

U.S. DEPARTMENT OF ENERGY

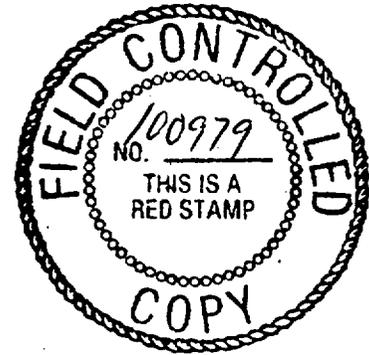
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**YUCCA MOUNTAIN
SITE CHARACTERIZATION
PROJECT**

**ENGINEERED BARRIER
SYSTEMS – COLUMN TESTING**

REVISION 0



**FIELD WORK PACKAGE
FWP-EBS-99-002**



UNITED STATES DEPARTMENT OF ENERGY

**OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
FWP/LWP APPROVAL**

QA: QA

SECTION I (Project Engineer completes)

FWP/LWP Title:
EBS Column Testing

FWP/LWP Identifier:
FWP-EBS-99-002

Assigned Project Engineer:
Douglas J. Weaver

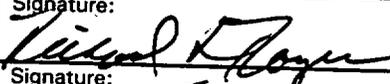
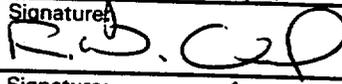
Affected Organizations in FWP/LWP:
CRWMS M&O (PI, EBSO, TCO, SFO, Sample Management, ~~OQA~~) ^{DW 10/21/99}

HISTORY OF REVISIONS

Revision Number	Effective Date	Reason for Change
0	10/26/99	Initial Issue.

SECTION II (Project Engineer obtains signatures) (N/A for expedited changes)

The following signatures authorize work to commence in accordance with this FWP/LWP and within the constraints identified in the Planning and Control System approved by the Office of Civilian Radioactive Waste Management.

Manager Name: Larry Hayes	Organization: M&O NEPO	Signature: 	Date: 10/21/99
Manager Name: Richard Royer	Organization: M&O S&H	Signature: 	Date: 10/21/99
Manager Name: Michael Harris	Organization: M&O EPD	Signature: TAP syste For MH	Date: 10-21-99
Manager Name: Robert Clark	Organization: OQA	Signature: 	Date: 10/22/99
Manager Name: Kalyan Bhattacharyya	Organization: M&O EBSO	Signature: 	Date: 10/23/99
Manager Name:	Organization:	Signature:	Date:

SECTION III (Project Engineer obtains signatures) (N/A for non-expedited changes)

Work approved in the previous revision of this FWP/LWP may continue with the expedited changes identified in this revision. A full review of this expedited change should be initiated within 3 working days of the effective date of this revision.

TCO Manager:	Signature:	Date:
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INTRODUCTION

This Field Work Package (FWP) developed in accordance with AP- 5.2Q, provides both administrative guidance and instructions which implement the Quality Assurance Requirements and Description (QARD) DOE/RW10333P, and Integrated Safety Management Program principles/functions related to Engineered Barrier Systems (EBS) Column Testing at the U.S. Department of Energy (DOE) North Las Vegas Facilities (NLVF). All participants are to conduct testing activities in accordance with this FWP and subordinate process. Affected Organizations are responsible for determining Quality Assurance (QA) applicability in accordance with their QA program.

1.0 SCOPE AND DESCRIPTION

1.1 GENERAL SCOPE DESCRIPTION

This EBS Testing FWP will address testing criteria, project controls, Environmental, Safety, and Health (ES&H) requirements, and identify roles and responsibilities specific to this testing workscope in a DOE operated facility outside of the OCRWM program.

1.1.1 General Test Description and Objectives

The Yucca Mountain Site Characterization Project (YMP) is preparing a Site Recommendation Report (SR) to indicate the suitability or unsuitability of the Yucca Mountain (YM) as a High Level Radioactive Waste (HLW) Repository. This report includes a Total Systems Performance Analysis (TSPA) and a design of the subsurface facilities, such as the emplacement drifts and the engineered barriers to be installed in the emplacement drifts. Process Models Reports (PMRs) and the Analysis and Model Reports (AMRs) will support the TSPA. This FWP describes couple column tests to be performed in the YMP EBS test facility located in the DOE Complex in North Las Vegas.

The goals of the Thermal-Hydrological-Chemical (THC) column testing, to be conducted at the NLVF are: (1) to compare THC effects in different materials (e.g. crushed tuff, quartz sand, or limestone), characterize THC coupled processes that could affect drip shield performance, particularly the magnitude of permeability reduction, the nature of minerals produced at or near the drip shield surface, and chemical fractionation (i.e. concentrative separation of salts and minerals due to boiling water), (2) analyze the composition of fluid that reenters the backfill after heating, and remobilize the precipitates, and (3) generate data for validating THC predictive models which will support the EBS Process Model Report (PMR), Rev. 01.

The general test description for EBS Column Testing includes the set-up of the columns at the NLVF, the installation of test materials and instrumentation, wiring the system for power, running the test, and performing post test characterization on the test cells including material sampling.

1.1.2 Requirements Basis for EBS Column-Testing

The following are controlled or published YMP documents that describe EBS Column Tests. These documents, together with related plans, include:

- “Development Plan (DP) for Engineered Barrier System Thermal/Hydrologic/Chemical (EBS THC) Column Testing,” TDP-EBS-ND-000003 Rev.00, Dated August 5, 1999
- Multi-Year Planning System FY00 at <http://ympcs1.ymp.gov>

1.2 SPECIFIC SCOPE DESCRIPTION

1.2.1 Organizational Responsibilities

The title for the Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O) will be named as M&O in this document for administrative purposes. Specific Environmental, Safety, and Health (ES&H) responsibilities, processes, and controls are included in Section 4.1. The organizations involved in implementing work under this FWP, as currently assigned by the Planning and Control System (PACS) include:

EBS TEST MANAGEMENT: The EBS Operations Office (EBSO) Testing Department has the overall responsibility for the EBS testing program. The EBS test management will be coordinated between the EBSO and all participants by the EBS Performance Testing Lead. The EBS Performance Testing Lead will be responsible for technical direction for the EBS test design, performance testing, pilot testing, and technical criteria.

TEST COORDINATION OFFICE: The Test Coordination Office (TCO) is responsible for coordinating and monitoring field test activities in support of participants and the Yucca Mountain Site Characterization Office (YMSCO), and for providing regular written reports on test status to the EBSO. The TCO shall assign a FWP Records Coordinator (FWPRC) to monitor the FWP records process and appoint a Data Manager for the data management activities including data distribution as described in FWP-ESF-96-001, “Exploratory Studies Facility Data Collection Systems (DCS).” The TCO has the responsibility to coordinate field activities with all affected organizations of the Project, to define requests and control field work scope that fall within the approved scope of this FWP under the acknowledgement of the EBSO. These responsibilities, when shared with the EBSO, the sponsoring Principal Investigators (PIs), and recognized organizations, will ensure that data and information gathered from the test activities described herein will meet requirements for SR and be consistent with DOE directives and the M&O Safety & Health Plan. At the test facility, the TCO is responsible for field test coordination, implementation, management, and maintains a Field Test Representative (FTR) (often times the Person-in-Charge [PIC]) whenever test-related activities are being conducted. These representatives are responsible for ensuring that all testing requirements and constraints are adequately met during test set-up and implementation consistent with test design and

implementing documents. The TCO will conduct Safety walkthroughs. The TCO or designee is responsible for coordinating test implementation with Bechtel Nevada (BN). The TCO or designee will request craft and testing support from BN, or be notified if direct requests are made. The TCO will coordinate all requests specific to testing that are included in this FWP as well as additional requests when supplied to the Project Engineer (PE) from the EBSO or PI.

BECHTEL FACILITY SUPPORT (BN) - The TCO will request BN craft labor via Work Instructions. This labor support will consist of craft labor and equipment to facilitate testing activities as requested by the PIs, and coordinated by the TCO, as bounded by the Work Instructions. Support for testing activities may, at a minimum, include the transportation of equipment inside the building, moving and locating large test assemblies once inside, machine shop services, and electrical hookups for instrumentation usage. BN has the responsibility of ensuring safe working conditions pertaining to the facility, and safe constructor operated equipment.

The TCO will provide **DATA COLLECTION STAFF**- Data Collection Staff are responsible for providing and configuring the DCS, terminating instrumentation wires to the DCS, conducting configuration acceptance testing, assigning data channel locations within the DCS, and collecting/distributing the data to the PI Organizations. The ESF Data Manager, as defined by FWP-ESF-96-001, controls and manages the Data Collection Staff and assigned responsibilities.

