for Mines

1.3 SYSTEM DESCRIPTION

- Wire rope, in sufficient length shall be furnished to extend from the hoist drum to the maximum depth in the shaft, as shown in the Contract Drawings
- Rope-end fittings and attachments, shall be furnished as shown in the Contract Drawings
- Hoist rope length to include allowances for cut-offs and dead turns.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for the Conveyance Hoist Ropes is II.

1.4.2 The supplier shall have an approved Quality Assurance Program.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 Rope construction and strength

2.1.2 Fittings and attachments

PART 3 - EXECUTION

3.1 Shipping

3.2 Storage

3.3 Spooling from shipping spool to hoist drum

3.4 Attachment to hoist drum

3.5 Attachment to conveyance

3.6 Inspection and Testing

3.7 Acceptance

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TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-1416

Q.A. LEVEL II

TITLE: ES-1 SHAFT EQUIPPING
DIVISION 14 - CONVEYING SYSTEMS
SUBDIVISION - MATERIAL HANDLING SYSTEMS

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Chris Lamm DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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ES-1 SHAFT EQUIPPING

PART 1 - GENERAL

1.1. WORK INCLUDED

This specification covers the installation of the shaft internals for ES-1.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Code of Federal Regulations (CFR)

- o 30 CFR 57 — Safety and Health Standards Underground Metal and Nonmetal Mines

1.2.2 State of Nevada Revised Statutes (NVR)

- o 46 NVR 512 — Mine Safety and Health Standards for Open Pit and Underground Metal and Nonmetal Mines and Sand, Gravel and Crushed Stone Operations.

1.2.3 California Administrative Code (CAC)

- o 8 CAC 4.17 — Mine Safety Orders

1.3 SYSTEM DESCRIPTION

The system includes all of the shaft internal structures, ventilation ducting, utilities, and the conveyance.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for ES-1 Shaft Equipping is II.

PART 2 - PRODUCTS

2.1 MATERIALS AND FABRICATION

2.2.1 Materials and fabrication for ES-1 shall be as specified in other related sections.

PART 3 - EXECUTION

3.1 PERMANENT EQUIPMENT TO BE INSTALLED

- o Buntons
- o Guides
- o Manway
- o Services
- o Conveyance

3.2 ALIGNMENT AND TOLERANCES

3.3 PLANT MODIFICATIONS FOR EQUIPPING

- o Work Deck
- o Collar

3.4 EQUIPPING SEQUENCE AND SCHEDULE

3.5 ACCESS TO TEST INSTRUMENT LOCATIONS

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TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-1417

Q.A. LEVEL II

TITLE: ES-2 SHAFT EQUIPPING
DIVISION 14 - CONVEYING SYSTEMS
SUBDIVISION - MATERIAL HANDLING SYSTEMS

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B.R. Chrysanthy DATE 12-7-88

APPROVED BY Paul B Hale DATE DEC 7, 1988

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ES-2 SHAFT EQUIPPING

PART 1 - GENERAL

1.1 WORK INCLUDED

This specification covers the installation of the shaft internals for ES-2.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Code of Federal Regulations (CFR)

- o 30 CFR 57 — Safety and Health Standards - Underground Metal and Nonmetal Mines

1.2.2 State of Nevada Revised Statutes (NRS)

- o 46 NRS 512 — Mine Safety and Health Standards for Open Pit and Underground Metal and Nonmetal Mines and Sand, Gravel and Crushed Stone Operations.

1.2.3 California Administrative Code (CAC)

- o 8 CAC 4.17 — Mine Safety Orders

1.3 SYSTEM DESCRIPTION

The system includes all of the shaft internal structures, ventilation plenum, utilities, conveyance and counterweight.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for ES-2 Shaft Equipping is II.

PART 2 - PRODUCTS

2.1 MATERIALS AND FABRICATION

2.1.1 Materials and fabrication for ES-2 shall be as specified in other related sections.

PART 3 - EXECUTION

3.1 PERMANENT EQUIPMENT TO BE INSTALLED

- o Buntons
- o Guides
- o Station Structure
- o Loading Pocket Equipping
- o Tail Shaft Equipping
- o Services
- o Conveyance and Counterweight

3.2 ALIGNMENT AND TOLERANCES

3.3 PLANT MODIFICATIONS FOR EQUIPPING

- o Work Deck
- o Collar

3.4 EQUIPPING SEQUENCE AND SCHEDULE

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TECHNICAL SPECIFICATION

(OUTLINE SPECIFICATION)

NO. FS-SP-1418

Q.A. LEVEL II

TITLE: EMERGENCY ESCAPE HOIST
DIVISION 14 - CONVEYING SYSTEMS
SUBDIVISION - HOISTS AND CRANES

APPROVED BY Bruce T. Stanley DATE 12-1-88

APPROVED BY B. R. Quintana DATE 12-7-88

APPROVED BY Paul B Hale DATE 12-7-88

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EMERGENCY ESCAPE HOIST

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EMERGENCY ESCAPE HOIST

1.1 WORK INCLUDED

The work under this section includes the design, fabrication and delivery of an emergency escape hoist for operation in the ESF shafts.

The hoist shall be capable of evacuating personnel from a stalled conveyance between the shaft collar and the operating levels.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 Anti-Friction Bearing Manufacturers Association (AFBMA)

- o STD11 Load Ratings and Fatigue Life for Ball Bearings

1.2.2 American Welding Society (AWS)

- o D1.1 Structural Welding Code, Steel

1.2.3 American Society for Testing and Materials (ASTM)

- o A36 Standard Specification for Structural Steel

1.2.4 Code of Federal Regulations (CFR)

- o 30CFR57 Safety and Health Standards Underground Metal and Nonmetal Mines

1.2.5 California Administrative Code (CAC)

- o Title 8, Chapter 4, Subchapter 17, Mine Safety Orders

1.3 SYSTEM DESCRIPTION

The unit covered by this specification shall be capable of the following performance:

- o Being positioned at the collar of either shaft to operate a personnel cage in the conveyance hoisting compartment of the shaft.

- Operating as a self-contained unit completely independent of the plant power supply.
- Being readily moved from one location to another with a minimum of delay.
- Operating over the total depth of either shaft at variable speeds from 50 to 100 ft/min.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for the Emergency Hoist Unit is II.

1.4.2 The vendor shall furnish for the Contracting QA Representative's approval, a Quality Assurance program describing specified work, including descriptions which identifies management controls relative to the fabrication process, quality control and inspection requirements, material procurement and test procedures, and documentation.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- Engine-powered truck chassis
- Diesel engine hoist prime mover
- Hydraulic hoist motor
- Smooth-faced steel hoist drum
- Hoist braking system
- Hoist safety systems
- Operator's control console
- Wire rope and attachments
- Hydraulic stabilizing jacks

2.1 Con't

- Boom-mounted head sheave
- Personnel cage
- Cage-to-hoist voice communication

2.2 FABRICATION

2.2.1 Welding and Fastening Requirements

2.2.2 Painting

PART 3 - EXECUTION

3.1 Shop Inspection and Testing

3.2 Field Testing and Operation

3.3 Acceptance

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