SCIENTIFIC PRINCIPAL INVESTIGATORS (PIs): The PIs will provide the scientific staff, instrumentation, and equipment necessary for maintaining and calibrating all required scientific equipment and instrumentation utilized in conducting the EBS Column Testing. This includes deployment of testing components, test set-up, instrumentation, and interactions with the established data collection services at the site. The PIs are responsible for ensuring that the data and information collected during test activities associated with the testing are acceptable to meet requirements for Project needs, are qualified in accordance with applicable QA requirements, and are responsible for the submission of the data. The PIs are responsible for ensuring that each of their field staff have been provided an opportunity to read and understand the contents of this FWP and associated Work Instructions.

1.2.2 Field Testing Equipment

The PI testing organizations will provide the test equipment required for field activities associated with EBS Column Testing and will have approved procedures and/or a scientific procedures to follow when using this equipment. The EBSO, PI testing organizations, or TCO will supply field data collection equipment. The equipment will be set-up and operated by the Data Collection Staff as described in Section 3.0.

1.2.3 Computer Software

Software (excluding that which is an integral part of measuring and test equipment) that uses numerical methods for complex scientific,

engineering, or mathematical calculations will be controlled in accordance with appropriate QA procedures. No manipulation of raw data will occur in the field during data collection, unless performed by the PI or Data Manager under approved procedures or documented in the PI's or Data Manager's scientific notebook. No data manipulation software is identified at this time.

1.3 IMPLEMENTING FIELD DOCUMENTS

The following procedures or their equivalents will be utilized to implement testing activities within the scope of this FWP. No land access or environmental permits are required for this self-contained test activity conducted inside an existing DOE facility. The sequence in which these documents are applied in executing the work is presented in Section 3.0. The decision to implement these procedures or apply them to QA controlled activities is under the direction of the implementing organization. This list identifies procedures and processes currently planned to implement activities. Integrated Safety Management (ISM) principles and functions are administrative in nature and are implemented using the Work Instruction process presented by Attachment 4 and the procedures identified by an asterisk (*). These procedures may be revised, replaced, or added to, as needed, without revising this FWP.

AP-17.1Q	Records Source Responsibilities for Inclusionary Records
AP-3.14Q	Transmittal of Input
AP-SIII.1Q*	Scientific Notebooks
AP-SIII.3Q	Submittal and Incorporation of Data to the Technical Data Management System
LANL-EES-13-DP-614	Data Collection System Configuration Acceptance Testing
LANL-EES-13-DP-615	Data Collection System Field Instrument Wire Terminations
LP-OM-001-M&O*	Lockout/Tagout Process
PRO-EP-002*	Non-Hazardous Waste Management
PRO-EP-004*	Spill Management
PRO-IM-011*	Lessons Learned Program
PRO-SH-001*	Accident Investigation, Reporting, and Recordkeeping
PRO-SH-002*	Procurement of Required Personal Protective Equipment
PRO-SH-003*	Compliance with the Occupational Safety and Health Administration Hazard Communication Standard
PRO-SH-004*	Hearing Conservation Program
PRO-SH-005*	Emergency Management
PRO-SH-007*	Health Surveillance Program
PRO-SH-008*	Occupational Heat Stress
PRO-SH-011*	Conducting a Job Safety Analysis
PRO-SH-014*	Silica Protection Program
PRO-SH-019*	Airborne Radiation Protection Program for Naturally Occurring Radon
PRO-TS-007*	Authorization to Purchase and Use Regulated Hazardous Materials
QAP-2-0	Conduct of Activities
YAP-12.3Q	Control of Measuring and Test Equipment and Calibration Standards
YAP-30.2	Land Access and Environmental Compliance

YAP-SII.1Q	Submittal, Review, and Approval of Requests for Yucca Mountain Site Characterization Project Geologic Specimens
YAP-SII.4Q	Collection, Submission, and Documentation of Non-Core and Non-Cuttings Samples to the Sample Management Facility for Site Characterization
YAP-SV.1Q	Control of the Electronic Management of Data
YMP-USGS-QMP-5.05	Scientific Notebook

1.4 DATA AND DELIVERABLES

The PIs have the responsibility for the collection, analysis, and reporting of data and records relating to the implementation of this FWP. Data record responsibility is addressed in Section 6.0 of this FWP.

1.5 PLANNED TFM USAGE

These initial tests will not be conducted on the YMP site, therefore, no Waste Isolation or Test Interference issues exist and no Determination of Importance Evaluation for this test is required. The contained test apparatus is located in a dedicated section of the DOE North Las Vegas Facility (NLVF), Building B-4. Facility controls and requirements, including the disposal system for waste material, will be followed.

By definition and applicability of YAP-2.8Q, no TFM are identified.

As reiterated in Attachment 5, Material Safety Data Sheets are kept on site for all substances used in support of these tests. Types of substances currently planned for use are as follows:

- Cutting Oils
- Adhesives
- Tape and Insulating Products
- Refrigerant (propylene glycol)

2.0 SAMPLING PLAN

2.1 SAMPLE COLLECTION

Samples shall be collected under the procedures identified in Section 1.3. PI organizations will provide all sample-packaging materials, transportation containers, and any associated equipment.

Expected samples include material sampling from the columns both prior to and after the test, and water sampling.

3.0 WORK IMPLEMENTATION AND CONTROL

3.1 IMPLEMENTATION

The following list of activities provides instructions on how work associated with this testing will be conducted and controlled. The TCO generally acts as the

interface and coordinator between the PI organization(s) and all other organizations involved in these activities. The TCO monitors all test-related support, assembly, decommissioning, and test activities associated with this FWP and conducted within the dedicated section of the NLVF. Safety requirements and procedures involved in these activities are addressed in Attachment 5.

The following list of activities includes actions which implement QARD requirements and management guidance that does not. Items flagged with a **QA** are recognized as being quality affecting unless specifically graded out by the organizations performing the task. Grading is accomplished in accordance with QAP-2-0 or other equivalent procedures. Items identified with a **QA:N/A** do not implement QARD requirements and are therefore considered administrative in scope. The sequence of **QA** activities may be modified by the TCO or the PI based on conditions in the field, provided those modifications are documented and affected organizations concur. All work activities will be conducted as described in the completed and approved Work Instruction that integrates Attachment 5 controls to testing work elements following the outline provided in Attachment 4.

PI denotes either the actual PI or PI assigned designee. For identification and record keeping, each control is uniquely identified by a number in parentheses at the end of each.

GENERAL ITEMS

QA:N/A Affected Organizations who perform EBS testing activities specific to this FWP shall coordinate Atlas Facility activities through the TCO or notify the TCO when test activities are being conducted. (3.1.1.1)

QA:N/A Throughout the implementation of this FWP, the TCO shall provide regular written status reports to the CRWMS M&O management and the EBSO regarding the status and progress during the test installation and monitoring phases. (3.1.1.2)

QA:N/A The TCO shall develop, with all affected organizations, a Work Instruction for this particular work that specifically addresses detailed ES&H issues. (3.1.1.3)

QA:N/A The TCO, PI, and/or all scientific staff conducting work at the facility, will participate in a daily Tool Box Safety Meeting that is held at YMP work sites at the start of each shift. (3.1.1.4)

TEST ASSEMBLY AND INSTRUMENTATION ACTIVITIES

QA:N/A The TCO or assigned designee shall request BN to provide construction support, test support facilities, and operational flexibility to instrument, maintain, operate, and monitor the EBS Column Tests as needed. (3.1.2.1)

QA: The PI shall assemble the apparatus and install instrumentation in accordance with their procedures identified in Section 1.3. (3.1.2.2)

QA: The PI shall take samples, as deemed necessary, of the material prior to installation in accordance with YAP-SII.4Q or AP-SIII.1Q. (3.1.2.3)

QA: The PI shall document the as-built configuration of the columns in accordance with their scientific notebook procedure identified in Section 1.3. (3.1.2.4)

TESTING

QA: The PI and/or TCO shall collect raw data in accordance with their scientific notebook procedure identified in Section 1.3. (3.1.3.1)

QA: The PI shall transmit initial and developed data to the records system in accordance with YAP-SIII.3Q as identified in section 6.1 of this FWP. (3.1.3.2)

QA: The PI shall make and document observations in accordance with the scientific notebook procedure identified in Section 1.3. (3.1.3.3)

QA: The PI shall sample water, as deemed necessary, from the system as encountered in accordance with YAP-SII.4Q and scientific notebook procedure. (3.1.3.4)

POST TEST CHARACTERIZATION

QA:N/A The TCO or designee shall request BN to provide craft support, test support facilities, and operational flexibility to disassemble the EBS column tests. (3.1.4.1)

QA:N/A The PI shall disassemble and remove components of the test assemblies in accordance with facility controls. (3.1.4.2)

QA: The PI shall take samples, as deemed necessary, of the post test materials as required in accordance with YAP-SII.4Q. (3.1.4.3)

QA: The PI shall document the post test as-built configuration of the test bed in accordance with their scientific notebook procedure identified in Section 1.3. (3.1.4.4)

QA:N/A The PI shall dispose of all materials in accordance with state/federal/local environmental regulations and M&O Environmental Programs Department (EPD) approved methods. (3.1.4.5)

DATA COLLECTION

Note The DCS is defined as any stand alone data acquisition system or data logger for which the Data Manager is responsible for the configuration, operation, and maintenance. This is independent of any active measurements that may be conducted or data loggers that may be supplied and operated by the PI organization.

QA: PIs are responsible for the submittal of DCS-related data, in accordance with procedures identified in Section 1.3. (3.1.5.1)

QA:N/A The **DATA COLLECTION STAFF** or designee shall connect labeled wires to the DCS according to LANL-EES-13-DP-615. (3.1.5.2)

QA: The **DATA COLLECTION STAFF** will conduct Configuration Acceptance Testing on all effected DCS channels according to LANL-EES-13-DP-614. (3.1.5.3)

QA: The **DATA COLLECTION STAFF** shall collect data in accordance with the scientific notebook procedure. (3.1.5.4)

QA: The **DATA COLLECTION STAFF** shall convert and distribute data to the PIs in accordance with applicable QA procedures listed in Section 1.3. (3.1.5.5)

QA: The **PIs** shall conduct active testing in accordance with scientific notebook procedures identified in Section 1.3. (3.1.5.6)

3.2 CONTINGENCY PLANS

No contingency plans have been identified for work covered in this FWP.

3.3 PREREQUISITES AND HOLD POINTS

No prerequisites or hold points have been identified specific to work described in this FWP.

3.4 STOP WORK

Affected organizations must inform the TCO if quality-related work elements cannot be conducted as described in this FWP. Work on those elements will be stopped until the FWP is changed to reflect the correct work practices. Any individual may stop work if an imminent danger exists to the workers, the public, or the environment.

3.5 SPECIAL INSTRUCTIONS

The use of diagnostic and documentation photographic equipment is authorized; however, personnel operating such equipment will have a valid NV SPECIAL PERMIT, (WSI-45), in their possession.

Foreign Nationals will be allowed into the compound area, if prior approvals are obtained and coordinated through the DOE/NV Visitor Control Office. Foreign National visitors will be badged at the Nevada Support Facility (NSF) Badge Office.

All personnel entering the facility will be in possession of a current DOE Access Badge.

4.0 ADMINISTRATIVE, (NON-QA) INSTRUCTIONS

4.1 ENVIRONMENTAL, SAFETY, AND HEALTH

4.1.1 Environment

All work specific to tracer use and disposal shall comply with applicable stipulations in YAP-30.2 and associated environmental approval letters. All work associated with this self-contained test activity shall comply with the BN building environmental facility controls. All materials shall be handled to control fugitive dust. No tracers are approved for this activity. Water, with no additives, will be the only fluid used in the tests. No fluids, except the referenced water shall be discharged down the sinks. Discharge of fluids other than water must be approved by M&O/EPD, prior to discharge.

4.1.2 Safety and Health

Specific ES&H requirements are implemented through Work Instructions particular to individual activities. All work activities will be conducted as described in the completed and approved Work Instructions that integrate Attachment 5 controls to testing work elements following the outline provided in Attachment 4. The Work Instructions acknowledge a person-in-charge, identify work scope, equipment requirements, hazard identification, and task steps.

Safety and Health Roles and Responsibilities: The YMP regards the S&H of all employees to be of paramount importance. To establish and maintain a high degree of S&H awareness on the YMP, all organizations and employees involved with the scientific characterization activities must clearly understand their roles and responsibilities in maintaining a safe and healthful workplace.

See Attachment 4 for Environmental, Safety, and Health Responsibilities and Controls.

4.2 POINTS OF CONTACT

EBS Performance Testing Lead	J. Pye	295-4250
EBS Performance Field Coordination	H. Kalia	295-4339
TCO Project Engineer	D. Weaver	295-5916
TCO Manager	R. Oliver	295-3578
TCO Safety Coordinator	M. Taylor	295-3647
TEST Manager	M. Peters	295-3644
Primary Field Test Representative	R. Johnston	295-0236
SEA Principal Investigator	W. Lowry	(505) 424-6955
USGS Principal Investigator	D. Hudson	295-5795
Data Manager	F. Homuth	295-4900
Data Collection Staff	R. Sievert	295-5798
Data Collection Staff	T. Williams	295-4313

Atlas Facility Point of Contact	J. Norton	295-2595
M&O Security	M. Schwartz	295-5349
BN Occupational Safety Dept. Contact	G. Schaefer	205-2743
DOE/YMSCO	J. Gonzalez	794-5454

4.3 SCHEDULE

The working schedule, included as Attachment 2, is expressly limited to this FWP and record development for Yucca Mountain site field activities associated with this FWP. Task dates and estimated durations are based on resource availability schedules and current strategies. These tasks, dates, and durations are subject to change.

4.4 SUMMARY ACCOUNTS

Summary accounts associated with the activities described in this FWP and related information are included as Attachment 3.

5.0 FIELD VERIFICATION AND SCOPE COMPLETION

5.1 FIELD VERIFICATION

No field verifications have been identified for this work.

5.2 SCOPE COMPLETION

The scope of this FWP will be completed when no further column testing data is being collected and the test apparatus is removed from the facility.

Scope completion will be documented by the EBSO and provided to the TCO. The PE will forward a copy of the completion notification record to the FWPRC.

6.0 RECORDS

6.1 LIST OF RECORDS

PIs are responsible for collection, management, and submittal of data, in compliance with applicable PI plans and procedures. All transfers of data between YMP Participants, submittal of data to the YMP database, and transfer of data to outside parties shall be conducted in accordance with YAP-SIII.3Q, and other applicable plans and procedures.

Records shall be submitted to the records center within 60 days of their completion. An information copy of any records submitted to the records center should be sent to the TCO PE assigned to the activity.

The FWPRC will coordinate and monitor the development of the FWP records package. The record package shall contain documents that demonstrate compliance with YMP procedures in conducting this field test. The completed records package may contain (or reference) the following:

RECORD	AFFECTED ORGANIZATION	QA DESIGNATOR
Revision/Changes to the FWP	TCO	QA: QA
ES&H Review	TCO	QA: N/A
Regular Reports Addressing Test Status	TCO/EBSO	QA: N/A
Documentation Identifying the Work as Complete	EBSO	QA: QA
Sample Numbers	PI Organizations/TCO	QA: QA
Tool Box Safety Briefing Forms	TCO	QA: N/A
Scientific Work Instructions	TCO	QA: N/A

6.2 RECORDS GENERATION

Activities within the scope of the FWP will be documented in accordance with approved procedures. See Section 6.1 above.

Documents associated with this FWP shall meet the legibility and indexing requirements established in AP-17.1Q.

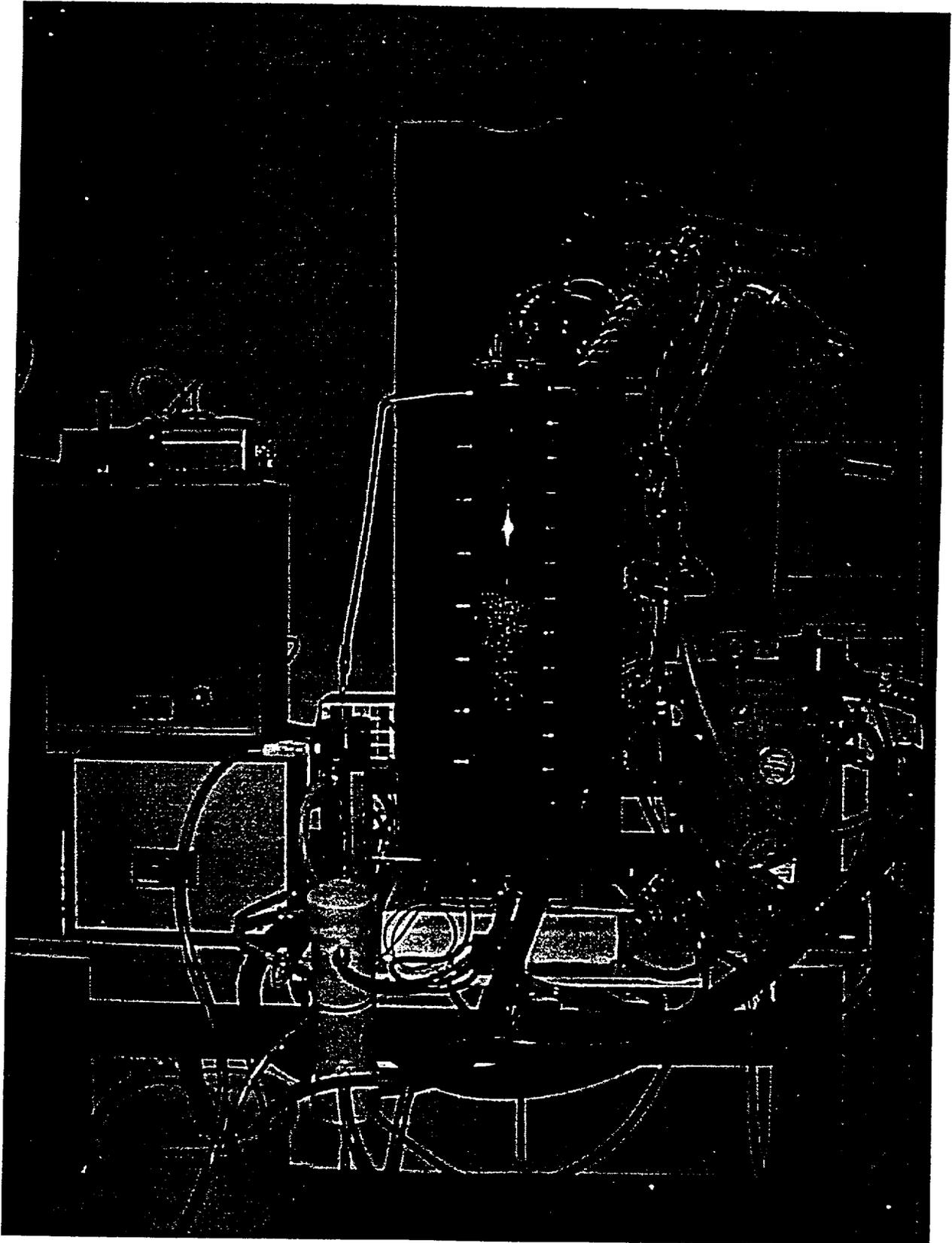
7.0 ATTACHMENTS

- Attachment 1. Schedule (QA: N/A)
- Attachment 2. Summary Accounts (QA: N/A)
- Attachment 3. Test Layout Schematics (QA: N/A)
- Attachment 4. Work Instruction Outline (QA: N/A)
- Attachment 5. Environmental, Safety, & Health Review (QA: N/A)

Engineered Barrier Systems –Column Testing
 FWP-EBS-99-002, R0, Attachment 2
 Summary Accounts (QA:N/A)

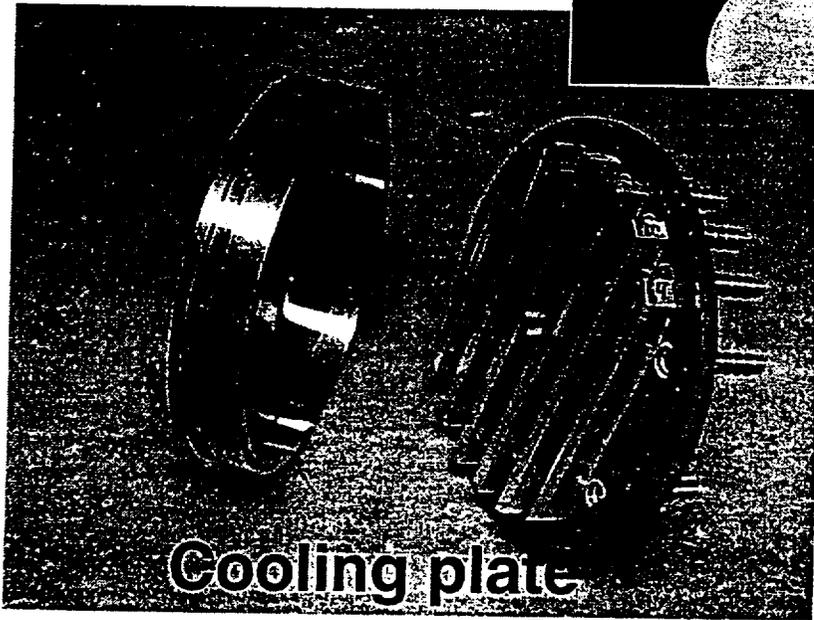
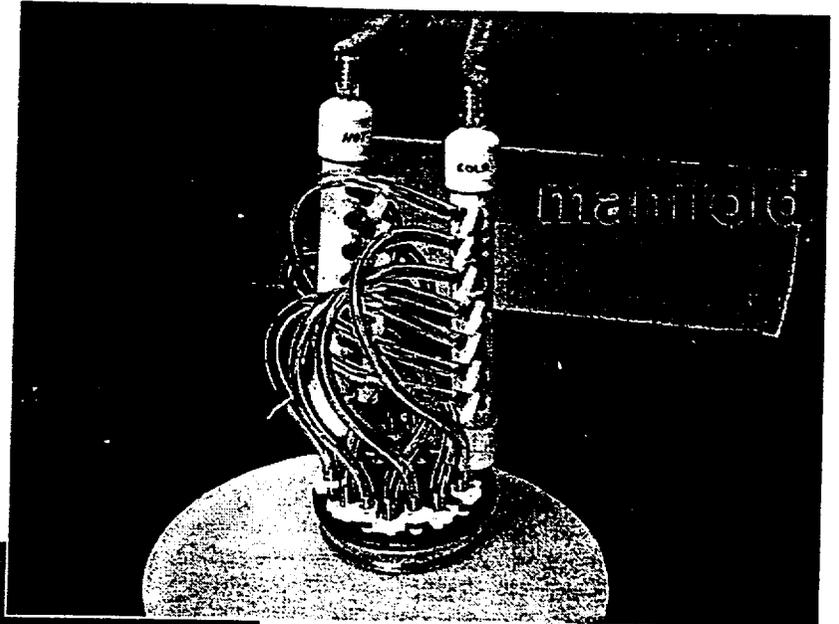
ID	TASK DESCRIPTION	LEAD MATRIX ORG.	FY00 WORK PACKAGE NUMBER
EBS Column Testing			
Test Implementation - Discrete			
I2	EBS Performance Testing for PMR	MK	1201213EM2
I2	EBS Performance Testing for PMR	SAIC	1201213EM2
I2	EBS Performance Testing for PMR	SEA	1201213EM2
I2	EBS Performance Testing for PMR	BN	1201213EM2
I2	EBS Performance Testing for PMR	SNL	1201213EM2
I2	EBS Performance Testing for PMR	LANL	1201213EM2
I2	EBS Performance Testing for PMR	LLNL	1201213EM2
I2	EBS Performance Testing for PMR	TRW	1201213EM2
Test Implementation - Matrix			
I12	Test Coordination	LANL	1401215TM2
I13	Field Test Coordination	LANL	1701215TM1
I14	Field Test Data Management	LANL	1401215TM4
I15	Sample Management	SAIC	1401215TM3
I16	Calibration Services	BN	1401215TM6
I17	Test Support ESF Craft Labor	MK	1701226TM1
I18	ESF Craft Supervision	MK	1701215SM8
I19	Site Technical Services	MK	1701215SM9
I20	Construction Management	MK	1701215SMA
I21	Occupational Safety & Health Management	LANL	18012152M1
I22	Project Baseline Planning & Control	TRW	50012154M3
I23	Project Control Engineering	TRW	50012154M4

Test Layout Schematics (QA: N/A)

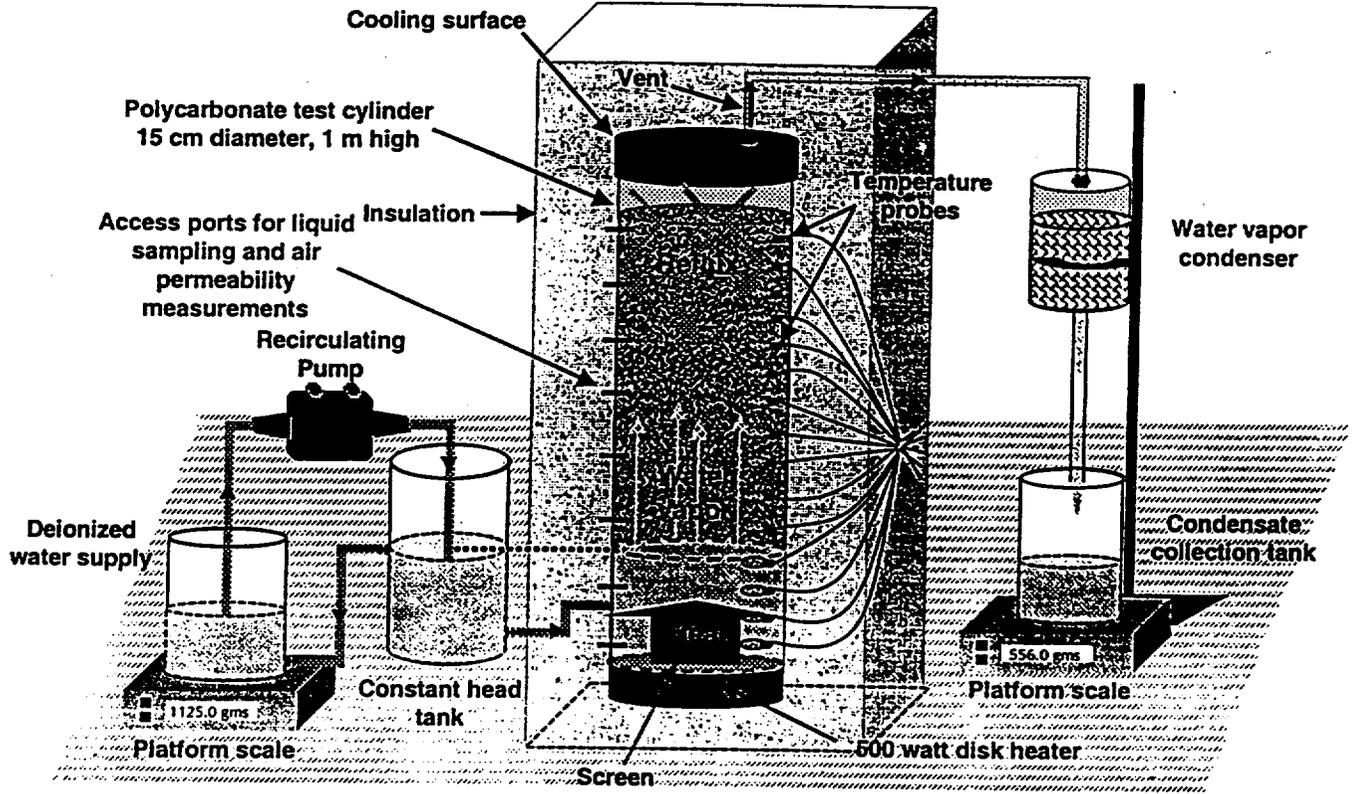


MOCK COLUMN SET-UP IN THE LABORATORY

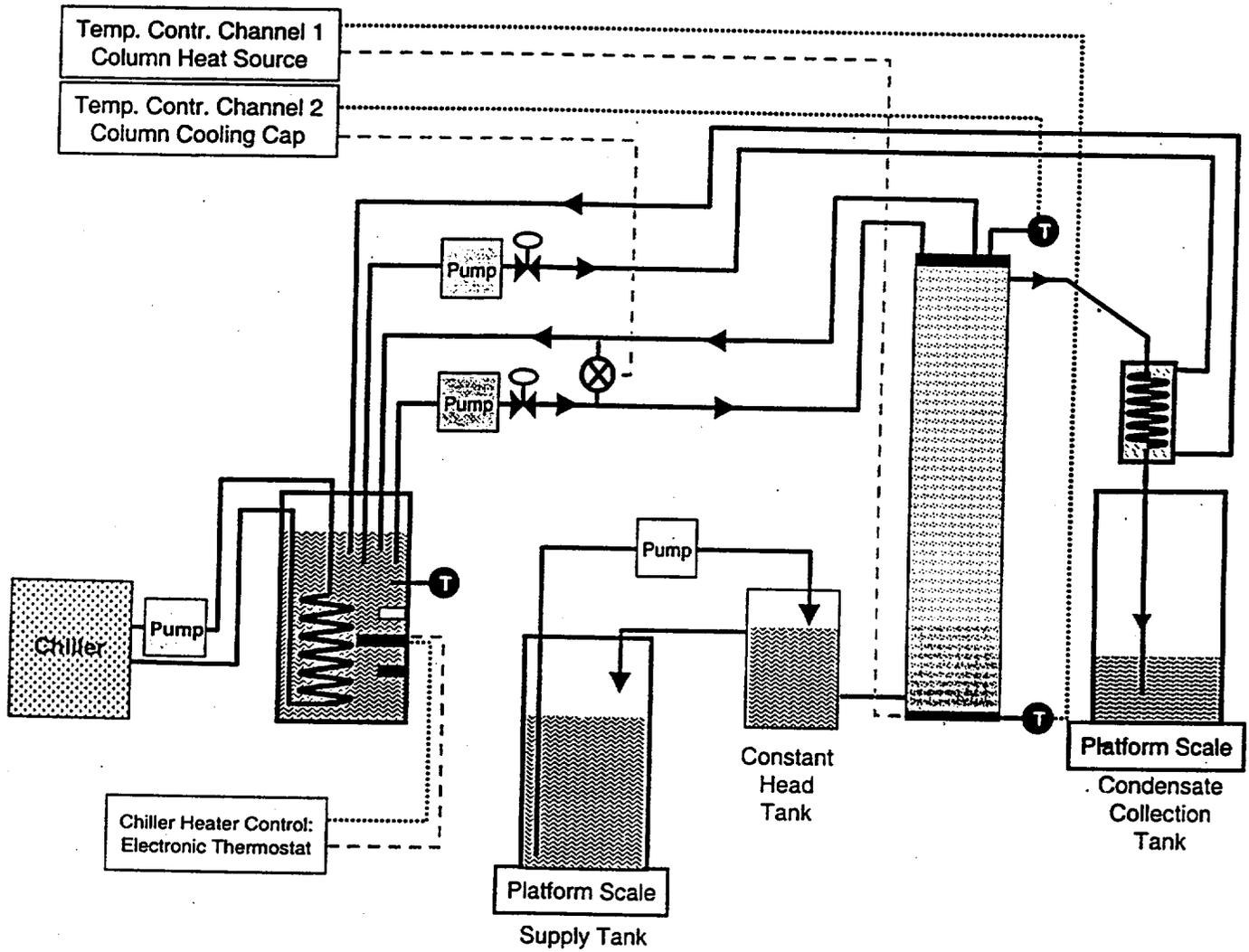
COLUMN COMPONENTS



THC Column Test

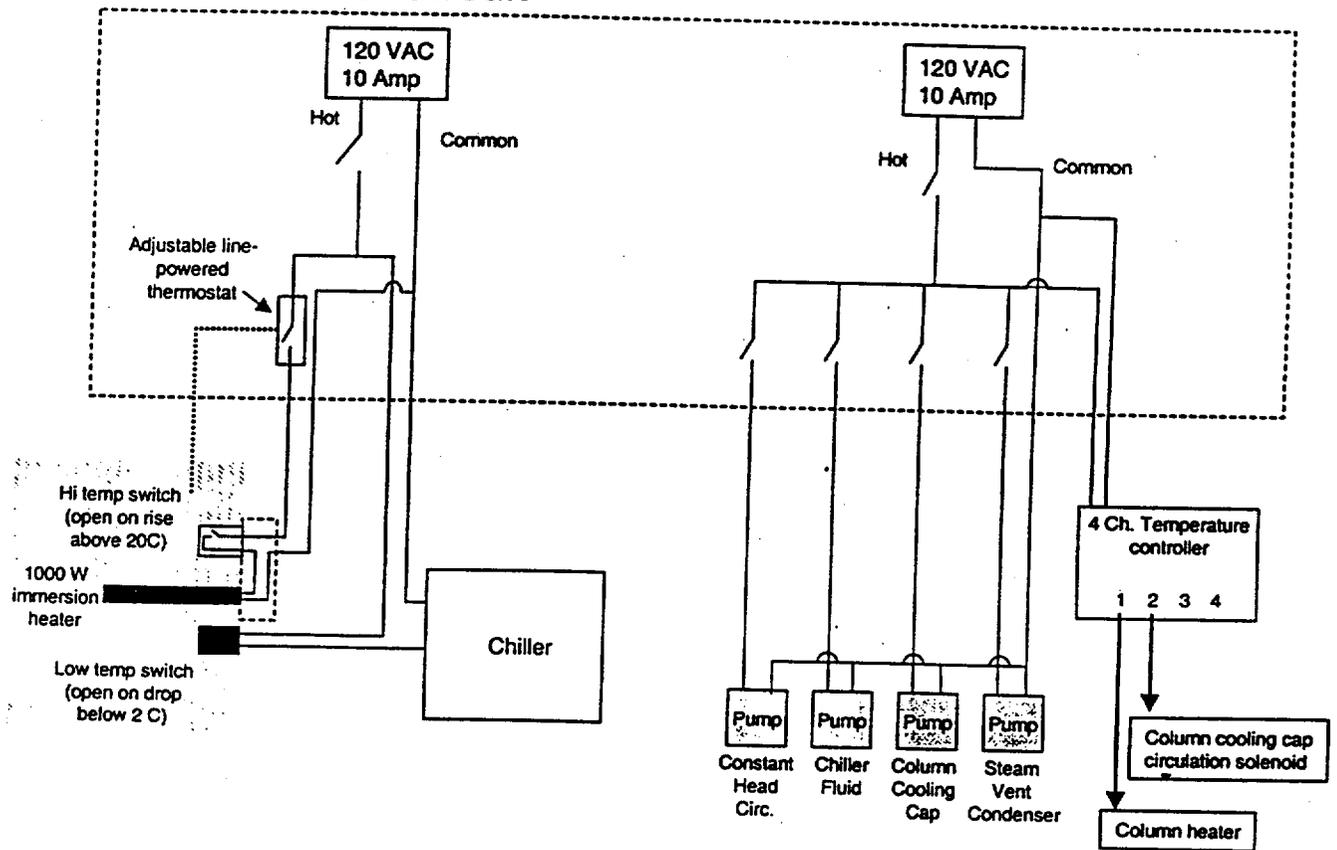


Column Flow and Temperature Controls



Chiller Temperature Control Circuit

Column Heater Circuit



WORK INSTRUCTION OUTLINE (QA:N/A)

The following is a generic outline used to integrate the controls established in the ES&H review and produce a Work Instruction specific to testing work elements.

- I. General Information
 - Work Instruction Number
 - Title
 - Start and End Dates
 - Work Type
 - Location of Work
 - Planner
 - Requestor
 - Person In Charge
 - Work Package, Job, and Charge Numbers
- II. Review and Approval
- III. Risk Assessment Code (RAC)
 - ES&H Severity Category
 - Probability Category
- IV. Work Scope
 - Requirements Source
 - Person In Charge
 - Equipment Requirements
 - Materials
 - Quantities
 - Work Location
 - Attachments
- V. Hazard Identification and Mitigations
- VI. Emphasis on Working Within Controls
 - Qualification and Training Requirements List
- VII. Task Steps
 - Work Instruction Acceptance Criteria
- VIII. Feedback and Comments
 - Completion Signatures

ENVIRONMENTAL, SAFETY, AND HEALTH REVIEW

1.0 INTRODUCTION

This Environmental, Safety, and Health (ES&H) Review of the Field Work Package (FWP) for Engineered Barrier Systems (EBS) Column Testing has been compiled by the Test Coordination Office (TCO). The purpose of this ES&H Review is to: (1) provide a Preliminary Hazard Analysis (PHA) which **identifies and lists the hazards**; and (2) **recommend** engineering, administrative, personal protective equipment, and work practice control measures for installing, operating, and maintaining equipment that will be used in EBS Column Testing activities. This review strives to incorporate the seven guiding principles and five core functions of Integrated Safety Management (ISM).

This ES&H Review is also being compiled to ensure that information about hazards and control measures will be transmitted to all affected organizations on the Yucca Mountain Site Characterization Project in order to **integrate environment, safety, and health** into all activities, processes, and operations.

Line managers and supervisors should read/review this document and work with Safety and Health to evaluate work processes and operations where a **Job Safety Analysis (JSA)** will need to be conducted and documented. No land access or environmental permits are required for this self-contained test activity conducted inside an existing DOE facility.

1.1 OBJECTIVES, TEST SCOPE, AND DESCRIPTION

A detailed description of the work activities can be found in Section 1.1 of Field Work Package FWP-EBS-99-002.

2.0 HAZARDS

2.1 PRELIMINARY HAZARD ANALYSIS:

Identified Hazards: Listing of activities/tasks and the potential hazards to scientific and support personnel conducting column scale testing activities:

Activity/Task:	Potential Hazards:
Heating the Columns.	Potential for Pressurized System.
Working with chemicals/ hazardous materials, mixing tracer chemicals.	Exposure (E) to chemicals.
Thermal heat from columns.	Contact (CW) hot surfaces.
Working around electrical equipment & systems.	Contact with (CW) energized electrical systems & components.

Heavy lifting, hand loading of fill material into columns.

Hernias, back strains, pulled muscles, crushed fingers and hands.

Filling of columns with gravel and sand materials.

Possible exposure (E) to respirable dust containing crystalline silica.

Occupying rodent and/or insect infested buildings, trailers or work areas.

Exposure (E) to Hantavirus, insect bites.

Working around flammable, combustible materials & other sources of ignition.

Fire.

Working with hand tools, drilling holes.

Eye hazard, and noise.

Working on Fridays and weekends.

Driving, vehicle accidents, and other emergencies.

3.0 HAZARD CONTROLS

Potential for a pressurized system: During the conduct of the test, the potential exists for creating a pressurized system. SEA, responsible for the design, fabrication, and operation of the test columns, will design and install burst plugs along the column length in the event of pressure build up.

Working with chemicals/hazardous materials, mixing tracer chemicals: Cutting oils and adhesives may be used in the construction of the columns. Tracers, Fluids, and Materials (TFM) that could be used as part of the testing must be approved by the Management and Operating Contractor Environmental Protection Department (EPD) through the "**Authorization to Purchase and use Regulated Hazardous Materials**", PRO-TS-007 Procedure. An Authorization to Purchase and use Regulated Hazardous Materials must be submitted and approved before chemicals and materials can be transported and used on the YMP.

The requirements for identifying, characterizing, tracking, and documenting the disposition, management, and disposal of non-hazardous waste (including empty and used containers, and used lead acid batteries) generated during these activities shall be in accordance with EPD Procedure PRO-EP-002, "**Non-Hazardous Waste Management**".

Federal, State, and the U.S. Department of Energy (DOE) requirements mandate that regulated and hazardous materials are managed to minimize the potential of their release during transport, storage, and use. EPD Procedure, PRO-EP-004, "**Spill Management**", directs those who use appropriate engineering practices, develop plans to be followed in the event of a release of a spill, be capable of responding to such a release, and be able to notify appropriate authorities.

Hazard Communications site/substance specific and other training:
Before using any chemical, a complete review of the Material Safety Data Sheets (MSDS) will be conducted.

Work and Personal Hygiene Practices:

Smoking tobacco, chewing tobacco, eating, and/or drinking will not be allowed in the areas where chemicals are being used, in the EBS test facility.

M&O Safety and Health Procedure PRO-SH-003 "Compliance with the OSHA Hazard Communication Standard" provides guidance for Project employees working with hazardous chemicals. In general, the affected organization must know the location of the MSDS, and the proper storage, use, transportation, and PPE requirements for all the hazardous chemicals they use. The MSDS should always be reviewed before using any product/material. Contact M. F. Taylor, ESF TCO ES&H Specialist, if there are questions regarding hazardous chemicals and/or TFM usage.

Working around heavy equipment, forklifts, overhead cranes (A-1 Highbay): These tests are currently planned to be conducted in Building B-4. No heavy equipment is anticipated in this area, however, if the testing is moved to the A-1 highbay, this hazard applies.

Working around heavy equipment (i.e., forklifts) presents safety hazards from contact with/being struck by moving equipment or the suspended load. When EBS activities require work in the same areas where heavy equipment, forklifts, and overhead cranes are used, personnel should be aware of the following:

All rigging shall be done under the supervision of a "qualified crane operator" supplied by BN. All cranes and forklifts will only be operated by "trained" personnel supplied by BN. All cranes, choker, cables, slings, and lifting devices will be "inspected" before use and only used in accordance with BN procedures, plans, or programs.

Do not stand behind mobile equipment (i.e., forklifts). The operator may not be able to see or even be able to hear you.

All mobile equipment (i.e., forklifts) have warning systems installed on them that sound a loud alarm whenever the equipment/machine is placed in reverse. Pay attention to these alarms and watch for moving equipment.

Most overhead crane and forklift equipment is operated with a tender (another operator or laborer), who watch the machine as it moves and warn the operator of foot travelers in the area. Never walk under a suspended load. Pay attention to the commands of the operator and/or the laborer.

Pay attention to your surroundings and follow all directions of the BN Craft Personnel and/or your TCO FTR while accessing the facility site where heavy equipment is being used.

Working in high noise levels: Personnel conducting these testing activities need to be aware that during some operations (i.e., hand tool operations) high noise levels "may" be created. Hearing protection (ear plugs and/or ear muffs) must be used during operations where noise levels above 85 dBa are created. Noise level measurements will be conducted by M&O Industrial Hygiene to

determine if hearing protection is required and the areas will be appropriately posted. Ear plugs are available on site.

The **M&O Safety and Health Procedure PRO-SH-004 "Hearing Conservation Program"** specifies the requirements for employees working in high noise level areas. All employees working in these areas must be in a "Hearing Conservation Program" and, among other things, obtain a baseline and annual audiogram (hearing test).

Thermal heat from columns test cells: EBS column testing activities include the use of heating elements inside the cell. This will result in the insides of the test cells being heated to near 300 degrees C. The cells will be insulated and no high temperature surfaces will be exposed. In addition, a barrier will be placed around the column test area and appropriate signs warning of the thermal hazard will be posted. The system is not airtight and is not planned to be pressurized.

Working around electrical equipment and systems: Whenever testing activities require personnel to conduct work on electrical circuits (i.e., canister heating or monitoring systems), the systems/components must first be de-energized, isolated, and rendered inoperative before employees can begin work. This process of de-energizing, isolating, and rendering inoperative is known as Lockout/Tagout. All electrical systems must be locked and tagged out before any work can even be attempted. The person performing the work must have the key in their possession. Lockout/Tagout is an Occupational Safety and Health Administration (OSHA) program requirement that seeks to ensure that the electrical circuits and electrical control circuits have been locked and tagged (identified) in order to prevent accidental activation.

Contact the TCO Field Test Representative (FTR) working at the facility to arrange for Lockout/Tagout assistance.

Personnel conducting testing activities on the facility "could" encounter "High Voltage" cabinets, conduit, or cables in the building. In most cases, these cabinets, conduits, or cables will not be of concern, however if the nature of any testing activity could cause physical damage to energized cabinets, conduits, or cables, it is mandatory that the TCO be contacted to arrange to have the electrical systems moved. Do not attempt to move any electrical cabinets, conduits, or cables. Contact the TCO for the services of the BN Craft Electricians.

All electrical outlets and cords being used in areas where water is present, should be plugged into outlets that are Ground Fault Circuit Interrupt (GFCI) protected. All extension cords or multi-outlet devices must be "Underwriters Laboratory (UL)" listed and be "rated" for "outside use".

Information and guidance for M&O Employees on Lockout/Tagout can be found in the **Line Procedure LP-MO-011-M&O, "Lockout/Tagout Process"**.

Extension cords should not be over 50 feet in length and no more than one extension cord can be used at any one outlet/location. Permanent or hard wired power drops should be used in place of extension cords whenever possible. All extension cords, or multi-outlet devices must be Underwriters Laboratory (UL) listed and be rated for heavy duty/outside use. Extension cords designated for

hard or extra hard use will have the following letters written on the outside: S, ST, SO, STO, SJ, SJO, SJT, SJTO, etc. Guidance/requirements for extension cord use can be found in OSHA 29 CFR 1926.405 (a)(ii)(J) or the National Electrical Code (NEC), Table 400-4.

A barrier will be erected around the elevated temperature cells with signage indicating that beneath the insulation, a surface of approximately 200 - 300°C exists. In addition, there is a remote chance of power leaking to ground through the metal can. Therefore, before any work is conducted on the test cells, the heaters will be de-energized.

Heavy lifting, hand loading of fill material and drip shields into test cells: Coarse gravel (washed gravel) and sand will be hand loaded into the columns. Personnel hand loading the test cells with material and instruments should follow the safe handling and lift practices as outlined below:

Approach the load and size it up (i.e., weight, size, and shape). Consider your physical ability to handle the load. Consider using two people.

Place the feet close to the object to be lifted, 8 to 12 inches apart for good balance. Whenever possible, have the container being lifted at least 12 inches from the ground, this will ease the strain on your back.

Bend the knees to the degree that is comfortable and get a good handhold. Then using both legs and back muscles lift the load straight up smoothly and evenly. Pushing with your legs, keep load as close to your body as possible.

Lift the object into carrying position, making no turning or twisting movements until the lift is completed. Turn your body with changes of foot position after looking over your path of travel making sure it is clear of tripping hazards.

Putting the load down is just as important as picking it up. Use both your legs and back muscles to comfortably lower the load by bending your knees. Once the load is secure release your grip.

Jewelry, rings, and loose clothing should not be worn by employees during material handling operations.

Filling of columns with gravel, sand, and invert materials: The process of filling the columns with gravel by scientific personnel "could" produce a small amount of respirable dust containing crystalline silica.

Filling the columns with gravel should only be conducted according to the Work Practices as outlined in Section 5.2 of the **M&O Safety and Health Procedure PRO-SH-014, "Silica Protection Program"**. PRO-SH-014 requires line managers and supervisors to implement effective engineering and/or administrative controls and work practices to control exposure to the respirable silica dust.

The M&O Silica Protection Program requires employees to attend a training course on the hazards and control measures for Silica exposure. PRO-SH-014 recommends that workers exposed to high dust level work areas receive a chest x-ray and "uniforms" to wear. In addition, as part of this program employees may be required to wear a respirator as a secondary line of defense.

Therefore the following engineering, administrative, Personal Protective Equipment (PPE), and work process control measures are recommended during the process of filling the columns:

Engineering Controls:

To minimize silica dust generation the gravel being loaded into the columns will be processed off site and arrive pre-crushed, screened, and washed.

Administrative Controls:

Personnel loading the gravel into the columns have received Silica Awareness Training which meets the specific hazard communication training requirements. In addition, personnel will practice good personal/work hygiene (i.e., wash hands after handling gravel during loading operation, no eating, drinking, smoking), and document the specific control measures as part of a "tool box safety meeting" that will be conducted before the canisters are loaded.

Personal Protective Equipment:

Personnel conducting the canister gravel loading operation will wear, at a minimum the following PPE:

NIOSH/MSHA approved ½ mask HEPA filtered respirator.

Cloth work gloves.

Safety Glasses.

EBS personnel are reminded that guidance for respiratory protection can be found in the **M&O Safety & Health Procedure PRO-SH-009 "Respiratory Protection Program"**. Supervisors and employees wearing respirators have several specific responsibilities/ actions under this procedure. Employees must have completed a physical examination within the past year and have no facial hair that interferes with the sealing surface of the respirator. **M&O Safety & Health Procedure PRO-SH-007, "Medical Surveillance Program"** describes how M&O employees can arrange for physical examinations, on Site through BN Medical. To schedule physical examinations call 5-2957.

Respiratory equipment, fit testing, and training for M&O Project and Scientific Characterization Personnel is being supplied by M&O Industrial Hygiene. Contact the Industrial Hygiene Supervisor (day shift only) in Trailer #5 on the ESF Pad (5-7447) for respirator fit testing, equipment issue, and training support.

Occupying rodent and/or insect infested buildings, trailers or, work areas:

Hantavirus: An outbreak of a potentially fatal illness has occurred in the Southwest, primarily in New Mexico and Arizona, although several cases have been reported in Central Nevada.

The cause of the illness has been identified by the Center for Disease Control (CDC) as the Hantavirus. Rodents such as pocket mice, deer mice, canyon mice, and kangaroo rats are the primary carriers of the virus.

As a precaution, all scientific personnel at EBS locations should be aware of the possibility of exposure to the Hantavirus and follow this advice:

- Avoid human contact with rodents, rodent droppings, and rodent nesting materials. Infected rodents carry the virus in saliva, urine, and feces.

- The virus can infect humans through breathing the dust of dried out rodent feces and urine, and/or contact with rodent feces/urine through skin that is cut, dried, or broken. Avoid breathing the dust from rodent infested areas, avoid skin contact with rodent infested areas.
- If a facility or job site in which scientific personnel are working has visible signs of "heavy" rodent infestations (i.e., rodent excreta, and/or rodent nests), the rodents should be trapped/removed and the facility cleaned and disinfected.
- Scientific personnel should make no attempt to remove or clean-up rodent infested areas. BN Industrial Hygiene personnel have trained craft support personnel in pest control techniques, and they have the expertise, equipment, and supplies to trap and clean-up heavy infestations.

Insects: Work areas that have signs of insect infestations should be sprayed with pesticides to eliminate the insects. These operations will need to be treated by trained personnel wearing PPE.

Scientific personnel should contact M. Taylor (5-3647) who will coordinate with BN Industrial Hygiene personnel for the services of "craft personnel" at the Atlas Facility.

Working with flammable, combustible, & other sources of ignition: The likelihood of a fire at facility where the EBS columns tests are located is remote, however scientific characterization personnel should be aware of the following:

YMP personnel conducting testing at the facility should have received incipient stage fire extinguisher training as part of their General Education Training (GET). Employees are reminded to evacuate the building and pull the fire alarm (or call 911) any time they encounter a fire that cannot be contained past the incipient stage. In addition, the "craft personnel" at the Atlas Facility are trained in the use of this equipment.

The facility itself will be equipped with fire extinguishers, EBS personnel should know their locations. Follow the direction of the BN craft support personnel and/or the local Fire Department in the event of a fire emergency.

Spills or leaks of flammable or combustible materials being used at the facility should be reported immediately to the BN craft support personnel and their supervisors.

Working with hand tools, drilling holes: The following are general requirements governing the use of hand tools by EBS personnel:

All hand tools operated by EBS personnel must be done in accordance with the manufacturer's instructions.

A "tool box safety meeting" should be held with EBS personnel covering the safe operation of hand tools before they are used.

Each employer is responsible for the safe condition of the tools and equipment used by employees, including tools and equipment that are furnished by employees. EBS personnel should inspect tools and equipment before each use

to ensure safe operation. Tools with broken components or damaged wiring should be removed from service.

Hand-held electrical tools (i.e., hand drills) must be equipped with a "dead man" or "quick release" control, so that power is shut off automatically whenever the operator releases the control.

All hand-held portable electrical equipment must either be double-insulated and identified as such and if used near water or wet surfaces, be plugged into a GFCI Outlet.

Working on Fridays and weekends: YMP vehicles will be utilized for many of the EBS activities during the work-week, on Fridays and even weekends. Since the Atlas Facility is across town, managers and supervisors are reminded that Nevada State Law requires drivers and passengers to wear seat belts. In addition, the DOE requires all occupants to wear seat belts in government vehicles. Drivers of vehicles are responsible for ensuring that passengers wear their seat belts.

In the Las Vegas Valley, call 911 to report any kind of vehicle or other (i.e., medical) emergency. In addition, YMP Ranch Control also has to be notified. Vehicle accidents and injuries reporting shall adhere to the **M&O Safety and Health Procedure PRO-SH-001 "Accidental Investigation, Reporting, and Record Keeping"**.

Scientific personnel conducting EBS activities at the Atlas Facility on Fridays or weekends, should be informed that prior authorization and approval from the TCO is required.

Scientific program managers performing work at the Atlas Facility should be aware that for weekend work a "Safety and Emergency Procedure Description Plan" must be completed by the TCO. The "Safety and Emergency Procedure Description and Plan" lists participants and emergency contacts and is distributed by the TCO to BN facility management and BN S&H.

4.0 ROLES AND RESPONSIBILITIES - SAFETY AND HEALTH

4.1 **Safety and Health Roles and Responsibilities:** The M&O is in charge of the YMP and has the responsibility for S&H for all teammate organizations, employees, visitors, and personnel from other organizations when they are on M&O controlled worksites. Clear roles and lines of responsibility, authority, and accountability are established at all levels of the organization to ensure protection of workers, the public, the environment, and property.

Therefore in order to fully implement the principles of ISM, the M&O has appointed a Person-In-Charge (PIC) for the work area or location where construction (testing support) and/or scientific testing activities are being conducted. (A description of the PIC's roles and responsibilities is provided below).

BN and the TCO will discuss the daily construction (testing support) and/or scientific testing activities scheduled to be conducted and appoint a PIC for each specific work area or location from their line management and supervision staff. Depending on each specific work activity i.e., construction/testing support or

scientific, the PIC may be any individual from BN, TCO, or a scientific testing organization. The PIC will be identified in the Toolbox Safety Meeting prior to the start of daily activities.

4.2 Specific Group and Individual Safety and Health Roles and Responsibilities: The following groups and individuals are responsible for:

BN: BN will be the craft labor support organization. BN will provide a management interface between the TCO and craft labor support organizations through Work Instructions. BN will provide craft labor and equipment to facilitate testing activities as requested by the PIs and coordinated by the TCO. BN has S&H responsibility for all employees inside the Atlas Facility. BN is responsible for maintaining the Atlas Facility in a safe and healthful condition, for maintaining mobile and stationary equipment, some S&H training (i.e., training in the safe operation of some pieces of equipment). This organization is responsible for conducting work in accordance with the OSHA, 29 CFR, 1910 "General Industry Standard", DOE S&H Orders and their own organizations', regulations, procedures and programs.

TCO: TCO is responsible for jointly, selecting the PIC with BN and the PI organizations. The TCO is responsible for scientific testing activities at the site. The TCO is responsible for the implementation of the requirements of this FWP and for coordinating all scientific testing activities/requirements with construction/testing support activities. The TCO and other scientific organizations are responsible for the S&H of their employees and conducting scientific testing activities in compliance with the M&O Safety and Health Plan and M&O S&H policy and procedures.

Line Managers and Supervisors: M&O line management and supervision is responsible and accountable for the protection of workers, the public, the environment, and property. M&O Line managers and supervisors are responsible for evaluating their work operations, activities, or processes that present new or unusual hazards, then conducting and documenting a JSA. A JSA is a structured, step-wise method to identify discrete tasks in a job, recognize the hazard(s) involved in each task, and specify mitigations to eliminate or reduce the hazard(s) to an acceptable level (i.e., engineering, administrative, or PPE controls, employee S&H training). All JSA must be conducted and documented in accordance with M&O Safety & Health Procedure PRO-SH-011, "Conducting a Job Safety Analysis". All JSA must be reviewed and approved by the M&O S&H. Contact the TCO ES&H Specialist for assistance in determining which scientific characterization activities require JSA. Once the JSA has been produced, reviewed, and approved, it will be used as a task guide for employee training purposes, and this training will be documented.

M&O Employees: M&O employees (once they have been trained and understand the requirements), regardless of their employer, are responsible for understanding and following the requirements of the ES&H programs of their employer and specific YMP ES&H programs i.e., Occupational Respiratory Protection, Noise Control, Hearing Conservation, and PPE. Individual M&O employees are responsible for ensuring that the ES&H training they have received is followed and implemented, regardless of whether the training was received from their parent organization or on the YMP. M&O employees are responsible for knowing the identity of the PIC in their specific work area or location. M&O employees are responsible for immediately notifying the PIC and

then their M&O organization supervisor of unsafe acts, conditions, and/or equipment.

Person-In-Charge (PIC): The PIC is responsible for ensuring the specific work (construction/testing support or scientific testing) activity is conducted in accordance with M&O established S&H procedures. The PIC is responsible for ensuring that the Toolbox Safety Meeting is conducted at the beginning of each shift, on a daily basis. A PIC shall be present in the specific work area during all construction/testing support or scientific testing activity, operation, or process. The PIC will determine if the workers present have the experience, knowledge, skills, and abilities needed to perform their work safely and competently. The PIC will be a point of contact for all visitors to the specific work area; i.e., all workers in the specific work area should be able to immediately identify the PIC. If the PIC needs to leave his/her assigned specific work area, a new PIC will be selected and the change will be communicated to all individual workers in the specific work area. If an issue arises, the PIC will be responsible for notifying the appropriate manager(s) within the EBS Operations Office, BN, and the TCO and serve as the focal point of contact for issue resolution.

4.3 Written Safety and Health Roles and Responsibilities - TCO ES&H Review

The ES&H Review is an attachment to this FWP and contains both a PHA and a section recommending control measures for all identified hazards. The ES&H Review is specific to the construction/testing support and scientific testing activities found in this FWP. Each organization's line management and supervision shall read the ES&H Review and use it as both guidelines and minimum requirements for informing, educating, and implementing protective measures, i.e., engineering, administrative, PPE controls, training to a JSA, or environmental conditions, for the identified hazards. A JSA may be assigned by the TCO to be generated by another organization and will be incorporated in the work described in this FWP. A copy of the ES&H review will be available at the ESF TCO field office, the Las Vegas Office, and will be available to test organizations working on the YMP.

M&O Teammate organizations and employees will still perform work that is authorized by their respective FWPs, work plans, work instructions, and/or work procedures. Teammate organizations perform their work as an "integrated group" to the environmental, safety, and health policies and procedures as set forth by the M&O.

M&O Teammate organizations and employees will continue to conduct construction/testing support and scientific testing work on the YMP through the umbrella of the M&O Safety and Health Plan and the listed Environmental plans that can be found in the FWP.

The "M&O Safety and Health Plan" (B00000000-01717-4600-00016), establishes implementing guidance and requirements through S&H procedures.

5.0 EMPLOYEE TRAINING

Personnel requiring access to the facility, must have a DOE badge and have completed or be escorted by an individual with GET, First Aid, and CPR Training. This training is available through the M&O training department.

PPE is required for all persons entering any Engineered Barrier systems testing locations (i.e., steel toed shoes [if working]), approved (ANSIZ87) safety glasses, and/or hearing protection (plugs or muffs). Casual dress (i.e., no shirt) shorts, "tank tops," "cut-offs" and/or sandals are not allowed at the facility. Work shirts (short sleeve or long sleeve), long pants are the normal attire. M&O Safety and Health Department Procedure PRO-SH-002 "Procurement of Required Personal Protective Equipment" describes how M&O employees go about obtaining prescription safety glasses and approved footwear through the M&O purchasing system.

5.1 OTHER TRAINING

All personnel entering the EBS site should attend the shift toolbox briefing that is held at the beginning of each shift. If you cannot attend this meeting, ask a TCO representative for support conditions at the site/location before work. This is to ensure compliance with applicable OSHA Standards.

6.0 EMERGENCY RESOURCES LOCATION AND CONTACTS

6.1 EMERGENCY REPORTING

M&O Safety and Health Procedure PRO-SH-005, "Emergency Management", was developed for supervisors who have responsibilities for a facility or worksite. In an emergency, Telephone 911.

6.2 NTS RADIO NET

The NTS Radio Net (Station 900) is manned 24 hours a day, everyday of the year. If your vehicle is equipped with a DOE Radio Net System, assistance can be gained by "Keying" the microphone and calling out "Mayday, Mayday, Mayday", then give name and net number. After contact is made, you will also have to give the details of assistance required.

6.3 NEAREST HOSPITAL OR CLINIC

Nearest hospital is North Las Vegas Hospital (approximately 5 miles). Nearest medical personnel are ParaMedics, and are available by calling 911 (ParaMedics are located at the North Las Vegas Fire Station #1, approximately 4 miles). In addition, NTS ParaMedics can be reached on any NTS Radio Net, through Station 900. A clinic is available in Building C-1 of the DOE complex.

6.4 NEAREST FIRST AID KIT/EYE WASH STATION

First aid kits and eye wash stations are located within the EBS testing area at the Atlas Facility.

6.5 SUGGESTED EMERGENCY EVACUATION ROUTE AND MEETING AREA(S)

Situations may occur at the facility that will require immediate evacuation of the operation. These situations may include, but are not limited to, fire

and equipment accidents. If such situations occur, follow the directions given on the emergency evacuation signs that are posted throughout the Atlas Facility.

7.0 EBS COORDINATION PERSONNEL AND PHONE NUMBERS

Hemi Kalia	295-4339
Douglas Weaver	295-5916
Mike Taylor, ES&H Specialist	295-3647
Roy Johnston	295-0236